

BHP

Mining Area C Fauna Management Plan

**February 2025
Version 2.3**

Document Amendment Record

Version	Page number	Description of Version	Key changes	Date
BEMP Version 5	All	Submitted on the 20 May 2018 to meet the requirements of MS1072 Condition 7	Updates BEMP with MS1072 Condition 7.	May 2018
Rev 0	All	New standalone document for MS1072 Condition 7. Updated in response to comments from DWER and DBCA (Ref DWERA-001051 and February 2020 review).	BHP has defined 'disturbance' and included this in the assumptions section of Table 3 and the definitions section of the plan. Triggers and Thresholds for both parts of the condition revised. Early indicators have been developed for condition 7-1(1) and 7-1(2). (See Table 5). Additional management responses have been included for each part of the condition. Further detail added to Table 3 'Rationale for Components'. Additional High Value Caves have been included in the monitoring program. The monitoring program has been adequately described in Table 4. Wording has been amended to consistently refer to the terms used in the MS e.g. 'Retained High Value Ghost Bat Caves' and 'High Value Ghost Bat Caves'. Maps have been developed for the caves, to show the buffer and trigger areas.	Feb 2020
Rev 1	All	Updated in response to comments on Rev 0 from DWER and DBCA (Ref April 2020 review)	Early Response Indicators, Triggers and Thresholds in Table 5 relating to the Population Outcome (Condition 7-1(1)) have been revised in the Fauna Management Plan (FMP). Reference sites are no longer included in the trigger or threshold criteria. Further information and specific report references have been added to Table 3 'Rationale for Components'. Map provided to show potential reference sites (Figure 5). Further detail on monitoring methods, frequency and locations are provided in Tables 4 and 5. Appendix 1 has been added to provide clarity on the location and value of retained and impacted caves. Appendix 2 has been added to support the choice and timeframes of metrics used for the indicator, trigger and threshold criteria. Cave AC32 has been removed from the monitoring program and previous Figure 2 amended. Table 4 has been updated to provide more specific detail for cave morphology mapping, vibration and	Aug 2020

Version	Page number	Description of Version	Key changes	Date
			sound monitoring, the location of humidity and temperature logging equipment.	
Rev 1.1	Pages: 19-21 (Table 4), 23-25 (Table 5), 26 (Figure 4), 36 (Section 3.2) 43 (Appendix)	Updated in response to comments on Rev 1 from DWER and DBCA (Ref Nov 2020 review).	Footnote added to Tables 4 and 5 to clarify Cave AC18 is currently unavailable for monitoring due to safety concerns from proximity to third party mining but monitoring to resume when safe access is re-established. Caves AC3, AC4, SF1, SF2 and SF17 removed from Table 5, Figure 4 and Appendix 1 to align with the rationale for monitoring site selection in Table 3 and align with the monitoring locations throughout the document.	Dec 2020
Rev 2.0	All	Administrative update to align with Ministerial Statement 1126 and EPA (2021) <i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans.</i>	Restructured/updated to align with EPA's revised October 2021 EMP Instructions and requirements of the current Ministerial Statements. Addition of recordings and observations to monitoring techniques for measuring Ghost Bat presence within the Development Envelope. Environmental Criteria to focus on the presence of Ghost Bats at caves within the Development Envelope rather than their absence. Environmental Criteria to include all caves with history of Ghost Bat utilisation, not just High Value Ghost Bat Caves. Change in scat monitoring frequency from every second month to quarterly, excluding the breeding season (October to December). Increase in the assessment period for Environmental Criteria to remove seasonal variation and to reflect trends of the generation length of a Ghost Bat.	August 2022
Rev 2.1	All	Updated in response to comments on Rev 2 from DWER and DBCA (Ref 2 February 2023 review).	Data has been updated throughout based on the latest data obtained from consultants. Validation of data has resulted in some changes to Environmental Criteria. Appendix 1B has been added to include the number of scats collected for genetic and hormone analysis. Retain bimonthly scat monitoring frequency. Revision of Environmental Criteria assessment periods.	March 2023
Rev 2.2	All	Updated in response to comments on Rev 2 from DWER (9 May 2024)	Caves have been categorised to align with Bat Call WA (2021) guidance. Further definition has been provided for the compliance criteria. Contextual caves have been added to the FMP. BHP research findings have been added to the FMP.	November 2024
Rev 2.3	All	Updated to include the MAC-SF significant amendment.	Inclusion of MAC-SF significant amendment Proposal	February 2025

Abbreviations and Definitions

Term	Meaning
BHP	BHP Billiton Iron Ore Pty Ltd, as manager and agent for and on behalf of the Mount Goldsworthy Mining Associates Joint Venture
Category 1*	Maternity/diurnal roost sites with permanent ghost bat occupancy
Category 2*	Maternity/diurnal roost caves with regular occupancy
Category 3*	Diurnal roost caves with occasional occupancy
Category 4*	Nocturnal roost caves with opportunistic usage
CAR	Compliance Assessment Report
Census Population	Total number of unique individuals
CEO	Chief Executive Officer
Disturbance	Disturbance to the cave is considered as a change or alteration to the cave that renders it unsuitable as a Ghost Bat cave.
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
Effective Population	The theoretical estimate of the number of breeding individuals that could contribute to a population with the observed genetic diversity.
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986</i>
FMP	Fauna Management Plan
High Value Ghost Bat Cave	A cave that is a feeding roost/ potential day roost, day roost, potential maternity roost or confirmed maternity roost to Ghost Bats.
Low Value Ghost Bat Cave	A cave that has previously been assessed as a feeding roost or which shows no signs of usage by Ghost Bats.
MAC mine	The Northern Flank orebody within the Mining Area C operation.
Mining Area C	The Northern Flank and Southern Flank orebodies that are approved under Part IV of the <i>Environmental Protection Act 1986</i> under MS 1072 which form the scope of this EMP.
MS	Ministerial Statement
Mtpa	Million tonnes per annum
OSA	Overburden Storage Area
PEAHR	Project Environmental Aboriginal Heritage Review

Term	Meaning
Retained High Value Ghost Bat Cave	As defined in MS1072, Attachment 1, Figure 2
Sibship	A group of offspring of the same parents
South Flank mine	The Southern Flank orebody within the Mining Area C operation.

* cave categorisation defined in Bat Call WA 2021

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Summary

Mining Area C Fauna Management Plan	
Proposal title	Mining Area C
Proponent name	BHP Iron Ore Pty Ltd
Ministerial Statement	1072
Purpose of the EMP	To meet the requirements of implementation Condition 7 of Ministerial Statement 1072.
Key Environmental Factor and Objectives	Terrestrial Fauna – <i>To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.</i>
Conditions	Condition 7 Ghost Bat Environmental Management Plan
Key components in the EMP	<p>Outcome-based components to achieve the following:</p> <ul style="list-style-type: none"> • maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope; and • no disturbance of the eleven (11) Retained High Value Ghost Bat Caves.
Proposed construction date	Not applicable – under construction
EMP required pre	No

1 Context, scope and rationale

BHP Iron Ore Pty Ltd (BHP) has updated this Mining Area C Fauna Management Plan (FMP) to meet the requirements under Part IV of the *Environmental Protection Act 1986* (WA) (EP Act) for the Central Pilbara Hub Surplus Water Stage 1 Proposal (this Proposal). BHP aims to refer this Proposal to the Environmental Protection Authority (EPA) as a Significant Amendment to the existing Mining Area C - South Flank (MAC-SF) mine hub, approved under Ministerial Statement (MS) 1072 (Approved Proposal). This Proposal and the Approved Proposal are collectively referred to as the Combined Proposal in this document.

The initial FMP (v1.1; BHP 2020) was prepared to meet the requirements of Condition 7 of Ministerial Statement (MS) 1072 issued under Part IV of the EP Act. The intent is to implement this updated FMP (v2.3) in place of the initial FMP (v1.1) to continue to meet the requirements of MS1072 Condition 7, and the anticipated updated implementation conditions of this Proposal, for potential impacts to Ghost Bat (*Macroderma gigas*), listed as Vulnerable under the *Biodiversity Conservation Act 2016* and the *Environment Protection and Biodiversity Conservation Act 1999*.

BHP has prepared this environmental management plan (EMP) in accordance with the *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (hereafter, the Instructions; EPA 2024).

1.1 Approved Proposal

The Approved Proposal is located primarily on Mineral Lease ML281SA, approximately 100 kilometres (km) northwest of Newman (Figure 1). The Approved Proposal includes the Packsaddle, Northern Flank and South Flank deposits (Figure 2). The South Flank ore body is located approximately 8 km south of the original MAC (Northern Flank) development (Figure 2).

In accordance with MS1072, BHP is approved to extract a total of approximately 150 million tonnes per annum (Mtpa) from the MAC-SF mine hub. Activities within the MAC-SF mine hub comprises above water table mining through conventional open-cut mining methods, as well as the abstraction of groundwater to allow mining below the groundwater table (dewatering).

The key components of the Approved Proposal are:

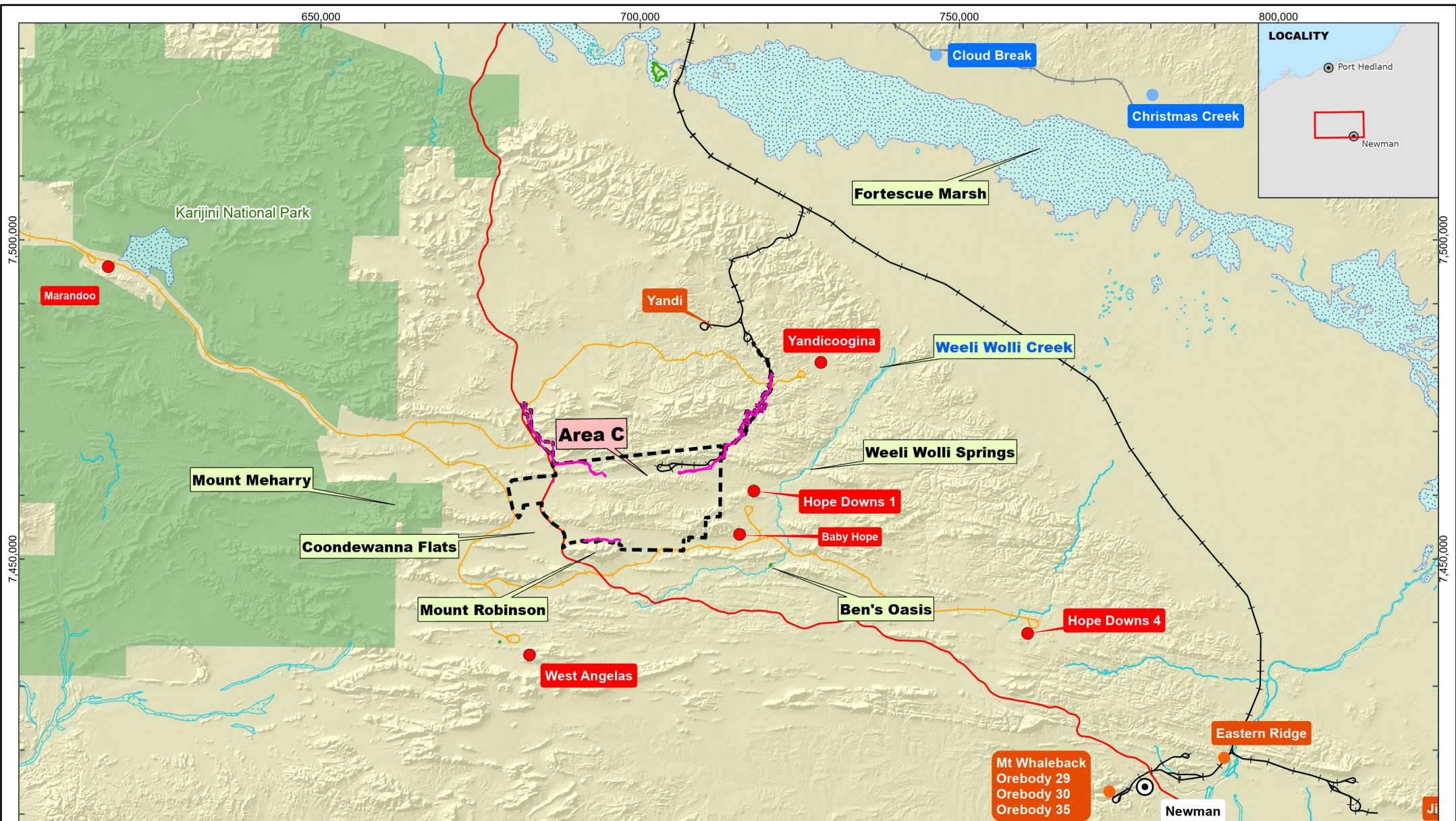
- open-cut mining and overburden storage areas (OSAs) at the MAC pits and South Flank satellite orebody
- primary crushing of ore at the South Flank satellite orebody
- transportation of ore mined at South Flank via overland conveyor to stockpiles and ore handling facilities located at MAC-SF
- dewatering of the satellite orebody aquifers and the preferential use of the water for operational purposes, with surplus water disposal options
- mobile equipment maintenance precinct. The maintenance precinct includes a warehouse delivery and laydown area, tyre storage and exchange facility, wastewater tanks, maintenance workshop, wash-down facility and parking
- South Flank ammonium nitrate products facility
- access and haul roads
- mine closure (including potential formation of pit lakes in the South Flank pits).

1.2 Proposal

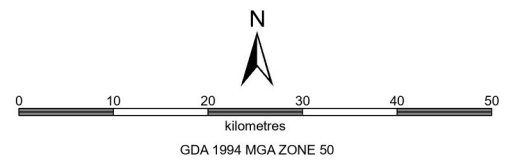
The Proposal is a Significant Amendment to the Approved Proposal mine project and comprises:

- increase in dewatering from 100 ML/d (37.3 GL/a) to 180 ML/d (65.7 GL/a) to allow below water table (BWT) mining
- increase in surplus water management from 34.84 GL/a to 56.21 GL/a
- installation of dewatering and surplus water infrastructure; including bores and pipelines
- additional clearing of 1,076 ha of native vegetation for pipelines and associated infrastructure
- installation of communication towers to support mine operation
- installation of additional surface water management structures, including diversions (including Grand Central Overburden Storage Area [GCOSA] Diversion), bunds and floodways at South Flank to protect OSAs.

The Proposal includes additional clearing of up to 1,076 ha of native vegetation and associated fauna habitats, including clearing up to 808 ha of critical foraging and dispersal habitat for the Ghost Bat within the Indicative Footprint. There are no Ghost Bat caves present within the Indicative Footprint (Figure 3), and no additional direct impacts to Ghost Bats greater than those currently being managed under MS1072 will occur due to the Combined Proposal.



- ⊙ Town
- BHP Billiton
- Fortescue Metals Group
- Rio Tinto
- Roy Hill Holdings
- Great Northern Highway
- BHP Billiton Rail
- FMG Rail
- Rio Tinto Rail
- Watercourse
- - - Significant Amendment Development Envelope
- ▭ Significant Amendment Indicative Footprint
- ▨ Priority Ecological Community
- ▨ Watercourse Areas - Non-perennial
- ▨ Land Subject To Inundation
- ▨ Karijini National Park



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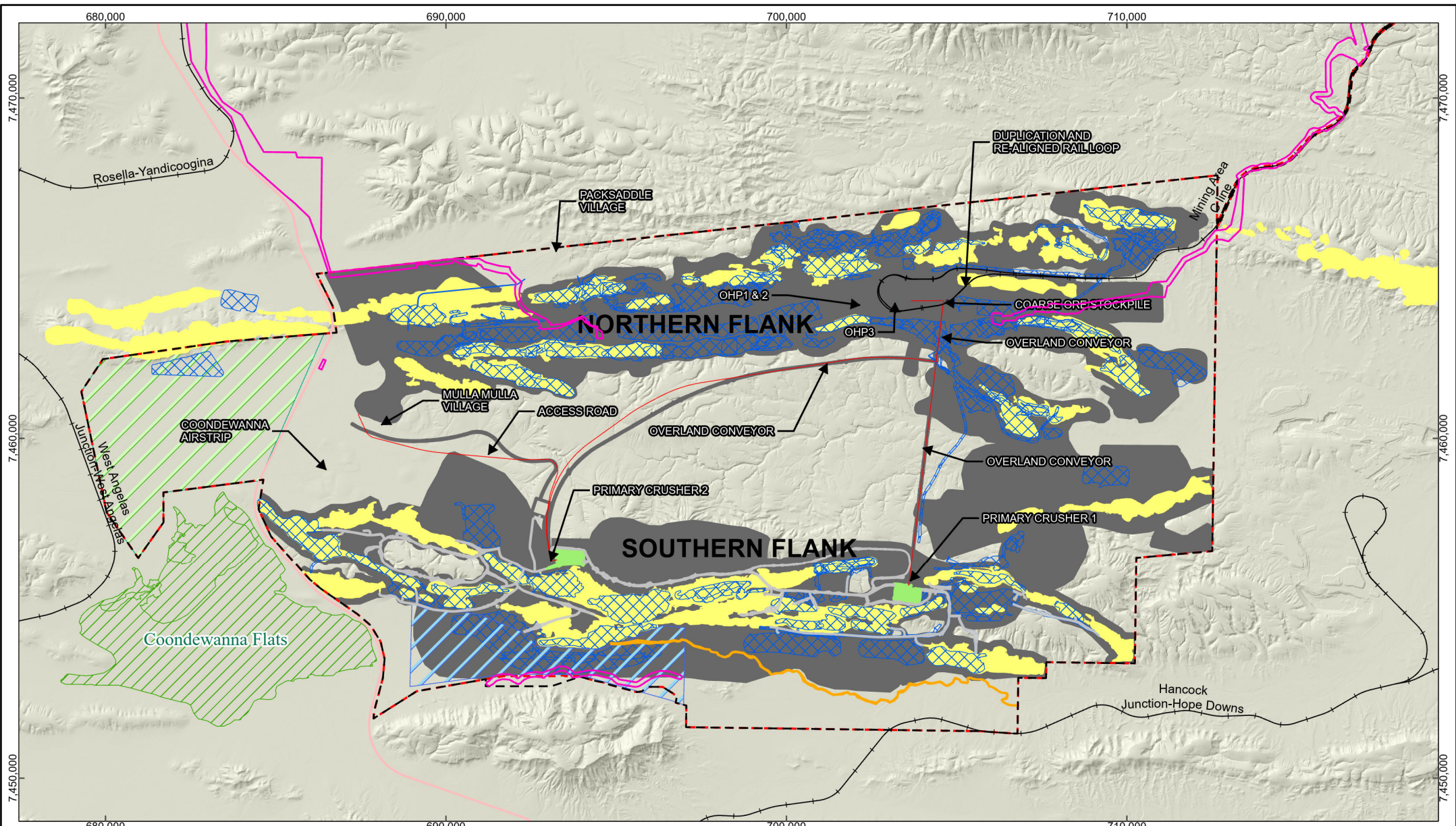
**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
MINING AREA C LOCATION**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

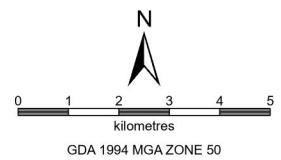
SCALE @ A4: 1:800,000 PREPARED: GEOMATICS FIGURE: 1

DATE: 27/11/2024 REQUESTOR: ENV APPROVALS

NO: A1285_065_RevA



- Great Northern Highway
- Existing Rail
- Significant Amendment Development Envelope
- Significant Amendment Indicative Footprint
- MS1072 Indicative Disturbance Area
- Pebble Mouse Creek discharge
- MAR - Southern Flank Valley
- MAR - Juna Downs
- Priority Ecological Community
- Indicative Layout**
- Southern Flank Haul Road
- Southern Flank ROM Pad
- Southern Flank Infrastructure
- Overburden Storage
- Pit Outlines



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**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
MINING AREA C OVERVIEW**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:150,000 PREPARED: GEOMATICS FIGURE: 2
 DATE: 2/12/2024 REQUESTOR: ENV APPROVALS

1.3 Key environmental factors

The key environmental factor relevant to this FMP is Terrestrial Fauna. Table 1 describes the relevant values, operational activities and actual or potential impacts on Terrestrial Fauna addressed by this EMP.

Table 1: Key environmental factor, values, activities and actual or potential impacts

Key environmental factor	Environmental values	Activities	Actual/Potential Impacts
Terrestrial Fauna	Ghost Bat (<i>Macroderma gigas</i>) individuals and habitat	Clearing of native vegetation and excavation for mining activities	<p>Direct impacts</p> <p>Loss of Ghost Bat caves from direct disturbance (13 High Value Ghost Bat Caves and 23 Low Value Ghost Bat Caves) (Figure 3; Appendix 1)</p> <p>Loss of up to 17,679 ha of Ghost Bat foraging habitat¹</p> <p>Indirect impacts</p> <p>Behavioral changes or disturbance response in Ghost Bat individuals (i.e., variation in seasonal distribution of local populations)</p>
		Vibration and sound from mining activities, heavy vehicle movements and blasting activities	<p>Direct impacts</p> <p>Loss or modification of Ghost Bat caves from structural change</p> <p>Indirect Impacts</p> <p>Behavioral changes or disturbance response in Ghost Bat individuals (i.e., variation in seasonal distribution of local populations)</p>
		Light for infrastructure and mining areas	<p>Indirect impacts</p> <p>Behavioral changes or disturbance response in Ghost Bat individuals</p> <p>Changes in prey behaviour resulting in a shift in Ghost Bat foraging behaviours</p>
		Dust from mining activities and open areas	<p>Indirect impacts</p> <p>Impact to vision from high dust levels</p> <p>Foraging habitat modification due to degradation of vegetation</p>
		Use of barbed wire for fencing	<p>Direct impacts</p> <p>Ghost Bats are known to become entangled in barbed wire fencing used for infrastructure and mining areas due to their low elevation flying pattern</p> <p>Indirect impacts</p> <p>Ghost Bats may become entangled in pastoral barbed wire fencing</p>

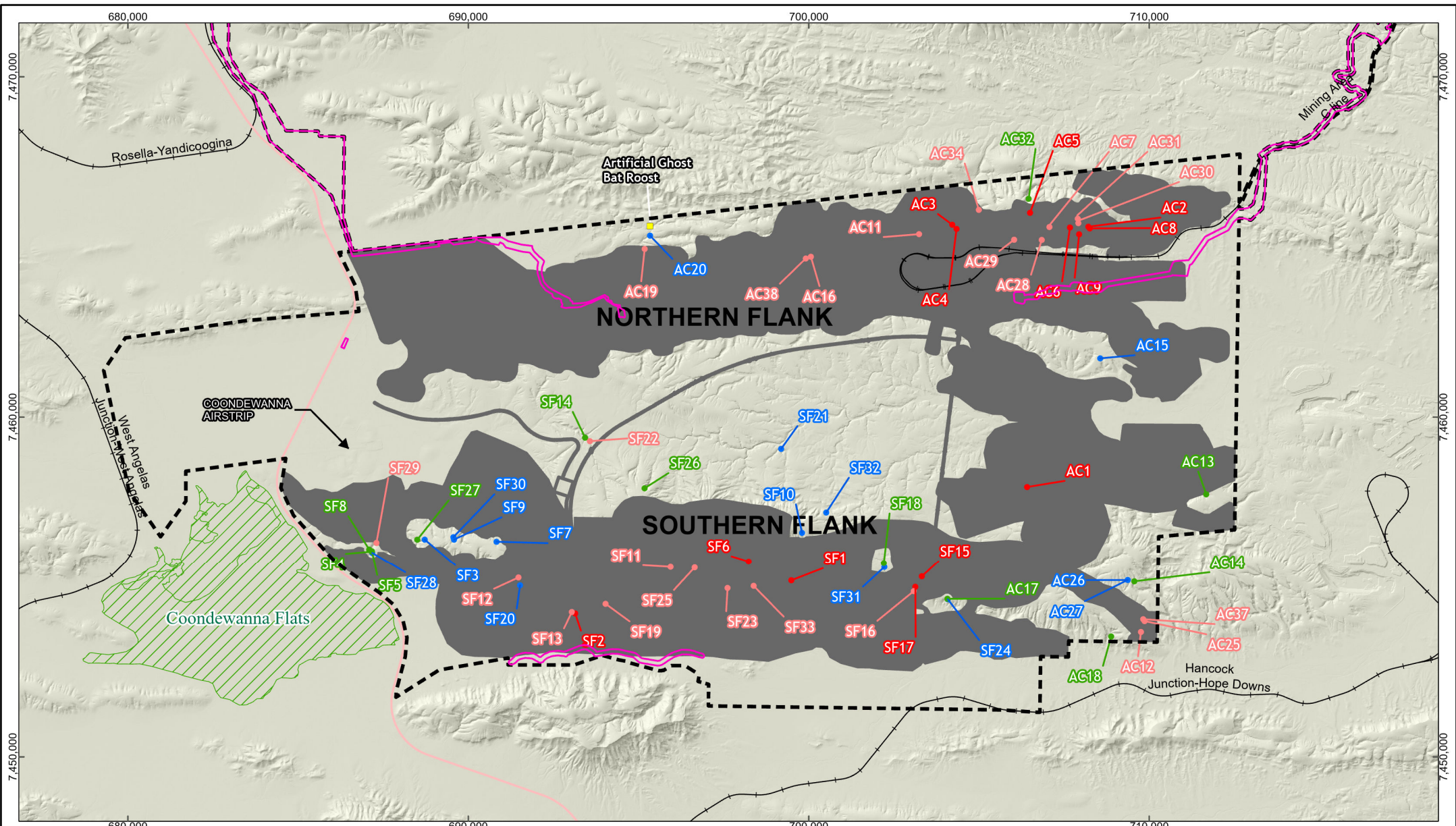
¹Loss of foraging habitat is not covered in the scope of this EMP.

1.4 Condition requirements

The condition requirements of Condition 7 (Ghost Bat Environmental Management Plan) are outlined in Table 2 below.

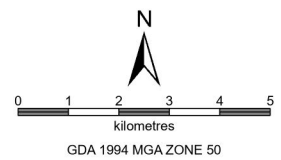
Table 2: MS1072 – Condition 7 requirements

Condition sub-clause	Ghost Bat Environmental Management Plan Condition	Sections which address this Condition
7-1	<p>The proponent shall prepare and submit an Environmental Management Plan (the Plan), on the advice of the Department of Biodiversity, Conservation and Attractions, that demonstrates how the proponent will achieve the following environmental outcomes:</p> <ol style="list-style-type: none"> 1) maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope as defined in Figure 1 of Schedule 1. 2) no disturbance of the eleven (11) Retained High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1. 	<p>Section 1.5.2 (Table 3 and Table 4)</p> <p>Section 2.0 (Table 5)</p>
7-2	The Plan shall specify Outcome/s, Trigger Criteria, Threshold Criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcomes in condition 7-1 will be met.	Section 2.0 (Table 5)
7-3	The Plan shall include the monitoring of High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1, including day roosts and any artificial roosts.	<p>Section 1.5.2 (Table 4)</p> <p>Section 2.0 (Table 5)</p>
7-4	The Plan shall be prepared in accordance with the EPA's <i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> , or any guideline published by the EPA which amends or replaces this document from time to time.	Section 1.0
7-5	The proponent shall submit the Plan to the CEO within three (3) months of the date of this Statement, or as otherwise agreed by the CEO.	Section 1.0
7-6	The proponent shall implement the most recent version of the Plan approved by the CEO.	Not applicable
7-7	In the event of exceedance of threshold criteria, the proponent shall meet the requirements in condition 3 (Compliance Reporting) and shall implement the measures outlined in the Plan, including, but not limited to, actions and investigations to be undertaken, and reporting to the CEO.	Section 2.0 (Table 5)
7-8	Any changes to Trigger Criteria, Threshold Criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions or Reporting in the Plan must be approved by the CEO in writing.	Not applicable
7-9	Within five (5) years from the date of this Statement, the proponent shall provide a report to the CEO that details how research undertaken by the proponent on Ghost Bat populations demonstrates that the outcomes in condition 7-1 will be met.	Section 1.5.2 and Appendix 2



- Significant Amendment Development Envelope
- Significant Amendment Indicative Footprint
- MS1072 Indicative Disturbance Area
- Priority Ecological Community
- Great Northern Highway
- Existing Rail

- High value Ghost bat caves to be retained (12)
- Low value Ghost bat caves to be retained (15)
- High value Ghost bat caves to be impacted (13)
- Low value Ghost bat caves to be impacted (23)
- Artificial Ghost Bat Roost (1)



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**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
GHOST BAT CAVES**

WAI0 PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:150,000 PREPARED: GEOMATICS FIGURE: 3

DATE: 27/11/2024 REQUESTOR: ENV APPROVALS

1.5 Rationale and approach

1.5.1 Management approach

BHP applied a risk-based approach to identify and prioritise components in this EMP. The purpose of the components is to mitigate impacts on the environmental values in Table 1. In developing the components, BHP has used available scientific information from recent investigations and studies, and has applied learnings from the management of Terrestrial Fauna at other mine sites in the Pilbara.

At a Global and Asset level, BHP has a number of applications, procedures and governance processes to assist with planning and implementing requirements associated with our environmental legal obligations and other internal corporate environmental requirements. At a legislative level, all legal obligations from Western Australia Iron Ore (WAIO) environmental approvals and management plans are registered and maintained within an internal legal obligations register. The conditions and commitments contained within this database are then hard-wired to a business-wide system to allow for work management of tasks associated with implementing the obligation. This approach ensures that any activity or task associated with an obligation can be planned, scheduled, assigned, implemented, tracked and closed out effectively. Automated diagnostics, analysis and reporting is then available to demonstrate WAIO's compliance performance.

At the site level and prior to any disturbance activities, BHP applies the internal Project Environmental Aboriginal Heritage Review (PEAHR) approval process to ensure any obligations associated with environment, Aboriginal heritage and land tenure are implemented. All ground disturbance activities will be required to meet the requirements and outcomes of the PEAHR process. All applicable legislative and regulatory requirements and BHP's "Our Requirements" policies (that aligns with International Council on Mining and Metals Mining Principles) flow through to a PEAHR approval. The PEAHR process also provides a final verification mechanism whereby technical and professional advice can be sought to ensure any disturbance is managed effectively on the ground. The PEAHR system consists of an electronic workflow process linked to a geographical information system.

1.5.2 Research

BHP has completed a three-year study on the ecology of Ghost Bats in the Hamersley sub-region as part of *the Western Australian Iron Ore Ghost Bat Research Plan* (hereafter, the Research Plan) (BHP 2017a; BHP 2023). The overarching objective of this study, which was to provide key information on certain aspects of the Ghost Bat's ecology in the Pilbara that will inform on-ground management and thereby demonstrate that the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope will be maintained, was achieved (BHP 2023). Overall, monitoring techniques such as genotypes and elevated progesterone were successfully developed and applied to on-ground management of Ghost Bats residing within the Mining Area C Development Envelope (BHP 2023). Due to the limitations of the study, the objectives of the key areas of research were partially achieved. Details on what was achieved are described below:

- 1) No clear patterns in the spatial and temporal use of roosting habitat were determined for Ghost Bats in the eastern Hamersley. Rather, the use of roosting habitat is likely to be in response to multiple factors, including but not limited to climatic conditions, resource availability and anthropogenic disturbance.
- 2) Data collected to date suggests that Ghost Bats prefer to forage in Stony Plains, Drainage Area/ Floodplain and Hillcrest/ Hillslope habitats. Insufficient data has been collected to date to determine if any one area is more critical than another.
- 3) Key dispersal corridors in the eastern Hamersley have not yet been confirmed, however, habitat types have been mapped across BHP tenure (Appendix 3). Interconnecting preferred foraging habitat types would be assumed to provide dispersal corridors.

Data obtained from this research, including the collection, genetic analysis and hormone analysis of scats that were specifically obtained for Mining Area C, has been used to develop this EMP, including for rationale of provisions (Biologic 2017a; 2017b; 2020a; 2022). Summary data from these reports specific to the development of Early Response Indicators, Trigger Criteria and Threshold Criteria is presented in Appendix 2.

BHP has funded the Department of Biodiversity, Conservation and Attractions (DBCA) to undertake additional research to refine DNA genotyping techniques and investigate sex-linked markers which may enable the sex of a genotype to be inferred. This will assist in understanding the dispersal patterns of male and female Ghost Bats between caves at Mining Area C. In line with the recommendations outlined in the report (BHP 2023), BHP is also undertaking further research to understand the actual population size using genetic markers, foraging habitat types and dispersal patterns using satellite tracking, and the threat of feral cat predation (BHP 2023).

1.5.3 Rationale

Table 3 provides a concise description (in tabular format) of the rationale for the EMP components in Section 2, including:

- survey and study findings
- key assumptions and uncertainties
- rationale for choice of components.

Table 3: Rationale for components

Condition Outcome	Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Rationale for choice of components
Environmental value: Terrestrial Fauna – Ghost Bat (<i>Macroderma gigas</i>)				
7(1) Maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope	<p>The key reports which have been used to develop the components related to the Ghost Bat include:</p> <ul style="list-style-type: none"> Bat Call WA (2021) A review of ghost bat ecology, threats and survey requirements, report prepared for the Department of Agriculture, Water and the Environment, Canberra. CC BY-NC-ND 4.0. Biologic Environmental Survey Pty Ltd. (2023) Central Pilbara Ghost Bat Monitoring 2022-2023. Unpublished report prepared for BHP Iron Ore. Biologic Environmental Survey Pty Ltd. (2022c) Central Pilbara Ghost Bat Monitoring 2021-2022. Unpublished report prepared for BHP Iron Ore. Biologic Environmental Survey Pty Ltd. (2022b) Central Pilbara Ghost Bat Monitoring 2020-2021. Unpublished report prepared for BHP Iron Ore. Biologic Environmental Survey Pty Ltd. (2022a) Central Pilbara Ghost Bat Monitoring 2018-2019. Unpublished report prepared for BHP Iron Ore. Biologic Environmental Survey (2020a). <i>Central Pilbara Ghost Bat Monitoring: 2017 – 2018</i>. Report to BHP WAIO. Biologic Environmental Survey (2017a). <i>Pilbara Region Ghost Bat Population and Roost Assessment: 2016/2017</i>. Report for BHP Iron Ore, Perth, Western Australia. Biologic Environmental Survey (2017b). <i>Hamersley Range Ghost Bat Population Study 2015/2016</i>. Report for BHP Billiton Iron Ore, Perth, Western Australia. <p>Other BHP surveys used to develop the components related to the Ghost Bat include:</p> <ul style="list-style-type: none"> Biologic Environmental Survey (2020b) <i>Cattle Gorge and Mining Area C Artificial Roost Monitoring 2017-2018</i>. Report for BHP WAIO. Biologic Environmental Survey (2015). <i>Central Pilbara Ghost Bat Population and Roost</i> 	<p>Survey and study findings:</p> <ul style="list-style-type: none"> The population size in the Pilbara has been estimated to be 1,300–1,900 individuals (Armstrong pers. comm. 2015) or 1,825 individuals (Bat Call WA 2021). The current population estimate for the Hamersley subregion is 350 individuals (Bat Call WA 2021) and the population estimate for the Chichester subregion is around 1,500 individuals (Bat Call WA 2021). Based on available data, breeding has been documented in natural caves at Mining Area C (including Southern Flank), Mt Brockman and West Angelas in the Hamersley sub-region, and at Callawa and Tambrey Station in the Chichester sub-region (Armstrong and Anstee 2000; Biologic 2013, 2015). Permanent (Category 1) roosts in the Pilbara are commonly formed out of abandoned mining infrastructure (e.g., Comet, Klondyke Queen, Lalla Rookh; Bat Call WA 2021). Ghost Bats move between a number of caves seasonally, or as dictated by weather conditions, and require a range of cave sites (Hutson et al. 2001), with presence ranging from occasional visitation to persistence over a long period. This result was supported by a spatial temporal analysis completed by BHP using genotypes collected from caves within and adjacent to the Development Envelope at Mining Area C, where the majority (67 %) of Ghost Bats genotyped were only detected once and two Ghost Bats (0.6%) were detected a maximum of 13 occasions over five years (BHP 2023). Previous studies have suggested that Ghost Bats in the Hamersley Range occur in small family groups that move from cave to cave (Armstrong and Anstee 2000). This result was supported by genotype studies funded by BHP that detected parent-offspring or full-sibling relationships between a maximum of three individuals all detected at the one cave (Biologic 2022). Outside the breeding season, male bats are known to disperse widely, most likely during the wet season when conditions and availability of resources would allow bats to use caves that would otherwise not be suitable. Genetic studies indicate that females are likely to stay close to preferred maternity roosts (Worthington-Wilmer et al. 1994). Traditional mark-recapture methods to estimate population size have been successfully adapted to use genetic data as a 'molecular tag' in bat species (e.g. Oyler-McCance et al. 2018), which has been successfully developed to monitor Ghost Bats at Mining Area C (BHP 2023). Monitoring of artificial bat caves constructed at Cattle Gorge and Mining Area C has revealed that Ghost Bats do visit these 	<p>Assumptions</p> <ul style="list-style-type: none"> Surveys and monitoring as part of the Research Plan (BHP 2017a) have collected Ghost Bat scats from caves at Mining Area C from 2014 to present. The frequency and location of the sampling from these programs has varied each year. This has led to an incomplete data set for each cave. The development and implementation of the structured and repeatable monitoring program presented in Table 4 is assumed likely to address the existing knowledge gaps. Surveys and monitoring as part of the Research Plan (BHP 2017a) have collected Ghost Bat scats from caves outside of the Development Envelope since 2014. The caves located in Tandanya and Mudlark Well may be used as contextual caves for comparison with the population of Ghost Bats at Mining Area C (Figure 5). Sampling at some of these caves has been limited to date and hence there is some uncertainty on comparability of Ghost Bat data at these locations with Mining Area C. The development and implementation of the structured and repeatable monitoring program presented in Table 4 is assumed likely to address the existing knowledge gaps. True baseline is consistent with data collected 3-4 years prior to MS1072 being granted and submission of the FMP (i.e., data collected prior to 20 February 2018). Generation length of a Ghost Bat is eight years (Armstrong et al., 2021). <p>Uncertainties</p> <ul style="list-style-type: none"> To date there have been no published studies on Ghost Bat foraging in the Pilbara. Studies are in progress on behalf of BHP in the Pilbara to understand key habitat requirements for the Ghost Bats. Whilst there has been a considerable increase in our understanding of the species, there are still key elements of their ecology that are not well understood. This includes temporal and spatial movement between roosts by males and females and the size and location of foraging habitats. 	<p>Type of components</p> <p>MS1072 specifies outcome-based components.</p> <p>Choice of components</p> <p>BHP has proposed components to provide information on Ghost Bat populations, to meet the outcome to <i>Maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope</i>:</p> <ul style="list-style-type: none"> Scat collection – presence of scats as a primary technique. The aim is to demonstrate that Ghost Bats are continuing to use the caves at Mining Area C. Scat analysis – number of genotypes using genetic analysis (primary technique) and hormone analysis (primary technique). The aim is to demonstrate a viable population continues to exist within the Development Envelope. <p>Table 4 provides details on the proposed monitoring program.</p> <p>BHP has proposed the following environmental criteria:</p> <ul style="list-style-type: none"> an early response indicator related to the presence of Ghost Bats in High Value Ghost Bat Caves and Low Value caves with occasional occupancy (Category 3) that have recorded presence of Ghost Bats, using scat presence and count recordings and observations of Ghost Bats; and Triggers and thresholds related to the presence of Ghost Bats using scat presence and count, recordings and observations of Ghost Bats, average numbers of bats as inferred from individual genotypes below a designated level from genetic analysis and presence of pregnant females as inferred from hormone analysis. <p>Environmental criteria will be reviewed and updated on an ongoing basis. Identified improvements may be incorporated following further research.</p> <p>In the event the early response indicator, triggers or threshold are exceeded the following supplementary monitoring techniques may be used as part of the investigation process:</p> <ul style="list-style-type: none"> Black InfraRed motion detection camera monitoring; and / or Full spectrum recording (echolocation and audible). <p>Further information on the monitoring program is provided in Table 4.</p> <p>Rationale</p> <p><u>Scat collection & observations</u></p> <p>Collection of scats from caves is a technique that provides reliable data that demonstrates continued use by Ghost Bats. If Ghost Bats are</p>

Condition Outcome	Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Rationale for choice of components
	<p><i>Assessment: 2014.</i> Report for BHP Billiton Iron Ore, Perth, Western Australia.</p> <ul style="list-style-type: none"> Biologic Environmental Survey and BatCall WA (2014). <i>Pilbara Regional Ghost Bat Review.</i> Report for BHP Billiton Iron Ore, Perth, Western Australia. Biologic Environmental Survey (2014). <i>Central Pilbara Ghost Bat Population and Roost Assessment.</i> Report for BHP Billiton Iron Ore, Perth, Western Australia. Biologic Environmental Survey (2011). <i>Southern Flank Vertebrate Fauna Survey.</i> Report for BHP Billiton Pty Ltd. Bat Call WA (2011). <i>South Flank 2010 Bat Survey Report.</i> Unpublished report for BHP Billiton Iron Ore. SVT Engineering Consultants (2016). <i>BHP Billiton Iron Ore Environmental Noise Assessment: South Flank Operations.</i> <p>In addition, information contained in:</p> <ul style="list-style-type: none"> Arteaga Claramunt Alba M., White Nicole E., Bunce Michael, O'Connell Morgan, Bullen Robert D., Mawson Peter R. (2019). Determination of the diet of the Ghost Bat (<i>Macroderma gigas</i>) in the Pilbara region of Western Australia from dried prey remains and DNA metabarcoding. <i>Australian Journal of Zoology</i> 66, 195-200. Augusteyn, John & Hughes, Jane & Armstrong, Graeme & Real, Kathryn & Pacioni, Carlo. (2017). <i>Tracking and tracing central Queensland's Macroderma – determining the size of the Mount Etna Ghost Bat population and potential threats.</i> <i>Australian Mammalogy</i>. 10.1071/AM16010. Armstrong and Anstee (2000). <i>The Ghost Bat in the Pilbara: 100 years on.</i> <i>Australian Mammalogy</i> 22: 93-101. Bat Call WA (2017). <i>Robe Valley Mesa A to Mesa 2405A, Impact of mining on Ghost Bat presence and activity, April 2017, including assessment of caves on Mesa F and G,</i> Unpublished report prepared for Rio Tinto. Bullen, R. and Creese, S. (2014). <i>A note on the impact on Pilbara leaf-nosed and Ghost Bat activity from cave sound and vibration levels</i> 	<p>structures with calls, video and scats recorded at them (Biologic 2020b).</p> <ul style="list-style-type: none"> Estimates of dispersal distances amongst caves in the Central Pilbara from genetic data have suggested a mean of 4 ± 0.9 km (Ottewell et al. 2017) and 5.8 ± 1.1 km (Ottewell et al. 2019). Dispersal was most frequent to caves near each other (up to 2 km), while larger distances up to 15 km were less frequently recorded. This is consistent with spatial autocorrelation analyses that suggest a high level of relatedness amongst Bats at short distances, and a spatial genetic neighbourhood size of between 10 km and 15 km (Spencer and Tedeschi 2016; Ottewell et al. 2017). The breeding season for Ghost Bats in the Central Pilbara is typically May through to November (Biologic 2020a). Research data for High Value Ghost Bat Caves at Mining Area C show the following: <ul style="list-style-type: none"> Ghost Bat scats are typically recorded at all caves sampled every second month (see Appendix 2 for summary data). Multiple pregnant Ghost Bat individuals, as indicated from hormone analysis on scats, utilise High Value Ghost Bat Caves with pregnant females detected in at least one High Value Ghost Bat Cave per year of monitoring (Biologic 2017a, 2020b) (see Appendix 2 for summary data). A maternity group was encountered at cave SF05/ SF08 (South Flank) on 22 October 2017, consisting of 25 individuals, about half of which had pups attached (12 pups). Pups are typically observed attached to females between October and December at Mining Area C. Of the 98 individuals identified within Central Pilbara caves (including MAC and South Flank), 27 individuals were also recorded from previous surveys, 17 of which were detected using the same caves between 2015/2016–2018 (Biologic 2020a). The average number of individual genotypes recorded across High Value Ghost Bat Caves during 2015-2016 was 4.6 (Ottewell et al. 2017) (see Appendix 2 for summary data). <p>Future BHP-funded research:</p> <ul style="list-style-type: none"> DBCA is refining DNA genotyping techniques and investigating sex-linked markers which may enable the sex of a genotype to be inferred. This will assist in understanding the dispersal patterns of male and female Ghost Bats between caves at Mining Area C. DBCA is investigating how genetic data for Ghost Bats at Mining Area C can be used as a molecular tag and population size estimated from models developed using traditional mark-recapture methods. BHP is undertaking further Ghost Bat tracking studies to investigate Ghost Bat dispersal patterns and foraging behaviours. 	<ul style="list-style-type: none"> Ghost Bats have been known to be absent for periods of time from caves they have traditionally frequented, only to then return again. This is reflected in the results of BHP studies, whereby some caves over the past three monitoring surveys have exhibited sporadic use by Ghost Bats (i.e. recording no scat deposition for several survey periods followed by use in the subsequent survey periods) (Biologic 2020a). It is not known what the causal factors are for these absences. A maternity group (e.g. group of bats with young) has been visually observed within the Development Envelope in 2015 and 2017 (Biologic 2017a, 2020a) with presence ranging from occasional visitation to persistence over a long period. Natural variation of the population size of Ghost Bats in the Pilbara and sub-regions (Hamersley and Chichester) is unknown. While there is the possibility of determining an effective population size from genetics and over time to monitor population health there is a time lag with regards to detecting a disturbance or change to a population (likely to be in the order of at least 3 to 5 years). The effective population size (N_e, breeding individuals) of Ghost Bats in the Central Pilbara Region has been shown to vary two-fold between 2017-2018 and 2015-2016 (106 vs. 52 individuals, respectively) (Ottewell et al. 2019). The variation between years in effective population size was attributed to differences in timing of sample collection, sampling effort (number of scats genotyped) and the spatial distribution of caves between the two studies. Whilst there is the possibility of using genetic mark-recapture techniques to determine population size in Ghost Bats, the method and statistical assumptions of social structure are still under development. The population size relating to long-term viability is unknown. Limitations in the current genetic technology and uncertainty that ongoing research will provide more robust techniques for population estimates in future. 	<p>present roosting within caves, scats will not be collected to minimise the risk of flushing the Ghost Bats. Rather, the number of Ghost Bats observed will be recorded.</p> <p>Bimonthly monitoring is proposed with no monitoring to occur in the breeding season from October to December (Bat Call WA 2021).</p> <p>Caves other than just High Value Ghost Bat Caves have been incorporated into environmental criteria as monitoring results from 2015 to 2022 demonstrated that Ghost Bats are utilising caves other than those designated as High Value Ghost Bat Caves (Appendix 2). The inclusion of Low Value caves with occasional occupancy (Category 3) will provide a more accurate sample of Ghost Bat activity within the Development Envelope.</p> <p>To develop the environmental criteria, an average of the number of caves with Ghost Bat records (i.e., scats and observations) was subtracted by the standard error of the mean (SEM) for records collected from baseline years (i.e., 2015 to 2017). Natural absences in the population mean are accounted for by subtracting the SEM from the average number of records across baseline years. Baseline was determined by the data collected prior to the issuing of MS1072 on 20 February 2018. This assumes that presence of bats in less than eight suitable caves would be considered the standard baseline parameter (Appendix 2; this is a parameter being investigated via research).</p> <p>The early response indicator is assessed using scats collected, observations and recordings at bimonthly intervals over a timeframe of two years. The rationale is to reduce the uncertainty associated with seasonal variability and to focus on population trends that are on scale with the generation length of a Ghost Bat (e.g., eight years; Armstrong et al., 2021). The adoption of the generation length for the assessment period for impacts is conservatively aligned to international frameworks for measuring impacts to biodiversity (e.g., UNEP-WCMC, Conservation International and Flora and Fauna International 2020). Two years was selected for the early response indicator as it is one quarter of the generation length of a Ghost Bat. Thereby allowing for population trends to be observed and remove variation associated with seasonal differences. A two-year timeframe is also considered a realistic timeframe to implement management responses and assess their effectiveness.</p> <p>Trigger and threshold criteria are assessed using the same parameter (i.e., less than eight suitable caves), but over a three and four year rolling average period, respectively. The timeframes were selected to observe population trends over a third of the Ghost Bat generational length (i.e., three years) and a half of a Ghost Bat generational length (i.e., four years).</p> <p><u>Genetic Analysis</u></p> <p>The genetic analysis of scats is a non-invasive technique which can provide a range of information on the Ghost Bat population occurring within and outside of the MS1072 Development Envelope. Genetic analysis may provide information on the population estimates genetic diversity, structure and spatial use of the caves across the local area.</p>

Condition Outcome	Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Rationale for choice of components
	<p>during drilling operations. The Western Australian Naturalist 29: 145-154.</p> <ul style="list-style-type: none"> • Biologic Environmental Survey (2017c). <i>West Angelas Ghost Bat Monitoring</i> Rio Tinto January 2018 • BHP (2017). <i>Western Australian Iron Ore Ghost Bat Research Plan</i>. Unpublished report. • Keeley, T. (2017). <i>Ghost Bat Research</i>. Memo provided to Biologic Environmental Survey and appended to Biologic (2017a) Report prepared for BHP. • Keeley, T. (2016). <i>Ghost Bat Research</i>. Memo provided to Biologic Environmental Survey and appended to Biologic (2017b) Report prepared for BHP. • Ottewell, K., McArthur, S., van Leeuwen, S., & Byrne, M. (2019). <i>Ghost Bat (Macroderma gigas) genetic monitoring: South Flank 2017–2018</i>. • Ottewell, K., McArthur, S., van Leeuwen, S., Byrne, M. (2017). <i>Population genetics of the Ghost Bat (Macroderma gigas) in the Pilbara bioregion</i>. Department of Biodiversity, Conservation and Attractions, August 2017. • Tidemann, C.R., Priddel, D.M., Nelson, J.E. and Pettigrew, J.D. (1985). <i>Foraging behaviour of the Australian Ghost Bat, Macroderma gigas (Microchiroptera: Megadermatidae)</i>. Australian Journal of Zoology 33: 705-713. • Toop, J. (1985). <i>Habitat requirements, survival strategies and ecology of the Ghost Bat Macroderma gigas Dobson (Microchiroptera: Megadermatidae) in central coastal Queensland</i>. Macroderma 1: 37-44. 	<ul style="list-style-type: none"> • BHP is undertaking monitoring and improvement trials, primarily at the artificial roost located in Mining Area C to improve knowledge related to artificial roosting structures. <p>Response actions implemented:</p> <ul style="list-style-type: none"> • In July 2021, the Early Response Indicator was achieved for Condition 7-1. In response, BHP increased the extent of the monitoring program to include Low Value caves (e.g., SF3, SF9, SF24, SF28 and SF30) to the bimonthly monitoring suite. These caves do not form a part of the EMP components, but will continue to be monitored to investigate if their cave categorisations need to be revised. 		<p>Provision of this data is likely to enable BHP to demonstrate if a viable population exists within the Development Envelope over the long term. Using the individual genotypes from the scats, BHP can gain an estimate of cave usage (i.e. average number of genotypes located in a cave), an estimate of effective population size (i.e. the size of the interbreeding population) and estimate the census population (or size) within the Development Envelope. The use of genetic analyses to estimate cave usage by bats and estimate effective population size and census population size is preferred to counts via video or calls where identification of unique individuals can be difficult.</p> <p>Estimates of the effective population size at Mining Area C have fluctuated between 52 individuals in 2015-2016 to 105-106 individuals in 2017-2019 (Ottewell et al., 2019; Ottewell et al., 2021). The recent increase in the effective population size has been attributed to sampling effort and timing of sampling collection (Ottewell et al., 2019; Ottewell et al., 2021). Future consistent sampling undertaken as part of this FMP will likely enable this to be estimated. Declines in effective population size (determined via genetics) may also be able to be used to measure long-term viability of the population. It is anticipated that in the event trigger criteria are exceeded, analyses of effective population size and census population size will form part of the investigation into whether the population viability is being maintained (refer to response actions in Table 5).</p> <p>The average number of genotypes recorded per cave ranged from 4.8 to 5.1 genotypes in 2016 and 2017, respectively (see Appendix 2 for summary data). The environmental criteria have allowed for natural absences at caves by subtracting the SEM from the mean number of genotypes per cave across 2016 to 2017 (i.e., less than four genotypes). This metric provides an indication of usage of caves which may be expected to drop if a population decline occurred.</p> <p>A limitation of genetics analysis is the time the analysis takes to determine the individual genotypes - six months minimum. Genetic analysis was therefore not considered ideal in the development of the Early Response Indicator, especially given that presence/absence could be detected from scat collection alone. Trigger and threshold criteria are assessed using the same parameter (i.e., less than four genotypes), but over a two year and a four-year rolling average period, respectively. The timeframes were selected to observe population trends over a quarter of the Ghost Bat generational length (i.e., two years) and half of a Ghost Bat generational length (i.e., four years). Longer assessment periods for this metric may be considered upon the receipt of further data.</p> <p><u>Pregnant females</u></p> <p>The tracking of the occurrence of pregnant females through hormone analysis will help to ensure that breeding is still occurring at Mining Area C. A reduction in cave usage by pregnant females over a four year rolling average period would suggest a disruption to breeding and a threat to the long-term viability of the population within the Development Envelope may exist. Surveys at Mining Area C have shown that pregnant Ghost Bats, as indicated from hormone analysis on scats, are usually detected in at least one High Value Ghost Bat</p>

Condition Outcome	Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Rationale for choice of components
				<p>Cave per year of monitoring (Biologic 2017a, 2017b, 2020a) (see Appendix 2 for summary data).</p> <p>The environmental criteria have allowed for natural absences at caves by subtracting the SEM from the mean number of caves where elevated progesterone levels were recorded from the 2014-2015, 2016-2017 and 2017-2018 reporting periods. This assumes that data collected during this timeframe is consistent with baseline. Therefore, environmental criteria have been developed to include elevated progesterone levels are recorded at less than five High Value Ghost Bat Caves or Low Value caves with occasional occupancy (Category 3) within the Development Envelope. The assessment period for the trigger and the threshold criteria is two and four years, respectively. Similar to scat presence, these timeframes will remove seasonal variation and uncertainty from data and will allow for responses to be measured against assessment periods proportional to the generation length (i.e., eight years; Armstrong et al., 2021) of a Ghost Bat.</p> <p><u>Monitoring sites</u></p> <p>Site selection considered:</p> <ul style="list-style-type: none"> • <i>Estimated life of the cave.</i> Caves that could be monitored for extended periods were prioritised for selection. For example, if the cave will be disturbed during construction or within the first five years of mining then these caves were not selected for long term continuous monitoring. This approach aligns with BHP internal planning process time horizons. These caves will be monitored during the three-yearly scat collection to provide the whole of site overview. • <i>Safe to access the cave.</i> Some of the Ghost Bat caves will be located within close proximity of active construction and mining areas. Accessing the caves is required to be undertaken in accordance with BHP Health and Safety requirements. Other areas may become inaccessible as mining and infrastructure are established e.g. establishment of a mine pit may remove safe access to travel to a cave location. • <i>The assessment of the value of the Ghost Bat cave</i> e.g. high and low values. • Spatial coverage within the Development Envelope. • Contextual caves that allow for comparison with caves outside of the Development Envelope.
<p>7(2) No disturbance of the eleven (11) Retained High Value Ghost Bat Caves as shown in</p>		<p>Survey and study findings:</p> <ul style="list-style-type: none"> • Sixty-three caves considered suitable to be used by Ghost Bats have been recorded within the Development Envelope. • These caves have been classified as having 'High' or 'Low' conservation value to Ghost Bats, depending on the type and frequency of use. Caves that have the physical attributes for a day or maternity roost and surveys indicate that there has been a 	<p>Assumptions</p> <ul style="list-style-type: none"> • 'Low impact' disturbance (e.g. LV tracks) has occurred within the trigger areas prior to 20 February 2018 when MS1072 was granted. These 'low impact' disturbance areas may continue to be utilised (e.g. LV tracks for monitoring access), or may be subject to 	<p>Type of components</p> <p>MS1072 specifies outcome-based components.</p> <p>Choice of components</p> <p>To meet the outcome that there is no disturbance of the eleven (11) Retained High Value Ghost Bat Caves, BHP has proposed environmental criteria (early response indicator, triggers and thresholds) relating to buffer distances from the caves.</p>

Condition Outcome	Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Rationale for choice of components
Figure 2 of Schedule 1.		<p>continual use over a period of years are classified as 'High' value caves. Low Value Ghost Bat Caves are considered to be used only as a feeding roost or have shown no sign of Ghost Bat use over multiple years of survey. Twenty-five High Value Ghost Bat Caves and 38 Low Value Ghost Bat Caves have been classified.</p> <ul style="list-style-type: none"> Of the 63 caves, 27 are to be retained (Figure 3; Appendix 1). The 27 retained caves consist of 12 High Value Ghost Bat Caves and 15 Low Value Ghost Bat Caves. Of the 12 High Value Ghost Bat Caves, 11 are the Retained High Value Ghost Bat Caves referred to in MS1072 (AC13, AC14, AC17, AC18, SF4, SF5, SF8, SF14, SF18, SF26 and SF27). The High Value Ghost Bat Cave AC32 will also be retained. Fifteen Low Value Ghost Bat Caves are AC26, AC27, AC15, AC20, SF10, SF31, SF3, SF7, SF9, SF20, SF30, SF21, SF24, SF28 and SF32. The 36 caves to be potentially disturbed consist of 13 High Value Ghost Bat Caves and 23 Low Value Ghost Bat Caves (Figure 3). Noise modelling was undertaken by SVT (2016) to determine potential noise levels at the entrances to known caves in the Development Envelope. All levels were predicted to be below 70 dB, with the highest levels ranging between 65 dB and 69.1 dB at three caves: SF15 (High), SF22 (Low) and SF31 (Low). Bullen and Creese (2014) suggested that sound levels up to 70 dB are unlikely to result in Ghost Bats leaving their roost. It is suggested that Ghost Bats will be able to tolerate vibrations of up to 15 mm/s (R. Bullen pers. comm.), although there has been no specific research undertaken to support this. In 2014, BHP commissioned TNL consultants to determine the susceptibility of shelters (caves) to blasting impacts. The quantitative assessment utilised a number of different techniques, including vibration monitoring, laser scanning and structural mapping, plus visual observations. The study concluded that for blasting to create fresh fractures in intact block rocks, vibration will need to be at least 320 mm/s, and blasting further than 50 m from a cave is unlikely to show impacts of severe damage. Rio Tinto (Biologic 2017) and Process Minerals International (Process Minerals International 2013) have recorded instances where mining has occurred within 50 m of known Ghost Bat caves. These include: Rio Tinto Iron Ore mining at West Angelas at 70 m, 90 m and 140 m from of Ghost Bat caves. Rio Tinto's Robe Valley - Bat Call WA (2017) undertook an assessment of Ghost Bat caves within Rio Tinto's Robe Valley to determine the impact of Ghost Bat presence and activity. Mining at Mesa A has been in progress since 2010, and operations now cover a majority of the mesa. The original escarpment on the north side of the mesa has been retained to a width of 50 to 100 m. Caves on this mesa have remained intact, however, there are limited signs of Ghost Bat use (caves determined to be night roosts). An assessment of other mesas where mining has been completed showed that those that have had their perimeters 	<p>progressive rehabilitation, without triggering a potential non-compliance.</p> <ul style="list-style-type: none"> Disturbance to a cave is considered to be a change or alteration to the cave whereby it renders it unsuitable as a Ghost Bat cave. All caves that are approved to be disturbed under MS1072 will be disturbed during the life of the project. <p>Uncertainties</p> <ul style="list-style-type: none"> Ghost Bats have been known to be absent for periods of time from caves they have traditionally frequented, only to then return. This is reflected in the results whereby some caves over the past three monitoring surveys have exhibited sporadic use by Ghost Bats (i.e. having recorded no scat deposition for several survey periods followed by use in the subsequent survey periods) (Biologic 2020a). It is not known what the causal factors are for these absences. The examples of Ghost Bat utilising caves in close proximity to active mining areas suggests that indirect impacts (such as vibration and noise) may not have an obvious impact on Ghost Bat occupancy of caves. 	<p>The maintenance of buffer zones has potentially succeeded in minimising impacts (DSEWPAC 2012) to caves and Ghost Bats. A 300 m buffer has also been included as an early response indicator that disturbance is approaching the caves and their buffers. Mining activities are permitted within 300 m, however, additional management is likely to be required in these areas.</p> <p>BHP has committed to a 150 m trigger buffer at all caves to be retained (except at the Low Value Ghost Bat Cave SF20 which has a 60 m trigger buffer, as committed to in the <i>Mining Area C – Southern Flank Public Environmental Review</i> (BHP Billiton, 2017b)) to minimise disturbance, light, dust, noise and vibrations on the caves and Ghost Bat individuals. Any mining activity or other excavations for non-mining related activities will be excluded from the 150 m buffer. Activities that will be permitted within the 150 m buffer are minor works for light vehicles access to the caves, works for construction and maintenance of culverts, monitoring equipment and investigation activities. BHP has proposed a 50 m threshold buffer for the Retained High Value Ghost Bat Caves. No disturbance is permitted within the 50 m threshold buffer.</p> <p>Rationale</p> <p>While there is limited published data on the Ghost Bat's response to vibration and noise, the size of the buffer is considered conservative and is expected to be sufficient to minimise impact to the Ghost Bat. The selection of the buffer size was informed by recent work undertaken by Process Minerals International and Rio Tinto. Rio Tinto (Biologic 2017) and Process Minerals International (Process Minerals International 2013) have recorded instances where mining has occurred in close proximity of known Ghost Bat caves. These include:</p> <ul style="list-style-type: none"> Rio Tinto mining operations at West Angelas occurring within 70 m, 90 m and 140 m from of Ghost Bat caves. Process Minerals International mining operations with a minimum 50 m buffer at Poondano. <p>Monitoring the effectiveness of the cave disturbance triggers and thresholds is possible as impacts to the caves and the bat activity (usage) within them can be measured directly through monitoring. BHP selected a range of traditional and emerging methodologies to monitor the caves and demonstrate use by Ghost Bats including:</p> <ul style="list-style-type: none"> Land disturbance reconciliation; Cave morphology mapping; Internal cave climate monitoring; and Vibration and sound monitoring. <p>Further information on the monitoring program is provided in Table 4.</p>

Condition Outcome	Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Rationale for choice of components
		<p>retained will continue to be used by Ghost Bats, either as nocturnal or diurnal roosts. Bat Call WA (2017) concluded that the retention of a façade greater than 20 m around the mesa perimeter will result in no loss of roosts. Rio Tinto have committed to retain a 40 m mining exclusion zone between the back of each cave and the proposed mine pit to protect the integrity of the roost.</p> <ul style="list-style-type: none"> • Process Minerals International's Poondano Iron Ore Project had applied a buffer zone in excess of 50 m from a Ghost Bat cave. Ghost Bats were recorded in this cave during 2009 and following the commencement of mining in 2012 they were subsequently recorded in this cave in 2012, 2013, 2014 and 2015 (Process Minerals 2013). • At BHP Goldsworthy operations a long-term (10 year) study of Ghost Bats and Pilbara Leaf-nosed Bats (<i>Rhinoicteris aurantia</i>) was undertaken at a cave located approximately 400 m from an active pit (Gleeson & Gleeson 2012), and this study showed no change in Bat activity for either species over the duration of the monitoring. • In each of the above projects, Ghost Bats have been recorded to continue to use the cave. 		

Table 4: Ghost Bat monitoring program

Outcome	Monitoring description	Parameter to be measured	Limitations	Location	Frequency/duration	Monitoring rationale
<p>7(1) Maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope</p>	<p>Scat collection and analysis</p>	<p>Scat Collection</p> <ul style="list-style-type: none"> • Presence and absence of Ghost Bats (by scat presence or absence) • Deposition rate <p>Genetic Analysis</p> <ul style="list-style-type: none"> • Presence and absence of Ghost Bat • Number of unique individuals • Population genetic diversity statistics • Calculate effective population size (N_e) • Recapture • Temporal patterns of cave use <p>Hormone Analysis</p> <ul style="list-style-type: none"> • Occurrence of pregnant individuals. 	<p>Occupational Safety</p> <p>The safety of our employees and contractors is our priority. High risk activities that do not have effective controls will be avoided. As such, caves that cannot be accessed safely will not be monitored.</p> <p>Cultural Heritage</p> <p>Caves that are identified as having cultural heritage significance may no longer be suitable for monitoring and avoided.</p> <p>Scat Collection</p> <ul style="list-style-type: none"> • It is unlikely bats only defecate on the sheets, and scats deposited outside of the cave or in areas inaccessible within the cave may not be included in analyses. • Requires multiple entry to the cave to collect the scats. This may increase the risk of the disturbance to the Ghost Bats. <p>Genetic Analysis</p> <ul style="list-style-type: none"> • Samples can degrade with time, reducing the genotyping success rate. • Cross contamination of scat samples may lead to an over estimate of unique individuals. • Lag time between collection of sample and time to complete the respective analysis (up to 6 months for unique individuals and population genetic diversity statistics and 3 to 4 years for effective population estimates). • The total number of individuals present in a cave may be underestimated if highly related individuals are present. Similar genotypes can occasionally be identified by genetic analysis software as sibs but can also be due to allelic drop out. Where this 	<p>For the monitoring program, within Ghost Bat caves:</p> <ul style="list-style-type: none"> • The Retained High Value Ghost Bat Caves – AC13, AC14, AC17, AC18¹, SF4, SF5 and SF8, SF14, SF18, SF26 and SF27. • The High Value Ghost Bat Caves to be disturbed²- AC1, AC2, AC5, AC6, AC8, AC9 and SF6. • Low Value caves with occasional occupancy (Category 3) (e.g., SF3, SF9, SF24, SF28, and SF30). • Artificial roost(s). • Low Value Ghost Bat Caves. • Contextual caves (e.g., (e.g., CTAN-01, CTAN-06, CTAN-31, CMUD-01, CMUD-02, CMUD-08, CMUD-10, CMUD-47, CMUD-63, CMUD-64). 	<p>Bimonthly collection of scats outside of the months when pups are usually present, i.e. no monitoring between October and December from:</p> <ul style="list-style-type: none"> • The Retained High Value Ghost Bat Caves – AC13, AC14, AC17, AC18¹, SF4, SF5 and SF8, SF14, SF18, SF26 and SF27. • The High Value Ghost Bat Caves to be disturbed²- AC1, AC2, AC5, AC6, AC8, AC9 and SF6. • Low Value caves with occasional occupancy (Category 3) (e.g., SF3, SF9, SF24, SF28, and SF30). • Artificial roost(s). • Contextual caves (e.g., CTAN-01, CTAN-06, CTAN-31, CMUD-01, CMUD-02, CMUD-08, CMUD-10, CMUD-47, CMUD-63, CMUD-64). <p>A scat collection to be undertaken within three years of the approval of this plan and then every three (3) years (e.g., 2021, 2024, 2027, etc) at:</p> <ul style="list-style-type: none"> • Ghost Bat caves (high and low value) that have not been disturbed and that can be accessed safely. 	<p>Scat Collection</p> <p>Collection of scats from caves is a technique that provides reliable data that demonstrates continued use of caves by Ghost Bats.</p> <p>Recordings</p> <p>Camera and ultrasonic recordings of Ghost Bats will be used to demonstrate utilisation of a cave and will count towards records.</p> <p>Observation</p> <p>Opportunistic records of Ghost Bats will be used to demonstrate utilisation of a cave and will count towards records.</p> <p>Genetic Analysis</p> <p>The genetic analysis of scats is a non-invasive technique which can provide a range of information on the Ghost Bat population occurring within and outside of the MS1072 Development Envelope. Genetic analysis can provide information on the number of unique individuals using caves, population estimates genetic diversity, structure and spatial use of the caves across the local area. Provision of this data is likely to enable BHP to demonstrate if a viable population exists within the Development Envelope.</p> <p>Hormone Analysis</p> <p>The occurrence of pregnant females amongst High Value Ghost Bat Caves will be tracked through hormone analysis to help determine if breeding is occurring at Mining Area C and South Flank. Hormone analysis of scats is undertaken for scat samples collected at all caves (High Value, Low Value and contextual) to provide information on pregnant females within and outside of the MS1072 Development Envelope. Provision of this data will compliment genetic analysis and enable BHP to demonstrate if a viable population exists within the Development Envelope.</p> <p>Other methods</p> <p>The absence of Ghost Bats may be investigated using black infrared motion detection camera and/or full spectrum recording as alternative monitoring methods in the event response actions are required. Continual nightly monitoring using these methods is not considered practical as it will be labour intensive and is unlikely to provide additional information to the scat analysis.</p> <p>Sampling Locations</p> <p>Site selection considered:</p> <ul style="list-style-type: none"> • <i>Estimated life of the cave.</i> Caves that could be monitored for extended periods were prioritised for selection. For example, if the cave will be disturbed during construction or within the first five years of mining then these caves were not selected for long term continuous monitoring. This approach aligns with BHP internal planning process time horizons. These caves will be

¹ The Retained High Value Ghost Bat Cave AC18 currently cannot be accessed for two-monthly monitoring due to safety concerns as this cave is located within 250 m of active mining by Rio Tinto. Monitoring is proposed to commence when safe access can be re-established, such as when Rio Tinto mining activities cease.

² The disturbance timing of these High Value Ghost Bat Caves will be dependant on the mine plan.

Outcome	Monitoring description	Parameter to be measured	Limitations	Location	Frequency/duration	Monitoring rationale
			<p>is the case, sibs are treated as duplicate genotypes rather than sibs as a conservative measure as the true sib-ship structure of ghost bat colonies is not yet known.</p> <ul style="list-style-type: none"> In population genetics, sample sizes of 25-30 individuals are typically required for accurate estimation of diversity statistics (Sinclair & Hobbs 2009; Hale et al. 2012). Where numbers of individuals at caves were too low to calculate diversity statistics, pooling of data from nearby caves maybe required. <p>Hormone Analysis</p> <ul style="list-style-type: none"> The potential extent of individual bat hormone excretion variation or changes to progesterone levels during gestation has not yet been fully evaluated (Keeley 2017, 2016). Hormone results to date have been compared with only one captive pregnant female from the Perth Zoo, Western Australia. Therefore, it is difficult to categorise some of the samples which have elevated progesterone values but remain between baseline and estimated gestation levels (assumed to be approximately 5-fold or greater above baseline). These samples may represent those of females during early gestation, failed gestation or other points in the reproductive cycles (e.g. non-pregnant luteal phase). Without knowing the variation which exists between females, it is difficult to accurately estimate absolute cut-off points defining non-pregnant and pregnant hormone levels (Keeley 2016). Despite this, data from the captive pregnant female and from individual samples collected from the wild suggest that levels above 900-1,000 ng/g are reflective of pregnancy. 			<p>monitored during the 3-yearly scat collection to provide the whole of site overview.</p> <ul style="list-style-type: none"> <i>Safe to access the cave.</i> Some of the Ghost Bat caves will be located within close proximity of active construction and mining areas. Accessing the caves will be undertaken in accordance with BHP Health and Safety requirements. <i>The assessment of the value of the Ghost Bat cave.</i> High Value Ghost Bat Caves are the targeted focus for scat collection as these caves are most highly frequented by Ghost Bats and typically have the highest number of records (see Figure 4). High Value Ghost Bat Caves are considered to be representative of the broader population at Mining Area C and South Flank. Scat collection at all known caves within the Development Envelope will be undertaken on a less frequent (every three years) basis to determine if Ghost Bats are utilising Low Value caves that are not being monitored in the bimonthly monitoring program. Low Value Ghost Bat Caves may also be investigated as part of Response Actions in the event there are exceedances to Early Response Indicators, Trigger Criteria and Threshold Criteria. Spatial coverage within the Development Envelope. Contextual caves that allow for comparison with caves outside of the Development Envelope. <p>The retained High Value Ghost Bat Cave AC32 has not been included in the monitoring program as part of addressing the Trigger and Threshold Criteria for Population Outcome [Condition 7-1 (1)] as the entrance is inaccessible (a small crack).</p> <p>Contextual Caves</p> <p>Comparison of cave usage by Ghost Bats at Mining Area C with contextual cave data will enable the investigation to determine whether any changes occurring are due to natural variation or possibly attributable to mining activities.</p> <p>Site selection will consider:</p> <ul style="list-style-type: none"> Other caves outside of the Development Envelope supporting similar numbers of Ghost Bats; Access due to tenure issues (e.g. third-party tenure) or safety; Not planned to be disturbed by mining activities or other developments; and Geographical proximity to Mining Area C. <p>Caves located within BHP's Tandanya and Mudlark Well tenements are currently monitored alongside caves within the Development Envelope for comparison (Figure 5). These caves may represent alternative habitat for Ghost Bats that utilise caves within the Development Envelope as determined by genetic analysis (Biologic 2020a, 2017a, 2017b).</p> <p>Monitoring frequency</p>

Outcome	Monitoring description	Parameter to be measured	Limitations	Location	Frequency/duration	Monitoring rationale
						BHP have proposed monitoring caves on a bimonthly basis to maintain consistency with the existing monitoring regime. Monitoring outside of the months when pups are usually present in caves (i.e. October to December) will ensure that mother bats and pups are not flushed from the caves (Bat Call WA 2021).
7(2) No disturbance of the eleven (11) Retained High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1.	Land disturbance reconciliation	<ul style="list-style-type: none"> Number of hectares disturbed Spatial location of the disturbance. 	<ul style="list-style-type: none"> Reliant on accuracy of instruments used to track disturbance, e.g. GPS systems, aerial photography. Unsuitable weather conditions for satellite imagery capture may cause delays to when imagery can be collected. 	Within the MS1072 Development Envelope.	<ul style="list-style-type: none"> Quarterly and Annual review. Unscheduled review if the trigger or threshold are exceeded. 	The land disturbance reconciliation is the internal process for calculating and tracking the location and amount of land disturbance undertaken. This process will determine if direct disturbance within the buffer or of the cave has occurred.
	Cave morphology mapping (using laser technology such as 'Zebedee' or other appropriate brands)	<ul style="list-style-type: none"> Internal morphology of the cave and if possible, length (m), width (m) and height (m). 	<ul style="list-style-type: none"> Requires entry to the cave. This may increase the risk of the disturbance to the Ghost Bats. Safe access to caves near to mining may limit where these surveys may be completed. 	<ul style="list-style-type: none"> Baseline cave mapping at all retained caves with prioritisation given to High Value Ghost Bat Caves. At locations where structural disturbance from mining activities is suspected and safe access is possible. 	One-off baseline mapping campaign.	The cave morphology mapping forms the baseline condition for the physical shape of the Ghost Bat caves. For any activities that may have resulted in suspected physical damage to the cave a subsequent mapping survey can be undertaken to determine if physical disturbance of the cave has occurred.
	Cave assessment using established BHP procedures	<ul style="list-style-type: none"> Visual signs of rock fall, partial or full cave collapse 	<ul style="list-style-type: none"> Requires entry to the cave. This may increase the risk of the disturbance to the Ghost Bats. Safe access to caves near to mining may limit where these surveys may be completed. 	<ul style="list-style-type: none"> At locations where structural disturbance from mining activities is suspected and safe access is possible. 	Unscheduled survey.	Disturbance to a cave may result in rock fall or partial or full cave collapse. The visual inspection of the cave will allow detection and recording of this through notes and photographs taken from standard photograph points.
	External (i.e. at cave entrance) and internal cave climate monitoring, including via internal loggers e.g. iButtons or similar	<ul style="list-style-type: none"> Temperature (°C) Humidity (%) 	<ul style="list-style-type: none"> Reliant on accuracy of instruments used to measure temperature and humidity. Extreme weather events may alter cave climatic conditions. 	At: <ul style="list-style-type: none"> The Retained High Value Ghost Bat Caves – AC13, AC14, AC17, AC18¹, SF4, SF5 and SF8, SF14, SF18, SF26 and SF27. The High Value Ghost Bat Caves to be disturbed²– AC1, AC2, AC5, AC6, AC8, AC9 and SF6. Artificial roost(s). 	Continuous monitoring.	Changes in the internal conditions of the cave may result in reduction in the suitability of the cave for use by Ghost Bats. The internal and external monitoring of the conditions may assist in identifying natural changes in the internal climate of the cave.
Vibration and Sound Monitoring (using a protocol similar to that outlined in Bullen & Creese (2014))	<ul style="list-style-type: none"> Vibration(mm/s) Sound in decibels (dB) 	<ul style="list-style-type: none"> Reliant on accuracy of instruments used to measure vibration and sound. 	Retained High Value Ghost Bat Caves within 300 m of blasting and that are safe for personnel to access.	Campaign monitoring for blasting events within close proximity to the cave.	<p>Vibration from blasting may result in dislodgement of rocks or damage to the Ghost Bat caves. By monitoring blasting events and assessing any potential impact to the cave, BHP may be able to determine if any indirect impacts may have occurred at the Ghost Bat caves.</p> <p>While there have been examples of Ghost Bats continuing to use caves adjacent to mining there is little documentation regarding what levels of vibration and sound Ghost Bats will tolerate. By monitoring the vibration and sound during blasting events, Ghost Bats tolerances may be able to be determined for the geologies present at Mining Area C.</p>	

Outcome	Monitoring description	Parameter to be measured	Limitations	Location	Frequency/duration	Monitoring rationale
	Black InfraRed motion detection camera monitoring	<ul style="list-style-type: none"> Presence and absence of Ghost Bats Total count of bats at a cave Cave use 	<ul style="list-style-type: none"> Identification of the number of unique individuals is likely to be limited. 	Retained High Value Ghost Bat Caves within 300 m of blasting and that are safe for personnel to access.	Campaign monitoring for blasting events within close proximity to the cave.	The motion detecting cameras can provide supplemental movement information during a blasting event (for example, did the Ghost Bat exit the cave during the blasting event).
	Full spectrum recording (echolocation and audible)	<ul style="list-style-type: none"> Presence and absence of Ghost Bats 	<ul style="list-style-type: none"> Ultrasonic calls of the Ghost Bat can be difficult to identify. 	Retained High Value Ghost Bat Caves within 300 m of blasting and that are safe for personnel to access.	Campaign monitoring for blasting events within close proximity to the cave.	The recordings can provide supplemental information about what impact the blast had on the Ghost Bat, for example, increase in social call may indicate an increase in stress.

¹ The Retained High Value Ghost Bat Cave AC18 currently cannot be accessed for two-monthly monitoring due to safety concerns as this cave is located within 250 m of active mining by Rio Tinto. Monitoring is proposed to commence when safe access can be re-established, such as when Rio Tinto mining activities cease.

2 EMP Components

BHP has provided detail of the EMP components in a table (Table 5), as per the preferred approach outlined in the Instructions. BHP has not used the 'Schedule' approach (which the Instructions state may be used), as this EMP covers only one operation. BHP may adopt the 'Schedule' approach in future for this EMP, should additional activities, operations or Ministerial Statements apply.

Table 5: Outcome-based components

EPA factor and objective	Terrestrial fauna – to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
Key environmental value/s	Ghost Bat (<i>Macroderma gigas</i>) – listed as <i>Vulnerable</i> under the <i>Biodiversity Conservation Act 2016</i> and the <i>Environment Protection and Biodiversity Conservation Act 1999</i>
Condition outcomes	7-1 (1) maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope as defined in Figure 1 of Schedule 1. 7-1 (2) no disturbance of the eleven (11) Retained High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1.
Key impacts and risks	Risk to biological diversity and/or ecological integrity of the Ghost Bat and its habitat, due to a loss of roosting and foraging habitat.

MS1072 condition clauses outcome-based components			
Environment criteria: Trigger criteria Threshold criteria	Response actions: Trigger level actions Threshold contingency actions	Monitoring	Reporting
<p>Condition 7-2</p> <p>The Plan shall specify Outcome/s, Trigger Criteria, Threshold criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcomes in condition 7-1 will be met.</p>	<p>Condition 7-2</p> <p>The Plan shall specify Outcome/s, Trigger Criteria, Threshold criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcomes in condition 7-1 will be met</p>	<p>Condition 7-2</p> <p>The Plan shall specify Outcome/s, Trigger Criteria, Threshold criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcomes in condition 7-1 will be met.</p> <p>Condition 7-3</p> <p>The Plan shall include the monitoring of High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1, including day roosts and any artificial roosts.</p>	<p>Condition 3-5</p> <p>The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known or suspected;</p> <p>Condition 3-6</p> <p>The proponent shall submit to the CEO a Compliance Assessment Report by 1 October each year addressing compliance in the previous financial year, or as agreed in writing by the CEO. The first Compliance Assessment Report shall be submitted by 1 October 2018 addressing the compliance for the period from the date of issue of this Statement, notwithstanding that the first reporting period may be less than twelve (12) months.</p> <p>The Compliance Assessment Report shall:</p> <ol style="list-style-type: none"> (1) be endorsed by the proponent's CEO or a person delegated to sign on the CEO's behalf; (2) include a statement as to whether the proponent has complied with the conditions; (3) identify all potential non-compliances and describe corrective and preventative actions taken; (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 3-1 <p>Condition 7-2</p> <p>The Plan shall specify Outcome/s, Trigger Criteria, Threshold criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcomes in condition 7-1 will be met.</p> <p>Condition 7-7</p> <p>In the event of exceedance of threshold criteria, the proponent shall meet the requirements in condition 3 (Compliance Reporting) and shall implement the measures outlined in the Plan, including, but not limited to, actions and investigations to be undertaken, and reporting to the CEO.</p> <p>Condition 7-9</p> <p>Within five (5) years from the date of this Statement, the proponent shall provide a report to the CEO that details how research undertaken by the proponent on Ghost Bat populations demonstrates that the outcomes in condition 7-1 will be met.</p>

Outcome-based components			
Environmental Criteria: Trigger and Threshold Criteria for Population Outcome [Condition 7-1 (1)]	Response actions: <ul style="list-style-type: none"> • Early Response Indicator actions • Trigger Level actions • Threshold contingency actions 	Monitoring	Reporting
<p>Early Response Indicator</p> <p>Ghost Bat records from scats, recordings or observations from less than five High Value or Low Value caves with occasional occupancy (Category 3) within the Development Envelope over a two-year rolling average period.</p>	<p>Response actions to early response indicator criteria may include, but are not limited to:</p> <ul style="list-style-type: none"> • Increase the extent of the monitoring to Low Value Ghost Bat Caves or alternative locations that the Ghost Bats may use e.g. culverts. • Include additional monitoring methods such as the use of black infrared motion detection cameras and full spectrum recording to supplement scat analysis. • Investigate the potential causes of the lack of records. 	<p>Bimonthly monitoring to include:</p> <ul style="list-style-type: none"> • Scat collection (bimonthly and outside of when pups are typically present, i.e., no monitoring between October and December). <p>The monitoring¹ will be undertaken at:</p> <ul style="list-style-type: none"> • The Retained High Value Ghost Bat Caves – AC13, AC14, AC17, AC18², SF4, SF5, SF8, SF14, SF18, SF26 and SF27; • The High Value Ghost Bat Caves to be disturbed³ – AC1, AC2, AC5, AC6, AC8, AC9 and SF6; 	<p>Internal Data Entry and Data Review</p> <p>Data is internally reviewed and entered into the database on receipt of the bimonthly report card. Results are verified on receipt of the annual report delivered by the consultant.</p> <p>Annual Reporting</p> <p>Include a summary of the exceedance of the indicator and the response implemented in the annual Compliance Assessment Report.</p>

¹ Figure 2 of MS1072 Schedule 1 depicts caves that are approved for disturbance mining. Monitoring will only be undertaken if access to the sites can be undertaken in accordance with BHP's safety requirements

² The Retained High Value Ghost Bat Cave AC18 currently cannot be accessed for bimonthly monitoring due to safety concerns as this cave is located within 250 m of active mining by Rio Tinto. Monitoring is proposed to commence when safe access can be re-established, such as when Rio Tinto mining activities cease

³ The disturbance timing of these High Value Ghost Bat Caves will be dependant on the mine plan.

Outcome-based components			
Environmental Criteria: Trigger and Threshold Criteria for Population Outcome [Condition 7-1 (1)]	Response actions: <ul style="list-style-type: none"> • Early Response Indicator actions • Trigger Level actions • Threshold contingency actions 	Monitoring	Reporting
		<ul style="list-style-type: none"> • Low Value caves with occasional (Category 3) occupancy (e.g., SF3, SF9, SF24, SF28 and SF30). • Artificial roost(s); and • Contextual sites (e.g., CTAN-01, CTAN-06, CTAN-31, CMUD-01, CMUD-02, CMUD-08, CMUD-10, CMUD-47, CMUD-63, CMUD-64). <p>Locations are shown in Figure 4 and Figure 5.</p>	
<p>Trigger</p> <p>Ghost Bat records from scats, recordings or observations from less than five High Value or Low Value caves with occasional occupancy (Category 3) within the Development Envelope over a three-year rolling average period.</p> <p>Or</p> <p>The average number of Ghost Bat individual genotypes (from scats) is less than four from High Value or Low Value caves with occasional (Category 3) or regular (Category 2) occupancy within the Development Envelope over a two-year rolling average period.</p> <p>Or</p> <p>Pregnant females (as determined from hormone analysis) recorded at less than four High Value or Low Value caves with occasional (Category 3) or regular (Category 2) occupancy within the Development Envelope over a two-year rolling average period.</p> <p>Threshold</p> <p>Ghost Bat records from scats, recordings or observations from less than five High Value or Low Value caves with occasional (Category 3) occupancy within the Development Envelope over a four-year rolling average period.</p> <p>Or</p> <p>The average number of Ghost Bat individual genotypes (from scats) is less than four from High Value Ghost Bat Caves or Low Value caves with occasional (Category 3) occupancy within the</p>	<p>Response actions to trigger criteria exceedance may include, but are not limited to:</p> <ul style="list-style-type: none"> • Increase the extent of the monitoring to Low Value Ghost Bat Caves or alternative locations that the Ghost Bats may use e.g. culverts; • Include additional monitoring methods such as the use of black infrared motion detection cameras and full spectrum recording to supplement scat analysis; • Investigate regional trends by comparing changes to results with results from other BHP Ghost Bat monitoring programs, including contextual caves (Figure 5); • Undertake analyses of population size to determine if population viability is being maintained or not; • Investigate other contributing factors in the area e.g. climate, fire; • Construction of artificial cave(s); and • Increase buffers on retained High Value Ghost Bat Caves. <p>Response actions to threshold criteria exceedance may include, but are not limited to, those listed for a trigger criteria and:</p> <ul style="list-style-type: none"> • Increase buffers on remaining High Value Ghost Bat Caves; • Changing or ceasing blasting within the buffer areas; and • Modify or cease mining excavations within the buffer areas. 	<p>Bimonthly monitoring to include:</p> <ul style="list-style-type: none"> • Scat collection (bimonthly and outside of when pups are typically present, i.e., no monitoring between October and December); • genetic analysis of the scats collected at the above periods with analyses undertaken on an annual basis; and • hormone analysis (scats collected annually in early September). <p>The monitoring⁴ will be undertaken at:</p> <ul style="list-style-type: none"> • The Retained High Value Ghost Bat Caves – AC13, AC14, AC17, AC18², SF4, SF5 and SF8, SF14, SF18, SF26 and SF27; • Low Value caves with occasional (Category 3) occupancy that have recorded Ghost Bats presence (e.g., SF3, SF9, SF24, SF28 and SF30); • Artificial roost(s); and • Contextual caves (e.g., CTAN-01, CTAN-06, CTAN-31, CMUD-01, CMUD-02, CMUD-08, CMUD-10, CMUD-47, CMUD-63, CMUD-64). <p>Locations are shown in Figure 4 and Figure 5.</p>	<p>Internal Data Entry and Data Review</p> <p>Data is internally reviewed and entered into the database on receipt of the bimonthly report card. Results are verified on receipt of the annual report delivered by the consultant.</p> <p>Annual reporting</p> <p>An annual Compliance Assessment Report will be submitted as part of the BHP Annual Environment Report, which will be submitted to the DWER by 1 October each year and shall meet the requirements in Condition 3 (Compliance Reporting).</p> <p>A summary of any exceedances of the trigger and threshold, and the response implemented will be included in the annual Compliance Assessment Report.</p> <p>BHP will annually provide the results of the monitoring program to DBCA.</p> <p>Exception reporting</p> <p>If threshold criteria has been exceeded:</p> <ul style="list-style-type: none"> • Condition 3-5 Notification of potential non-compliance in the event of exceedance of threshold criteria, will be provided to the DWER within 7 days of that potential non-compliance being known or suspected. • Condition 7-7 In the event of exceedance of threshold criteria, the proponent shall meet the requirements in condition 3 (Compliance Reporting) and shall implement the measures outlined in the Plan, including, but not limited to, actions and investigations to be undertaken, and reporting to the CEO. <p>Research program</p> <p>Condition 7-9 on 20 February 2023, a report was provided to the DWER that detailed how research undertaken by the proponent on Ghost Bat populations demonstrates that the outcomes in condition 7-1 will be met.</p>

Outcome-based components			
Environmental Criteria: Trigger and Threshold Criteria for Population Outcome [Condition 7-1 (1)]	Response actions: <ul style="list-style-type: none"> • Early Response Indicator actions • Trigger Level actions • Threshold contingency actions 	Monitoring	Reporting
<p>Development Envelope over a four-year rolling average period.</p> <p>Or</p> <p>Pregnant females (as determined from hormone analysis) recorded at less than four High Value Ghost Bat Caves or Low Value caves with occasional (Category 3) occupancy within the Development Envelope over a four-year rolling average period.</p>			

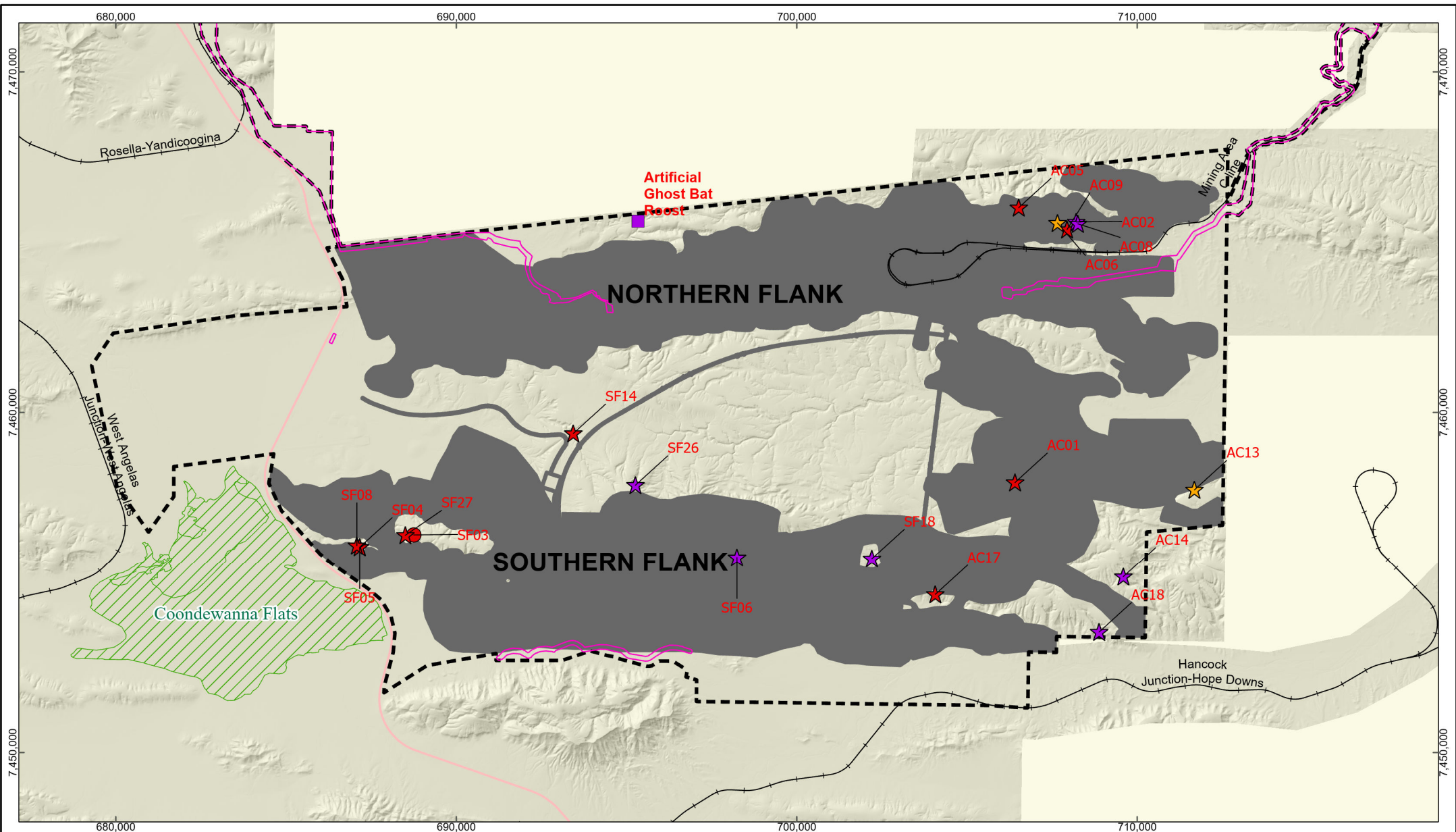
¹Low impact disturbance (e.g. LV tracks) has occurred within the trigger areas prior to 20 February 2018 when MS1072 was granted. These 'low impact' disturbance areas may continue to be utilised (e.g. LV tracks for monitoring access), or may be subject to progressive rehabilitation, without triggering a potential non-compliance.

²The Retained High Value Ghost Bat Cave AC18 currently cannot be accessed for two-monthly monitoring due to safety concerns as this cave is located within 250 m of active mining by Rio Tinto. Monitoring is proposed to commence when safe access can be re-established, such as when Rio Tinto mining activities cease.

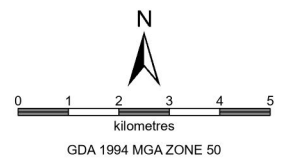
Outcome-based components			
Trigger and Threshold Criteria for Disturbance Outcome [Condition 7-1 (2)]	Response actions	Monitoring	Reporting
<p>Early Response indicator</p> <p>Land disturbance occurs 300 m from the extent of:</p> <ul style="list-style-type: none"> Retained High Value Ghost Bat caves (i.e., AC13, AC14, AC17, AC18², AC32, SF4, SF5, SF8, SF14, SF18, SF26 and SF27 (Figure 6 to Figure 12)). 	<p>Response actions to early response indicator criteria may include, but are not limited to:</p> <ul style="list-style-type: none"> Establish the location and extent of the ground disturbance. 	<p>Undertake satellite or aerial imagery capture within 2 months of completion of the land disturbance (spatial footprint and hectares).</p>	<p>Annual Reporting</p> <p>Include a summary of the exceedance of the indicator and the response implemented in the annual compliance assessment report.</p>
<p>Trigger</p> <p>Mining or excavation¹ occurs within 150 m from the extent of:</p> <ul style="list-style-type: none"> Retained High Value Ghost Bat Caves (i.e., AC13, AC14, AC17, AC18², AC32, SF4, SF5, SF8, SF14, SF18, SF26 and SF27 [Figure 6 to Figure 12]). 	<p>Response actions to trigger criteria exceedance may include, but are not limited to:</p> <ul style="list-style-type: none"> Survey the location and extent of the ground disturbance; Establish if the cave has been damaged or disturbed; Establish if Ghost Bats are present and or continuing to utilise the cave; Direct rehabilitation of the disturbance within the 150 m trigger areas; Assess the extent of the damage e.g. cave internal conditions; Investigations as to why Ghost Bats may not be present; Investigate the cause that led to the disturbance event; and Construction of an artificial cave/s. 	<p>Baseline mapping of High Value Ghost Bat Caves (that will not be disturbed with the first 5 years of mining) to determine the extent of each cave, completed within 2 years of the approval of the plan.</p> <p>Quarterly land disturbance reconciliation (spatial footprint and hectares) undertaken within cave buffer areas.</p> <p>Annual land disturbance reconciliation (spatial footprint and hectares) undertaken across MS1072 Development Envelope and detailed review undertaken within cave buffer areas.</p>	<p>Annual reporting</p> <p>An annual Compliance Assessment Report will be submitted as part of the BHP Annual Environment Report, which will be submitted to the DWER by 1 October each year and shall meet the requirements in Condition 3 (Compliance Reporting).</p> <p>A summary of any exceedances of the trigger and threshold, and the response implemented will be included in the annual Compliance Assessment Report.</p> <p>Exception reporting</p> <p>If a threshold criteria has been exceeded</p> <ul style="list-style-type: none"> Condition 3-5 Notification of potential non-compliance in the event of exceedance of threshold criteria, will be provided to the DWER within 7 days of that potential non-compliance being known or suspected. Condition 7-7 In the event of exceedance of threshold criteria, the proponent shall meet the requirements in condition 3 (Compliance Reporting) and shall implement the measures outlined in the Plan, including, but not limited to, actions and investigations to be undertaken, and reporting to the CEO.
<p>Threshold</p> <p>Land disturbance occurs within 50 m from the extent of:</p> <ul style="list-style-type: none"> Retained High Value Ghost Bat Caves (i.e., AC13, AC14, AC17, AC18², AC32, SF4, SF5, SF8, SF14, SF18, SF26 and SF27 [Figure 6 to Figure 12]). 	<p>Response actions to threshold criteria exceedance may include, but are not limited to, those listed for a trigger criteria and:</p> <ul style="list-style-type: none"> Increase buffers on remaining High Value Ghost Bat Caves; Changing or ceasing blasting within the buffer areas; and Modify or cease mining excavations within the buffer areas. 		

¹Low impact disturbance (e.g. LV tracks) has occurred within the trigger areas prior to 20 February 2018 when MS1072 was granted. These 'low impact' disturbance areas may continue to be utilised (e.g. LV tracks for monitoring access), or may be subject to progressive rehabilitation, without triggering a potential non-compliance.

² The Retained High Value Ghost Bat cave AC18 currently cannot be accessed for two-monthly monitoring due to safety concerns as this cave is located within 250 m of active mining by Rio Tinto. Monitoring is proposed to commence when safe access can be re-established, such as when Rio Tinto mining activities cease.



- Priority Ecological Community
- MS1072 Indicative Disturbance Area
- Significant Amendment Development Envelope
- Significant Amendment Indicative Footprint
- Great Northern Highway
- Existing Rail
- Low value caves with occasional occupancy (Category 3)
- Artificial Ghost Bat Roost (Category 4)
- High value caves to be monitored**
- Category 2
- Category 3
- Category 4



BHP **PUBLIC**

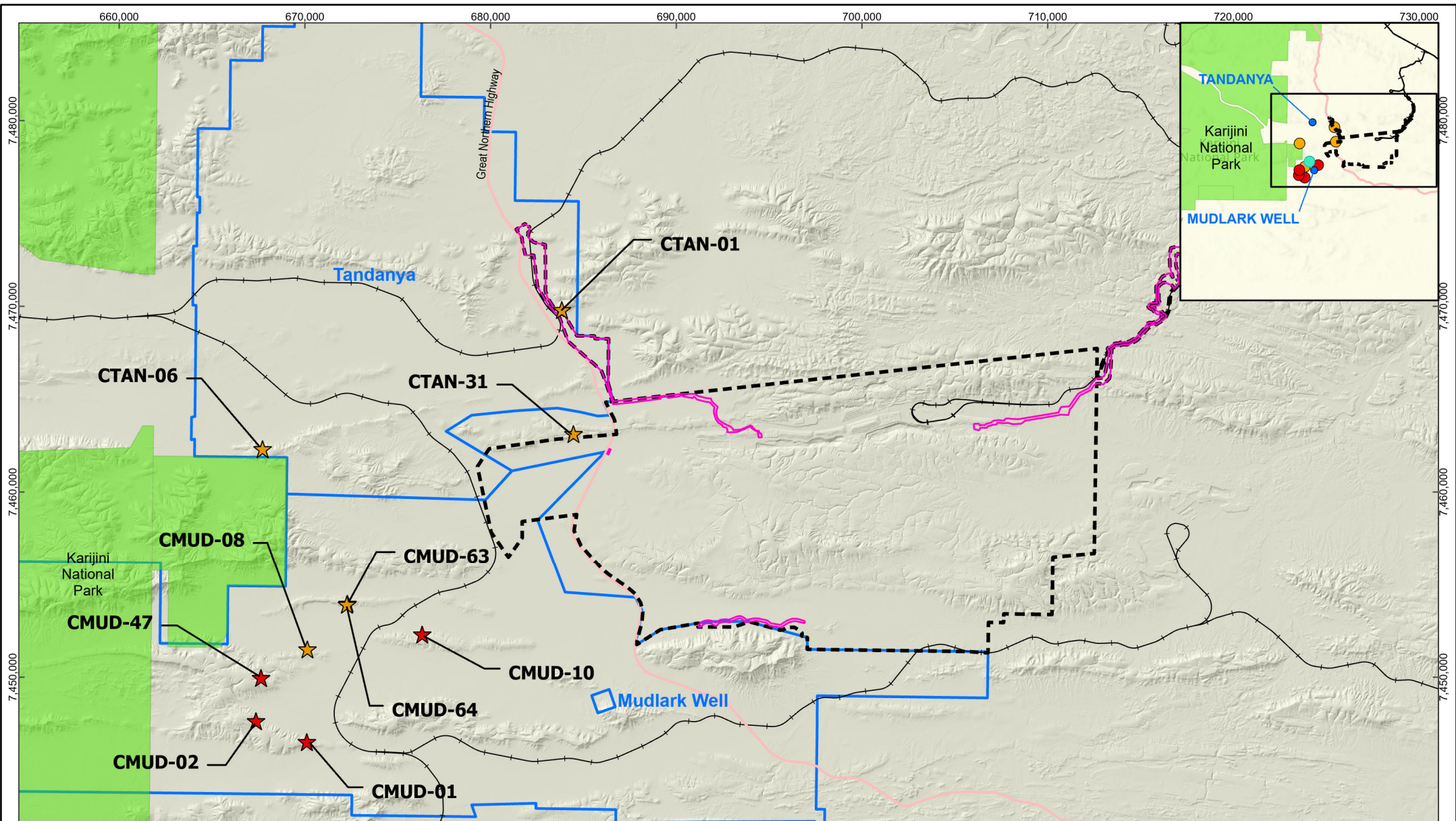
**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
GHOST BAT MONITORING LOCATIONS**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:150,000 PREPARED: GEOMATICS FIGURE: 4

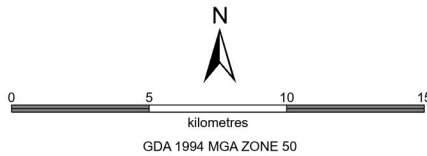
DATE: 28/11/2024 REQUESTOR: ENV APPROVALS

NO: **A1285_064 RevA**



Contextual Ghost Bat Caves

- ★ Category 2
- ★ Category 3
- Principal Road
- Existing Rail
- National Park
- - - Significant Amendment Development Envelope
- Significant Amendment Indicative Footprint



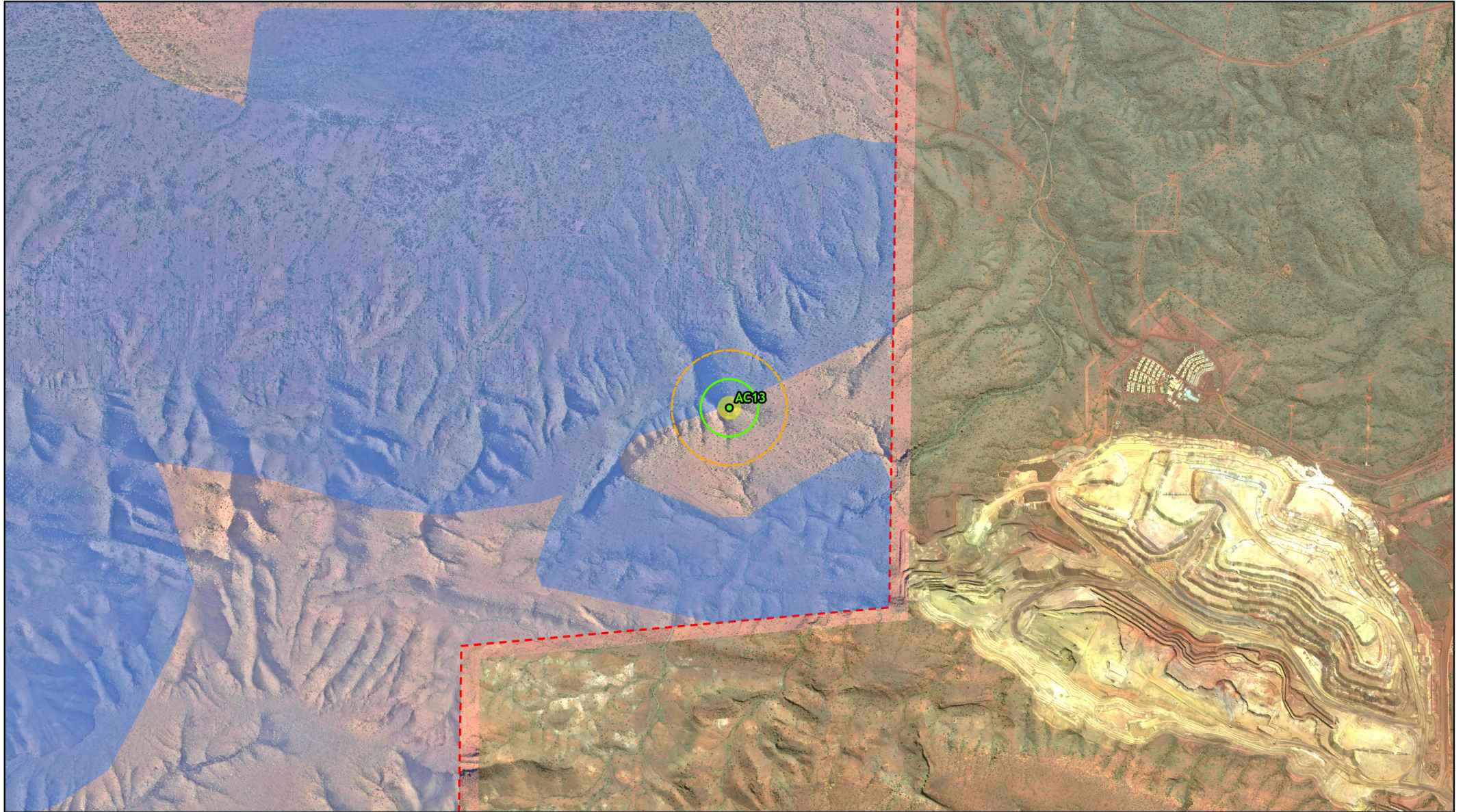
BHP **PUBLIC**

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
GHOST BAT CONTEXTUAL SITES**

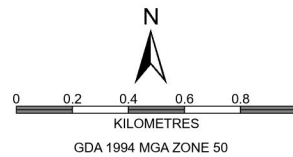
WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:275,000 PREPARED: GEOMATICS FIGURE: 5
 DATE: 27/11/2024 REQUESTOR: ENV APPROVALS

NO: **A1285_069_RevA**



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



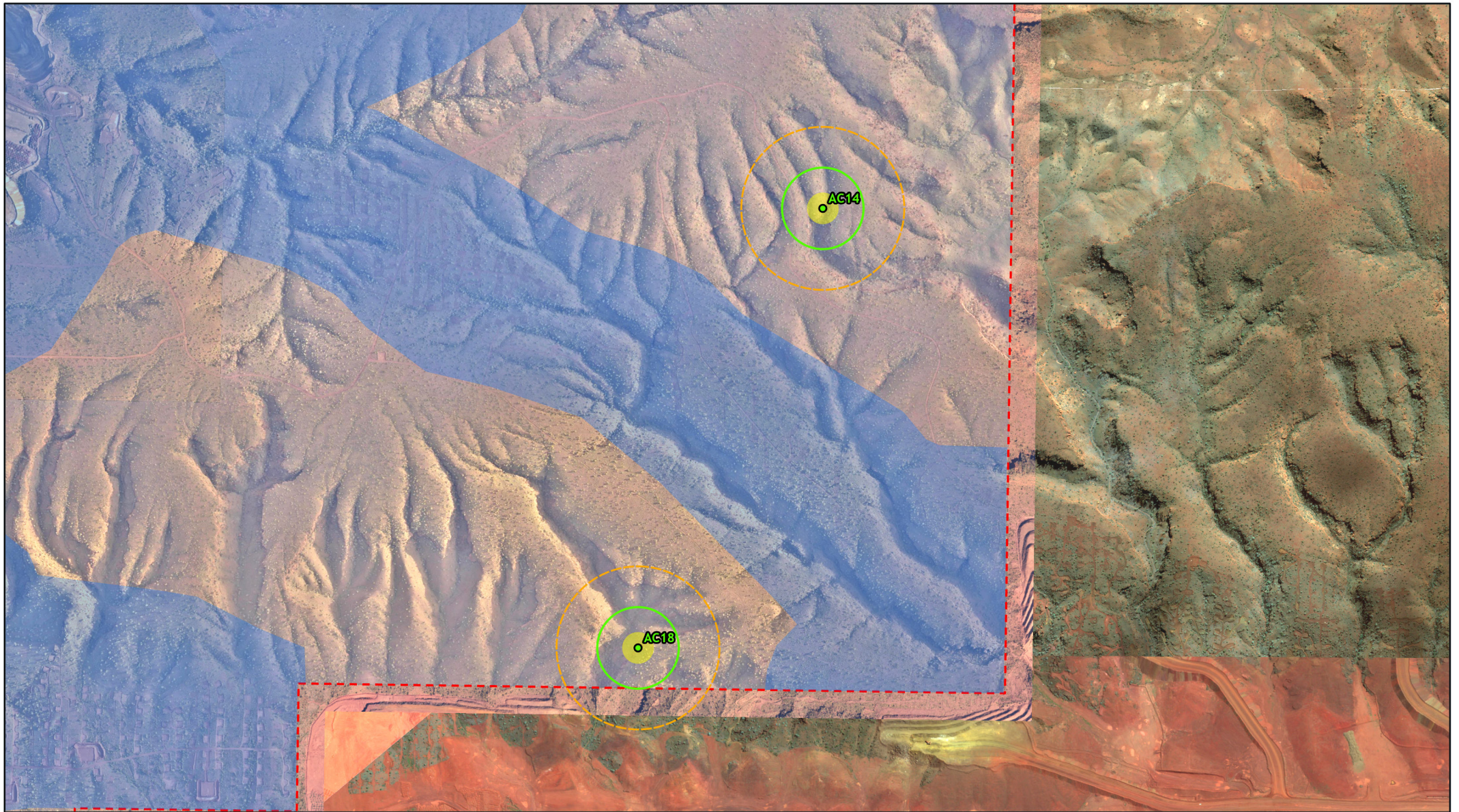
BHP PUBLIC

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

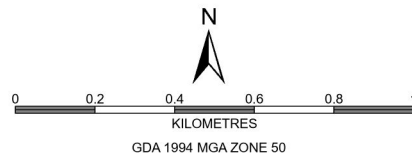
AC13 High value cave.

WAI0 PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4:	1:27,000	REQUESTOR:	ENV. APPROVALS	FIGURE:	6
DATE:	29/11/2024	PREPARED:	GEOMATICS	NO:	A1285-070 RevA
		REVIEWED:			



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



BHP PUBLIC

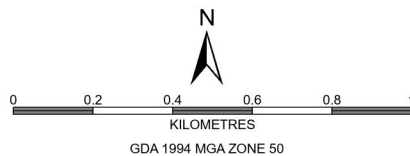
**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

**AC14, AC18 High value caves.
WAI0 PLANNING, TECHNICAL AND ENVIRONMENT**

SCALE @ A4:	1:19,000	REQUESTOR:	ENV. APPROVALS	FIGURE:	7
DATE:	29/11/2024	PREPARED:	GEOMATICS	NO:	A1285-070 RevA
		REVIEWED:			



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



BHP PUBLIC

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

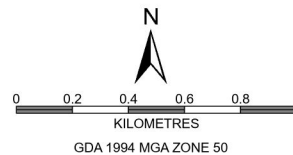
SF18 High value cave.

WAI0 PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:19,000 REQUESTOR: ENV. APPROVALS FIGURE: 8
 DATE: 29/11/2024 PREPARED: GEOMATICS NO: A1285-070 RevA
 REVIEWED:



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



BHP PUBLIC

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

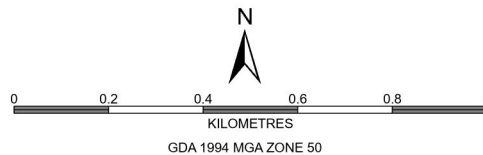
SF14, SF26 High value caves.

WAO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4:	1:27,000	REQUESTOR:	ENV. APPROVALS	FIGURE:	9
DATE:	29/11/2024	PREPARED:	GEOMATICS	NO:	A1285-070 RevA
		REVIEWED:			



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



BHP PUBLIC

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

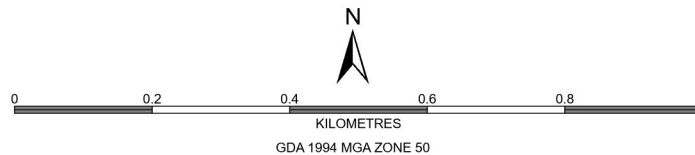
SF27 High value cave.

WAI0 PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:16,000	REQUESTOR: ENV. APPROVALS	FIGURE: 10
DATE: 29/11/2024	PREPARED: GEOMATICS	NO: A1285-070 RevA
	REVIEWED:	



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



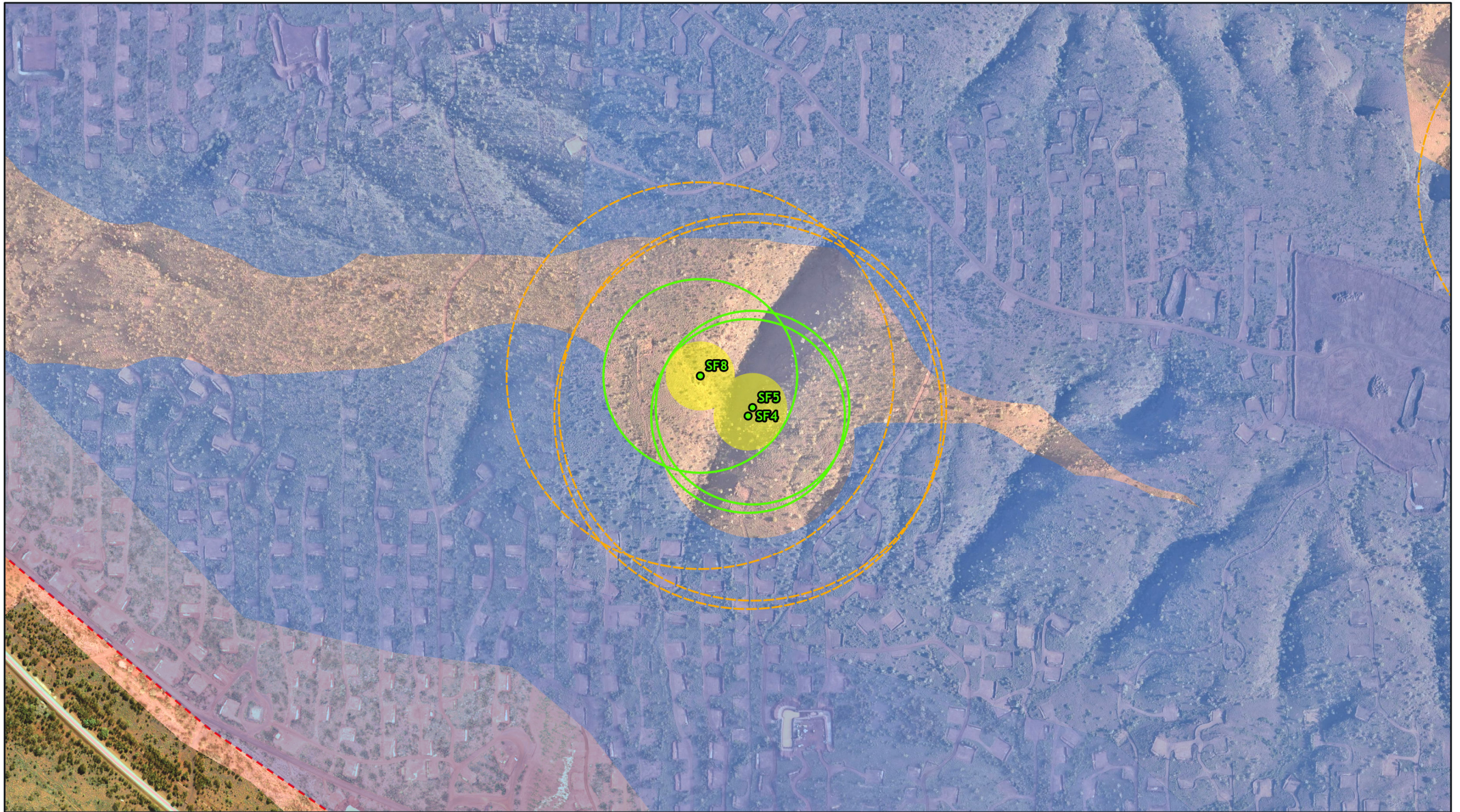
BHP PUBLIC

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

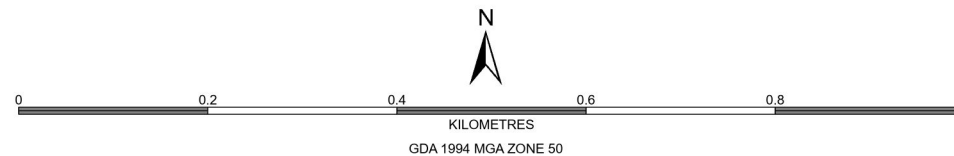
AC17 High value cave.

WAI0 PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4:	1:11,000	REQUESTOR:	ENV. APPROVALS	FIGURE:	11
DATE:	29/11/2024	PREPARED:	GEOMATICS	NO:	A1285-070 RevA
		REVIEWED:			



- Ghost Bat cave to be retained - High value
- Ghost Bat cave threshold area
- Ghost Bat cave 150m trigger area
- Early response indicator
- MS1072 Indicative Disturbance Area
- MS1072 Approval Boundary



BHP PUBLIC

**MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
RETAINED HIGH VALUE GHOST BAT CAVES
AND BUFFERS**

**SF4, SF5, SF8 High value caves.
WAO PLANNING, TECHNICAL AND ENVIRONMENT**

SCALE @ A4: 1:8,000 REQUESTOR: ENV. APPROVALS FIGURE: 12
 DATE: 29/11/2024 PREPARED: GEOMATICS REVIEWED: NO: A1285-070 RevA

3 Adaptive management and review of the EMP

3.1 Adaptive management approach

BHP applies an adaptive management framework for implementing management measures identified in this EMP, which is consistent with the Instructions. Adaptive management is a structured, iterative process to decision making. The framework embeds a cycle of monitoring, reporting and implementing change where required. It allows an evaluation of the management and mitigation measures so that they are progressively improved and refined, or alternative solutions adopted, to ensure that environmental objectives and outcomes in the plan are achieved. The key steps of the adaptive management approach are outlined in Figure 13:.

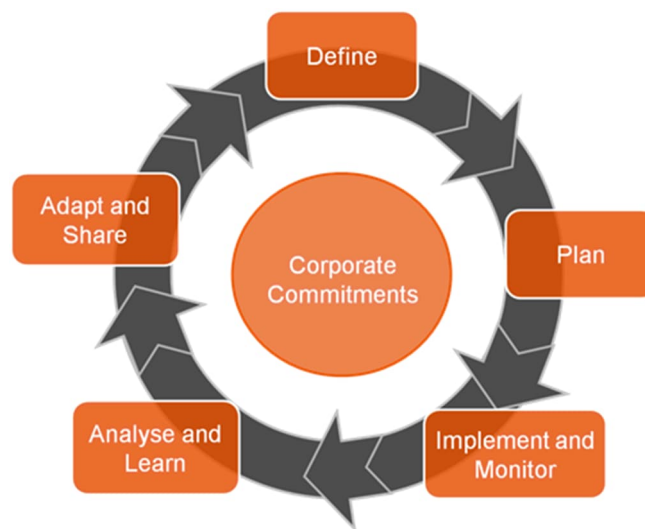


Figure 13: BHP’s adaptive management approach

Where the EMP is a requirement of a MS condition, BHP notes that if it chooses to amend an EMP provision in Table 5 based on information gained through adaptive management, it must seek formal approval from the Department of Water and Environmental Regulation (DWER).

3.1.1 Early Response Indicators

BHP has included Early Response Indicators as part of our adaptive management approach. According to EPA (2024) these provide information on changes that are precursors to an environmental impact and allow initiation of early response actions before or at the onset of an environmental impact. Early Response Indicators are considered useful in dealing with complex environmental systems where trends need to be established or where the consequence of potential impacts are not well understood. As there are still knowledge gaps in the population dynamics of Ghost Bats at Mining Area C, the adoption of Early Response Indicators were considered appropriate in the components developed for this EMP.

If the Early Response Indicators are exceeded, BHP will initiate early response actions which may include increasing the extent of monitoring to other areas within the Development Envelope, including additional monitoring methods, investigating the possible causes of lack of Ghost Bat records and establishing the extent of ground disturbance (refer to Response Actions in Table 5).

3.2 Review and update of this EMP

BHP will review this EMP (and update it if required), to ensure that it achieves the identified environmental objectives and meets MS conditions. A review may arise from the following:

- 1) Where required by a MS condition.
- 2) If initiated by BHP as part of the adaptive management process.
- 3) If triggered by a MS condition (e.g. for exceedance of trigger and/or threshold criteria).

Changes to the endorsed version of the EMP may arise from the following:

- 1) BHP reviews the EMP if the EPA or relevant government agencies develop new, or amend existing guidance or policy.
- 2) BHP adds components when a new operation (or change to an existing operation) is proposed.
- 3) BHP adds or amends components when new proposals are approved and conditioned through Part IV of the EP Act or due to a change to MS conditions.
- 4) The CEO of DWER directs BHP to revise the EMP.
- 5) The CEO of DWER confirms by notice in writing that it has been demonstrated that the objective and/or outcome in the relevant condition is being and will continue to be met and therefore implementation of certain condition requirements addressed in the EMP are no longer required.

BHP will commit to reviewing and updating the early response indicators, trigger criteria and threshold criteria based on monitoring and research information for the local Ghost Bat population as it becomes available. The first review was completed by 20 February 2023, to enable the utilisation of two years of Ghost Bat field monitoring data and Ghost Bat Research results required under MS1072. BHP will resubmit the management plan if the review recommends changes to the monitoring, trigger and thresholds or meets any of the above criteria.

In accordance with Condition 7-8, BHP will seek approval from the CEO in writing for any changes to Trigger Criteria, Threshold Criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions or Reporting in the Plan. In accordance with Condition 7-1 and where appropriate, BHP will consult with DBCA on proposed changes to this EMP prior to changes being implemented.

BHP may make minor and/or administrative changes to this EMP (i.e. excluding changes to components in Table 5) without seeking endorsement from DWER.

4 Stakeholder consultation

BHP has considered recent feedback from DWER-EPA Services and the DBCA on the previous version of this EMP (Ref March 2023) and EMPs for other operations in developing this EMP.

Condition 7-1 requires BHP to prepare this plan on the advice of the DBCA. BHP has endeavoured to engage with the DBCA at appropriate times throughout the development of this plan to date and consult with Ghost Bat subject matter experts where possible. BHP will consult with DBCA as part of ongoing research and as part of the adaptive management framework. DBCA has been consulted as outlined in Table 6 as a key stakeholder.

BHP will consult with government agencies (including decision-making authorities), local authorities, groups and individuals, where relevant, in future revisions of this EMP.

Table 6: BHP Stakeholder consultation for the Fauna Management Plan

Stakeholder	Date of Consultation	Description of Consultation	Topics / Issues Raised	BHP Response
DWER-EPA Services	July 2019	Document Review of Comments (Ref DWERA – 001051)	The recommended changes to the plan included: <ul style="list-style-type: none"> • A precautionary approach applied to the trigger and threshold criteria; • Further information to support that the proposed monitoring is appropriate; and • Further information on proposed contingency actions. 	BHP has considered the recommendations and made amendments to the plan (Rev 1).
DBCA	4 October 2017	Meeting with Science & Conservation Division	Meeting with DBCA and BHP's fauna consultants to discuss proposed research work to be undertaken between 2017 and 2018. The purpose of this research work is to further understand the population genetics of Ghost Bats at Mining Area C and South Flank and surrounds and to determine key areas of foraging habitat. The DBCA confirmed that the approach is suitable for the key aims. The DBCA is providing the genetics services for the project.	BHP has developed a research proposal for Ghost Bats for review and endorsement by DBCA.
	27 March 2018	Meeting with Environmental Management branch	Meeting to discuss draft Schedule 4 – Ghost Bat Management Plan, to address the requirements of MS1072. DBCA requested a copy of the contextual information within the Biodiversity EMP to support Schedule 4.	Contextual information within the Biodiversity EMP to support Schedule 4 provided on 13 April 2018.
	July 2019	Document Review of Comments (Ref DWERA – 001051)	The recommended changes included: <ul style="list-style-type: none"> • A precautionary approach applied to the trigger and threshold criteria; • Further information to support that the proposed monitoring is appropriate; and • Further information on proposed contingency actions. 	BHP has considered the recommendations and made amendments in this version of the plan (Rev 1).

Stakeholder	Date of Consultation	Description of Consultation	Topics / Issues Raised	BHP Response
	16 August 2019	Meeting with Science & Conservation Division	<p>Meeting to discuss:</p> <ul style="list-style-type: none"> Existing monitoring programs managed by the DBCA for Pilbara Leaf-nosed Bat, Pilbara Olive Python and Ghost Bat including any key outcomes and limitations of the programs. Opportunities to undertake research or address key knowledge gaps for the Ghost Bat, Pilbara Leaf-nosed Bat, and Pilbara Olive Python. 	BHP to engage with key consultants and other Ghost Bat expertise.
	8 October 2019	Meeting with Science & Conservation Division	<p>Meeting to discuss:</p> <p>Future research to be undertaken by the DBCA on genetic analysis and sex determination from scat samples of Ghost Bats and partnership with BHP.</p>	BHP will be a joint partner in research on genetic analysis and sex determination in Ghost Bats undertaken by the DBCA.
	5 Feb 2020	Request meeting to discuss changes to the plan and follow up phone conversation	DBCA advised the department was comfortable with providing advice via the EPA process. Should the changes significantly vary from the advice provided by the DBCA, then a pre-submission consultation was recommended between the DBCA, TEB and BHP.	BHP advised that the changes are consistent with the advice provided by DBCA. BHP to submit the revised plan to DWER.
	14 July 2020	Meeting with Science & Conservation Division	Joint consultation session with DBCA and officers of the EPA Services to explain rationale behind revised triggers and thresholds using BHP baseline Ghost Bat data available to date and review monitoring methods and management responses.	BHP has considered the recommendations and made amendments in this version of the plan (Rev 1). As requested, BHP has provided the presentation material to the DBCA (and EPA Services).

Stakeholder	Date of Consultation	Description of Consultation	Topics / Issues Raised	BHP Response
Local expertise	19 August 2019	BatCall WA: Bob Bullen Biologic: Morgan O'Connell, Chris Knuckey and Norm Mackenzie	Ghost Bat Workshop for to discuss: <ul style="list-style-type: none"> • Monitoring methods • What we know • Population definitions • Limitations • Future areas of research required. 	BHP has considered the advice of subject matter experts in the development of this plan.

5 Changes to the EMP

Table 7 summarises the key changes in this version of the FMP (Version 2.3) compared to the version currently endorsed by EPA (Version 1.1).

Table 7. Changes to the EMP.

Complexity of changes		Minor revisions	Moderate revisions ✓	Major revisions
Number of key environmental factors		1 ✓	2-3	>3
Date revision submitted to EPA	August 2022			
Proponent's operational requirement timeframe for approval of revision	< One month	< Six months ✓	> Six months	None
Reason for timeframe	The proposal has been implemented and are in operations. Six months is required to work through internal management of change processes.			

Item no.	EMP section	EMP page no.	Summary of change	Reason for change
1.	1	16, 17 and 22	Addition of recordings and observations to monitoring techniques for measuring Ghost Bat presence within the Development Envelope.	Relying on scat presence alone may be problematic to demonstrate cave utilisation by ghost bats. For example, if Ghost Bats are present within the cave, the monitoring team will exit the cave without collecting scats to reduce the likelihood of disturbing the observed bats. Therefore, it is proposed to include observations to address the environmental criteria. Furthermore, supplementary data, such as ultrasonic recorders and video cameras may provide additional information compared scat sampling and observations alone. Creating a more robust dataset.
2.	1 and 2	16-18, 27 and 28	Environmental Criteria to focus on the presence of Ghost Bats at caves within the Development Envelope rather than their absence.	The proposed change will better demonstrate the ongoing presence of Ghost Bats within the Development Envelope and aligns with the objective of the environmental outcome; to maintain the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope.
3.	1 and 2	16, 17, 22, 24 and 27-29	Environmental Criteria to include all caves with history of Ghost Bat utilisation, not just High Value Ghost Bat Caves.	Caves were determined as High Value Ghost Bat Caves due to their complex structure and therefore perceived Ghost Bat utilisation. Monitoring data collected has demonstrated that Ghost Bats utilise other Low Value Ghost Bat Caves as well as High Value Ghost Bat Caves. To understand Ghost Bat movements, effectively manage their roost habitat and more accurately address the Environmental Outcome of maintaining a viable population of Ghost Bats within the Development Envelope, the latest revision of the FMP includes those other (Low Value) Ghost Bat caves with records of Ghost Bat presence.
4.	1 and 2	17-19	Increase in the assessment period for	The rationale for the proposed change is to

Item no.	EMP section	EMP page no.	Summary of change	Reason for change
		and 27-29	Environmental Criteria to remove seasonal variation and to reflect trends of the generation length of a Ghost Bat.	<p>utilise long-term datasets to remove seasonal variation that could occur in response to natural causes (e.g., limited rainfall, fire). The Threshold assessment period (for Ghost Bat presence, number of genotypes and elevated progesterone) was selected as it represents half of the Ghost Bat generational length (i.e., eight years). Therefore, the Threshold will enable us to monitor shifting trends over half of a generation to remove seasonal variation in comparison to baseline years. Generation lengths are used to assess potential species declines over time as a result of operational impacts.</p> <p>The Trigger assessment period (for Ghost Bat presence) was selected as it represents just over one third of a Ghost Bat generation length. This will provide information on trends within a relatively shorter period that will allow for BHP to respond by taking actions listed Table 5 of the MS1072 Ghost Bat FMP. The Trigger assessment period (for number of genotypes and elevated progesterone) was selected as it represents one quarter of the generation length of a Ghost Bat. This allows for seasonal variation to be minimised.</p> <p>Similarly, the Early Response Indicator assessment period (for Ghost Bat presence) was selected as it is also one quarter of a Ghost Bat generation length allowing for seasonal variation to be minimised.</p>
5.	1 and 2	17-19 and 27-29	The acceptance limit of the environmental criteria has been calculated by subtracting the average of the metric in question by the SEM for baseline records (i.e., data collected prior to the 20 February 2018).	This method accounts for natural absences in by subtracting the SEM from the average number of records across baseline years.
N/A	1	1 to 2	A description of the Central Pilbara Hub Surplus Water Stage 1 Proposal, which is a significant amendment to the existing Mining Area C - South Flank (MAC-SF mine), has been added to the document.	To support the Central Pilbara Hub Surplus Water Stage 1 significant amendment Proposal and to continue to meet the requirements of MS1072 Condition 7, including the anticipated updated implementation conditions of the significant amendment.

6 References

- Armstrong, K.N., Woinarski, J.C.Z., Hanrahan, N.M. & Burbidge, A.A. (2021) *Macroderma gigas* (amended version of 2019 assessment). The IUCN Red List of Threatened Species 2021: e.T12590A209530568. <https://dx.doi.org/10.2305/IUCN.UK.2021-3.RLTS.T12590A209530568.en>. Accessed on 04 February 2022.
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Appendices

Appendix 1: Summary of Caves, Value, Categorisation, Location, Disturbance Commitment and Monitoring Frequency

Cave ID.	Value (Biologic 2016)	Categorisation (Bat Call WA 2021)	Location	Disturbance Commitment	Monitoring Frequency
AC1	High	Category 2	Development Envelope	Impact	Bimonthly
AC2	High	Category 4	Development Envelope	Impact	Bimonthly
AC3	High	Category 3	Development Envelope	Impact	N/A ¹
AC4	High	Category 4	Development Envelope	Impact	N/A ¹
AC5	High	Category 2	Development Envelope	Impact	Bimonthly
AC6	High	Category 3	Development Envelope	Impact	Bimonthly ²
AC7	Low	Category 4	Development Envelope	Impact	Triennially
AC8	High	Category 4	Development Envelope	Impact	Bimonthly
AC9	High	Category 2	Development Envelope	Impact	Bimonthly
AC11	Low	Category 4	Development Envelope	Impact	N/A ³
AC12	Low	Category 4	Development Envelope	Impact	Triennially
AC13	High	Category 3	Development Envelope	Retain	Bimonthly
AC14	High	Category 4	Development Envelope	Retain	Bimonthly
AC15	Low	Category 4	Development Envelope	Retain	Triennially
AC16	Low	Category 4	Development Envelope	Impact	Triennially
AC17	High	Category 2	Development Envelope	Retain	Bimonthly
AC18	High	Category 4	Development Envelope	Retain	Bimonthly ⁴
AC19	Low	Category 4	Development Envelope	Impact	N/A ⁵
AC20	Low	Category 4	Development Envelope	Retain	N/A ⁵
AC25	Low	Category 4	Development Envelope	Impact	Triennially
AC26	Low	Category 4	Development Envelope	Retain	Triennially
AC27	Low	Category 4	Development Envelope	Retain	Triennially
AC28	Low	Category 4	Development Envelope	Impact	Triennially
AC29	Low	Category 4	Development Envelope	Impact	Triennially
AC30	Low	Category 4	Development Envelope	Impact	Triennially
AC31	Low	Category 4	Development Envelope	Impact	N/A ⁵
AC32	High	Category 3	Development Envelope	Retain	N/A ⁶
AC34	Low	Category 4	Development Envelope	Impact	Triennially
AC37	Low	Category 4	Development Envelope	Impact	Triennially

Cave ID.	Value (Biologic 2016)	Categorisation (Bat Call WA 2021)	Location	Disturbance Commitment	Monitoring Frequency
AC38	Low	Category 4	Development Envelope	Impact	Triennially
SF1	High	Category 2	Development Envelope	Impact	N/A ¹
SF2	High	Category 3	Development Envelope	Impact	N/A ¹
SF3	Low	Category 3	Development Envelope	Retain	Bimonthly
SF4	High	Category 4	Development Envelope	Retain	Bimonthly
SF5	High	Category 2	Development Envelope	Retain	Bimonthly
SF6	High	Category 4	Development Envelope	Impact	Bimonthly
SF7	Low	Category 4	Development Envelope	Retain	Triennially
SF8	High	Category 2	Development Envelope	Retain	Bimonthly
SF9	Low	Category 4	Development Envelope	Retain	Bimonthly
SF10	Low	Category 4	Development Envelope	Retain	Triennially
SF11	Low	Category 4	Development Envelope	Impact	Triennially
SF12	Low	Category 4	Development Envelope	Impact	Triennially
SF13	Low	Category 4	Development Envelope	Impact	Triennially
SF14	High	Category 2	Development Envelope	Retain	Bimonthly
SF15	High	Category 4	Development Envelope	Impact	N/A ¹
SF16	Low	Category 4	Development Envelope	Impact	Triennially
SF17	High	Category 4	Development Envelope	Impact	N/A ¹
SF18	High	Category 4	Development Envelope	Retain	Bimonthly
SF19	Low	Category 4	Development Envelope	Impact	Triennially
SF20	Low	Category 4	Development Envelope	Retain	Triennially
SF21	Low	Category 4	Development Envelope	Retain	Triennially
SF22	Low	Category 4	Development Envelope	Impact	N/A ¹
SF23	Low	Category 4	Development Envelope	Impact	N/A ⁷
SF24	Low	Category 4	Development Envelope	Retain	Bimonthly
SF25	Low	Category 4	Development Envelope	Impact	Triennially
SF26	High	Category 4	Development Envelope	Retain	Bimonthly
SF27	High	Category 2	Development Envelope	Retain	Bimonthly
SF28	Low	Category 4	Development Envelope	Retain	Bimonthly
SF29	Low	Category 4	Development Envelope	Impact	Triennially
SF30	Low	Category 4	Development Envelope	Retain	Bimonthly

Cave ID.	Value (Biologic 2016)	Categorisation (Bat Call WA 2021)	Location	Disturbance Commitment	Monitoring Frequency
SF31	Low	Category 4	Development Envelope	Retain	Triennially
SF32	Low	Category 4	Development Envelope	Retain	Triennially
SF33	Low	Category 4	Development Envelope	Impact	Triennially
AMAC-01	Artificial Ghost Bat Cave	Category 4	Development Envelope	Retain	Bimonthly
CEPA-10	N/A	Category 3	East Packsaddle	N/A ⁸	Bimonthly
CMUD-01	N/A	Category 2	Mudlark Well	N/A ⁸	Bimonthly
CMUD-02	N/A	Category 2	Mudlark Well	N/A ⁸	Bimonthly
CMUD-08	N/A	Category 3	Mudlark Well	N/A ⁸	Bimonthly
CMUD-10	N/A	Category 2	Mudlark Well	N/A ⁸	Bimonthly
CMUD-47	N/A	Category 2	Mudlark Well	N/A ⁸	Bimonthly
CMUD-63	N/A	Category 3	Mudlark Well	N/A ⁸	Bimonthly
CMUD-64	N/A	Category 3	Mudlark Well	N/A ⁸	Bimonthly
CTAN-01	N/A	Category 3	Tandanya	N/A ⁸	Bimonthly
CTAN-06	N/A	Category 3	Tandanya	N/A ⁸	Bimonthly
CTAN-31	N/A	Category 3	Tandanya	N/A ⁸	Bimonthly

¹ Previously retained caves for five years which are now impacted. Removed from monitoring program.

² Cave unsafe to enter (entrance height >2m from ground).

³ Cave impacted at the time of submission.

⁴ Cave not currently available for monitoring due to safety concerns arising from its proximity to third-party mining operations.

⁵ Cave unsafe to access due to steep terrain.

⁶ Cave unsafe to access due to steep terrain and restricted entrance dimensions (height and width too narrow for safe entry/ egress).

⁷ Cannot be entered as the entrance is too small.

⁸ Contextual monitoring cave outside the Development Envelope. Therefore, not subject to any disturbance commitments as a part of MS 1072.

Appendix 2: Summary Ghost Bat Data for Components at Mining Area C

A) Total number of scats recorded on scat sheets at High Value, Low Value and contextual caves within and adjacent to Mining Area C during monitoring (bimonthly).

Cave Id.	Nov-15	Dec-15	Apr-16	May-16	Oct-16	Dec-16	May-17	Jun-17	Late Jun-17	Oct-17	Jan-18	Mar-18	May-18	Jul-18	Sep-18	Feb-19	May-19	Aug-19	Oct-19	Nov-19	Dec-19	Oct-20	Feb-21	May-21	Jul-21	Sep-21	Jan-22	Mar-22	May-22	Jul-22	Sep-22	Jan-23	Mar-23	May-23	Jul-23	Sep-23	Jan-24	Mar-24	May-24			
High value caves																																										
AC1	0	0	5	1500	150	0	—	2	—	0	15	0	0	—	60	0	450	70	0	0	0	0	0	0	0	0	0	—	—	0	2	0	0	0	0	2	10	0	0	0		
AC2	—	—	—	—	0	0	—	—	—	—	0	—	—	—	—	—	—	0	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AC5	—	—	—	—	5	0	—	—	—	15	3	0	0	—	3	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	32	3	39	0	0	0	0	0	0	0	0	
AC8	—	—	—	—	0	0	—	—	—	0	0	0	14	—	0	50	—	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	4	
AC9	—	—	—	—	0	0	—	—	—	300	50	3	20	—	0	250	—	300	75	50	2	100	400	200	40	0	10	—	—	—	400	2000	100	80	0	0	10	0	0	0		
AC13	0	0	0	0	9	9	—	—	—	—	—	—	—	—	—	—	2000	—	—	—	—	—	0	—	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
AC14	—	—	—	—	—	0	—	—	—	1	—	—	—	—	0	—	0	—	—	—	—	—	0	0	0	0	—	—	—	—	0	0	0	0	0	0	—	0	0	0	3	
AC17	2	1	2	0	500	0	—	40	—	800	35	0	0	—	—	—	400	0	5	0	0	—	0	—	0	150	0	6	50	30	0	0	0	0	38	0	0	0	0			
AC18	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	0	—	—	2	—	0	—	—	0		
SF2	0	13	2	3	—	30	30	—	—	0	—	300	0	—	40	—	14	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	0	0	51	0	1	0	0	
SF4	—	—	—	1	0	0	—	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	—	0	26	0	0
SF5	—	—	—	—	—	0	—	—	—	700	0	#	0	—	400	—	8	3000	3	0	0	0	0	0	200	20	2	2	0	0	4	0	7	0	—	—	220	10	2	0	0	
SF6	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—	3	0	—	—	—	—	0	0	0	0	0	0	0	2	0	0	0	0	0	0	—	—	—	—	—	
SF8	1	0	8	120	19	0	—	300	—	5700	2	0	0	—	350	—	0	3500	10	200	0	300	0	0	0	2000	0	400	#	#	500	2500	60	1	—	2000	5	0	200	0		
SF14	0	0	100	350	70	0	—	150	—	3	0	#	40	—	30	—	2	1	10	0	0	0	0	0	4	0	0	0	0	3	0	0	0	0	10	0	37	0	0			
SF18	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	—	0
SF26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	
SF27	0	0	0	7	0	0	—	—	—	35	0	—	40	—	—	—	60	2	0	0	0	0	0	0	0	0	0	1	500	0	0	0	0	20	1	—	—	4	0	0		
Low Value caves																																										
SF3	0	0	7	0	200	—	—	11	—	0	0	—	100	—	—	—	45	1	0	0	0	0	—	0	0	0	0	70	0	50	0	40	0	17	—	40	0	0	0	0		
SF9	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	0	1	—	—	—	—	—	—	0	0	30	0	0	00	0	2	0	0	0	0	0	0	0	0	0	
SF24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	0	2	0	0	0	0	0	1	0	0	0	0	0	0	—	0	
SF28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	40	0	—	30	75	9	—	5	0	300	10	3	0	0		
SF30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	
Contextual caves																																										
CEPA-10	0	0	3	0	50	0	—	—	—	100	0	—	0	—	0	0	14	250	2	0	0	0	0	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMUD-01	500	500	1500	2000	700	60	—	150	—	1	50	850	100	—	1100	40	0	4020	30	—	25	50	—	0	0	0	—	0	0	0	5	0	0	—	8	0	—	—	0	0		
CMUD-02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0	0	0	0	0	0	—	0	—	0	0	0	0	
CMUD-08	1	0	20	4	0	0	—	0	—	30	30	1	250	—	5	0	20	30	50	—	0	30	—	150	12	10	30	0	—	8	47	800	0	—	0	150	—	50	0	0		
CMUD-10	0	1	10	0	23	0	—	30	—	50	—	—	200	—	—	40	5	250	80	—	0	400	—	21	—	12	—	0	—	40	0	0	100	—	—	—	180	0	2	0		
CMUD-47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
CMUD-63	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
CMUD-64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
CTAN-01	6	75	30	10	400	0	—	—	—	2250	1250	—	2500	350	300	250	300	40	50	7	25	120	—	30	0	—	0	0	—	0	7	0	0	0	—	1500	—	23	0	0		
CTAN-06	0	0	0	150	4	0	—	10	—	0	0	1	1	—	0	2	0	30	0	0	0	0	—	—	5	0	0	0	0	0	107	3	2	0	40	—	40	—	—	—		
CTAN-31	0	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	0	0	—	9	20	0	

Notes:
 — not sampled.
 # Number of scats could not be accurately determined.

B) Total number of scats collected on and off scat sheets at High Value, Low Value and at contextual caves within and adjacent to Mining Area C during monitoring.

Cave Id.	Nov-15	Dec-15	Apr-16	May-16	Oct-16	Dec-16	May-17	Jun-17	Late Jun-17	Oct-17	Jan-18	Mar-18	May18	Jul-18	Sep-18	Feb-19	May-19	Aug-19	Oct-19	Nov-19	Dec-19	Oct-20	Feb-21	May-21	Jul-21	Sep-21	Jan-22	Mar-22	May-22	Jul-22	Sep-22	Jan-23	Mar-23	May-23	Jul-23	Sep-23	Jan-24	Mar-24	May-24			
High Value caves																																										
AC1	0	0	5	49	20	0	-	2	-	0	15	0	0	-	10	0	20	20	0	0	0	0	0	0	0	0	0	0	-	-	0	2	0	0	0	2	10	0	0	0		
AC2	-	-	-	-	0	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
AC5	-	-	-	-	20	0	-	-	-	11	3	0	0	-	3	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	6	20	0	0	0	0	0	0		
AC8	-	-	-	-	20	0	-	-	-	0	0	0	18	-	0	17	-	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	4	
AC9	-	-	-	-	20	0	-	-	-	16	20	3	12	-	0	20	-	20	20	20	2	20	40	20	20	0	10	-	-	-	20	20	30	20	0	0	5	0	0	0		
AC13	0	0	0	0	23	9	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
AC14	-	-	-	-	-	1	-	-	-	1	-	-	-	-	0	-	0	-	-	-	-	-	0	0	0	0	-	-	-	-	0	0	0	0	0	0	0	0	0	3		
AC17	2	1	2	0	20	0	-	20	-	34	19	0	0	-	-	-	20	0	2	0	0	-	0	-	0	22	0	6	20	20	0	0	0	20	0	0	0	0	0	0		
AC18	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	2	-	0	-	-	0			
SF2	0	13	2	3	-	10	12	-	-	0	-	0	0	-	11	-	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	1	0	0	
SF4	-	-	-	1	0	0	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0
SF5	-	-	-	-	-	0	-	-	-	16	0	7	0	-	10	-	8	21	3	0	0	0	0	0	0	21	13	2	2	0	0	4	0	7	0	-	8	0	2	0	0	
SF6	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	3	0	-	-	-	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	-	-	-	-	
SF8	1	0	8	48	20	0	-	20	-	41	2	0	0	-	7	-	0	20	7	20	0	20	0	0	0	18	0	20	0	#	20	20	13	1	-	30	5	0	30			
SF14	0	0	10	34	20	0	-	15	-	3	0	10	20	-	10	-	2	1	6	0	0	0	0	0	4	0	0	0	0	0	3	0	0	0	7	0	25	0	0			
SF18	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SF26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0		
SF27	0	0	0	7	0	0	-	-	-	35	0	40	-	-	-	60	2	0	0	0	0	0	0	0	0	0	0	0	1	20	0	0	0	0	0	1	-	-	1	0	0	
Low Value caves																																										
SF3	0	0	7	0	20	-	-	11	-	0	0	-	20	-	-	-	20	1	0	0	0	0	-	0	0	0	0	22	0	20	0	20	0	17	-	30	0	0	0			
SF9	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	10	1	-	-	-	-	-	-	0	0	19	0	0	0	0	0	2	0	0	0	0	0	0	0	0	
SF24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
SF28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	20	0	-	20	20	9	-	5	0	23	2	3	0	0		
SF30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	0	0	0	0	0	0	0	0	10	0	0	0	0		
Contextual caves																																										
CEPA-10	0	0	3	0	16	0	-	-	-	21	0	-	0	-	0	0	14	19	2	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CMUD-01	27	30	23	24	20	23	-	20	-	22	20	0	20	-	9	10	0	40	20	-	16	20	-	0	0	0	-	0	0	0	5	0	0	-	8	0	-	-	0	0		
CMUD-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CMUD-08	1	0	20	4	0	0	-	0	-	18	14	6	20	-	5	0	10	20	19	-	0	20	-	20	12	10	18	0	-	8	20	20	0	-	0	20	-	20	0			
CMUD-10	0	1	10	0	20	0	-	0	-	11	-	-	20	-	-	11	5	15	20	-	0	20	-	20	-	12	-	0	-	20	0	0	0	-	-	-	29	0	2			
CMUD-47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
CMUD-63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
CMUD-64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
CTAN-01	6	24	21	8	20	0	-	-	-	30	65	-	20	10	10	20	15	19	15	7	9	20	-	18	0	-	0	0	-	0	7	0	0	0	-	30	-	23	0			
CTAN-06	0	0	0	16	20	0	-	8	-	0	0	0	1	-	0	2	0	13	0	0	0	0	-	-	5	0	0	0	0	0	20	3	2	0	20	-	5	-	-			
CTAN-31	0	0	0	0	4	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	-	9	15	

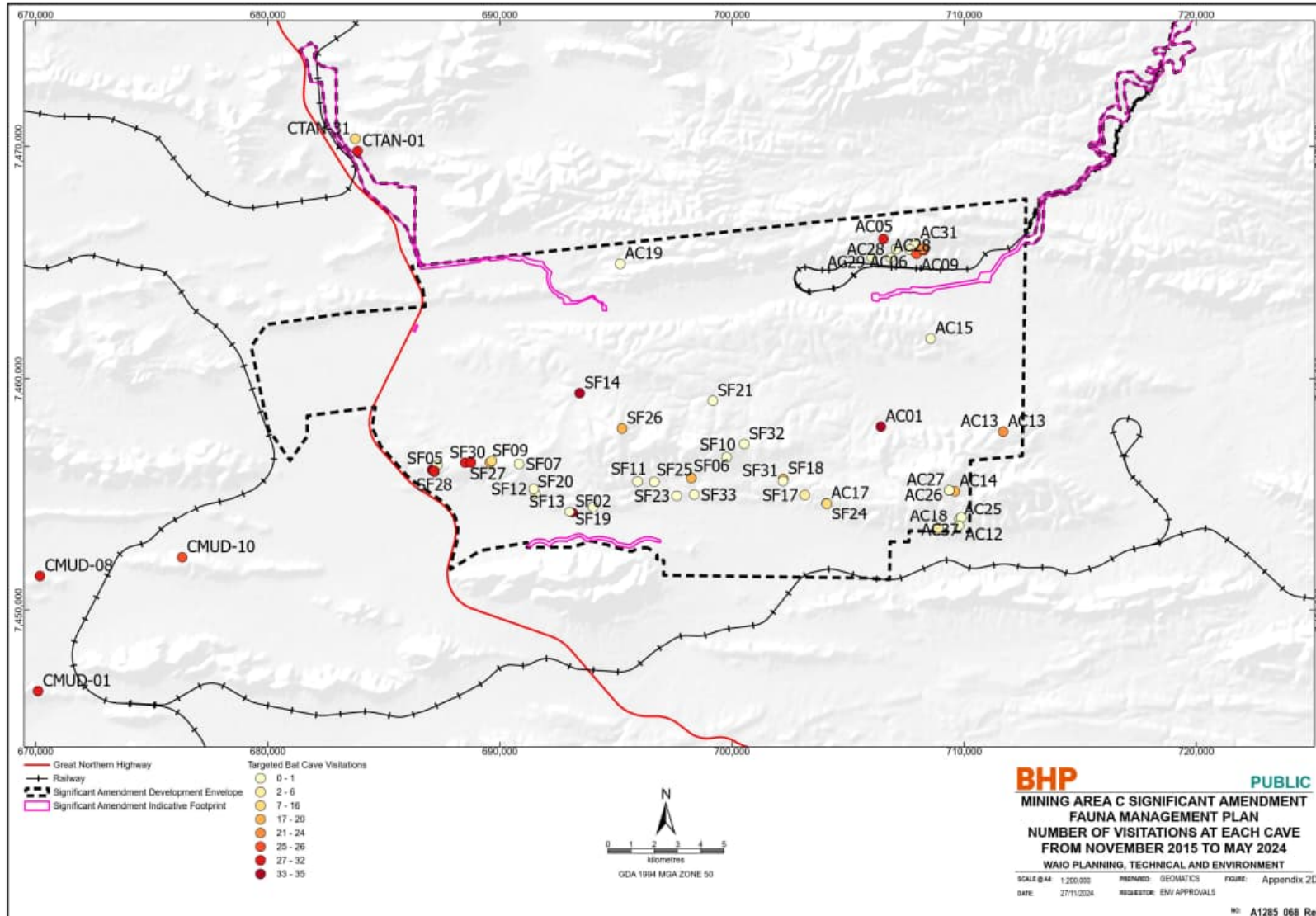
Notes:
 - not sampled.
 # Number of scats could not be accurately determined.

C) Number of Ghost Bats observed at High Value, Low Value and at contextual caves within and adjacent to Mining Area C during monitoring.

Cave Id.	Nov-15	Dec-15	Apr-16	May-16	Oct-16	Dec-16	May-17	Jun-17	Late Jun-17	Oct-17	Jan-18	Mar-18	May-18	Jul-18	Sep-18	Feb-19	May-19	Aug-19	Oct-19	Nov-19	Dec-19	Oct-20	Feb-21	May-21	Jul-21	Sep-21	Jan-22	Mar-22	May-22	Jul-22	Sep-22	Jan-23	Mar-23	May-23	Jul-23	Sep-23	Jan-24	Mar-24	May-24											
High Value caves																																																		
AC1	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
AC2	-	-	-	-	0	0	-	-	0	-	0	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
AC5	-	-	-	-	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
AC8	-	-	-	-	0	0	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
AC9	-	-	-	-	0	1	-	0	1	0	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	1	0	0	0	0	0	0	0	0	0	0	0				
AC13	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
AC14	-	-	-	-	-	0	-	0	-	0	-	-	0	-	0	-	0	-	-	-	-	-	-	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0	-	0	0	2	0	0	0	0				
AC17	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-	-	0	0	0	0	0	0	0	0	-	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
AC18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
SF2	0	0	0	0	-	-	-	0	-	0	-	0	0	-	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SF3	0	0	0	0	0	0	-	0	0	0	0	-	0	-	-	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SF4	0	0	0	0	0	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SF5	-	-	-	-	-	-	-	25	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SF6	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	0	0	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SF8	0	0	0	1	0	0	-	0	0	0	0	0	1	-	1	-	12	1	3	0	0	0	2	2	1	1	1	1	0	1	1	0	1	2	2	-	1	0	1	0	1	0	1	0	0	0				
SF14	0	0	0	1	0	0	-	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SF18	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
SF26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
SF27	0	0	0	1	0	0	-	-	0	-	0	-	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Low Value caves																																																		
SF3	0	0	0	0	0	0	-	0	0	0	0	-	0	-	-	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SF9	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
SF24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SF28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SF30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Contextual caves																																																		
CEPA-10	0	0	0	0	-	0	-	1	0	-	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CMUD-01	0	0	0	2	-	0	0	-	0	2	0	-	0	-	0	0	4	0	0	-	0	0	-	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMUD-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CMUD-08	0	0	4	0	0	0	0	0	0	5	0	0	0	-	-	0	0	0	0	0	-	0	0	-	0	0	0	0	0	-	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMUD-10	0	0	0	0	0	0	0	1	-	-	1	-	0	-	-	0	0	0	0	0	-	0	0	-	0	-	-	-	-	-	0	0	0	1	-	1	-	1	-	0	0	0	0	0	0	0	0	0	0	0
CMUD-47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CMUD-63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CMUD-64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CTAN-01	1	1	1	0	0	0	-	0	1	-	4	1	1	1	1	0	2	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CTAN-06	0	0	0	0	0	1	0	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	-	0	-	-	
CTAN-31	0	0	0	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
- not sampled.

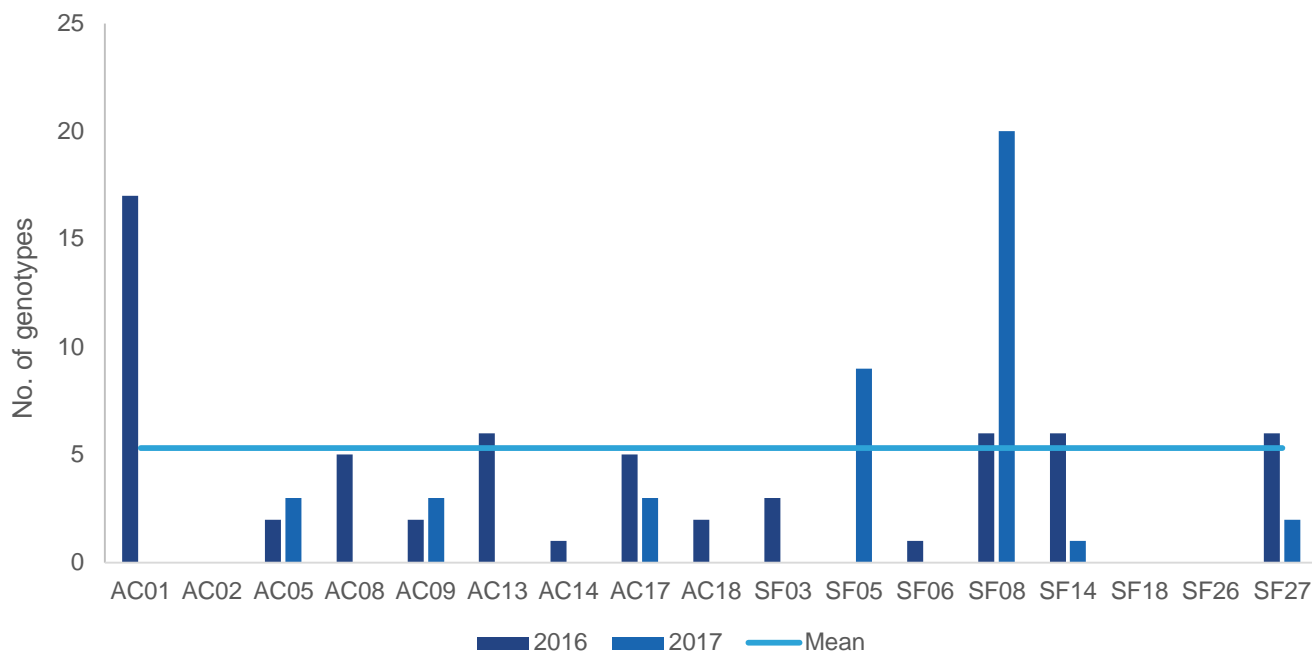
D) Sampling effort or number of visitations



E) Baseline information used to derive the environmental criteria for the number of caves where Ghost Bats were present using scat and observational records.

Year	Caves with Ghost Bat records	Total	Average	SEM	Average-SEM	Environmental criteria (# caves)
2015	AC17, SF8	2	7.67	2.85	4.82	< 5
2016	AC1, AC5, AC9, AC13, AC17, SF3, SF4, SF8, SF14, SF27	10				
2017	AC1, AC5, AC9, AC14, AC17, SF3, SF4, SF5, SF8, SF14, SF27	11				

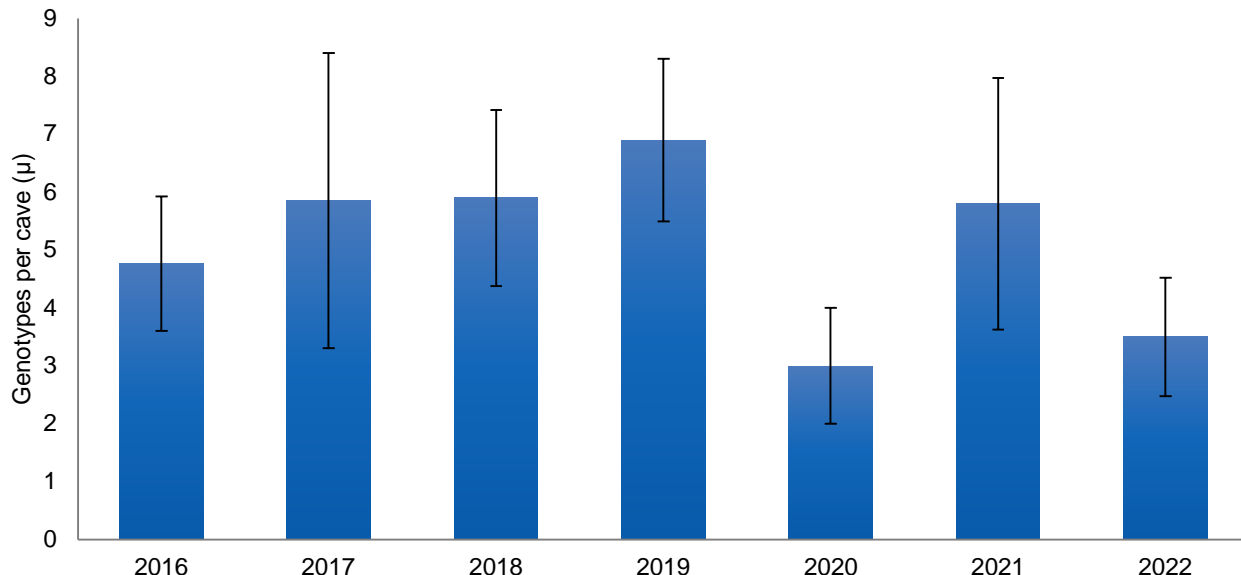
F) Number of individual genotypes recorded in genetic analyses from High Value Ghost Bat Caves and Low Value caves with occasional (Category 3) occupancy at Mining Area C during baseline (2016 and 2017) monitoring.



G) Baseline information used to derive the environmental criteria for the average number of genotypes recorded at caves.

Baseline years	Number of genotypes	Average	SEM	Average-SEM	Environmental criteria (# genotypes)
2016	62	5.15	1.13	4.02	< 4
2017	41				

H) Number of individual genotypes (mean ± SEM) recorded in genetic analyses from High Value Ghost Bat Caves and Low Value caves with occasional (Category 3) occupancy at Mining Area C from 2016 to 2022.



I) High Value Ghost Bat Caves and Low Value caves with occasional (Category 3) occupancy at Mining Area C with records of presumed pregnant Ghost Bats as indicated by hormone analyses (Progesterone > 1,000 ng/g) from the 2014-2015 reporting period to the 2022-2023 reporting period.

Cave ID	Reporting period (year/s)						
	2014-15	2016-17	2017-18	2019	2020-21	2021-22	2022-23
AC1	Yes	—	Yes	Yes	—	—	Yes
AC2	—	—	No	No	No	No	No
AC5	Yes	—	Yes	No	—	—	No
AC8	Yes	—	—	No	—	—	—
AC9	No	—	Yes	Yes	Yes	Yes	Yes
AC13	Yes	—	Yes	—	—	—	No
AC14	—	No	—	—	—	—	—
AC17	—	—	—	Yes	Yes	—	No
AC18	—	Yes	—	—	—	—	No
SF2	—	Yes	Yes	Yes	No	No	Yes
SF3	—	—	—	Yes	—	Yes	Yes
SF4	No	—	—	—	—	—	—
SF5	Yes	—	No	Yes	—	Yes	Yes
SF6	—	Yes	—	Yes	—	—	—
SF8	No	—	Yes	Yes	Yes	Yes	Yes
SF14	No	—	Yes	Yes	—	Yes	Yes
SF27	—	—	No	Yes	—	Yes	Yes
SF28	—	—	—	—	—	Yes	Yes

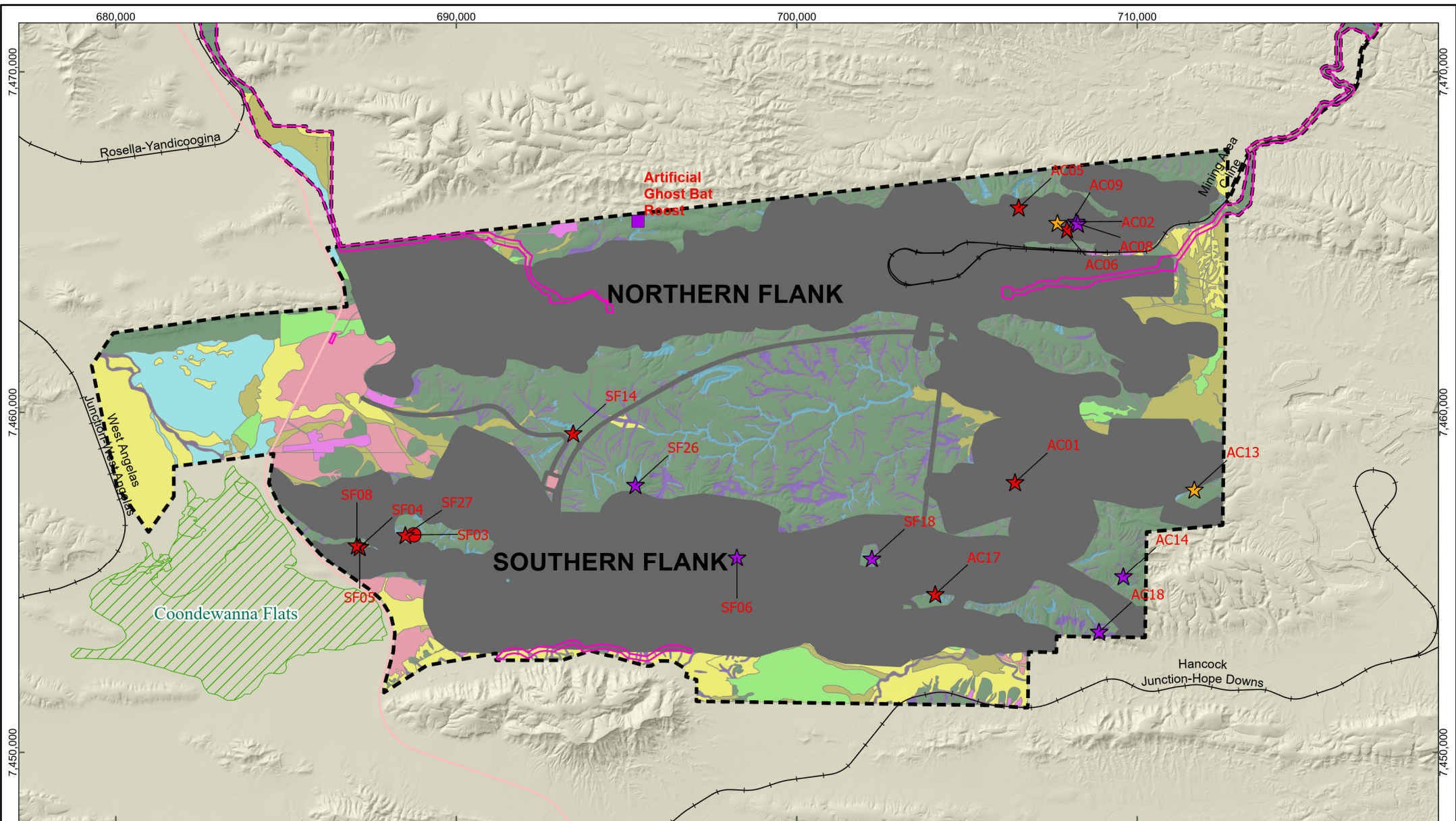
Cave ID	Reporting period (year/s)						
	2014-15	2016-17	2017-18	2019	2020-21	2021-22	2022-23
SF30	—	—	—	—	—	Yes	No
TOTAL	4	3	6	9	3	8	8

Notes:
 '—' not sampled.

J) Baseline information used to derive the environmental criteria for number of caves with elevated progesterone (> 1,000 ng/g).

Baseline years	Number of caves	Average	SEM	Average—SEM	Environmental criteria (# caves)
2014-15	6	5.00	1.00	4.00	< 4
2016-17	3				
2017-18	6				

Appendix 3: Fauna habitat types

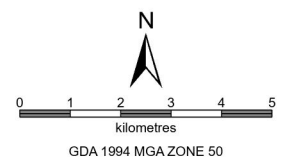


- Priority Ecological Community
- MS1072 Indicative Disturbance Area
- Great Northern Highway
- Existing Rail
- Significant Amendment Indicative Footprint
- Significant Amendment Development Envelope

- Low value caves with occasional occupancy (Category 3)
- Artificial Ghost Bat Roost (Category 4)
- High value caves to be monitored**
- Category 2
- Category 3
- Category 4

- Habitat Type**
- Breakaway/ Cliff
 - Cleared/ Disturbed
 - Drainage Area/ Floodplain
 - Gilgai Plain
 - Gorge/ Gully
 - Hardpan Plain
 - Hillcrest/ Hillslope

- Major Drainage Line
- Medium Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain



BHP

PUBLIC

MINING AREA C SIGNIFICANT AMENDMENT
FAUNA MANAGEMENT PLAN
FAUNA HABITAT TYPES

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:150,000	PREPARED: GEOMATICS	FIGURE: A3
DATE: 3/12/2024	REQUESTOR: ENV APPROVALS	

NO: 976 028 RevC