



BHP Pilbara Strategic Assessment

**Central Pilbara Hub
Surplus Water Stage 1
Validation Notice**

22 September 2026

Foreword

Document Version

Rev	Description Of Amendment	Date	Date Validation Notice Effective From
Rev 0	Draft Validation Notice for Public Comment	25 June 2026	
Rev 1	Final Validation Notice	22 Sept 2026	20 Oct 2026

Glossary and Abbreviations

Term	Meaning
\$/ha or \$ per ha	Australian dollar amount per hectare
Activity	The Activity as described in Sections 1.4 and 2.1.
Activity Area	The Activity Area (as described in Section 1.5) is the spatial extent within which the Activity may be undertaken. It represents the maximum area within which direct disturbance may occur.
AER	Annual Environmental Reporting
APOP	Pilbara Strategic Assessment Assurance Plan and Offsets Plan, Revision 2.3.
Approval	The approval of the taking of an action or class of actions granted by the Minister on 19 June 2017 in accordance with the Program given under section 146B of the EPBC Act.
Approval Holder	Any person or persons named in an Approval as an Approval Holder who may take action in accordance with the Program.
BHP	BHP Iron Ore Pty Ltd
Biennial	Every 2 years
Clearing Extent	The maximum amount of native vegetation to be cleared
CPI	Consumer Price Index
CPWRMP	Central Pilbara Water Resource Management Plan
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Department, the	The Australian Government Department responsible for the administration of the EPBC Act or successors.
Direct Disturbance	The clearing of native vegetation and/or moving of earth as a result of activities undertaken within the Strategic Assessment Area in accordance with the Program.
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety (Was DMIRS - Department of Mines, Industry Regulation and Safety)
DoE	Department of the Environment

Term	Meaning
DWER	Department of Water and Environment Regulation
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC or EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GST	Goods and Services Tax
Impact or impacts	As defined in section 527E of the EPBC Act.
Important population	A population that is necessary for a species' long-term survival and recovery (N.B. variations of this definition may exist for the Program Matters - See Section 4.1.1).
IRR	Impact Reconciliation Report
km	Kilometre
mbgl	Metres below ground level
MAR	Managed aquifer recharge
MACSF	Mining Area C Southern Flank
Minister	Minister responsible for administering the EPBC Act (being, at the date of this Validation Notice, the Minister for the Environment).
mm	Millimetre
MNES	Matters of National Environmental Significance
MS	Ministerial Statement
New Listing	Any new listed threatened species or existing species that have been included in a higher endangerment category identified in accordance with section 4.1.2 of the Program
Notifiable Action	An activity that is considered likely to have a relevant impact on a Program Matter based on an assessment of the proposed Activity against the thresholds defined for Program Matters in the Assurance Plan and Offset Plan. In relation to the voluntary part of the Program, this includes an activity that is considered likely to have a relevant impact on a New Listing or a New Matter.
NVCP	Native Vegetation Clearing Permit

Term	Meaning
Offsets Plan	The plan that provides further detail on the processes that will be implemented to identify and deliver offsets associated with a Notifiable Action, as approved by the Minister on 15 May 2023. Supersedes BHP (2018b) version.
PEOF	Pilbara Environmental Offset Fund
PMO	Program Matter Outcomes
Program	The BHP Billiton Iron Ore Pilbara Strategic Assessment Program endorsed by the Minister on 11 May 2017. Whilst the Agreement refers to a Plan, it was agreed with the Department that the term Program is a better reflection of the systems and processes to be delivered by BHP.
Program Matters	The listed threatened species Pilbara Leaf-nosed Bat (<i>Rhinonictis aurantia</i>), Northern Quoll (<i>Dasyurus hallucatus</i>), Greater Bilby (<i>Macrotis lagotis</i>), Ghost Bat (<i>Macroderma gigas</i>), Pilbara Olive Python (<i>Liasis olivaceus barroni</i>), Night Parrot (<i>Pezoporus occidentalis</i>), and Grey Falcon (<i>Falco hypoleucos</i>), as detailed in the Pilbara Strategic Assessment Assurance Plan and Offsets Plan (BHP 2023).
Residual impacts	Unavoidable impacts which remain after avoidance and mitigation measures have been implemented.
SAA or Strategic Assessment Area	Strategic Assessment Area: The geographical extent of the assessment and boundaries within which the Program must be implemented, as depicted in Appendix 1.
SEA	Strategic Environmental Approval
Study Area	The geographical extent of survey boundaries.
Triggers	Species-specific decision-making criteria which initiate the requirement for a specific Validation Action (i.e. Validation Notice or Decision Report) when met. Requirements of the Validation Action are dictated by which triggers have been met.
TSS	Total suspended solids
TSSC	Threatened Species Scientific Community
Validation Notice	This Validation Notice under Part C of the program.
WA	Western Australia

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1 Introduction

1.1 Background

BHP Iron Ore Pty Ltd (BHP) currently operates a network of iron ore mines, along with associated rail and port infrastructure, in the Pilbara region of Western Australia (WA). The current mining operations include:

- Newman Operations - located approximately 2 kilometers (km) west and 5 km east of the Newman township, comprising of Mount Whaleback, Orebodies 29, 30 and 35, as well as the Eastern Ridge and Western Ridge deposits.
- Mining Area C – South Flank Operations - situated approximately 100 km north-west of the Newman township.
- Jimblebar Operations - located approximately 35 km east of the Newman township and consisting of Orebody 18, Orebody 31 and Jimblebar.
- Yandi (Marillana Creek) Operations - located approximately 100 km north north-west of Newman township.

Ore from these operations is transported by rail to Port Hedland via the BHP Newman to Port Hedland Mainline and associated spur lines. From there, it is then exported overseas via BHP port facilities at Nelson Point and Finucane Island in Port Hedland.

BHP proposes to implement the Central Pilbara Hub Surplus Water Stage 1¹ project (the Activity) including surplus water infrastructure (bores, infiltration ponds, and pipelines), managed aquifer recharge and creek discharge to enable the disposal of dewatering surplus from the existing Mining Area C-South Flank (MACSF) Mine. This Validation Notice has been prepared to document the validation process for the Activity, as required under the *BHP Billiton Iron Ore Pilbara Strategic Assessment Program* (the Program) (BHP 2017) (see Section 1.2 below).

1.2 Framework

BHP has a strategic approval (the Commonwealth Strategic Approval) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Program (BHP Billiton 2017) was endorsed by the Minister for Environment and Energy on 11 May 2017 and an Approval Decision (with conditions) for taking actions in accordance with the Program was issued on 19 June 2017. The approval covers future activities (actions) within the Strategic Assessment Area, which is the same as the State Strategic Activity boundary. The relevant Program Matters are Matters of National Environmental Significance (MNES) and include the following listed threatened fauna species: Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*), Northern Quoll (*Dasyurus hallucatus*), Greater Bilby (*Macrotis lagotis*), Ghost Bat (*Macroderma gigas*), Olive Python (Pilbara subspecies) (*Liasis olivaceus barroni*), Grey Falcon (*Falco hypoleucos*) and Night Parrot (*Pezoporus occidentalis*).

The Approval applies to the development of new iron ore mines and associated infrastructure, and the expansion of existing iron ore mines and associated infrastructure, within the defined Strategic Assessment Area (SAA) (Figure 1-1).

All actions within the scope of the Strategic Approval must be taken in accordance with the Program. BHP administers a non-statutory validation decision process under Part C of the endorsed Program to decide whether an action will

¹ BHP is currently assessing a future CPHSW Stage 2 project. This work is confined to study phase only and no decision has been made to proceed with the development at this time.

have an impact on Program Matters. BHP has determined that the Activity is a Notifiable Action, given the Notifiable Action Trigger is met for the Activity.

Key commitments of the Program and conditions of approval include:

- preparation and approval of an Assurance Plan (BHP 2018a) and Offsets Plan (BHP 2018b), and
- undertaking a validation process, including preparation of a Validation Notice for each Notifiable Action carried out under the Program.

The original versions of the Assurance Plan (BHP 2018a) and Offset Plan (BHP 2018b) have been revised and consolidated into a single titled 'the Assurance Plan and Offsets Plan' (APOP) (BHP 2023), which was endorsed by the Minister on 15 May 2023.

The APOP outlines the environmental objectives, procedures and governance arrangements to ensure that all future activities within the scope of the Program are conducted in accordance with the endorsed Program and achieve the Program's objectives. It includes:

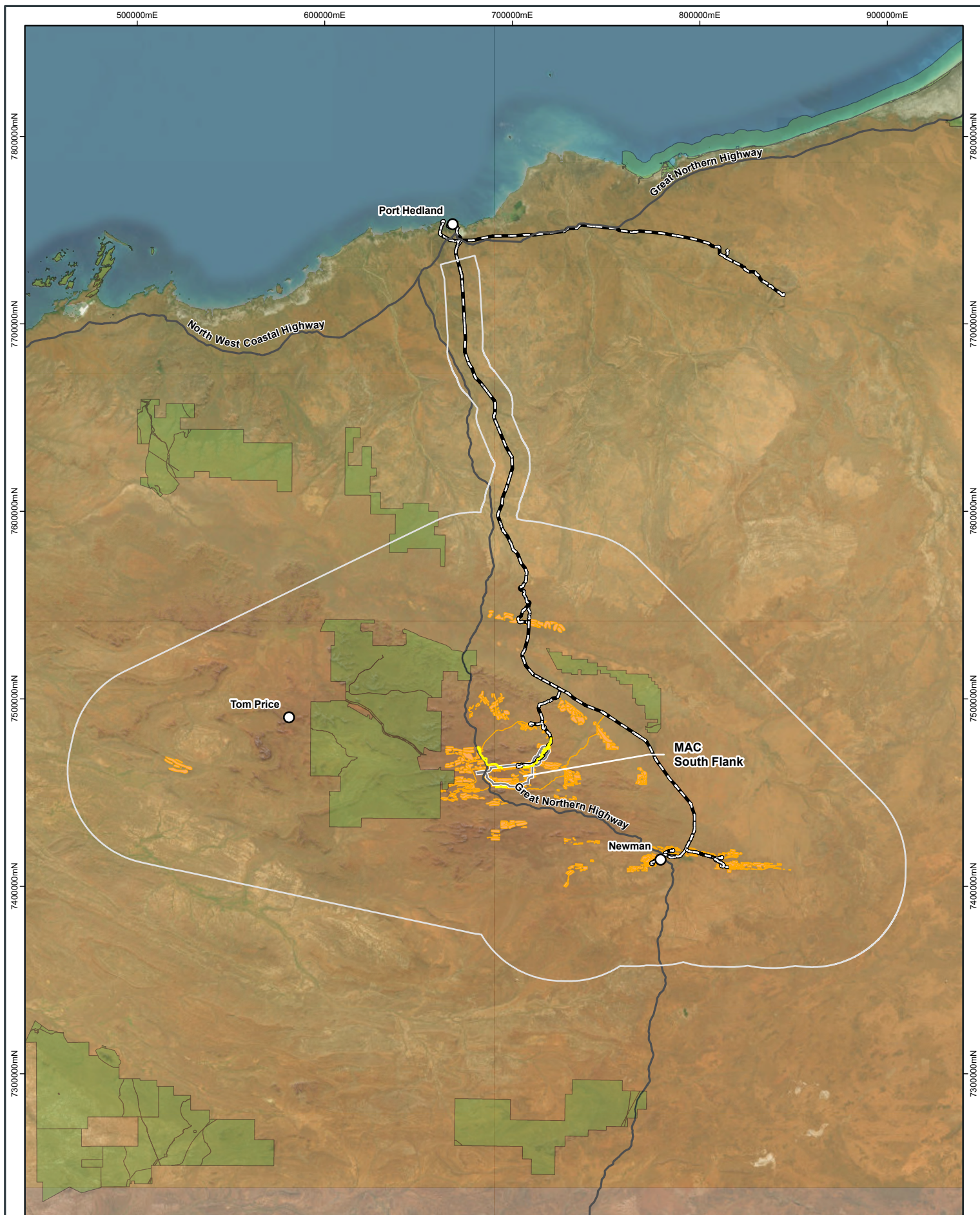
- Program Matter Outcomes (PMO) – measurable outcomes that BHP must meet to achieve the objectives developed for each Program Matter.
- Notifiable Action Triggers – criteria within the APOP that determine when a Validation Notice is required.

During the validation process for Notifiable Actions, BHP must apply the mitigation hierarchy to the Activity. If residual impacts to Program Matters cannot be avoided or mitigated to an acceptable level, BHP will implement an offsets pathway.

In accordance with Part C of the Program and the requirements of the APOP, BHP has prepared this Validation Notice for the Activity to ensure that the PMOs are achieved across the SAA.

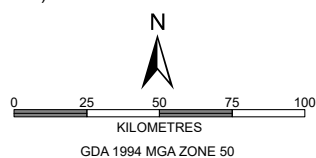
This Activity is considered to require a Validation Notice, as it:

- falls within the scope of the Program, as it is considered an expansion to an existing mine, and
- meets one or more of the Notifiable Action Triggers defined in the APOP (refer to Table 1-2).



Legend

- Activity Area
- Strategic Proposal Area (7,650,074 ha)
- Strategic Proposal Full Conceptual Development Scenario (98,500 ha)
- Conservation Area
- Townsite
- Major Roads
- Rail (BHP)



BHP

PUBLIC

REGIONAL LOCATION CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4:	1:2,600,000	REQUESTOR:	PROJECTS	FIGURE:	1-1
DATE:	18/06/2026	PREPARED:	GEOMATICS	NO:	A1440-034 RevA
		REVIEWED:			

Document Path: Y:\Jobs\A1001_A1500\A1440\3Project\A1440_034_CPHSW1\N_RegionalLocation.aprx

1.3 Program, Assurance Plan and Offsets Plan requirements

The endorsed Program and APOP specify the requirements and content of the Validation Notice. A summary of where the specified requirements and contents are addressed in this Validation Notice are provided in Table 1-1.

Table 1-1: Content of Validation Notice

Requirement	Strategic Assessment Program Offsets Plan Requirements	Sections which address these Requirements
1	Decision on whether a Validation Notice is required for the Activity	1.7
2	Authorisation and date the Validation Notice will take effect	Foreword
3	Program Matters and triggers relevant to the Validation Notice	Table 1-2 and 5
4	Project description including Activity location, map illustrating the boundary of the Activity Area and area of Direct Disturbance and timeframes for the duration of activities	2
5	Stakeholder engagement and public consultation	3
6	Review of baseline and contemporary data with a description of the direct and indirect impacts	5
7	Estimates of disturbance and residual impacts	2, 5.2.7, 5.3.7, and 5.4.7
8	Application of the mitigation hierarchy to avoid impacts on Program Matters	5.2.6, 5.3.6, and 5.4.6,
9	Outline the objective/s of the offset project/s, consistent with the scope of actions to offset impacts stated in the Program and APOP	7 and 8
10	Outline how the offset project/s will support the long-term persistence and viability of the relevant Program Matters	7 and 8
11	Commitment to measurable offset project milestones	8.4
12	Key monitoring, management, clearing, offset, contingency and corrective action commitments.	8

1.4 Activity overview

The proposed Activity consists of a surplus water management infrastructure and creek diversion required for the existing MACSF mining hub located approximately 100 km northwest of the Newman Township. The purpose of the Activity is to facilitate continued mining of below water table orebodies which requires a dewatering uplift and associated surplus water management infrastructure. The proposed Activity is within the SAA of the Program.

The Activity includes the following:

- clearing of up to 1,076 ha of native vegetation

- construction and operation of surplus water management infrastructure; including but not limited to; reinjection bores, creek discharge, infiltration ponds, tanks and pipelines
- installation of additional surface water management structures, including diversions, bunds and floodways
- dewatering uplift of an additional 28.4 gigalitres (GL) per annum (GL/a).

Further detail is provided in Section 2.

The Activity is currently under assessment by the Environmental Protection Authority (EPA) WA under Part IV of the *Environmental Protection Act 1986* (WA) (EP Act) as a significant amendment to Ministerial Statement 1072 (MS1072) (Section 2.3).

1.5 Activity Area

The Activity Area is the spatial extent within which the Activity may be undertaken. It represents the maximum area within which direct disturbance may occur. The Activity Area (Figure 1-2) encompasses a total of 1,482 ha of which 406 ha is already disturbed. The Activity Area consists of native vegetation with some existing disturbed/cleared areas. Up to 1,076 ha of native vegetation within the Activity Area will be cleared for the Activity.

1.6 Timeframes

This Validation Notice takes effect 20 business days from the date of authorisation (refer to the Foreword page). If the Notifiable Action has not substantially commenced within a period of five years from that authorisation date, BHP or a subsequent Approval Holder must not implement the Notifiable Action unless:

- the Department of Climate Change, Energy, the Environment and Water (DCCEEW) authorises commencement of the action by BHP or the Approval Holder, or
- BHP issues a new Validation Notice for the action in accordance with this Program, thereby extending the commencement timeframe by an additional five years.

The Activity is forecast to commence in 2027. The Activity is forecast to be completed within 43 years from the date of this Validation Notice. This timeframe reflects the predicted life span of the Activity including construction, operation, decommissioning and rehabilitation at closure of MACSF.

1.7 Decision for a Validation Notice

A Validation Notice is required for actions that are a Notifiable Action, in accordance with Notifiable Action Triggers set out in the APOP (BHP 2023) and reproduced in Table 1-2. The Activity is a Notifiable Action as it meets the trigger criteria for the following Program Matters: Ghost Bat, Northern Quoll and Pilbara Olive Python.

This Validation Notice will demonstrate how the implementation and operation of the Activity will meet the PMOs by undertaking an impact assessment, applying the mitigation hierarchy and evaluating residual impacts for the following Program Matters:

- Ghost Bat
- Northern Quoll
- Pilbara Olive Python.

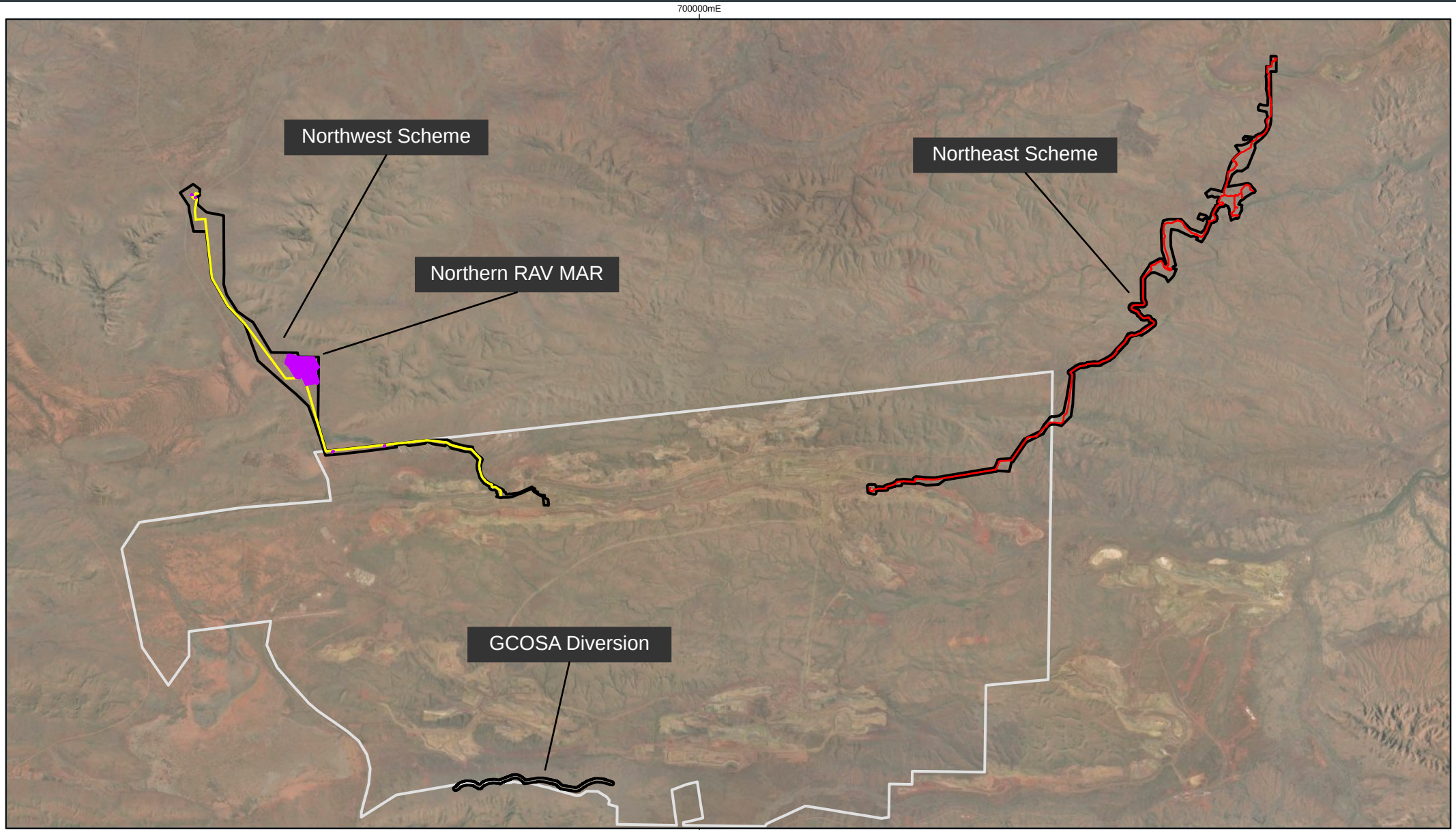
This section satisfies the requirements of Section 6.2 of the APOP. This decision to issue a Validation Notice will also be reported in the Annual Environmental Report (AER).

The Activity does not meet the Notifiable Action Triggers for the following Program Matters:

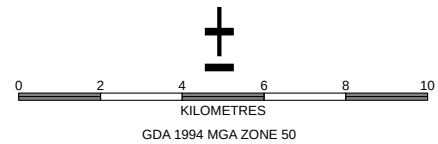
- Pilbara Leaf-nosed Bat
- Greater Bilby
- Grey Falcon
- Night Parrot.

As such, these species are not applicable to this Activity (refer to Table 1-2). However, general information regarding these species, including the absence of suitable habitat and/or records, is provided to support the assessment in Table 1-2. Sections 5.2 to 5.8 outline the findings for each species to support this determination.

The Activity Area and an associated 500 m buffer have been subject to a comprehensive historical and contemporary survey effort. Nine targeted MNES surveys have been undertaken within the last five years to provide complete coverage of the Activity Area and over 99% of 500 m buffer of the Activity Area (Table 4-1; Figure 4-1 and; Appendix 1). A survey gap exists in an existing mine pit that is cleared of all vegetation which is unlikely to change the outcome of this Validation Notice. For this Validation Notice, an assessment of historical surveys has also been undertaken to assist in defining the signs or presence of a colony/population or transient/dispersal species.



- Activity Area
- Mining Area C-Southern Flank Validation Notice Boundary
- Northeast Scheme Pipeline
- Northwest Scheme Pipeline
- Northern RAV MAR



THE ACTIVITY AREA CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4:	1:185,000	REQUESTOR:	Env. Approvals	FIGURE:	1-2
DATE:	5/08/2026	PREPARED:	Geomatics	NO:	A1440-002 RevC
		REVIEWED:			

Table 1-2: Notifiable Action Triggers for the Activity

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
Ghost Bat (<i>Macroderma gigas</i>)	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Ghost Bat critical habitat and or supporting habitat AND Presence or sign/s of Ghost Bat colony or residing individuals	Ghost Bat critical foraging habitats where it occurs within 12 km of critical roosting habitat is present in the Activity Area and 500 m buffer. The following habitat types are considered critical; Gorge/Gully, Major Drainage Line, Medium Drainage Line, Minor Drainage Line, Breakaway/Cliff, Drainage Area/Floodplain, Stony Plain, and Hillcrest/Hillslope. There are no Ghost Bat caves within the Activity area. There are 10 Ghost Bat caves within a 500 m buffer of the Activity Area of which there is one Category 2 cave, two Category 3 caves, and seven Category 4 caves. Nine Category 2 Caves are present beyond the 500 m buffer but within 12 km of the Activity Area and influence the presence of critical foraging habitat. There are 26 records of Ghost Bats, including sighted individuals, calls recorded via ultrasonic recorder and scats, within the 500 m buffer of the Activity Area. These records are considered signs of a Ghost Bat colony or residing individuals.	Yes Critical and supporting habitat is present within the Activity Area and/or the 500 m buffer. Numerous records provide evidence of Ghost Bat colony or residing individuals within a 500 m buffer of the Activity boundary. On this basis, the Notifiable Action Trigger for Ghost Bat has been met as there is likely a colony or residing individuals.
	Within the Activity Area there is: Presence of Ghost Bat critical habitat and or supporting habitat	Ghost Bat critical foraging habitats where it occurs within 12 km of critical roosting habitat is present in the Activity Area. The following habitat types are considered critical; Gorge/Gully, Major Drainage Line, Medium Drainage	No Critical and supporting habitat is present within the Activity Area.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
	AND Presence or sign of Ghost Bat transient, infrequent or dispersing individual/s	Line, Minor Drainage Line, Breakaway/Cliff, Drainage Area/Floodplain, Stony Plain, and Hillcrest/Hillslope. There are no Ghost Bat caves within the Activity area. Nine Category 2 Caves are present outside of but within 12 km of the Activity Area, and influence critical foraging habitat within the Activity Area There are no records of the Ghost Bat within the Activity Area.	Numerous records provide evidence of Ghost Bat colony (or colonies) or residing individuals within the 500m buffer but there are no records within the Activity Area. On this basis, the Notifiable Action Trigger for Ghost Bat has not been met as there are no records of transient, infrequent or dispersing individuals within the Activity Area itself.
Northern Quoll (<i>Dasyurus hallucatus</i>)	Within the Activity Area or within a 500 m buffer of the Activity boundary there is: Presence of Northern Quoll critical habitat and or supporting habitat AND Presence or sign/s of Northern Quoll colony or residing individuals	Critical and supporting Northern Quoll habitat is present within the Activity Area and a 500 m buffer. The following habitat types are considered critical: Gorge/Gully, Major Drainage Line and Breakaway Cliff. The following habitat types are considered supporting; Artificial Wetland, Hillcrest/Hillslope, Medium Drainage Line, Minor Drainage Line, and Drainage Area Floodplain. There are nine records of Northern Quoll, seven recorded in the Activity Area and two recorded in the 500 m buffer. Eight of the records were taken on the same survey and comprised of multiple records at camera traps positioned at three locations. A photographic review of the records indicates that all records are likely to be the same	No Critical and supporting habitat is present within the Activity Area and/or the 500 m buffer. The Northern Quoll records collected indicated that there is not a colony or residing individuals in the Activity Area or 500 m buffer and the records reported are from transient, dispersing individuals.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
		individual Northern Quoll and it was transitory in behaviour. One record is a historical record of a scat found in Hillslope/Hillcrest habitat. The Northern Quoll may be present in very low densities or only intermittently and are likely representative of transient, infrequent or dispersing individuals.	
	Within the Activity Area: Presence of Northern Quoll critical habitat and or supporting habitat AND Presence or sign of Northern Quoll transient, infrequent or dispersing individual/s.	Critical and supporting Northern Quoll habitat is present within the Activity Area. The following habitat types are considered critical: Gorge/Gully, Major Drainage Line and Breakaway Cliff. The following habitat types are considered supporting; Artificial Wetland, Hillcrest/Hillslope Line, Minor Drainage Line, and Drainage Area Floodplain. There are nine records of Northern Quoll, seven recorded in the Activity Area and two recorded in the 500 m buffer. Eight of the records were taken on the same survey and comprised of multiple records at camera traps positioned at three locations. A photographic review of the records indicates that all records are likely to be the same individual Northern Quoll and it was transitory in behaviour. One record is a historical record of a scat found in Hillslope/Hillcrest habitat.	Yes Critical and supporting habitat is present within the Activity Area. The Northern Quoll records collected indicated that there is presence or sign of Northern Quoll transient, infrequent or dispersing individuals in the Activity Area.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
		The Northern Quoll may be present in very low densities or only intermittently and are likely representative of transient, infrequent or dispersing individuals	
Pilbara Olive Python <i>(Liasis olivaceus barroni)</i>	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Pilbara Olive Python critical habitat and or supporting habitat AND Presence or sign/s of a Pilbara Olive Python population or residing individuals	Critical and supporting Pilbara Olive Python habitat is present within the Activity Area and a 500 m buffer. The following habitat types are considered critical: Gorge/Gully, Major Drainage Line, Breakaway Cliff and Artificial Wetland. The following habitat types are considered supporting; Minor Drainage Line, and Medium Drainage Line There are two records of Pilbara Olive Python within the Activity Area. Records of this species have previously been identified in the Marillana Creek and Yandicoogina Creek waterways. This likely indicates that the watercourses are an important feature for foraging and dispersal opportunities for the Pilbara Olive Python.	Yes Critical and supporting Pilbara Olive Python habitat is present within the Activity Area and a 500 m buffer. Records indicate that a Pilbara Olive Python population or residing individuals is present.
	Within the Activity Area there is: Presence of Pilbara Olive Python critical habitat and or supporting habitat AND Presence or sign of Pilbara Olive Python transient, infrequent or dispersing individual/s	Critical and supporting Pilbara Olive Python habitat is present within the Activity Area. The following habitat types are considered critical: Gorge/Gully, Major Drainage Line, Breakaway Cliff and Artificial Wetland. The following habitat types are considered supporting; Minor Drainage Line, and Medium Drainage Line.	Yes Critical and supporting Pilbara Olive Python habitat is present within the Activity Area. Records indicate that a Pilbara Olive Python is present within the Activity Area as a residing individual, not as a transient, infrequent or dispersing individual.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
		There are two records of Pilbara Olive Python within the Activity Area. One record of this species have previously been identified in the Yandicoogina Creek area and this record likely indicates that the Creek is an important feature for foraging and dispersal opportunities for the Pilbara Olive Python. One record of this species was identified within Marillana Creek.	
Pilbara Leaf-nosed Bat <i>(Rhinonictis aurantia)</i>	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Pilbara Leaf-nosed Bat critical habitat and or supporting habitat AND Presence or sign/s of Pilbara Leaf-nosed Bat colony or residing individuals	Critical and supporting Pilbara Leaf-nosed Bat habitat is present in the Activity Area and within a 500 m buffer. The following habitat types are considered critical; Gorge/Gully, Major Drainage Line, and Breakaway/Cliff. The following habitat types are considered supporting Medium Drainage Line, Mulga Woodland, Minor Drainage Line, Drainage Area/Floodplain, Stony Plain, Undulating Hills and Hillcrest/Hillslope. There are no records of Pilbara Leaf-nosed Bat in the Activity Area. There is one record of a Bat Call in 2011 within a 500 m buffer. The Pilbara Leaf-nosed Bat is considered relatively scarce in the region due to the limited occurrence of potential roosting habitat. The lack of records in the broader vicinity suggests that the occurrence of Pilbara	No Critical and supporting Pilbara Leaf-nosed bat habitat is present within the Activity Area and a 500 m buffer. The Pilbara Leaf-nosed Bat record within the 500 m buffer indicates that there is presence or sign of a transient, infrequent or dispersing individual of Pilbara Leaf-nosed Bat, and that a colony or residing individuals are not present.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
		Leaf-nosed Bat is restricted to foraging and/or dispersal events only.	
	Within the Activity Area there is: Presence of Pilbara Leaf-nosed Bat critical habitat and or supporting habitat AND Presence or sign of Pilbara Leaf-nosed Bat transient, infrequent or dispersing individual/s	Critical and supporting Pilbara Leaf-nosed Bat habitat is present in the Activity Area. The following habitat types are considered critical; Gorge/Gully, Major Drainage Line, and Breakaway/Cliff. The following habitat types are considered supporting Minor Drainage Line, Drainage Area/Floodplain, Stony Plain, and Hillcrest/Hillslope. There are no records of Pilbara Leaf-nosed Bat in the Activity Area. The Pilbara Leaf-nosed Bat is considered relatively scarce in the region due to the limited occurrence of potential roosting habitat. The lack of records in the broader vicinity suggests that the occurrence of Pilbara Leaf-nosed Bat is restricted to foraging and/or dispersal events only.	No Critical and supporting Pilbara Leaf-nosed Bat habitat is present in the Activity Area. There are no records of any presence or sign of transient, infrequent or dispersing Pilbara Leaf-nosed Bat individuals in the Activity Area.
Greater Bilby (<i>Macrotis lagotis</i>)	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Greater Bilby critical habitat and or supporting habitat AND	Supporting Greater Bilby habitat is present in the Activity Area and within a 500 m buffer. The Sand Plain, Drainage Area/Floodplain, Major, Medium and Minor Drainage Line habitats are considered supporting, albeit marginal, habitat for the Greater Bilby.	No Supporting Greater Bilby habitat is present in the Activity Area and within a 500 m buffer. There is no presence or sign of Greater Bilby residing individuals.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
	Presence or sign/s of Greater Bilby residing individuals	There is no direct or indirect evidence of Greater Bilby individuals or population within the Activity Area or within a 500 m buffer.	
	Within the Activity Area there is: Presence of Greater Bilby critical habitat and or supporting habitat AND Presence or sign of Greater Bilby transient, infrequent or dispersing individual/s	Supporting Greater Bilby habitat is present in the Activity Area. The Sand Plain, Drainage Area/Floodplain, Major, Medium and Minor Drainage Line habitats are considered supporting, albeit marginal, habitat for the Greater Bilby.. There is no direct or indirect evidence of Greater Bilby individuals or population within the Activity Area.	No Supporting Greater Bilby habitat is present in the Activity Area and within a 500 m buffer. There is no presence or sign of Greater Bilby transient, infrequent or dispersing individuals.
Grey Falcon (<i>Falco hypoleucos</i>)	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is Presence of Grey Falcon critical habitat and or supporting habitat AND Presence or sign of Grey Falcon residing individuals.	Critical and supporting Grey Falcon habitat is present in the Activity Area and a 500 m buffer. The following habitat types are considered critical; Major Drainage Line, Medium Drainage Line and Drainage Area/Floodplain. The following habitat types are considered supporting Minor Drainage Line, Artificial Wetland, Stony Plain, and Hillcrest/Hillslope. There is no direct or indirect evidence of Grey Falcon individuals or population within the Activity Area or within a 500 m buffer.	No Critical and supporting Grey Falcon habitat is present in the Activity Area and within a 500 m buffer. There is no presence or sign of Grey Falcon residing individuals.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
	Within the Activity Area there is: Presence of Grey Falcon critical habitat and or supporting habitat AND Presence or sign/s of Grey Falcon transient, infrequent or dispersing individual/s	Critical and supporting Grey Falcon habitat is present in the Activity Area. The following habitat types are considered critical; Major Drainage Line and Drainage Area/Floodplain. The following habitat types are considered supporting Minor Drainage Line, Artificial Wetland, Stony Plain, and Hillcrest/Hillslope. There is no direct or indirect evidence of Grey Falcon transient, infrequent or dispersing individuals within the Activity Area.	No Critical and supporting Grey Falcon habitat is present in the Activity Area. There is no presence or sign of Grey Falcon transient, infrequent or dispersing individuals.
Night Parrot (<i>Pezoporus occidentalis</i>)	Within the Activity Area and or within a 500 m buffer of the Activity boundary there is: Presence of Night Parrot critical habitat and or supporting habitat AND Presence or sign(s) of Night Parrot population(s) or residing individuals	There is no critical habitat for the Night Parrot present within the Activity Area or 500m buffer due to the lack of old growth Triodia present, given the high levels of disturbance and fragmentation and given the lack of connectivity between areas of potentially suitable habitat. Potential supporting Night Parrot habitat is present in Stony Plain and Drainage Area/ Floodplain habitats within the Activity Area and 500 m buffer. There is no direct or indirect evidence of Night Parrot populations or residing individuals within the Activity Area or a 500 m buffer.	No Potential supporting Night Parrot habitat is present in the Activity Area and within a 500 m buffer. There is no potential critical Night Parrot habitat within the Activity Area and within a 500 m buffer. There is no presence or sign of Night Parrot populations or residing individuals.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter Data	Applicable Trigger? Yes/No
	Within the Activity Area there is: Presence of Night Parrot critical habitat and or supporting habitat AND Presence or sign(s) of Night Parrot transient, infrequent or dispersing individual/s	Potential supporting Night Parrot habitat is present in the Stony Plain and Drainage Area/ Floodplain habitats within the Activity Area. There is no direct or indirect evidence of Night Parrot within the Activity Area.	No Potential critical or supporting Night Parrot habitat is present in the Activity Area. There is no presence or sign of transient, infrequent or dispersing Night Parrot individuals.

2 Project description and disturbance

Section 1 describes the Activity in detail while Section 2.2 summarises the proposed disturbance for the Activity. Figure 1-2 illustrates the location of the proposed works comprising the Activity under assessment in this Validation Notice.

2.1 Activity description

The purpose of the Activity is to facilitate continued mining of below water table orebodies which requires a dewatering uplift and associated surplus water management infrastructure. The key physical elements of the Activity are shown on Figure 1-2 can be summarised by location as follows:

- North-west scheme: includes the MAC (Mining Area C) to Upper Marillana Creek pipeline, Northern Runaway Valley (RAV) MAR, Upper Marillana Creek Discharge (Figure 2-1)
- North-east scheme: includes the MAC to Yandi East pipeline, Yandicoogina Gorge Supplementation Scheme and Lower Marillana Creek Discharge (Figure 2-2)
- Grand Central Overburden Storage Area (GCOSA) Diversion Structure: infrastructure to divert flows from Mount Robinson from inundating the overburden storage area (OSA) (Figure 2-3).

2.1.1 Clearing and ground disturbance

Clearing of up to 1,076 ha of native vegetation will be undertaken for the construction and operation of the Activity within the Activity Area.

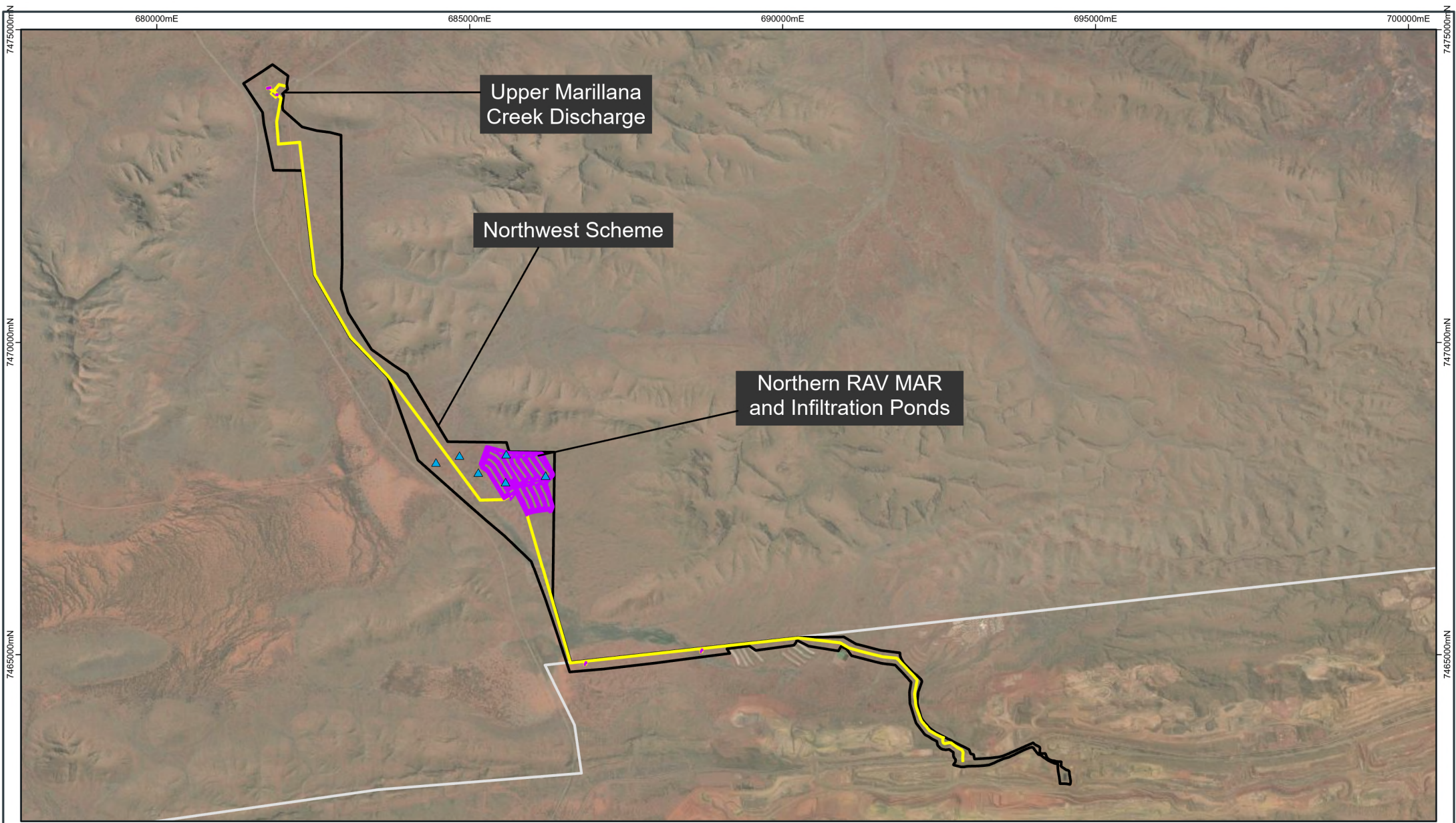
2.1.2 Surface water diversion structure

The GCOSA is located within the Mount Robinson Valley at the South Flank mine. As shown in Figure 2-3 Mount Robinson is located to the south of the MACSF mine and is divided into two catchment area. The west side contributes to the Coondewanna Catchment (and Coondewanna Flats) and the east side to Weeli Wolli Creek Catchment (via Pebble Mouse Creek). The GCOSA will intercept runoff conveyed in natural watercourses from the upstream catchments. Diversion channels upstream of the GCOSA are required to introduce a controlled interception of the runoff to prevent flood inundation of the downstream OSA.

A summary of the civil design of the diversion channel includes the following (detailed drawings included in Appendix 2):

- The total length of the east and west diversion channels are approximately 3.3 km and 2.7 km respectively.
- The east channel grades to the east and the west channel grades to the west consistent with existing catchments.
- The alignment of the diversion channels are defined such that the maximum longitudinal slope is achieved (meaning the alignments closely follow elevation contours of the existing topography).
- The base width of the channel varies from 15 m to 30 m with an average cut depth of 0.7 to 1.5 m.
- The excavated material from the diversion channel will be used as fill for construction of a berm with an average height of 2.1 m to 2.6 m.

The diversion structure will exist in the landscape post-closure of MACSF mine.



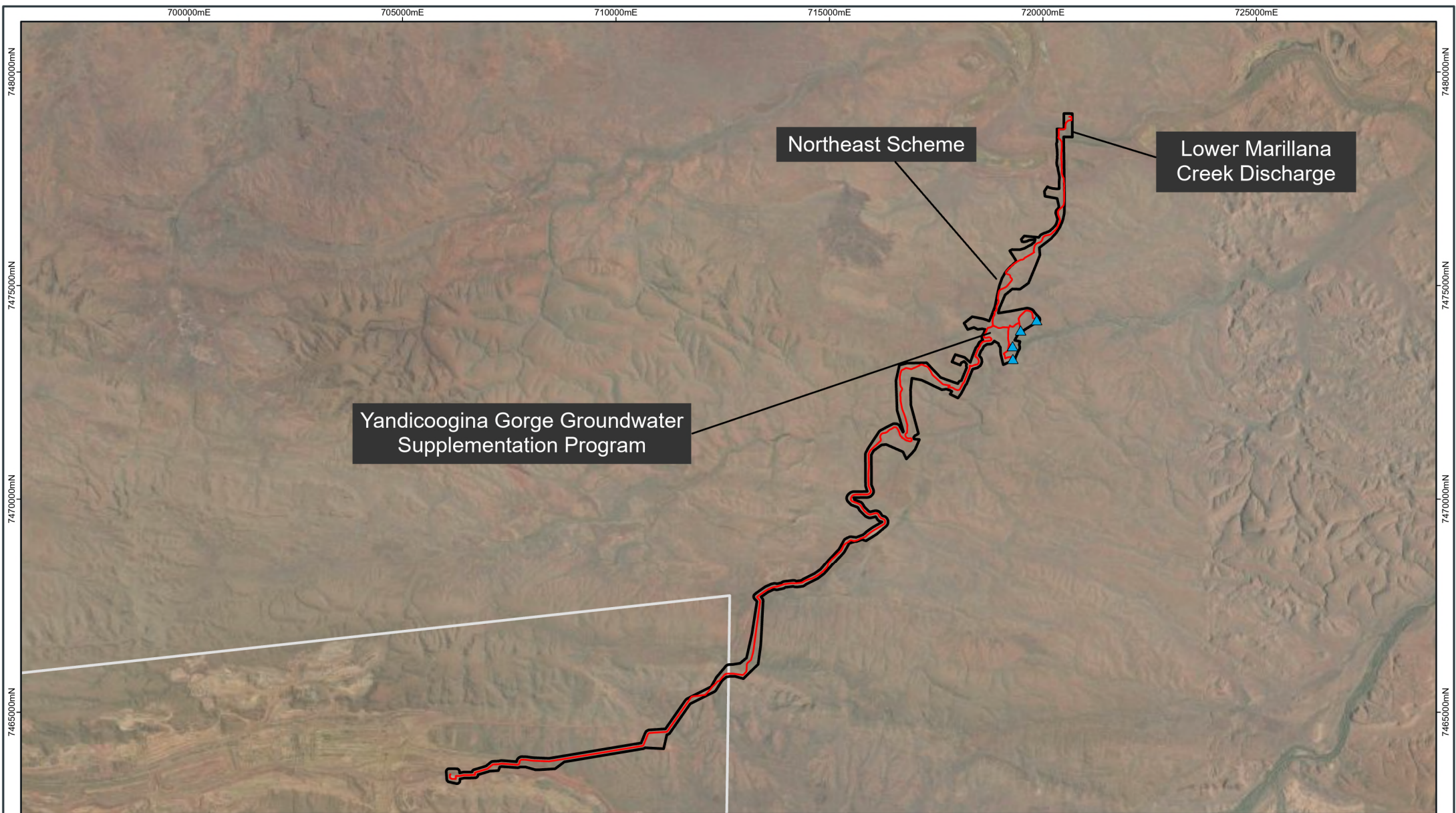
- Activity Area
- Mining Area C-Southern Flank Validation Notice Boundary
- Northwest Scheme Pipeline
- Northern RAV Infiltration Ponds
- Northern RAV MAR



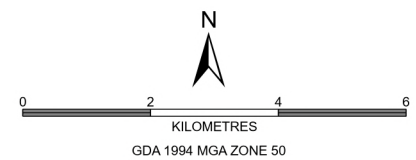
BHP **PUBLIC**

THE ACTIVITY AREA - NORTHWEST SCHEME
CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT				
SCALE @ A4:	1:80,776	REQUESTOR:	Env. Approvals	FIGURE: 2-1
DATE:	26/08/2026	PREPARED:	Geomatics	
		REVIEWED:		NO: A1440-036 RevC



- Activity Area
- Mining Area C-Southern Flank Validation Notice Boundary
- Northeast Scheme Pipeline
- Aquifer Injection Points

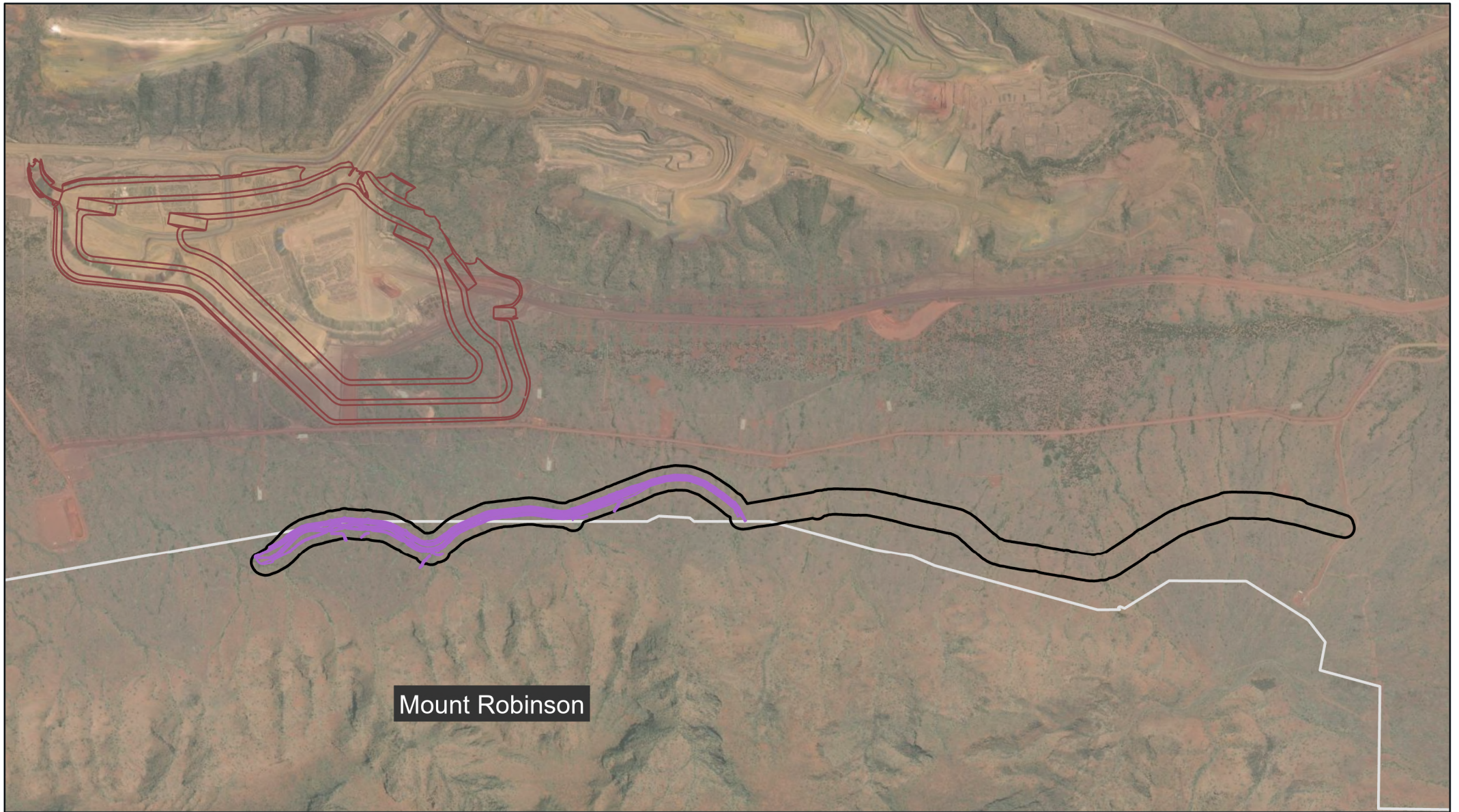


PUBLIC

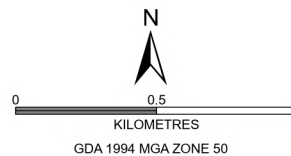
THE ACTIVITY AREA - NORTHEAST SCHEME

CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT			
SCALE @ A4:	1:118,400	REQUESTOR:	Env. Approvals
DATE:	26/08/2026	PREPARED:	Geomatics
		REVIEWED:	
		NO:	A1440-036 RevC



- Activity Area
- Mining Area C-Southern Flank Validation Notice Boundary
- Indicative Diversion Location
- Overburden Storage Areas



BHP

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THE ACTIVITY AREA - GCOSA DIVERSION CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4:	1:26,864	REQUESTOR:	Env. Approvals	FIGURE:	2-3
DATE:	26/08/2026	PREPARED:	Geomatics	NO:	A1440-037 RevC
		REVIEWED:			

2.1.3 Mine dewatering and surplus water discharge

Mine dewatering will occur at MACSF, the potential impacts associated with groundwater drawdown are included in Mining Area C Validation Notice (BHP 2018). The dewatering uplift is included in this document.

The Activity will involve the following groundwater abstraction:

- increase in groundwater abstraction from 100 ML/day to 180 ML/day.

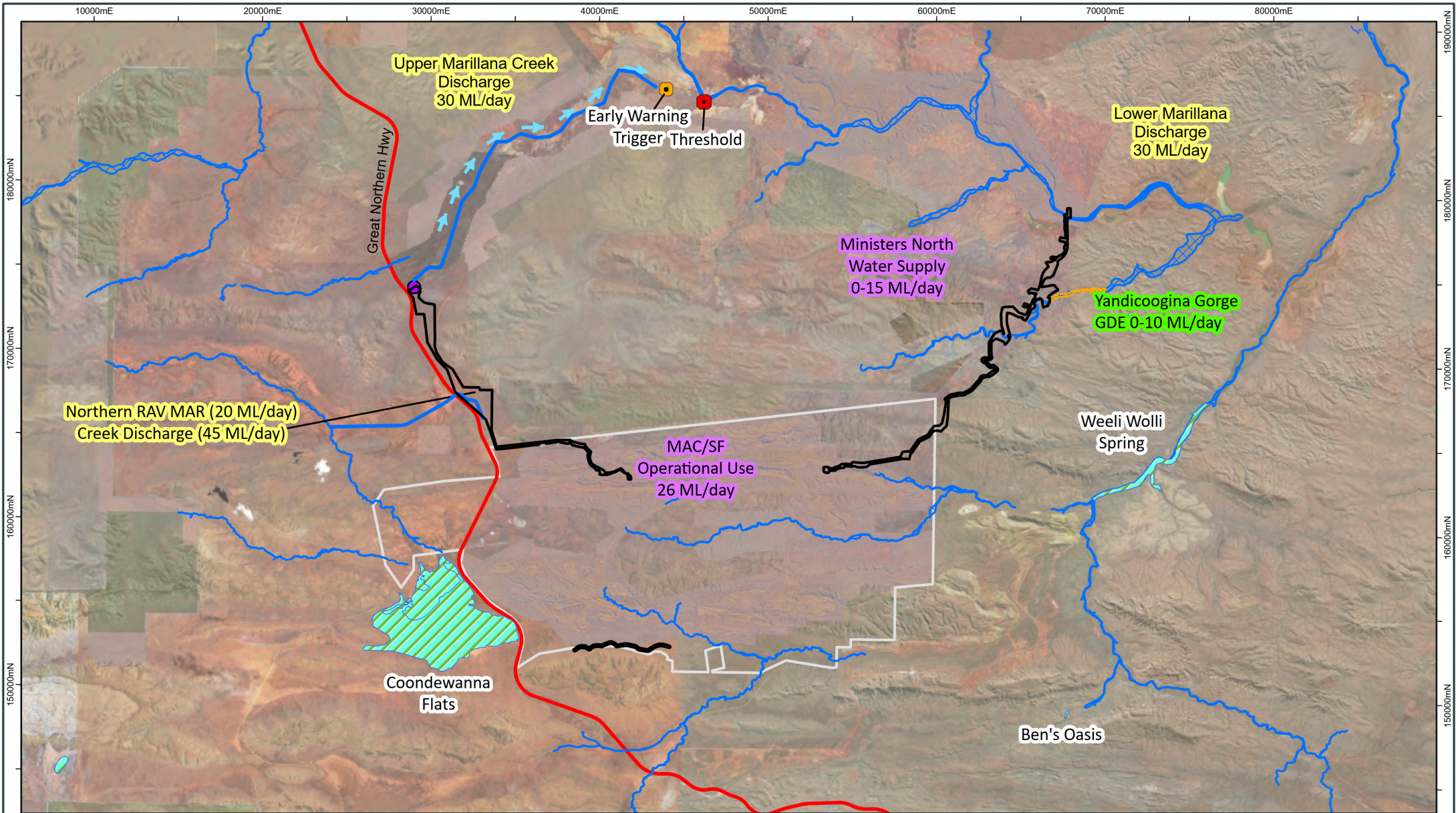
The Activity will involve the following surplus water discharge elements:

- increase in surplus water management from 34.84 GL/a to 56.21 GL/a.

The Activity includes the following water management strategy elements shown on Figure 2-4. The water management sources are utilised consistent with a surplus water management hierarchy which prioritises environmental water, beneficial use, return to ground over creek discharge.

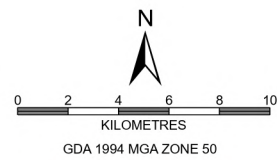
They are listed below in their hierarchy of use:

- supply of up to 10 ML/day to Yandicoogina Gorge to meet environmental water requirements
- provision of water for operational use including at MACSF (approximately 26 ML/day) and the proposed future Ministers North mine (up to 15 ML/day). Operational water use includes (but not limited to) activities such as dust suppression on haul roads, construction, ore processing, washdown facilities, and equipment cooling.
- reinjection and infiltration of surplus water back into aquifer including the Northern Runaway Valley (RAV) Managed Aquifer Recharge (MAR) and infiltration ponds of up to 20 ML/d
- creek discharge of surplus water to Upper and Lower Marillana Creeks, as a contingency surplus water management method
 - Upper Marillana Creek Discharge (up to 30 ML/d, with 90-day no discharge in dry season with maximum 5-year operating life and maximum wetting front extent of 27 km)
 - Lower Marillana Creek Discharge (up to 30 ML/d, with 90-day no discharge in dry season with maximum 5-year operating life).



- Activity Area
- Priority Ecological Community
- Yandicoogina Gorge
- Sensitive Pilbara Drainage
- Mining Area C-Southern Flank Validation Notice Boundary

- Purple Text -** Operational Use
- Green Text -** Environmental Water Requirement
- Yellow Text -** Proposed Surplus Water Management



BHP **PUBLIC**

SURPLUS WATER MANAGEMENT CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:300,000	REQUESTOR:	ENVIRONMENT	FIGURE:	2-4
DATE:	24/06/2026	PREPARED:	GEOMATICS	NO:	A1440-003 RevG
		REVIEWED:			

2.1.4 Pipeline

Two new approximately 750mm diameter surplus water pipelines will be constructed and operated within the Activity Area to discharge surplus water from MACSF to the water management strategy elements listed above.

The North-east scheme originates in the MACSF mining area and terminates at Yandi Operations. The scheme is approximately 31 km long with 7 km below ground and 24 km above ground. The scheme is aligned where possible to the rail corridor to reduce habitat fragmentation and utilise existing disturbed area.

The North-west scheme originates in the MACSF mining area and terminates at a Tributary to Marillana Creek (also referred to as Upper Marillana). The scheme is approximately 16 km long with 2.5 km below ground and 14 km above ground. The scheme is aligned where possible to Great Northern Highway to reduce habitat fragmentation and utilise existing disturbed area.

The pipeline will be lifted off the ground by approximately 200 mm in areas of high value linear habitat to support passage of smaller-ground dwelling fauna where suitable vegetation coverage exists. The pipeline will be elevated by placing a concrete sleeper underneath the pipeline which will provide sufficient clearance underneath the pipeline to allow fauna passage underneath the pipeline. Please see

Plate 2-1 below for a typical configuration.

BHP determined that high value habitat potentially impacted by the pipeline was linear type habitat such as drainage lines and gorge/gully or in areas with good vegetation cover either side of the pipeline. Fauna underpasses at this location will maintain habitat connectivity and provide enough vegetation cover to allow safe passage for fauna and reduce the risk of predation. BHP has not located fauna underpasses in areas highly disturbed by rail, Great Northern Highway and existing mining operations where fauna could potentially be directed into high traffic areas and increase the risk of fauna strike.

The pipeline is to be buried under all watercourses as shown in Figure 2-5 and Figure 2-6 to not impede flow. Waterway crossings will be designed and constructed to minimise impacts to natural drainage and creek flows. Crossing methods will be selected based on site-specific conditions, constructability and environmental requirements. Buried pipeline crossings will be constructed in accordance with applicable BHP standards, while above-ground crossings (where applicable) will maintain natural flow paths beneath the pipeline. Measures to minimise scour and disturbance to creek beds and drainage lines will be incorporated into the design.

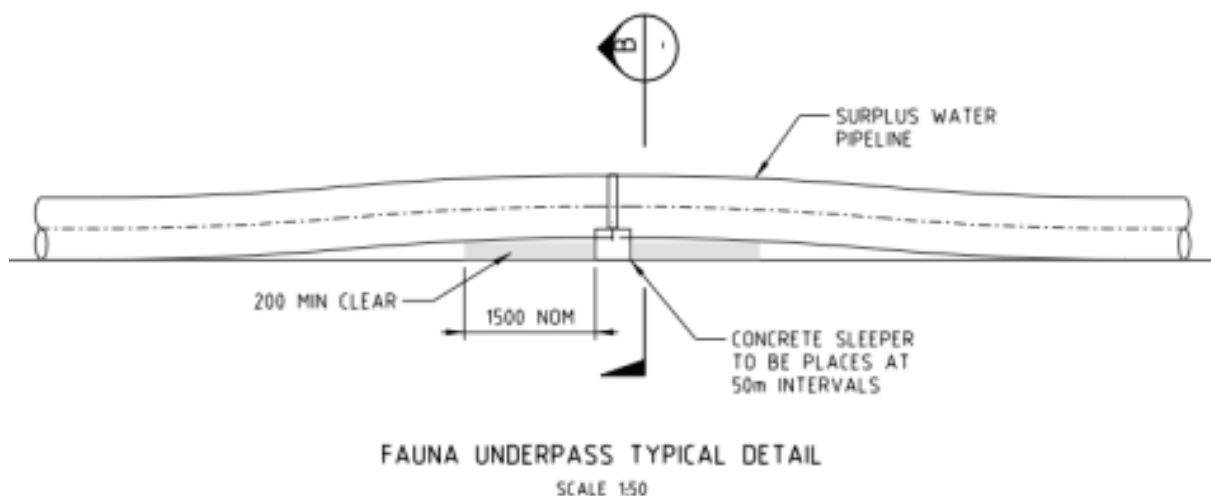
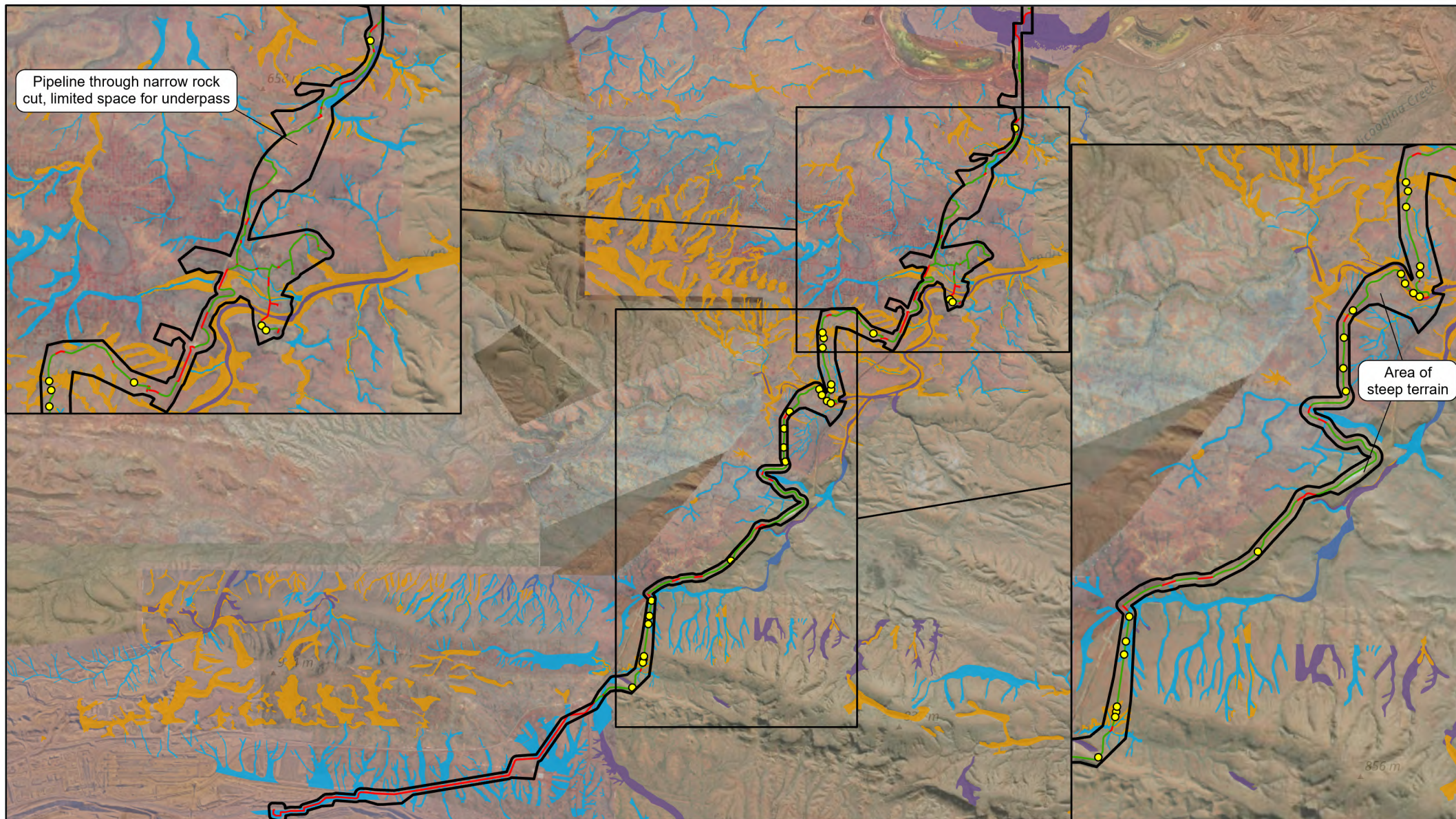


Plate 2-1: Typical Section for Fauna Underpass



Activity Area

Indicative Fauna Underpass Location

Pipeline - Above Ground

Pipeline - Below Ground

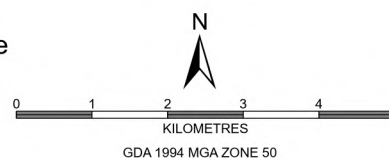
Habitat Type

Gorge/ Gully

Major Drainage Line

Medium Drainage Line

Minor Drainage Line



BHP

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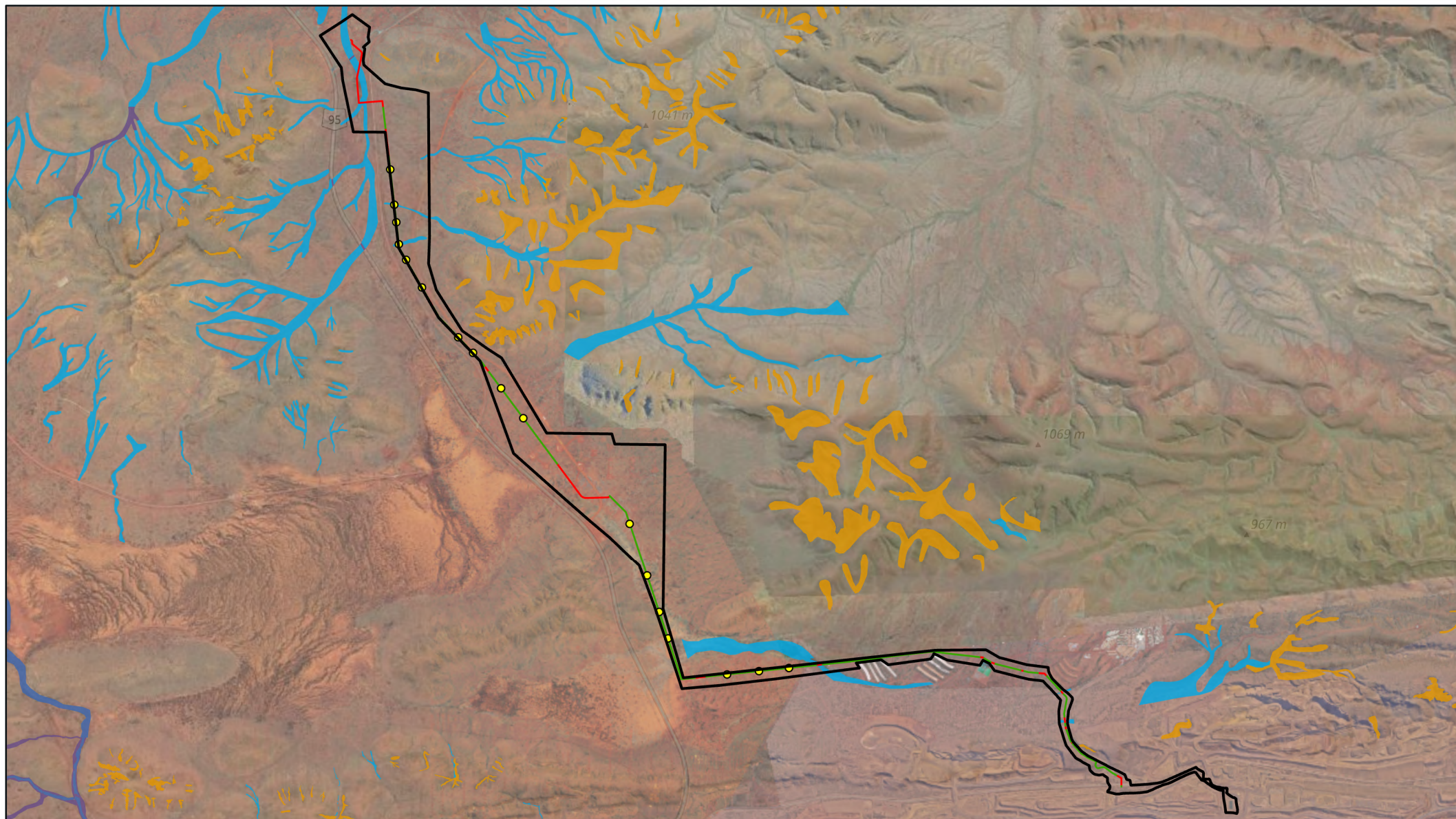
INDICATIVE FAUNA UNDERPASS LOCATIONS - NORTH-EAST PIPELINE CORRIDOR CPHSW1 VALIDATION NOTICE

WAIO- PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4: 1:100,000
DATE: 6/08/2026

REQUESTOR: Env. Approvals
PREPARED: Geomatics

FIGURE: 2-5
NO: A1440-038 RevA



Activity Area

Indicative Fauna Underpass Location

Pipeline - Below Ground

Pipeline - Above Ground

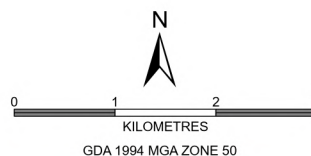
Habitat Type

Gorge/ Gully

Major Drainage Line

Medium Drainage Line

Minor Drainage Line



BHP

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INDICATIVE FAUNA UNDERPASS LOCATIONS - NORTH-WEST PIPELINE CORRIDOR CPHSW1 VALIDATION NOTICE

WAIO- PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4: 1:75,000
DATE: 6/08/2026

REQUESTOR: Env. Approvals
PREPARED: Geomatics

FIGURE: 2-6
NO: A1440-039 RevA

2.1.5 Rehabilitation and closure

Rehabilitation, decommissioning and closure will be undertaken in accordance with the Mining Area C Hub Mine Closure Plan (BHP 2025b). Rehabilitation will be undertaken progressively when disturbed areas are no longer required for operations and use specified seed mix, including the use of local provenance native seed and species of ethnobotanical value, where possible. In addition, vegetation types used in rehabilitation will be diverse to improve habitat value and encourage colonisation by a range of fauna. At closure, fauna habitats will be constructed into rehabilitated areas. The Mine Closure Plan also addresses how pits and constructed landforms (principally OSAs) will be designed, constructed and rehabilitated, to ensure they are safe, stable and non-polluting. This includes potential management strategies and processes for monitoring the risk indicators for surface water and groundwater quality.

2.2 Proposed disturbance

2.2.1 Native vegetation clearing

The proposed Activity will result in the disturbance of up to 1,076 ha of native vegetation and fauna habitat within the Activity Area, as depicted in Figure 1-2. Clearing has been minimised by planning new proposed infrastructure within previously disturbed areas.

The disturbance associated with this Validation Notice and the cumulative disturbance remaining against the SAA upper disturbance limit of 110,000 ha, is detailed in Table 2-2.

2.2.2 Alteration of groundwater regimes

The Activity involves a water management strategy to manage dewatering surplus. The following components have the potential to impact terrestrial fauna habitats:

- Changes to groundwater regimes from dewatering drawdown of mine pits
- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme
- Changes to groundwater regimes due to groundwater mounding due to Yandicoogina GDE Supplementation Scheme.

Groundwater Drawdown from Dewatering

The Activity involves a dewatering uplift from 100 ML/day to 180 ML/day. Altered groundwater regimes have the potential to cause a decline in the health, composition and/or extent of potential groundwater dependent vegetation/riparian vegetation or cause groundwater fed pool levels to decline if they are groundwater dependent. This can result in a subsequent decline in the health, composition and/or extent of the associated fauna habitats.

A catchment wide numerical model was used to predict dewatering rates and groundwater drawdown for the remaining life of MACSF operations and is inclusive of third-party operations. The modelling is detailed in the Central Pilbara Hydrogeological Assessment (BHP 2025) provided as Appendix 3.

The predicted drawdown in 2050 is shown in Figure 2-7. The key differences from the dewatering drawdown proposed in 2018 includes the following:

- Greater dewatering depth and changes in hydraulic parameters result in an increased vertical drawdown in Coondewanna Flats by 10 to 60 m.

- Drawdown is expected to extend laterally by 1.6 km to the west.
- The southern extent of the 1 m drawdown is reduced by approximately 2.5 km due to additional monitoring in the area.
- A general reduction in drawdown is predicted in the eastern extent towards Weeli Wolli Springs due to additional monitoring in the area.

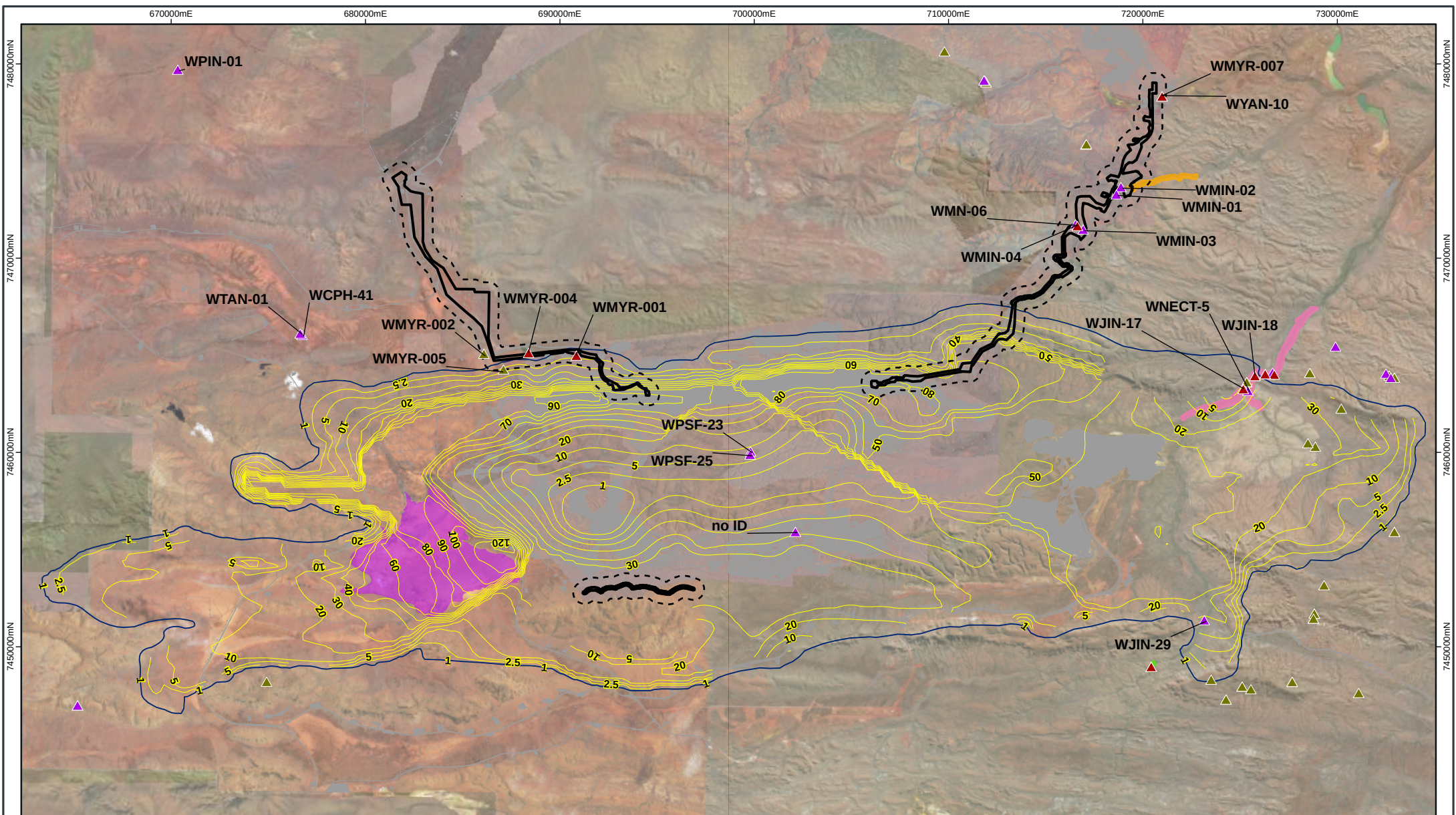
Over the past two decades, Weeli Wolli Spring has been influenced by dewatering and discharge activities at Rio Tinto Hope Downs Operations. Within Weeli Wolli Springs, the lowering of the groundwater table has caused a change in direction of groundwater flow, ceasing of spring flow, loss of permanent creekflow and groundwater source to the permanent pools and reduced access to water by vegetation resulting in some tree deaths (EPA 2018). The Weeli Wolli system is sustained by dewatering discharge from Hope Downs mine to maintain fauna habitats and function of the ecosystem. The predicted dewatering drawdown proposed by the Activity does not influence the water levels at Weeli Wolli Spring during the operation of Hope Downs mine. However, in 2045 when the RTIO Hope Downs mine closes and their mitigation measures cease, drawdown at Weeli Wolli Spring is predicted to increase to between 11-14 m (without mitigation) (BHP 2025). This has the potential to result in the degradation or loss of terrestrial fauna habitats associated with groundwater dependent vegetation/riparian vegetation or a decline in water level within the groundwater-fed surface water pools along Weeli Wolli Creek.

BHP (2025) included an assessment of the likely mitigation requirements for water levels and baseflow at Weeli Wolli Spring. This was based on the assumption that successful long-term mitigation will result from returning groundwater levels within the Weeli Wolli Spring and Hope Downs aquifer compartments to pre-development conditions (no anthropogenic influence). The assessment showed that:

- The publicly available Rio Tinto Iron Ore (RTIO) Hope Downs mitigation strategy is insufficient to account for the Hope Downs proportion of impacts at the spring and meeting the requirements of their EP Act approval.
- To fully account for Hope Downs impacts, the RTIO mitigation strategy was adjusted within the 20-year post closure timeframe (2025 to 2045). The creek discharge was increased from 20 ML/d to 28 ML/d and MAR was increased from 20 ML/d to 55 ML/d.
- Assuming BHP utilises existing production bores in the vicinity of B and R Deposits for MAR and that the RTIO mitigation is adjusted as described above, mitigation of BHP impacts was achieved with:
 - injection of 40 ML/d into both B and R deposit (80 ML/d total) from 2041 (when dewatering ceases) to 2045. This equates to a total volume of 146 GL.
 - then, injection of 12ML/d at both B and R deposits (24 ML/d) from 2046 to 2051. This equates to a further 53 GL.

To mitigate the residual impacts of dewatering on spring baseflow BHP will ensure no degradation or loss of groundwater dependent fauna habitats. To achieve this BHP will:

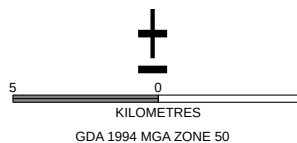
- Further investigate the water requirements to maintain the ecohydrological function of the Weeli Wolli Springs and associated fauna habitat values.
- Adopt an adaptive management approach integrated into the Central Pilbara Water Resource Management Plan (CPWRMP) to establish triggers, thresholds and criteria to maintain fauna habitats.
- Adhere to the surplus water management hierarchy with the goal to store as high a proportion as possible of surplus dewatering into suitable aquifers for recovery.
- Prioritise pit finish and fill to reduce dewatering and water deficit.



- Activity Area
- Activity Area 500m Buffer
- Combined Proposal 1m Groundwater Drawdown
- Coondewanna Flats
- Weeli Wolli Spring
- Ben's Oasis
- Yandicoogina Gorge
- Worst Case Drawdown Scenario 2050

Water Features

- ▲ Permanent/ Persistent
- ▲ Semi-permanent / Semi-persistent
- ▲ Ephemeral



BHP

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GROUNDWATER DRAWDOWN AND FAUNA HABITAT FEATURES CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:260,000	REQUESTOR:	ENVIRONMENT	FIGURE:	2-7
DATE:	21/09/2026	PREPARED:	GEOMATICS	NO:	A1440-031 RevD

Northern RAV MAR Scheme

The Northern RAV MAR scheme is located within the north-west scheme of the Activity (Figure 2-4).

Groundwater mounding can be summarised as follows:

- Groundwater mounding contours are shown in Figure 2-8. The groundwater mounding footprint is entirely within the SAA.
- Groundwater mounding up to 30 mbgl, 20 mbgl and 10 mbgl is predicted to occur at the Northern RAV MAR.
- The 10 mbgl contours mostly being confined to the Activity Area and extending 1 km west.
- The 20 mbgl and 30 mbgl contours extend approximately 2 km and 12 km west, of the Northern RAV scheme location with another isolated patch of mounding up to 20 mbgl occurring approximately 7 km west of the Northern RAV MAR location.

Mounding to less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases and groundwater levels decrease.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees which have deep roots capable of accessing groundwater. Elevated groundwater levels associated with mounding may temporarily increase water availability within the root zone, resulting in enhanced physiological condition and growth. As groundwater levels decline and return toward baseline conditions, this elevated water supply cannot be sustained, and trees may experience reduced water availability relative to the preceding period of mounding, potentially leading to water stress and a decline in canopy condition and growth rates.

Potential changes in groundwater quality as a result of the Northern RAV MAR could occur due to the introduction of dewatering surplus. Changes to groundwater quality have the potential to degrade fauna habitats through contamination.

Potential change in groundwater quality because of the MAR scheme has been assessed through analysis of groundwater quality results at the location in comparison with groundwater quality results from source water quality within the MACSF. Analysis of source water was undertaken by Biologic (2023c) and provided in Appendix 4.

Groundwater samples were collected from three bores proposed for the MAR scheme in Northern RAV and reported in the hydrogeological drilling report (BHP 2023b).

The water quality results are summarised as follows and provided in Table 2-1:

- pH at Northern RAV is slightly basic between 8.3-8.4 and is comparable to the water quality from MACSF dewatering surplus with mean pH of 7.6 and results ranging from 5.6-8.8.
- EC at Northern RAV is between 930-1200 $\mu\text{S}/\text{cm}$ whereas the Approved Proposal EC is between 70 - 1,100 $\mu\text{S}/\text{cm}$ with a mean of 610 $\mu\text{S}/\text{cm}$. Results indicate that all groundwater quality is fresh.
- Most ions within Northern RAV are comparable or slightly higher than those observed in the Approved Proposal, indicating there is unlikely to be any increase in 'hardness'.
- Concentrations of metals are comparable between the Approved Proposal and Northern RAV with no values (where available) exceeding ANZG (2018).
- Nitrates (as N) are higher in the Northern RAV area in comparison to the Approved Proposal area with both exceeding the ANZG (2018).

- *Draft toxicant default guideline values for aquatic ecosystem protection: Nitrate in freshwater (ANZG 2024)* indicate that in areas with 'hard' water (greater than 150 mg/L CaCO₃), design guideline values for 99%, 95%, 90%, and 80% protection of species levels are 18 mg/L, 29 mg/L, 38 mg/L and 56 mg/L respectively. In consideration of these draft guidelines all concentrations of nitrate are within 99% protection of species.

In summary, the water quality between MACSF and Northern RAV is comparable based on the analysis of water quality parameters and is unlikely to cause impacts. Water quality at Northern RAV will not be discussed further in this document.

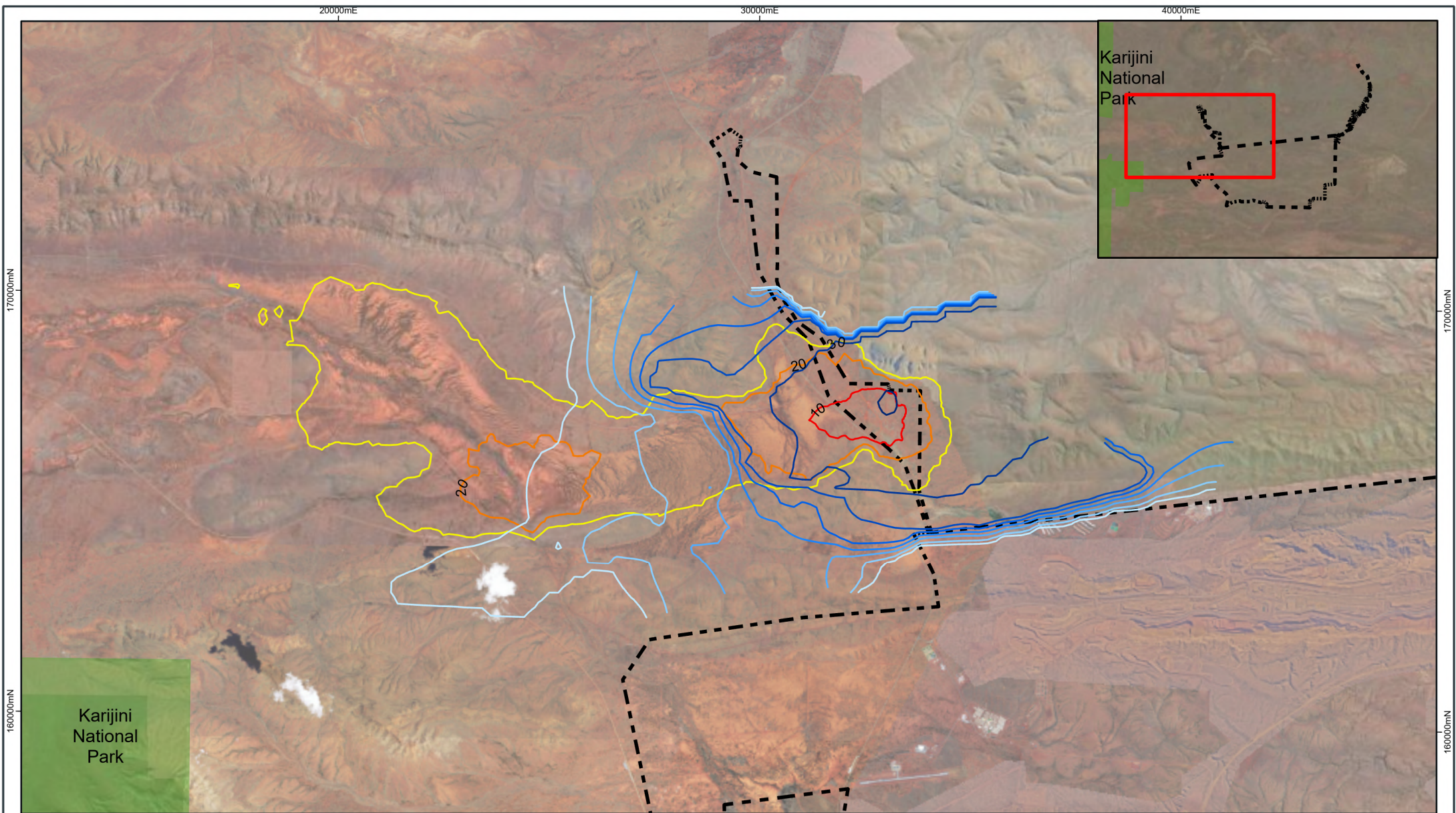
Table 2-1: Water Quality Comparison between Northern RAV and MACSF Dewatering Surplus

Analyte of Concern	ANZG (2018)* 95%	Northern RAV Water Quality			Dewatering Surplus Mean Groundwater Quality [#]
		HMKB0015P	HMKB0016P	HMK0017P	
pH (pH units)	6-8	-	8.3	8.4	7.6
Electrical Conductivity (µS/cm)	250	1200	960	930	610
Turbidity (NTU)	15	0.9	<0.5	<0.5	15
Alkalinity (mg/L)	-	390	390	290	204
Hardness (mg/L)	-	440	460	330	247
Aluminium (mg/L)	0.055	<0.005	<0.005	<0.005	0.006
Arsenic (mg/L)	0.024	<0.001	<0.001	0.0020	0.001
Barium (mg/L)	-	0.0450	0.0610	0.0530	0.009
Boron (mg/L)	0.94	0.340	0.320	0.240	0.246
Cadmium (mg/L)	0.0002	<0.0001	<0.0001	<0.0001	0.00006
Calcium (mg/L)	-	78	83	61	43
Chromium (mg/L)	0.001	0.0020	0.0010	00.20	0.002
Copper (mg/L)	-	<0.001	<0.001	0.001	0.003
Lead (mg/L)	0.0034	<0.001	<0.001	<0.001	-
Magnesium (mg/L)	-	60	62	43	30
Manganese (mg/L)	1.9	0.001	<0.001	<0.001	-
Molybdenum (mg/L)	-	<0.001	<0.001	<0.001	-
Nickel (mg/L)	0.011	<0.001	<0.001	<0.001	-
Potassium (mg/L)	-	11	12	9.4	7.1
Selenium (mg/L)	-	0.002	<0.001	<0.001	0.001

Analyte of Concern	ANZG (2018)* 95%	Northern RAV Water Quality			Dewatering Surplus Mean Groundwater Quality [#]
		HMKB0015P	HMKB0016P	HMK0017P	
Zinc	-	<0.005	<0.005	<0.005	-
Nitrate as N (mg/L)	2.4*	6.099	5.648	5.873	1.47

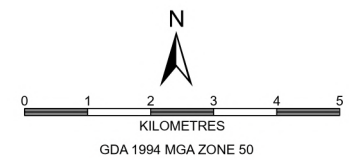
*Guideline value for 95% protection of species from National Institute of Water & Atmospheric Research (NIWA) (2013) as recommended from ANZG (2018)

Biologic 2023c



- Development Envelope
- Karijini National Park
- Predicted Depth to Groundwater**
- 10mbgl
- 20mbgl
- 30mbgl

- Water Level Increase (m)**
- 1
- 2
- 4
- 6
- 8
- 10
- 20
- 30



**PREDICTED GROUNDWATER MOUNDING
AT NORTHERN RAV (20 YEARS AT 20 ML/DAY)
CPHSW1 VALIDATION NOTICE**

PUBLIC

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:120,000	REQUESTOR:	ENVIRONMENT	FIGURE:	2-8
DATE:	18/06/2026	PREPARED:	GEOMATICS	NO:	A1440-032 RevB
		REVIEWED:			

Yandicoogina Gorge Groundwater Supplementation Scheme

Yandicoogina Gorge ('the Gorge') is located approximately 83 km north-west of Newman, and approximately 15 km north-west from MACSF. The Gorge comprises of an area where surface water of Yandicoogina Creek and groundwater discharges (Figure 2-4). Yandicoogina Creek is approximately 42 km in length and flows north-east into Marillana Creek which drains eastward into Weeli Wolli Creek. Downstream of the Gorge, the creek flows via a well-defined channel into with Marillana Creek and ultimately into the Fortescue River Valley.

The Gorge is characterised by riparian and/or groundwater dependent vegetation (GDV) as well as a series of permanent and semi-permanent pools that are likely supported by groundwater at (or close to) surface. The Gorge is culturally significant to the Banjima Traditional Owners, has affinities with the Priority 2 Ecological Community 'Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara' (DBCA 2023), supports a high diversity of aquatic fauna, contains significant subterranean fauna values and contains critical and/or supporting habitat for Program Matters including the Pilbara Olive Python, Northern Quoll, Pilbara Leaf-nosed Bat and Ghost Bat.

Since 2018, groundwater levels in the aquifer assumed to support groundwater levels within the Gorge have demonstrated a consistent decline. In the period from March 2018 to February 2023, groundwater levels declined almost 3.5 m. Additionally, water levels in the permanent pool of the Gorge have been recorded since 2020 and have declined approximately 1 m during that period. Periodic monitoring of tree health within the Gorge has also recorded tree deaths and decline of GDV health.

The causation for groundwater decline in the area cannot be defined at present but may be attributed to climate variability and/or dewatering of the channel iron deposit (CID) by BHP and/or third-party operators in the area. MACSF dewatering activities are separated by a groundwater barrier from the Gorge and therefore are highly unlikely to influence groundwater levels.

BHP are currently working with Traditional Owners, the Western Australian government and third parties to mitigate further groundwater decline at the Gorge and improve hydrogeological understanding through a groundwater supplementation trial. The trial is not part of this Validation Notice.

The scope of the trial has involved the following aspects:

1. Construction of 8 km of a 200-250 mm high-density polyethylene pipeline from BHP's Yandi mine.
2. Conveyance of up to 1.7 ML/day of surplus dewatered groundwater from existing approved surplus discharge point to a break tank within Ministers North Tenure.
3. Reinjection head works with a solar and/or diesel-powered pump to enable reinjection into one of four existing groundwater bores located near the head of the Gorge.
4. Installation of six additional groundwater monitoring bores at two locations within 200 m of the head of the Gorge to monitor reinjection levels and water quality.
5. Installation of three additional shallow groundwater monitoring bores in one location within Yandicoogina Creek, upstream from the Gorge and Ministers North to assess recharge of rainfall events.
6. Establishment of remote supervisory control and data acquisition systems to provide real time monitoring and control during the trial.
7. Development of a Trigger Action Response Plan, with trigger and threshold criteria values to support the trial.

The trial commenced in late 2024 and initial results indicate the following:

- Groundwater reinjection rates can be maintained between 1.0-1.3 ML/day without altering the natural surface water regime within Yandicoogina Creek.
- There reinjection rates appear capable of sustaining water levels across the trial area.
- No water quality exceedances of TARP trigger values were identified in any of the monitoring locations.
- Ongoing reinjection and monitoring is required to identify when recovery will propagate across the rest of the aquifer.

Acknowledging that the cause of groundwater decline at the Gorge is unknown and under investigation, BHP will stabilise or recover groundwater at the Gorge with respect to the component of drawdown attributable to BHP's mining operations (if at all).

To achieve this outcome, BHP will implement a longer-term groundwater supplementation scheme, informed by the outcomes of short-term trials and studies, to stabilise and recover groundwater conditions consistent with the maintenance of identified environmental values.

As such, the Activity proposes the installation and operation of reinjection bores and pipelines within the head of the Gorge, and the supply of surplus water from MACSF as an environmental water requirement for an ecosystem of value, being the highest water use priority in the surplus water hierarchy.

As a result, the Activity is not anticipated to adversely impact the Gorge but should prevent or minimise further decline in the permanent pools, and vegetation health and condition. These values provide critical and/or supporting habitat for Program Matters.

While reinjection is not anticipated to increase groundwater levels beyond historical levels within the Gorge, changes in groundwater quality may arise given the water will be sourced from a separate aquifer. A such, an assessment of the water quality from the source aquifer (MACSF), and comparison to ground and surface water quality within the Gorge, was undertaken.

A desktop assessment of water quality data was conducted by Biologic (2023c) (included as Appendix 4), to provide a comparison of water quality between MACSF and the Gorge (groundwater and surface water) and assess the risk of each mitigation strategy to the Gorge. The mitigation strategy for this water quality study included both injection of groundwater and surface discharge, noting that surface discharge is not part of this Activity.

A water quality comparison and discussion of analytes of concern (AoC) was conducted as part of this desktop assessment. For groundwater (injection), AoC were pH, hardness as CaCO₃ (calcium carbonate which represents 'hardness'), magnesium (Mg), sulfate (SO₄), nitrates (N-NO₃), boron (B) and electrical conductivity (EC).

The assessments found that source groundwater quality from MACSF was broadly similar to that of the Gorge receiving environment groundwaters, on average pH being circum-neutral (albeit slightly higher at MACSF), fresh and clear, with relatively low concentrations of dissolved metals (in comparison to ANZG DGVs). The most notable difference in groundwater quality was the markedly higher concentrations of nitrates (N-NO₃) in MACSF groundwaters (Biologic 2023c). However, the risk of eutrophication in groundwater is negligible due to the absence of light.

Based on the analysis of source water and existing water quality at the Gorge, there is negligible risk to environmental receptors as a result of changes in water quality (pH, salinity, ions, nutrients, metals and calcite) There is a low eutrophication risk to surface water pools as a result of reinjection due to nutrient enriched source water. The injection point and the existing surface water pool is approximately 3 km apart and some nitrate is also likely to be taken up/assimilated in the groundwater before expressing at surface. As such impacts to fauna habitats as a result of change to water quality within Yandicoogina Gorge are considered low.

2.2.3 Alteration of surface water regimes

Creek Discharge

The Activity involves surplus water discharge along creeklines as part of the water management strategy. This has the potential to alter surface water regimes via changes to water quantity, water quality, flow rates, and/or physical or biological attributes. The construction of pipelines and diversion infrastructure for the Activity also have the potential to interfere with the natural sheetflow of water and increase erosion and sedimentation. These impacts have the potential to result in modification, degradation or even loss of critical and supporting habitat for Program Matters.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation (and the associated Program Matter habitats) through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway.

The Upper Marillana Creek discharge point is proposed to have a maximum rate of 30 ML/day which is predicted to have a wetting front of approximately 27 km as a low-flow channel in the creek. The extent of the wetting front is likely to remain within the low flow channel of the creek which is estimated to be 15 m to 22 m in width (compared to the main channel width of 100 m to 200 m). The scheme will be used for a five-year period from commissioning occur and will observe a 90-day drying period during the dry season to mitigate any changes to vegetation.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved (under EP Act licence L6168/1991/11) and has been operating for approximately 15 years as part of the BHP Yandi mine. Discharges from the mine have created a short section of continuous flow which has resulted in changes to the composition of riparian vegetation.

The licence for this discharge location authorises up to 41.1 ML/day of surplus water discharge. No changes to the licence allocation are required for the Activity as a maximum of 30 ML/day limited to a 5-year period will be discharged from the Activity, and up to 11 ML/day from the existing Yandi mine. Wetting front limits have not previously been set for this location, however the maximum recorded was 9 km in 2008, and more recently 2.5 km in 2023 due to a reduction in discharge.

The scheme will be used for a five-year period from commissioning and will observe a 90-day drying period during the dry season to mitigate any changes to vegetation.

There are no reported water quality impacts associated with the existing creek discharge.

Potential Surface Water Quality Impacts

Marillana Creek is ephemeral and can be considered as a dryland river ecosystem, according to the “Characterising the relationship between water quality and water quantity” guidelines (Sinclair 2013). This is a generalisation based on the conceptual model of dryland rivers.

The Creek, at the location of the Upper Marillana Creek discharge and downstream to the confluence with Marillana Creek, is predominately dry all year round. As such proposed discharges will have different effects during the predominant no-flow conditions and the infrequent natural flow conditions and this requires consideration. During no-flow scenarios, water quality of the Upper Marillana Creek would predominately be composed of the abstracted water. During flowing scenarios, the water would undergo mixing with natural runoff.

Source water characterisation was conducted in the study conducted by Biologic (2023c) to conduct a risk assessment for receiving water at Yandicoogina Gorge. The characterisation of source water from the MACSF (C deposit) is applied the below assessment of surface water quality impacts, as follows:

- MAC C Deposit source groundwater was acidic (pH 5.6) to alkaline (pH 8.8), fresh (70 to 1,100 $\mu\text{S}/\text{cm}$ EC), warm (average temperature 29.0°C) and relatively clear (0.25 Nephelometric Turbidity Units (NTU) to 18 NTU turbidity; average 2.74 NTU). All EC values were above the ANZG (2018) DGV of 250 $\mu\text{S}/\text{cm}$. A small percentage (12%) of pH values were in exceedance of the upper ANZG (2018) guideline (pH 8.0), while a single pH value fell below the lower guideline (pH 6.0). No Dissolved Oxygen (DO) data were available. Ionic composition was dominated by HCO_3 anions, followed by SO_4 , with no Cl data available. Na was dominant amongst anions, followed by Ca, Mg and K (Biologic 2023c).
- Nitrate concentrations were relatively high in the MAC groundwater, with N_{NO_3} exceeding DGVs for eutrophication on 69% of sampling occasions. For total P, 31% of values exceeded the eutrophication guideline (0.01 mg/L), although the dataset was limited to 13 records. Only two records for N_{NO_x} and total N were provided, with all values being above DGVs (Biologic 2023c).
- Concentrations of most dissolved metals were below laboratory Limits of Reporting and/or ANZG (2018) DGV. Exceptions included Cd, Cu Ni and Zn, however, ANZG (2018) DGV exceedance frequency was 26% or lower for each of these analytes. The limit of reporting (LOR) for Cr (0.004 mg/L) was not sufficiently low to allow for comparison against the ANZG (2018) DGV (0.001 mg/L) (Biologic 2023c).
- Concentrations of hydrocarbons and other contaminants were mostly below analytical detection limits (Biologic 2023c).

An analysis of surplus water quality within MACSF indicates that there is unlikely to be impacts to surface water quality for the following analytes: pH, salinity, and dissolved metals. The risk of eutrophication because of elevated nutrients is considered low as attenuation of nitrate in saturated sediments may occur. Water quality changes will not be discussed further.

Construction of GCOSA Diversion Structure

Installation of the GCOSA diversion structure for the Activity (described in Section 2.1.2) will cause a reduction in catchment area of 17% for the west catchment and 24% for the east catchment. The associated percentage reduction to regional catchments areas is 0.44% loss to the Coondewanna Catchment (west) and 0.05% to Weeli Wolli Catchment (east). The diversion is unlikely to significantly impede flows to creek lines and therefore are unlikely to impact areas of vegetation and associated fauna habitats. The surface water impact assessment is provided in *Update of South Flank Grand Central Overburden Storage Area Surface Water Management Plan and Surface Water Impact Assessment* (WSP 2024) included in Appendix 2

Table 2-2: SAA Disturbance Allocation

Project Name	Decision Made	Date Decision Documented	Proposed Disturbance (ha)	Overall Cumulative Program Disturbance Remaining (ha)
MAC/South Flank	Validation Notice	May-18	16,000	94,000
Jimblebar OSA1 Stage 1	Not a Notifiable Action	Aug-18	95	93,905
Western Creek Diversion	Not a Notifiable Action	Feb-20	15	93,890
MAC Surplus Water	Not a Notifiable Action	Apr-20	0	93,890
Jimblebar Optimisation Project	Validation Notice	Jun-20	2,000	91,890
OB31 Stage 1 clearing	Not a Notifiable Action	Dec-22	5	91,885
Mooka Rail Siding	Validation Notice	April-23	23	91,862
Revised Jimblebar Optimisation Project	Validation Notice	May-23	1,042	90,820
Western Ridge	Validation Notice	Jul-23	4,266	86,554
Yeerabiddy Rail Works	Validation Notice	Aug-23	60	86,494
Thirteen Creek Drilling Program	Not a Notifiable Action	Aug-23	11	86,483
Rail decarbonisation electrification Project	Not a Notifiable Action	Aug-23	0	86,482.98
Orebody 32 Below Water Table	Not a Notifiable Action	Sep-23	224	86,259
Newman West (Mount Whaleback Mine)	Not a Notifiable Action	Nov-23	155	86,104
Newman Water Treatment Plant Tank Replacement and Upgrades	Not a Notifiable Action	Nov-23	7	86,097
Jimblebar Met Mast Decision Report	Not a Notifiable Action	Nov-23	2	86,095

Project Name	Decision Made	Date Decision Documented	Proposed Disturbance (ha)	Overall Cumulative Program Disturbance Remaining (ha)
Jimblebar Validation Notice	Validation Notice	Feb-24	2067	84,028
East Pilbara Surplus Water Drilling Validation Notice	Validation Notice	May-24	45	83,983
Jugari (Yandicoogina) Gorge Supplementation Trial Project	Not a Notifiable Action	May-24	1	83,982
Whaleback Hub Landfarm	Not a Notifiable Action	Apr-25	12	83,970
Newman Water Treatment Plant Tank Replacement and Upgrades (Rev 2)	Not a Notifiable Action	May-25	1	83,969
Homestead Bore 46	Not a Notifiable Action	Jun-25	38	83,931
Yandicoogina Gorge Mitigation Trial Additional Bore Installation	Not a Notifiable Action	Jun-25	5.4	83,925
Orebody 29/30/25	Validation Notice	Aug-25	116	83,809
Yarnima IPG1 Project	Not a Notifiable Action	Sep-25	3	83,806
Orebody 25 West	Validation Notice	Apr-26	175	83,631
Newman Source Water Upgrade	Not a Notifiable Action	Dec-25	29	83,602
Orebody 32 BWT Creek Discharge	Not a Notifiable Action	Jul-26	40	83,562
Ministers North Enabling Communications	Not a Notifiable Action	Mar-26	1.1	83,561
Ministers North 132kV Relocation	Not a Notifiable Action	Mar-26	64.5	83,496
Mesa Gap	Not a Notifiable Action	Apr-26	60	83,437
OB32 Go Line	Not a Notifiable Action	May-26	9.8	83,428
Ministers North Project	Validation Notice	Jul-26	1,848	81,580

Project Name	Decision Made	Date Decision Documented	Proposed Disturbance (ha)	Overall Cumulative Program Disturbance Remaining (ha)
Marillana Creek (Yandi)	Validation Notice	Jun-26	95	81,485
Yarnima IPG1 Project Amendment	Not a Notifiable Action	Jun-26	1.2	81,483
Ministers North Fleet Access- Rail Access Widening	Not a Notifiable Action	TBC	2.9	81,481
Ministers North Enabling Communication Works- Revised	Not a Notifiable Action	Aug-26	0.24	81,480
Central Pilbara Hub Surplus Water Stage 1	Validation Notice	Oct 26	1,076	80,404

2.3 Existing approvals

Commonwealth Environment Approvals

At a Commonwealth level, the Activity is within the scope of BHP's Pilbara Strategic Assessment (2017), and the Activity Area is located within the corresponding SAA, approved under the EPBC Act.

The existing MACSF mine is authorised under the EPBC Act via the Mining Area C Validation Notice (BHP, 2018). A disturbance of approximately 16,000 ha is approved for the following activities:

- open-cut mining and overburden storage areas (OSAs) at the Mining Area C expansion pits and Southern Flank satellite orebody
- primary crushing of ore at the Southern Flank satellite orebody
- transportation of ore mined at Southern Flank via overland conveyor to stockpiles and ore handling facilities located at the Mining Area C hub
- dewatering of the satellite orebody aquifers and the preferential use of the water for operational purposes, otherwise to manage the surplus volumes via managed aquifer recharge or infiltration basins as outlined in the CPWRMP and its revisions
- mobile equipment maintenance precinct, including a warehouse delivery and laydown area, tyre storage and exchange facility, wastewater tanks, maintenance workshop, wash-down facility and parking
- Southern Flank ammonium nitrate products and facility
- access and haul roads.

The Activity also interfaces with the following published Validation Notices:

- Marillana Creek (Yandi) Validation Notice (May 2026): Provides for the discharge of surplus water from Yandi dewatering operations to Marillana Creek. This Activity involves the installation of a new surplus water pipeline between MACSF and Yandi, and use of the same discharge location (i.e., the Lower Marillana Creek discharge point).
- Ministers North Validation Notice (June 2026): Relates to above water table mining at Ministers North, with operational water requirements to be sourced from other BHP Iron Ore operations. This Activity will support those requirements by supplying operational water via a new pipeline connecting MACSF to Ministers North.

State Environment Approvals

The existing MACSF mine is authorised under Part IV of the *Environmental Protection Act 1986* (WA) via Ministerial Statement (MS1072). The Activity is currently under assessment as a significant amendment to MS1072.

Other relevant Western Australian government approvals are listed in Table 2-4.

Tenure and State Agreements

BHP manages tenure holdings and legal structures on behalf of the Mount Goldsworthy Mining Associates Joint Venture, as the party to the *Iron Ore (Mount Goldsworthy) Agreement Act 1964* (Mount Goldsworthy State Agreement). The Mount Goldsworthy Mining Associates Joint Venture comprises of BHP Minerals Pty Ltd, Mitsui Iron Ore Corporation Pty Ltd, and Itochu Minerals and Energy of Australia Pty Ltd.

The Activity Area interacts with various other tenements held by BHP which will co-exist with existing tenure being utilised for the Activity and the new Miscellaneous Licences but are not required for execution of the Activity.

BHP also manages tenure holdings and legal structures, as the party to the *Iron Ore (Marillana Creek) Agreement Act 1991* (Marillana Creek State Agreement). The land the subject of the Activity Area is Mining Lease 270SA (M270SA) which is granted pursuant to the Marillana Creek State Agreement.

The Activity is located primarily on Mineral Lease ML281SA, Mineral Lease ML249SA, and proposed new tenure. Operations at the Central Pilbara Hub are situated on the tenure listed in Table 2-3.

Table 2-3: Central Pilbara Hub tenure

Lease	Description	Legislation
ML281SA	Mineral Lease 281SA	<i>Iron Ore (Mount Goldsworthy) Agreement Act 1964 (WA)</i>
M270SA	Mining Lease - Activities and ancillary works connected with Mining and Exploration under the State Agreement. Incorporates the area of Mining Lease 47/292 which no longer exists.	<i>Iron Ore (Marillana Creek) Agreement Act 1991 (WA)</i>
ML249SA	Mineral Lease 249SA	<i>Iron Ore (Mount Goldsworthy) Agreement Act 1964 (WA)</i>
ML251SA	Mineral Lease 251SA	<i>Iron Ore (Goldsworthy-Nimingarra) Agreement Act 1972 (WA)</i>

Table 2-4: Other Western Australian government approvals

Decision-making authority	Legislation or Agreement regulating the activity	Approval required (and relevant proposal element)	Statutory decision-making process can mitigate impacts on the environment
Department of Water and Environmental Regulation (DWER)	Environmental Protection Act 1986 (EP Act) - Part V	Works Approval and Licence (Processing, mining dewatering, surplus water management, waste management, bulk storage of chemicals etc.)	Yes Licence contains limits and conditions to mitigate impacts on the environment. Impacts related to discharges and emissions can be regulated through an amendment to existing MACSF licence.
DWER	<i>Rights in Water and Irrigation Act 1914 (WA) (RiWI Act)</i>	26D & 5C Licence to construct bores and take water (Groundwater abstraction, including for dewatering) Permit to interfere with bed and banks (Creek diversions)	Yes Licenses contain limits and conditions (Groundwater operating strategy) to mitigate impacts on water resources and the environment. Impacts related to drawdown and abstraction will be regulated through an amendment to the MACSF groundwater licences.
Department of Planning, Lands and Heritage (DPLH)	<i>Aboriginal Heritage Act 1972 (WA) (AH Act)</i>	AH Act s. 18 consent to disturb, if previously unidentified sites are recorded and cannot be avoided	Yes s. 18 of the AH Act authorises impacts to Aboriginal sites. Impacts which are already approved under s. 18 will continue to apply.
Minister for State Development	<i>Iron Ore (Mount Goldsworthy) Agreement Act 1964 (WA)</i> <i>Iron Ore (Marillana Creek) Agreement Act 1991 (WA)</i> <i>Iron Ore (Goldsworthy-Nimigarra) Agreement Act 1972 (WA)</i>	Additional State Agreement Proposal(s) <u>are</u> required under the relevant legislation (that being Mount Goldsworthy State Agreement and Marillana Creek State Agreement) prior to commencement of activities	Yes State agreement requires approval under Part IV of the EP Act (Section 2.3) prior to being granted.
Department of Mines, Petroleum and Exploration (DMPE)	<i>Mining Act 1978 (WA)</i>	Mining Development and Closure Proposal (MDCP) Mine Closure Plan	Yes Risks associated with decommissioning, rehabilitation and closure will be regulated through a mandatory Mine Closure Plan. Amendment to the existing MACSF Mine Closure Plan will be required.

3 Stakeholder engagement

BHP's commitment to community engagement is articulated in BHP's *Communications, Community and External Engagement Our Requirements* (BHP 2019), which states:

'Working openly with the communities in which we operate and with governments contributes to economic and social development and enhancement of BHP's reputation and social licence to operate...'

To support this commitment, BHP has comprehensive company standards and dedicated resources to ensure its activities are underpinned by continuous community engagement and feedback.

3.1 Stakeholder consultation

BHP is required to maintain a register of interested parties for the purpose of stakeholder consultation, under the Strategic Assessment Program. Interested parties listed on this register have been identified through the formal Strategic Assessment public consultation period or have self-identified after the consultation period. Community members and groups may self-identify through local stakeholder engagement activities such as Community Consultative Groups in Port Hedland and Newman, regular meetings with Traditional Owner groups, or through www.bhp.com/contact. The BHP community team manages enquiries and requests to be included in stakeholder engagement activities relating to the Strategic Assessment.

Key regulatory authorities, including the DCCEE was consulted during the development of the draft Validation Notice. Consultation included an overview of the SAA, the proposed submission, including a description of proposed activities of the Notifiable Action, potential impacts on Program Matters and the proposed management approach.

The stakeholders consulted and level of stakeholder engagement undertaken were determined based on the location, complexity, size and risk profile of the Activity, as well as the level of stakeholder interest.

Table 3-1 summarises the relevant consultation undertaken by BHP regarding the aspects of this Validation Notice.

3.2 Public consultation

This draft Validation Notice is available for public comment for a period of 28 days from the date of revision. Comments can be made via email to: environmentapprovals-waio@bhp.com. Registered stakeholders have been notified via email that the consultation period has commenced. A summary of the engagement undertaken as relevant to the preparation of the Validation Notice is provided in Table 3-1. Stakeholders listed in this table will be notified of the draft Validation Notice public comment period.

Table 3-1: Relevant Stakeholder Engagement for the Activity

Stakeholder	Date	Topics/Issues Discussed	BHP Response and Outcome
DCCEEW	19 June 2026	Pre-advertising meeting regarding the CPHSW1 Validation Notice	BHP to provide the draft Validation Notice for comment.
13 August 2025	Heritage and Environment Committee undertaken at KNAC offices in Port Hedland	BHP presented the Activity and proposed disturbance to KNAC representatives and Nyiyaparli Traditional Owners	No further management measures or consultations are suggested.
20 June 2025	BHP, KNAC and Preston Consulting meet to discuss review feedback from the EP Act referral documentation.	Upon review of the feedback provided from KNAC and their consultants BHP presented further detail regarding how the Proposal and impacts with the Nyiyaparli NTDA.	Key issues raised in the feedback include clarity on what direct and indirect impacts are on Nyiyaparli NTDA, Marillana Pastoral Station, monitoring, management and mitigation strategies for changes to the groundwater regime, adequacy of consultation with KNAC/Nyiyaparli, monitoring opportunities for Nyiyaparli Traditional Owners, Dust management and consultation on mine closure.
19 March 2025	Heritage and Environment Committee undertaken at KNAC offices in Port Hedland	BHP requested feedback on the EP Act referral documentation from KNAC and their consultants.	BHP advised KNAC of its referral of the MAC-SF Significant Amendment to the Western Australia EPA. BHP noted that KNAC contacted BHP in the week prior to the HEC to communicate concerns about the lack of consultation and advised BHP of their direct submission to the regulator regarding the proposal. BHP advised that it had primarily focused its assessment on the disturbance footprint, which is entirely on Banjima country but acknowledged that sensitive water receptors

Stakeholder	Date	Topics/Issues Discussed	BHP Response and Outcome
			are on Nyiyaparli country and BHP should have engaged with KNAC. BHP apologized for the oversight. BHP advised that KNAC can review all documents and BHP will respond to comments and feedback. BHP to respond to KNAC concerns and comments regarding the MAC SF Significant Amendment.
Environmental Protection Authority (EPA) WA	10 February 2025 - ongoing	The Mining Area C South Flank Significant Amendment was referred under the <i>Environmental Protection Act 1986</i> (WA) for assessment.	The Activity is currently under assessment by the EPA. The EPA has reviewed the referral documentation, consulted with other relevant WA government departments and requested further information.
Banjima representatives, BNTAC	1 November 2024	Endorsement of the Mining Area C South Flank- Significant Amendment Central Pilbara Hub Surplus Water Proposal Stage 1: Social, Cultural, Heritage and Environmental Management Plan (SCHEMP)	Endorsement of the SCHEMP conditional on BHP to update with additional items: - At each HAC meeting updates are to be provided to the HAC, including all relevant monitoring required by BHP's Ministerial Statement, and the actions from the SCHEMP to the satisfaction of the HAC - BHP investigate the potential for regional impacts due to the dewatering activities particularly near Coondewanna Flats. - BHP investigate reinjection to mitigate regional aquifer drawdown impacts, particularly Coondewanna Flats. BHP and HAC are aligned on the area 'Coondewanna Flats' to satisfy and protect the ethnographic values, and

Stakeholder	Date	Topics/Issues Discussed	BHP Response and Outcome
			achieve the above conditions, which is to be agreed at the first HAC in 2025.
Banjima representatives, BNTAC	May 2024	Social surroundings engagement including addressing updated scope of project, Yandicoogina Gorge, volumes of discharge, dewatering drawdown, locations of infiltration ponds and communication towers.	BHP will operate the Yandicoogina Gorge Supplementation Scheme in accordance with the Trigger Action Response Plan (TARP) reviewed by and agreed with Banjima. The TARP details supplementation program parameters and includes triggers and thresholds for the Yandicoogina Gorge trial. The supplementation scheme at Yandicoogina Gorge to be integrated into the CPH Stage 1 SCHEMP, EP Act Part V approval conditions and RiWI Act licensing.
BNTAC	24 April 2024	Change of scope to CPHSW Project since 2022 social surroundings engagements and discussion on further consultation with Banjima representatives.	BHP and BNTAC agreed to further engagement on country regarding Yandicoogina Gorge, volumes of discharge, and dewatering drawdown.
Banjima representatives, BNTAC	18-22 July 2022	On-country social surroundings engagement including project overview, identification of existing values, potential impacts and proposed environmental management.	BHP committed to give due consideration to feedback from Banjima and providing Banjima feedback on those considerations.
Banjima representatives, BNTAC	13-17 June 2022	On country social surroundings engagement including project overview, identification of existing values, potential impacts and proposed environmental management.	BHP committed to give due consideration to feedback from Banjima and providing Banjima feedback on those considerations.

4 Validation process

4.1 Guidance

The most recent Commonwealth guidance considered in the preparation of this Validation Notice include:

- DCCEEW (2025) *Conservation Advice for *Pezoporus occidentalis* (Night Parrot)*
- DCCEEW (2024) Threat abatement plan for predation by feral cats
- DCCEEW (2023) Recovery Plan for the Greater Bilby (*Macrotis lagotis*)
- DoE (2016) EPBC Act referral guideline for the endangered Northern Quoll
- DoE (2013) Matters of National Environmental Significance Significant Impact Guidelines 1.1 EPBC Act
- Department of the Environment, Water, Heritage and the Arts (DEWHA; 2008a) Threat abatement plan for predation by the European red fox
- DEWHA (2008b) Approved Conservation Advice for *Liasis olivaceus barroni* (Olive Python – Pilbara subspecies)
- DEWHA (2010) Survey guidelines for Australia's threatened bats
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011a) Survey guidelines for Australia's threatened mammals
- DSEWPaC (2011b) Survey guidelines for Australia's threatened reptiles
- DSEWPaC (2011c) Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads
- Threatened Species Scientific Committee (TSSC) (2020) Conservation Advice *Falco hypoleucos* Grey Falcon
- TSSC (2016a) Conservation Advice *Macroderma gigas* Ghost Bat
- TSSC (2016b) Conservation Advice *Macrotis lagotis* Greater Bilby
- TSSC (2016c) Conservation Advice *Rhinonicteris aurantia* (Pilbara form) (Pilbara Leaf-nosed Bat)
- TSSC (2016d) Conservation Advice *Pezoporus occidentalis* Night Parrot
- TSSC (2005) Commonwealth Listing Advice on Northern Quoll (*Dasyurus hallucatus*).

The most recent Western Australian guidance considered included:

- EPA (2020) *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment*.

Other guidance considered included:

- Bat Call WA (2021a) *A review of ghost bat ecology, threats and survey requirements*. DWER
- Bat Call WA (2021b) *A review of Pilbara leaf-nosed bat ecology, threats and survey requirements*. DWER
- Southgate *et al.* (2018) *Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground-based techniques and asserting absence*. Australian Mammalogy

- DBCA (2017) *Guidelines for surveys to detect the presence of bilbies and assess the importance of habitat in Western Australia*
- DBCA (2024) *Guidelines for determining the likely presence and habitat usage of Night Parrot (Pezoporus occidentalis) in Western Australia.*

4.1.1 Important population

For the purpose of this Validation Notice, and following EPBC Act guidance (DoE 2013), an important population for all Program Matters, with exception of Northern Quoll, is defined as:

'a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- *key source populations either for breeding or dispersal,*
- *populations that are necessary for maintaining genetic diversity, and/or*
- *populations that are near the limit of the species range.'*

An important population for the long-term survival of the Northern Quoll is specifically defined by DoE (2016) as including:

- *'high density quoll populations, which occur in refuge-rich habitat critical to the survival of the species, including where cane toads are present*
- *occurring in habitat that is free of cane toads and unlikely to support cane toads upon arrival i.e. granite habitats in WA, populations surrounded by desert and without permanent water*
- *subject to ongoing conservation or research actions i.e. populations being monitored by government agencies or universities or subject to reintroductions or translocation.'*

4.1.2 Critical habitat

Critical habitat is defined by DoE (2013) as *'Habitat critical to the survival of a species or ecological community'* and refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting, or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long-term evolutionary development*
- *for the reintroduction of populations or recovery of the species or ecological community.*

Critical habitat and supporting habitats for the seven Program Matters are defined in Sections 5.1 to 5.7 and Table 12.1 of the APOP (BHP 2023) and are based on relevant published conservation guidance. Note that critical and supporting habitats may also be further refined during field surveys.

4.2 Surveys and studies

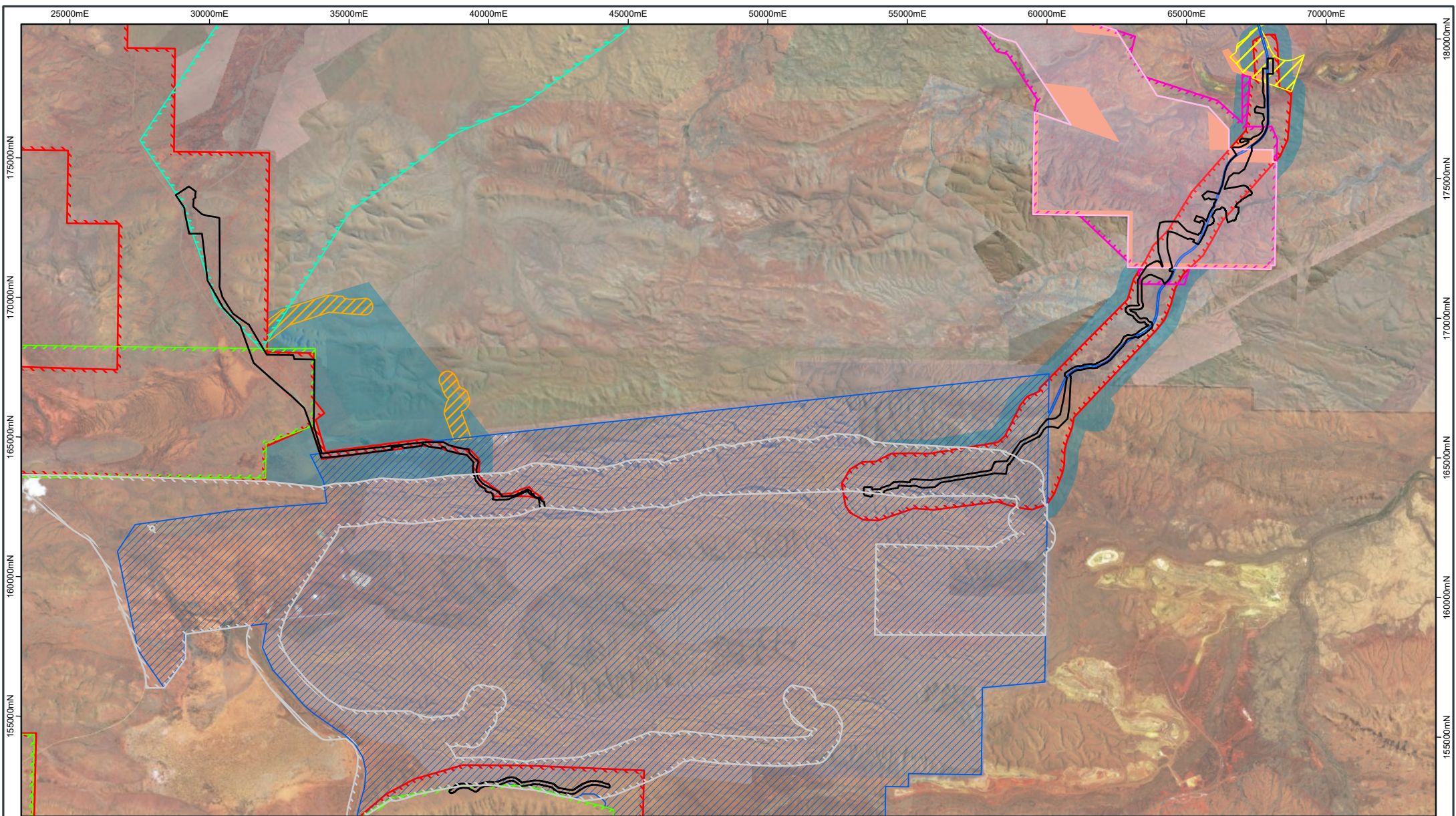
The contemporary and historical surveys which form the baseline data for the Activity Area are considered adequate for validating impacts to Program Matters in line with the requirements of Section 7.1 (Contemporary Information and Data) of the Program.

4.2.1 Contemporary surveys

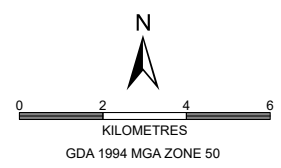
Surveys undertaken within the last five years to inform assessment of the Activity Area are presented in Figure 4-1 and Table 4-1, and the reports are provided in Appendix 1. Table 4-1 summarises the results of the entire survey area which may extend beyond the Activity Area and a 500 m buffer of the Activity Area.

The Activity Area has complete survey coverage. The 500m buffer of the Activity Area has near complete survey coverage, there is a gap in the buffer survey near the start of the northwest pipeline, the area is comprised entirely of an active mine pit within MAC. The survey gap is not considered to be a limitation for this Validation Notice as no additional Program Matters are likely to be found within a heavily disturbed and active mining area.

Surveys were undertaken in a manner consistent with the requirements of the Commonwealth and Western Australia guidance for surveys listed in Section 4.1 and fulfil the requirement of Section 7.1 of the Program for contemporary targeted on-ground surveys.



- Activity Area
- Terrestrial Vertebrate Fauna Surveys**
- Ministers North Targeted Significant Vertebrate Fauna Survey (Astron 2025)
 - Central Pilbara Hub Stage 2 Targeted MNES Vertebrate Fauna Survey (Biologic 2025a)
 - Targeted Pilbara Olive Python Survey: South Flank and Mining Area C (Biologic 2023d)
 - Yandi 45C Targeted Significant Vertebrate Fauna Survey (Astron 2023)
 - CPH Targeted Matters of National Environmental Significance Vertebrate Fauna Survey (Biologic 2023a)
 - Ministers North Fauna Survey Level (GHD 2021)
 - MAC Phase 4 Marillana Creek Targeted MNES Fauna Survey (Biota 2022)
 - MAC 4 Pipeline Level 1 Vertebrate Fauna Survey (Biologic 2019a)
 - Consolidated Ministers North Targeted Significant Vertebrate Fauna Surveys (Astron Environmental 2024)
 - MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey (Biologic 2025)
 - Mining Area C: Targeted Vertebrate MNES Fauna Survey (Biologic 2025)



CONTEMPORARY TERRESTRIAL VERTEBRATE FAUNA SURVEYS
CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3: 1:181,000

REQUESTOR: ENVIRONMENT

FIGURE: 4-1

DATE: 10/06/2026

PREPARED: GEOMATICS

NO: A1440-004 RevC

Table 4-1: Terrestrial Fauna – contemporary studies and surveys

Title	Survey Dates	Survey type	Summary
MAC to Yandi Corridor & Runaway Valley North: Target Vertebrate MNES Fauna Survey (Biologic 2025a)	May 2025	Targeted MNES Survey	A single-phase survey targeting eight MNES fauna species in the 500m buffer area surrounding the Northeast Pipeline Route (MACSF to Yandi) and the proposed managed aquifer recharge (MAR) scheme at Northern RAV. Sampling methods included habitat and habitat feature assessments, ultrasonic and acoustic sound recordings, camera trap transects, targeted searches, and nocturnal searches. One Program Matter species, the Ghost Bat, was recorded twice during the survey; one Ghost Bat scat and a single Ghost Bat call was recorded via ultrasonic recorder.
Mining Area C Targeted Vertebrate MNES Fauna Survey (Biologic 2025b)	May 2024	Targeted MNES Survey	A single season targeted vertebrate fauna survey of Mining Area C and adjacent tenements. Sampling methods included species-specific targeted sampling during the field survey comprised habitat and habitat feature assessments, ultrasonic and acoustic sound recordings, camera trap transects, targeted searches and nocturnal searches. The survey covered approximately 215 ha of the Activity Area. Three Program Matter species were recorded during the survey including: • Ghost Bat: recorded on six occasions including scats observed in caves CMAC-014, CEPA-037, CEPA-038 and CEPA-039, as well as two opportunistic sites. Individual Ghost bats were also sighted at CEPA-037, CEPA-038 and CEPA-039. Ghost bats were recorded on ultrasonic recorders over four nights with a total of 15 recorded calls. • Pilbara Olive Python: a single live individual was recorded at water feature (WEPA-004) within Breakaway/ Cliff habitat. An eDNA sample taken from the same water feature also identified the presence of Pilbara Olive Python. • Grey Falcon: observed opportunistically (two individuals) within the Survey Area within a Cleared/ Disturbed area. However, there is no direct or indirect evidence of Grey Falcon individuals or populations within the Activity Area or within a 500 m Buffer.

Title	Survey Dates	Survey type	Summary
			In addition, 10 potential Ghost Bat caves were recorded during the survey: three (CEPA-037, CEPA-038 and CEPA-039) were classified as Category 3 and five (CMAC-012, CMAC-014, CMAC-016, CMAC-017 and CMAC-013) were classified as Category 4 (nocturnal roost caves with opportunistic usage).
Jinidi Targeted Vertebrate Fauna Survey (Biologic 2024b)	March 2023 May 2023 September-October 2023	Targeted MNES Survey	A targeted vertebrate fauna survey was undertaken within the Jinidi, Northeast Corner and South Parmelia areas of the Central Pilbara. Field surveys were completed during March, May and September–October 2023 and incorporated both desktop and field-based assessments. Species-specific targeted sampling during the field survey comprised habitat and habitat feature assessments, ultrasonic and acoustic recordings, camera trap transects, targeted searches and eDNA sampling. Three Program Matters were recorded during the survey: • Ghost Bat: Recorded on 18 occasions across the study area, including detections from caves, ultrasonic recorders and eDNA sampling; three Category 2 roost caves (CJIN-13, CJIN-14, CJIN-33) were identified, supporting a locally important breeding population. • Northern Quoll: Recorded from 12 locations based on scat evidence, primarily within Gorge/Gully and breakaway habitats; occurrence is considered localised and unlikely to represent an important population at a regional scale. • Pilbara Olive Python: Recorded on eight occasions (including active individuals, scats and eDNA); the study area contains critical habitat associated with permanent water features and drainage systems, supporting an important population. In addition, whilst no individuals or evidence of Pilbara Leaf-nosed Bat were recorded during the current survey, eight caves were identified as Category 4 caves for the Pilbara Leaf-nosed Bat, with no suitable Category 1–3 roost caves present.

Title	Survey Dates	Survey type	Summary
Central Pilbara Hub Stage 2 Targeted MNES Vertebrate Fauna Survey (Biologic 2025c)	April 2022 May 2022 February 2023 March 2023	Targeted MNES Survey	A two-phase targeted vertebrate fauna survey of the Central Pilbara Hub (CPH) Stage 2 area. Species specific targeted sampling during the field survey comprised habitat and habitat feature assessments, ultrasonic and acoustic sound recordings, camera trap transects, targeted searches and nocturnal searches. Two Program Matters were recorded during the survey: • Ghost Bat was acoustically detected on 33 nights at four locations; the study area also contains several Category 2 ghost bat roost caves (e.g., CMUD-01, CMUD-02, CMUD-10, CMIN-03, CACW-31), supporting local use. • Pilbara Leaf-nosed Bat: 19 individual calls from Pilbara leaf-nosed bats were recorded at eight locations during the surveys, consistent with foraging individuals; no diurnal roost caves (Categories 1–3) were identified—caves assessed were Category 4 (nocturnal refuge) only.
Ministers North Consolidated Targeted Significant Vertebrate Fauna Surveys (Astron 2025)	April 2023	Targeted significant fauna survey	A two-phase targeted vertebrate fauna survey covering the Ministers North tenement and northeast infrastructure corridor. Species specific targeted sampling during the field survey comprised habitat and habitat feature assessments, motion sensitive cameras, acoustic bat surveys using Song Meter SM4, Night Parrot surveys, Greater Bilby plots, eDNA sampling, nocturnal searches, caves assessments, and targeted transect searches. Three Program Matter species were recorded during the survey: • Northern Quoll recorded on three separate motion cameras across two transects associated with Yandicoogina Creek. Two cameras recorded an individual on multiple nights, with imagery suggesting this is likely the same individual.

Title	Survey Dates	Survey type	Summary
			- Ghost Bat recorded from direct observations of six ghost bats roosting in cave CMN-02, and from scats recorded at the same cave in phase 2 of the survey. Another cave 700 m north (CMNY-05), was also found to have approximately 50 to 100 ghost bat scats. - Pilbara Olive Python recorded via a scat, proximate to a water body within Major Drainage Line habitat.
CPH Targeted Matters of National Environmental Significance Vertebrate Fauna Survey (Biologic 2023a)	Nov 2021 Apr – May 2022	Targeted MNES Survey	A two-phase targeted vertebrate fauna survey covering the CPH area including Mudlark Well, Pineapple Hill and Camp Hill and the MAC to Yandi Rail Corridor. Sampling methods included habitat and habitat feature (i.e. cave and water features) assessments, ultrasonic and acoustic sound recordings, camera trap transects, targeted searches and nocturnal searches. Two Program Matter species were recorded during the survey: - Ghost Bat was acoustically detected on 33 nights at four locations; the study area also contains several Category 2 ghost bat roost caves (e.g., CMUD-01, CMUD-02, CMUD-10, CMIN-03, CACW-31), supporting local use. - Pilbara Leaf-nosed Bat: 15 ultrasonic calls at four locations, consistent with foraging individuals; no diurnal roost caves (Categories 1–3) were identified—caves assessed were Category 4 (nocturnal refuge) only.
Targeted Pilbara Olive Python Survey: South Flank and Mining Area C (Biologic 2023b)	March 2023	Targeted Pilbara Olive Python Survey	A single season targeted Pilbara Olive Python survey. Sampling methods included targeted searches and environmental DNA (eDNA) sampling at a water feature. Pilbara Olive Python were recorded on three occasions within Gorge/Gully habitat during survey including one visual observation and one eDNA detection of the same individual at the water feature and the third record from eDNA detection at a separate water feature. The records are not from the Activity Area or the 500 m buffer.

Title	Survey Dates	Survey type	Summary
Yandi 45C Targeted Significant Vertebrate Fauna Survey (Astron 2023)	23 Sept – 2 Oct 2022	Targeted significant fauna survey	A targeted vertebrate fauna survey covering the Yandi mining area. Species specific targeted sampling during the field survey comprised habitat and habitat feature assessments, motion sensitive cameras, acoustic bat surveys using Song Meter SM4, Night Parrot surveys, Greater Bilby plots, and targeted transect searches. One MNES species was recorded during this survey: the Common Sandpiper (<i>Actitis hypoleucos</i>; listed as Migratory). No Program Matter species were recorded during this survey.
MAC Phase 4 Marillana Creek Targeted MNES Fauna Survey (Biota 2022)	Nov 2020 Mar 2021 Jan 2021	Targeted significant fauna survey	A two-phase survey targeting significant fauna species, with a particular focus on MNES. The sampling area focused on the proposed creek discharge at Upper Marillana. Sampling methods included motion cameras, targeted searches, nocturnal searches, habitat assessment, hair traps (if active burrows detected) and echolocation call recorders. One Program Matter species was recorded; the Pilbara Olive Python was observed during a nocturnal search in a rock pool at Flat Rocks (site MAC-06).

5 Existing environmental values

5.1 Fauna habitats

Detailed fauna habitat mapping of the Activity Area has been completed during the surveys and studies described in Section 4.2. The type and extent of fauna habitats present in the Activity Area are provided in Table 5-1 and shown in Figure 5-1, Figure 5-2, and Figure 5-3.

Table 5-1: Fauna habitats in the Activity Area

Habitat Type	Description	Value to significant fauna*	Extent in Activity Area to be cleared
Gorge/Gully	Gorges and gullies are rugged, steep-sided valleys incised into the surrounding landscape. Gorges tend to be deeply incised, with vertical cliff faces, while gullies are more open (but not as open as Minor Drainage Lines). Caves and rock pools are most often encountered in this habitat type. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.	Critical breeding, roosting, denning (where suitable caves and overhangs exist) and/or foraging and dispersal habitat for Northern Quoll, Pilbara Olive Python and Ghost Bat. Where no suitable caves or overhangs exist, supporting foraging and dispersal habitat for Ghost Bat and Pilbara Leaf-nosed Bat.	14.96 ha
Major Drainage Line	The Major Drainage Line habitat supported an upper story of relatively tall Eucalyptus. The habitat is prone to flooding and is more likely to retain water when inundated. The structure and condition of vegetation often varies seasonally, particularly following rainfall events. This habitat type is often subject to heavy cattle grazing.	Provides critical foraging and dispersal habitat for Ghost Bat (when within 12 km of critical roosting habitat), Northern Quoll, and Pilbara Olive Python. Provides critical roosting, breeding and foraging habitat for Grey Falcon and Pilbara Leaf-nosed Bat.	10.14 ha
Breakaway/Cliff	The Breakaway/ Cliff habitat comprised a single sided rock face, within the steep mid-upper slope comprising bare rock outcrops or cliffs. Does not comprise the entire slope.	Provides critical breeding roosting, denning (where suitable caves or overhangs exist) and/or foraging and dispersal habitat for Northern Quoll, Ghost Bat, Pilbara Leaf-nosed Bat and Pilbara Olive Python.	2.19 ha
Artificial Wetland	The dewatering discharge outlet, located on the northern extent of the proposed Development Envelope within Lower Marillana Creek (Yandi tenement) where excess water discharging into this section of the creek has created a permanent artificial pool.	Provides critical foraging and dispersal habitat for Pilbara Olive Python. Provides supporting habitat for Northern Quoll and Grey Falcon.	1.03 ha

Habitat Type	Description	Value to significant fauna*	Extent in Activity Area to be cleared
Drainage Area/Floodplain	Lower lying plain often subjected to sheet flow following large rainfall events. Vegetation and substrates of this habitat was variable, often comprising scattered Eucalyptus over <i>Acacia</i> and/or <i>Grevillea</i> shrubs with an understory dominated by <i>Triodia</i> hummock grasses and/or mixed tussock grasses on alluvial substrates, often comprising heavy clays and gravel.	Provides critical foraging habitat for Ghost Bat where it occurs within 12 km of critical roosting habitat. Provides critical habitat for Grey Falcon. Provides supporting habitat for Pilbara Leaf-nosed Bat, and Northern Quoll. Potentially provides supporting habitat for the Night Parrot and Bilby.	356.53 ha
Stony Plain	Stony Plain comprise low-lying open plains and the rolling hills below upland areas, with very slight to no gradient. The substrate consists of gravel and pebbles, with vegetation dominated by <i>Triodia</i> , although scattered trees also occur. Vegetation within this habitat varied in composition but was generally dominated by scattered Mulga and <i>Acacia</i> forming an over-storey, with patches of various small to medium shrub species, over low hummock grasslands of <i>Triodia</i> . Scattered <i>Corymbia</i> and <i>Eucalyptus</i> are usually present.	Provides critical foraging habitat for Ghost Bat where it occurs within 12 km of critical roosting habitat. Provides supporting habitat for Pilbara Leaf-nosed Bat and Grey Falcon. Potentially provides supporting habitat for the Night Parrot.	387.24 ha
Hillcrest / Hillslope	The Hillcrest/ Hillslope habitat comprised a rocky substrate, often with exposed bedrock, on moderate to steep slopes leading into lower footslopes. This habitat was characterised by steep slopes with a high proportion of coarse fragments dominated by ironstone. These can contain cracks and crevices. This habitat is usually dominated by open <i>Eucalyptus</i> woodlands, <i>Acacia</i> and <i>Grevillea</i> scrublands and <i>Triodia</i> low hummock grasslands.	Provides critical foraging and dispersal habitat for the Ghost Bat where it occurs within 12 km of critical roosting habitat. Provides supporting habitat for Ghost Bat, Pilbara Leaf-nosed Bat, Northern Quoll and Grey Falcon.	234.3 ha

Habitat Type	Description	Value to significant fauna*	Extent in Activity Area to be cleared
Minor Drainage line	Minor Drainage Line habitat usually lacks a tall dense upper storey, but with a dense mid storey, including sparse <i>Eucalyptus</i> sp., and <i>Acacia</i> sp. over tussock grasses and <i>Triodia</i> sp. hummock grasses. Is a common habitat type, primarily surrounding areas of higher elevation, particularly within the Hillcrest/ Hillslope habitat.	Provides critical foraging and dispersal habitat for Ghost bat where it occurs within 12 km of critical roosting habitat. Provides supporting habitat for Ghost Bat within 12 km of critical roosting habitat, Northern Quoll, Pilbara Leaf-nosed Bat, Pilbara Olive Python and Grey Falcon.	38.87 ha
Sand Plain	Sand Plain habitat is characterised by relatively deep sandy soils supporting dense spinifex grasslands and sparse shrubs. This habitat often occurs as terraces along Major Drainage Lines.	Potentially provides supporting habitat for the Bilby.	1.65 ha
Cleared/Disturbed	Previously disturbed area		28.08
No Survey Data ¹			1.03
Total Habitat			1,076 ha

¹ No survey data relates to survey boundary misalignment with Activity Area slivers

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690000mE

695000mE

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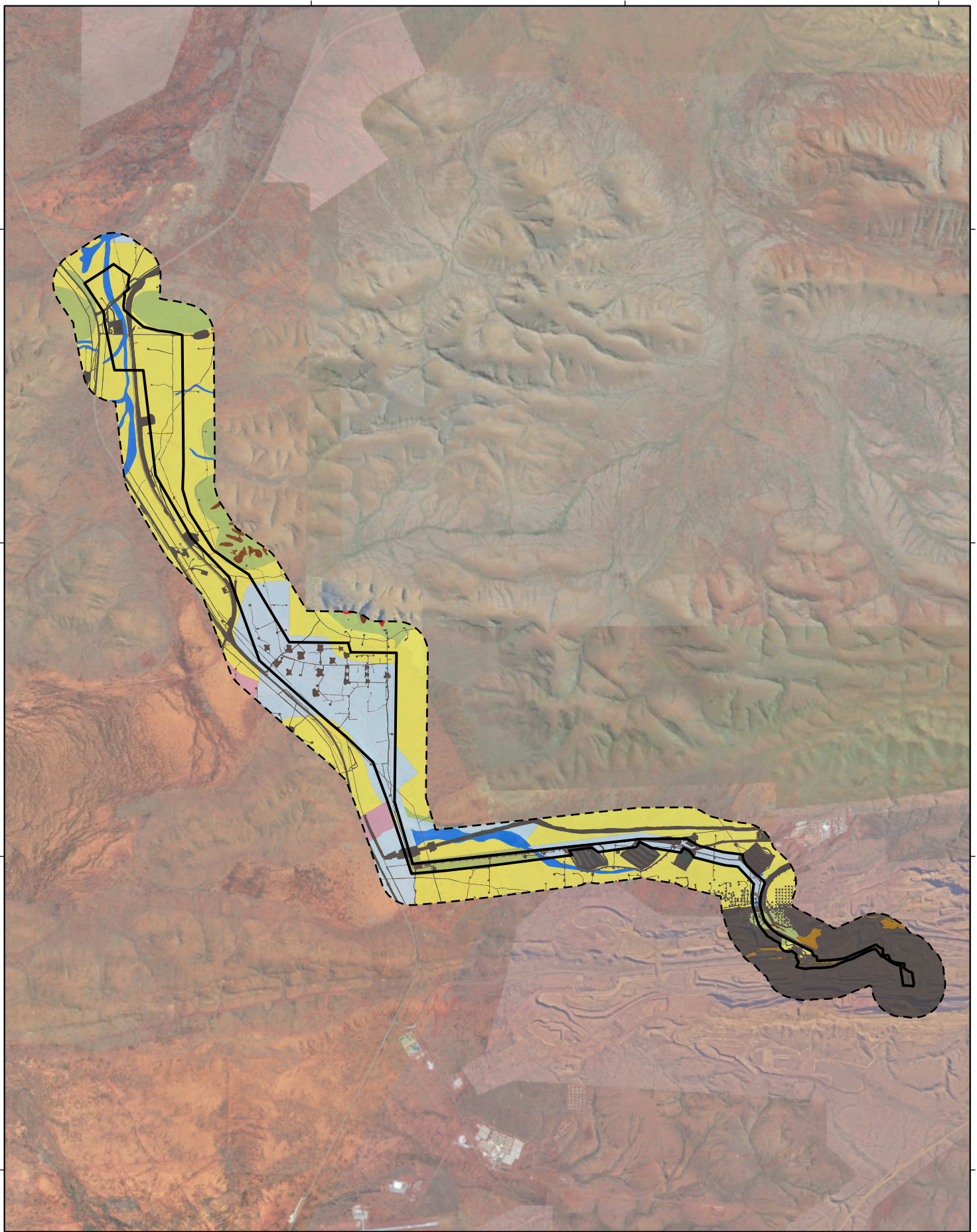
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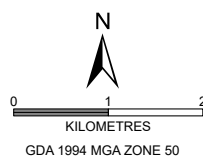
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- Activity Area**
 Activity Area 500m Buffer
 Cleared Area
Habitat Type
 Breakaway/ Cliff
 Drainage Area/ Floodplain
 Gorge/ Gully

- Hardpan Plain
 Hillcrest/ Hillslope
 Minor Drainage Line
 Mulga Woodland
 Sand Plain
 Stony Plain
 Undulating Low Hills

**BHP****PUBLIC**

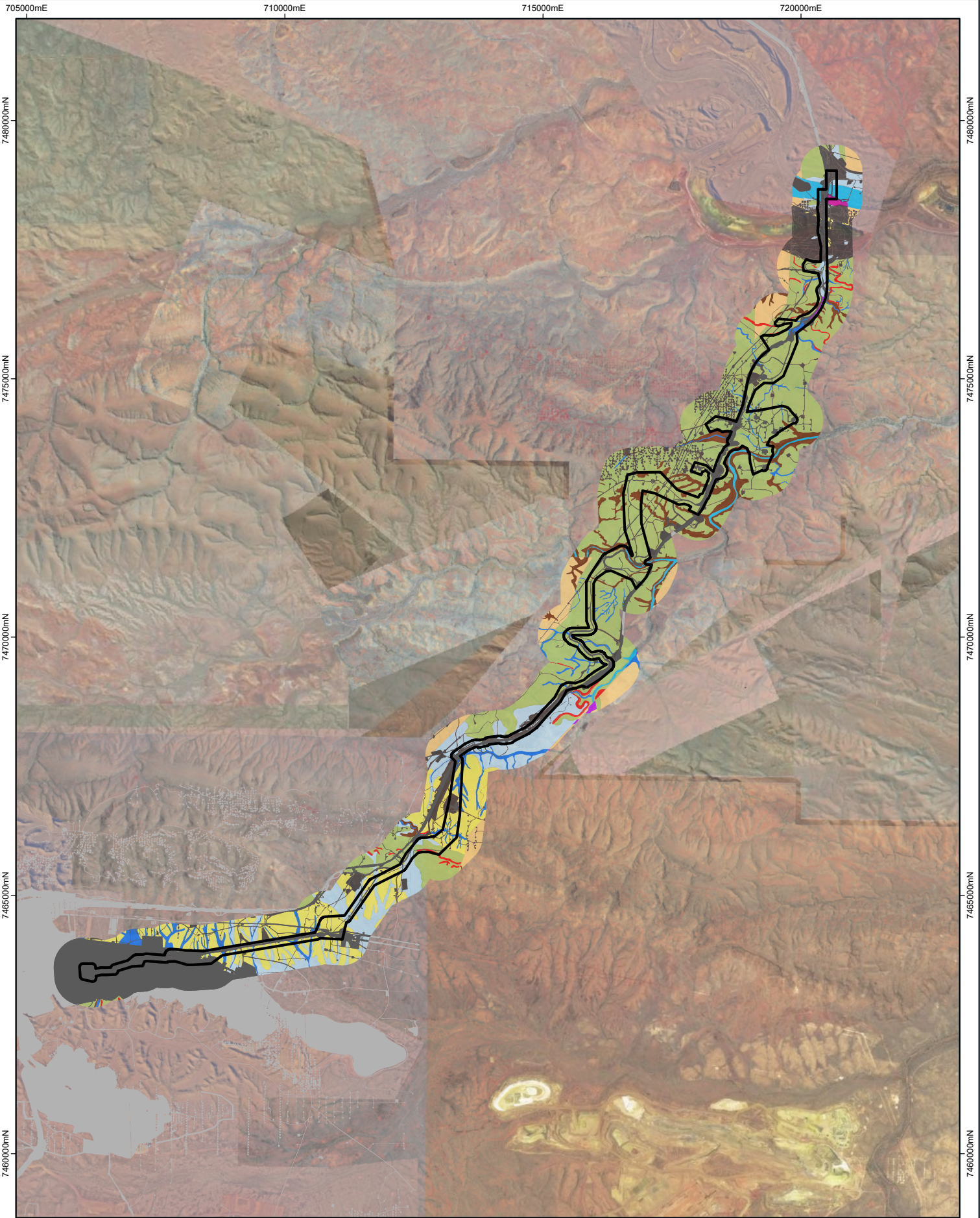
**FAUNA HABITAT WITHIN THE
NORTHWEST SCHEME
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

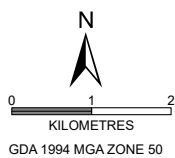
SCALE @ A4: 1:80,000
DATE: 18/06/2026

REQUESTOR: ENV APPROVALS
PREPARED: GEOMATICS

FIGURE: **5-01**
NO: **A1440_006_RevC**



- | | |
|---------------------------|----------------------|
| Activity Area | Hillcrest/ Hillslope |
| Cleared Area | Major Drainage Line |
| Habitat Type | Medium Drainage Line |
| Artificial Wetland | Minor Drainage Line |
| Breakaway/ Cliff | Stony Plain |
| Drainage Area/ Floodplain | Undulating Low Hills |
| Gorge/ Gully | |



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**FAUNA HABITAT WITHIN THE
NORTHEAST SCHEME
CPHSW1 VALIDATION NOTICE**

WAI0 PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4:	1:95,000	REQUESTOR:	ENV APPROVALS	FIGURE:	5-02
DATE:	18/06/2026	PREPARED:	GEOMATICS	NO:	A1440_007_RevC

692000mE

694000mE

696000mE

7456000mN

7454000mN

7452000mN

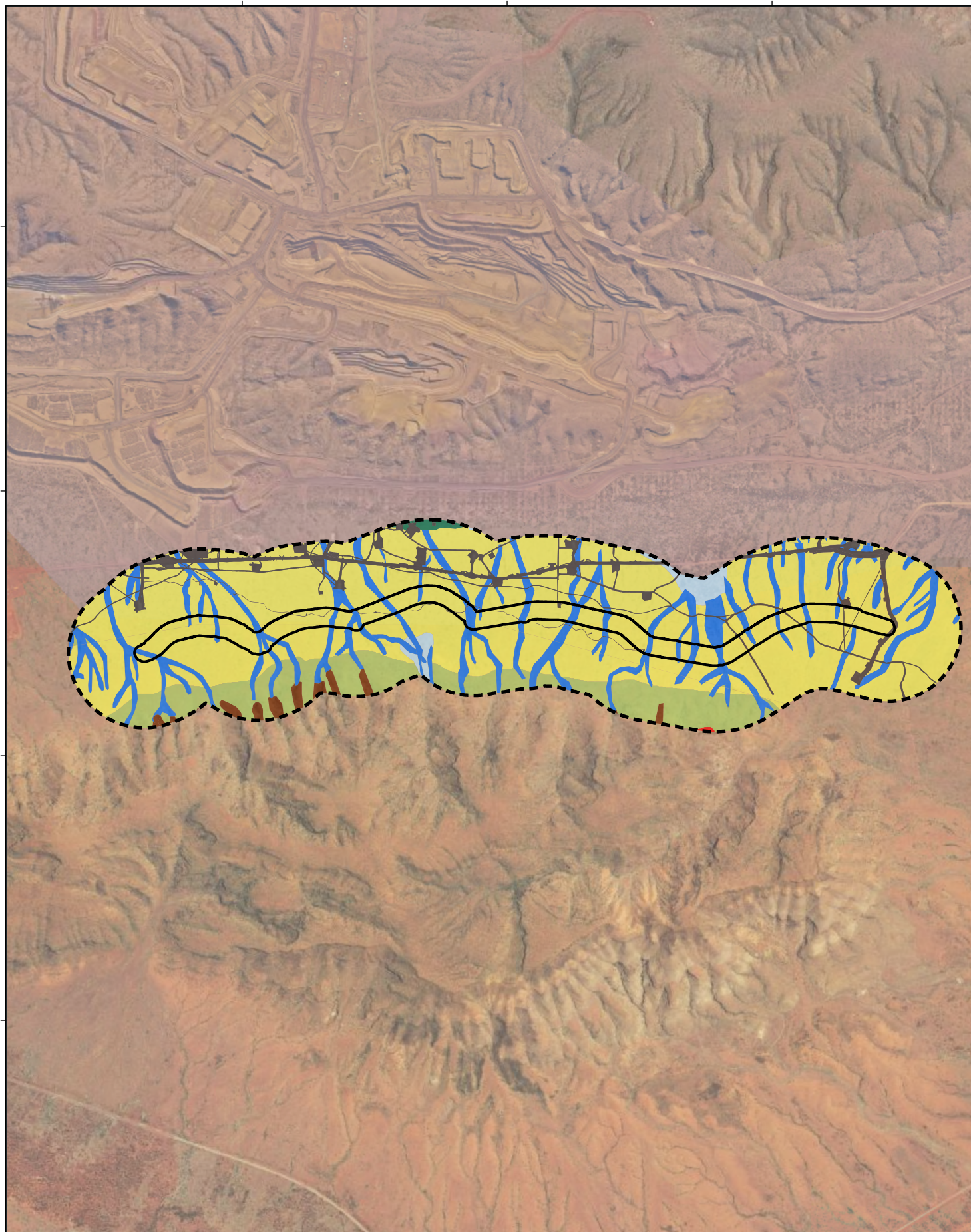
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7456000mN

7454000mN

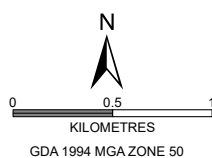
7452000mN

7450000mN



- Activity Area
 Activity Area 500m Buffer
 Cleared Area
Habitat Type
 Breakaway/ Cliff
 Drainage Area/ Floodplain

- Gorge/ Gully
 Hillcrest/ Hillslope
 Minor Drainage Line
 Mulga Woodland
 Stony Plain

**BHP****PUBLIC**

**FAUNA HABITAT WITHIN THE
GCOSA DIVERSION
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A4: 1:38,000
 DATE: 18/06/2026
 REQUESTOR: ENV APPROVALS
 PREPARED: GEOMATICS
 FIGURE: **5-03**
 NO: **A1440_008_RevC**

5.2 Ghost Bat

The following sections provide background information to demonstrate that Notifiable Action Triggers for Ghost Bat are met. Impacts to the Ghost Bat are discussed to illustrate that the Program Matter Objective (as described below) for this species will be met.

Program Matter Objective: *“To support the long-term persistence and viability of the Ghost Bat within the SAA.”*

5.2.1 General species information

The Ghost Bat is listed as ‘Vulnerable’ under the EPBC Act. It is the largest microbat in Australia and the second largest globally (TSSC 2016a).

In the Pilbara region, the species occurs across all four sub-regions and was recorded in 21 of the 24 areas surveyed by DPaW during the Pilbara Biological Survey (2002-2007; see McKenzie and Bullen 2009). The Pilbara-based Ghost Bat population is currently estimated to be approximately 1,850 individuals, with around 350 in the Hamersley Range and 1,500 in the eastern Pilbara (Bat Call WA 2021a).

The largest colonies of Ghost Bats in the Pilbara occur outside the SAA, primarily roosting in abandoned mines. Within the SAA, studies suggest colonies are smaller and they are likely to depend on multiple roosts within their range.

Ghost bats in the Pilbara typically roost in deep, complex caves beneath bluffs of low rounded hills, often composed of Marra Mamba Iron Formation or banded iron formation, granite rock piles and abandoned mines (Armstrong and Anstee 2000). Ghost Bats may move between caves both seasonally and in response to weather changes (van Dyck and Strahan 2008).

Highly suitable foraging habitats for the Ghost Bat in the Pilbara include Gorge/Gully, Drainage Area/Floodplain, Major Drainage Line, and Mulga Woodland, followed by Stony Plain as a less suitable habitat (Biologic 2020; unpublished data).

Recent Ghost Bat tracking studies (Augusteyn *et al.* 2018 and Bullen 2021) indicate that male and females forage over large areas, typically up to 12 km from their diurnal roost (Augusteyn *et al.* 2018; Bullen 2021), and occasionally up to 17 km during foraging bouts (Bullen *et al.* 2023).

Regional records and the distribution of Ghost Bat are shown in Figure 5-4.

5.2.2 Studies and sampling effort

At least seven contemporary surveys have targeted the Ghost Bat within the Activity Area and/or 500m buffer (Section 4.2.1; Table 4-1), as well as numerous contemporary and historical surveys in the wider area (Appendix 1). Survey coverage and sampling effort for the Ghost Bat is shown in Figure 5-5. Sampling methods for Ghost Bat within the Activity Area and 500 m buffer include habitat assessments (including water and cave feature assessments), targeted searches and/ or transects, and ultrasonic recorders (Biologic, 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025; Figure 5-5). Where suitable caves or overhangs that may be utilised by the species were located, detailed cave assessments and searches were undertaken to search for evidence of occurrence and determine the likely use of the cave as a roost site.

Sampling methods for cave assessments includes searching inside or at entrances of caves, scat collection, counts and analysis, visual observations of individuals, DNA analysis, hormone analysis, placing ultrasonic detectors near water features, caves and foraging/ dispersal corridors, and infra-red video recordings. Microclimate and photo monitoring are also undertaken to monitor the suitability of the caves as habitat for ghost bats. Where a cave was not deemed safe for entry, efforts were made to assess the cave without entering (Biologic 2023a).

5.2.3 Local habitat

The Activity Area falls within the current distribution of the Ghost Bat whereby the species or species habitat may occur (Figure 5-4).

The Activity Area and the region is likely to be an important area to the Ghost Bat based on the presence of critical and supporting habitats (Biologic 2023a). Gorge/Gully habitat often contains important habitat features such as overhangs and caves (Biologic 2023a).

Critical foraging and dispersal habitat and supporting habitat are present within the Activity Area and 500 m buffer of the Activity Area as discussed below and in Figure 5-5, Figure 5-6a, Table 5-2 and Table 5-3.

Critical habitat

There are no caves within the Activity Area.

There are 10 caves within 500 m of the Activity Area (Table 5-2 and Figure 5-6a). Caves within 500 m have been considered in this assessment as they could potentially be subject to indirect impacts associated with the Activity such as increased dust, noise, or vibration. Caves outside the 500 m distance are highly unlikely to be impacted by the Activity.

There are nine Category 2 caves located outside the 500 m buffer of the Activity Area and within 12 km of the Activity Area (Table 5-2 and Figure 5-6a). There are also at least 32 unclassified caves within 12 km of the Activity Area.

The following habitats are considered critical foraging and dispersal habitat where proximal (within 12 km) to Category 2 caves; Gorge/Gully, Major Drainage Line, Breakaway/Cliff, Medium Drainage Line, Mulga Woodland, Drainage Area/Floodplain, Stony Plain, Hillcrest/Hillslope, Minor Drainage Line, Sandy/Stony Plain and Undulating Low Hills.

Within the Activity Area there is approximately 1,044 ha of critical habitat present within the Gorge/Gully, Breakaway/Cliff, Major Drainage Line, Drainage Area/Floodplain, Stony Plain, Minor Drainage Line and Hillcrest / Hillslope habitats (Table 5-3).

Within the 500 m buffer, there is approximately 5,677 ha of critical habitat present within all of the above-mentioned habitat types, as well as Medium Drainage Line, Mulga Woodland and Undulating Low Hills, which also represent critical habitat for the Ghost Bat given they occur within 12km of a Category 2 cave (Table 5-3).

Supporting habitat

All supporting habitats for the Ghost Bat present with the Activity Area or 500 m buffer are considered to be critical Ghost Bat Habitat due to their proximity (within 12 km) of Category 2 Caves.

Table 5-2: Caves with potential and recorded Ghost Bat use outside of the Activity Area

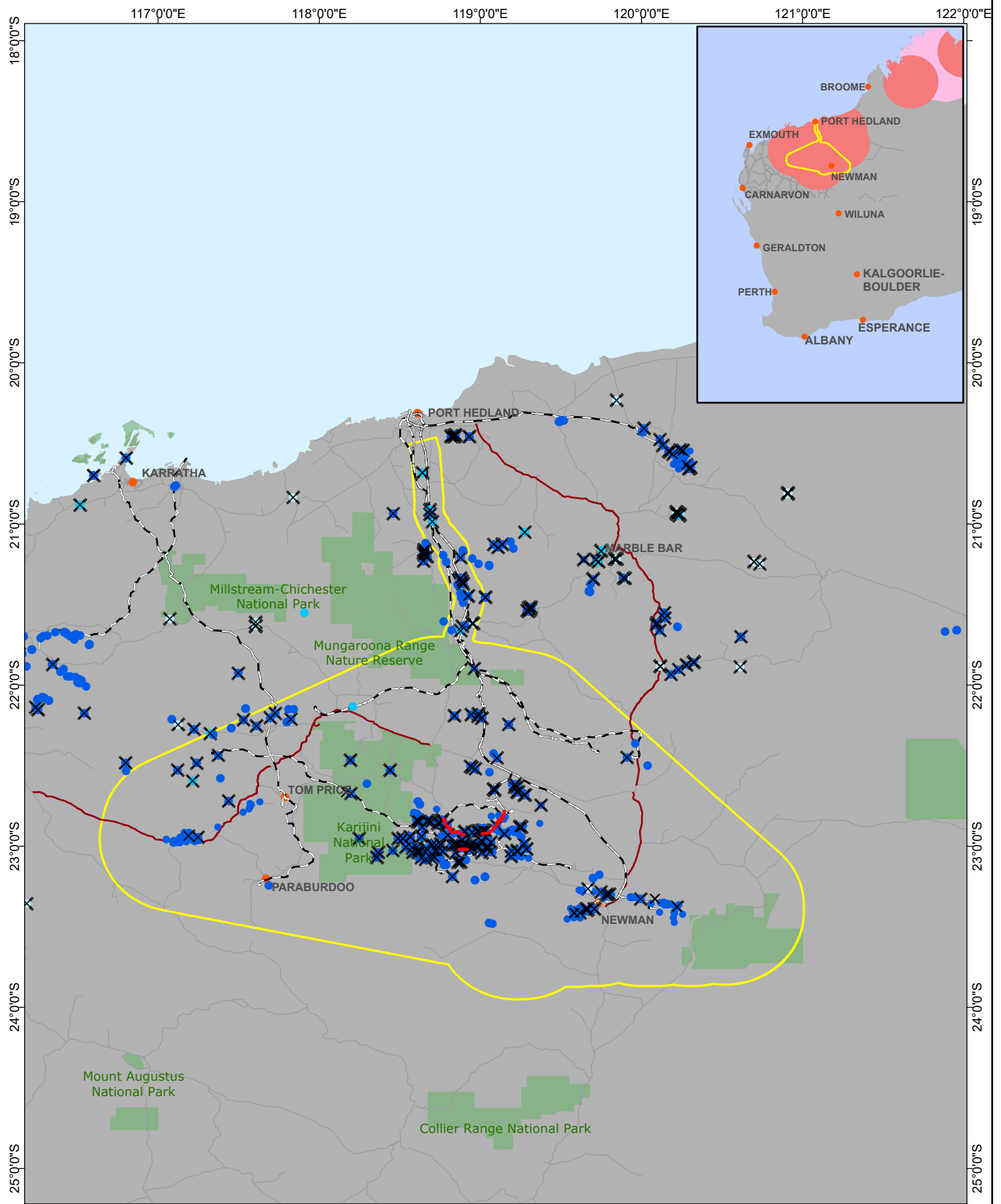
Cave ID (Historic Cave ID)	Roost Classification	Distance from Activity Area	Evidence of use by Ghost Bat
Caves within 500 m of the Activity Area			
CTAN-02 (CACW-12/ACW2)	Category 4	172 m -	Ghost Bat scats recorded and individual ghost bat observed in 2014.
CTAN-13 (CACW13/ACW13)	Category 4	165 m -	No evidence of use, not actively monitored. Categorisation based on cave dimensions.
CTAN-01 (CACW-01/ACW1)	Category 3	176 m	CTAN-01 has been regularly monitored since 2015 as part of the Central Pilbara Ghost Bat Monitoring Program with many records of scats. CTAN-01 has shown occasional to regular use (Ghost Bat scats recorded during several surveys, including up to 2500 scats in 2018 , Ghost Bat individuals observed infrequently - fifteen individuals have been sighted across 11 visitations). Between August 2019 and May 2025 individuals have only been observed on one occasion. Scats have not shown elevated progesterone and the cave depth of only 10 m restricts this cave from being elevated to a Category 2.
CTAN-11 (CACW-11/ACW11)	Category 3	126 m -	No evidence recorded.
CMN-03 (ACY3)	Category 4	177 m	No evidence recorded.
CMIN-03 (ACY1)	Category 2	130 m -	Ghost Bat scats recorded in 2011. Monitored as part of the Central Pilbara Ghost Bat Monitoring Program - no subsequent evidence of use (no scats or individuals) during recent monitoring surveys (Biologic 2024a).

Cave ID (Historic Cave ID)	Roost Classification	Distance from Activity Area	Evidence of use by Ghost Bat
CMIN-01	Category 4	300 m	Potential feeding cave for Ghost Bat. No evidence of use to date.
CMIN-02	Category 4	223 m	Currently under investigation No evidence of use to date
CMN-06 (CV-04)	Category 4	15 m	No evidence of use to date
CMN-04 (CV-01)	Category 4	383 m	No evidence of use to date
Category 2 Caves within 12 km of the Activity Area (excluding caves within 500 m buffer)			
AC1	Category 2	5.5 km	All Category 2 Caves identified have been monitored regularly since 2015 as part of the Mining Area C Fauna Management Plan with the monitoring report provided (Biologic, 2024). Ghost Bats have been identified through scat recordings and it is the primary technique to identify the continued use of the Caves within MACSF. Scat analysis in all caves undergoes hormone analysis to track the occurrence of pregnant females. All caves listed are considered maternity caves.
AC5	Category 2	2.3 km	
AC9	Category 2	1.4 km	
AC17	Category 2	7.3 km	
SF3	Category 2	4.3 km	
SF5	Category 2	5.2 km	
SF8	Category 2	5.3 km	
SF14	Category 2	3.7 km	
SF27	Category 2	4.5 km	

Table 5-3: Ghost Bat Habitat

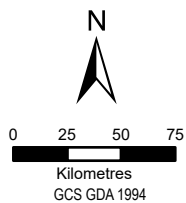
Habitat Type	Extent within Activity Area to be cleared (ha)	Extent within 500 m Buffer of Activity Area (ha)
Critical foraging habitat within 12 km of a Category 1 or 2 roost*		
Gorge/Gully	15.0	206.5
Breakaway/Cliff	2.2	36.2
Major Drainage Line	10.1	62.6
Medium Drainage Line	0	4.3
Mulga Woodland	0	2.5
Drainage Area/Floodplain	356.5	860.2
Stony Plain	387.2	2208.3
Minor Drainage Line	38.9	347.3
Undulating Low Hills	0	181.8
Hillcrest / Hillslope	234.3	1770.4
Total critical habitat	1,044	5,677

*uncategorised caves are also assumed as Category 2 caves for conservative assessment of critical habitat



- Activity Area
- Town
- Major Roads
- Minor/Regional Road
- Rail Centreline
- Strategic Assessment Area

- Ghost Bat Records**
- Records After 2005 - 2017
 - Records Between 1980 - 2004
 - Records Prior 1979
 - Records Missing Date



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**GHOST BAT REGIONAL
RECORDS AND DISTRIBUTION
CPHSW1 VALIDATION NOTICE**

WAIO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4: 1:3,500,000

PREPARED: GEOMATICS

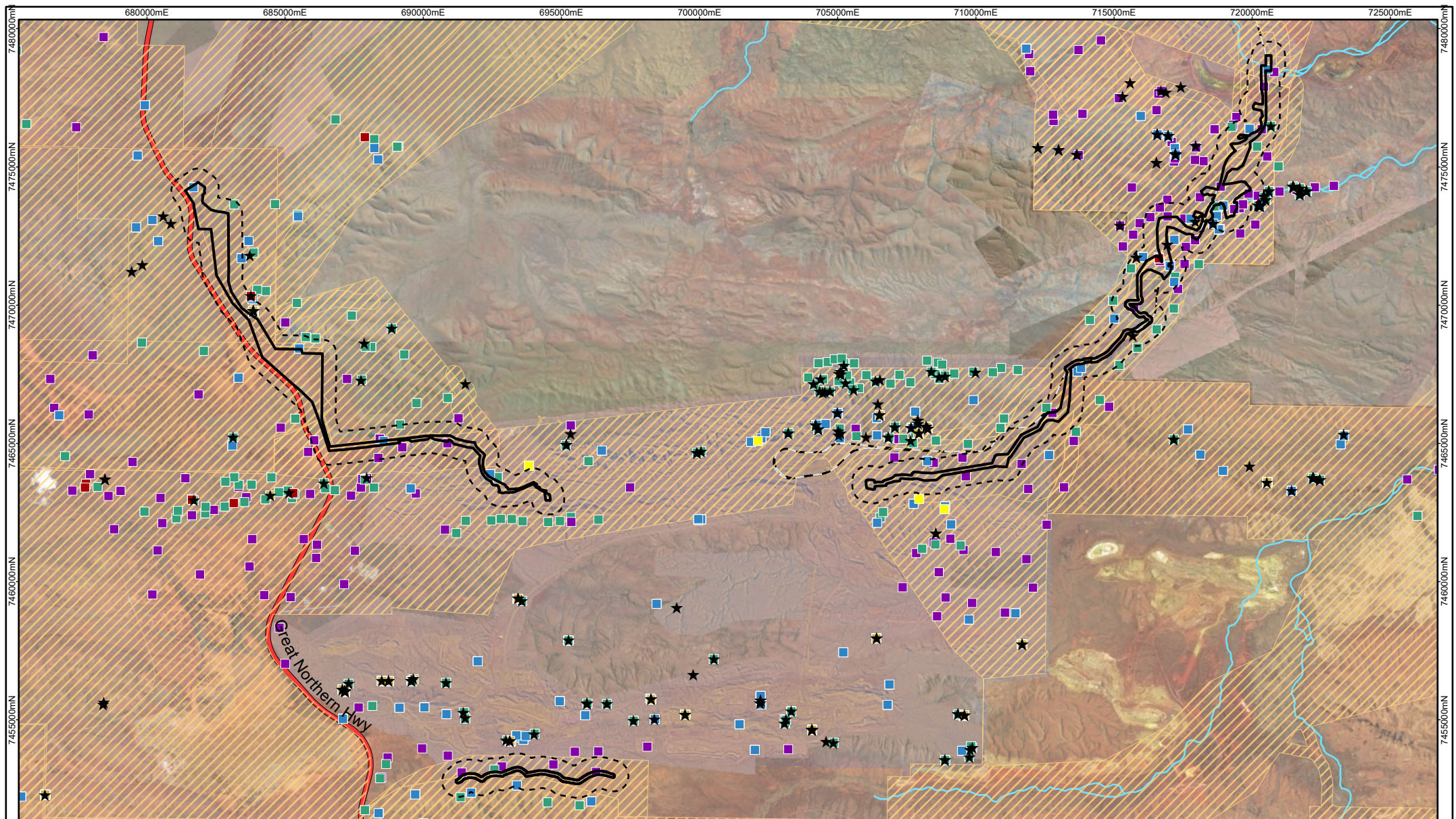
FIGURE: 5-04

DATE: 18/06/2026

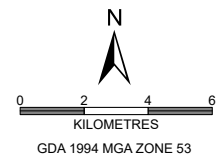
REQUESTOR: ENV APPROVALS

NO:

A1440_009 RevB



- Activity Area
- Activity Area 500m Buffer
- Terrestrial Vertebrate Fauna Surveys
- Rail Centrelines
- Watercourse
- Ghost Bat Sample Method**
- Ultrasonic Recording
- Bat Trap
- Nocturnal Search
- Scat Sheet
- Targeted Search
- Bat Detector
- ★ Targeted Bat Cave



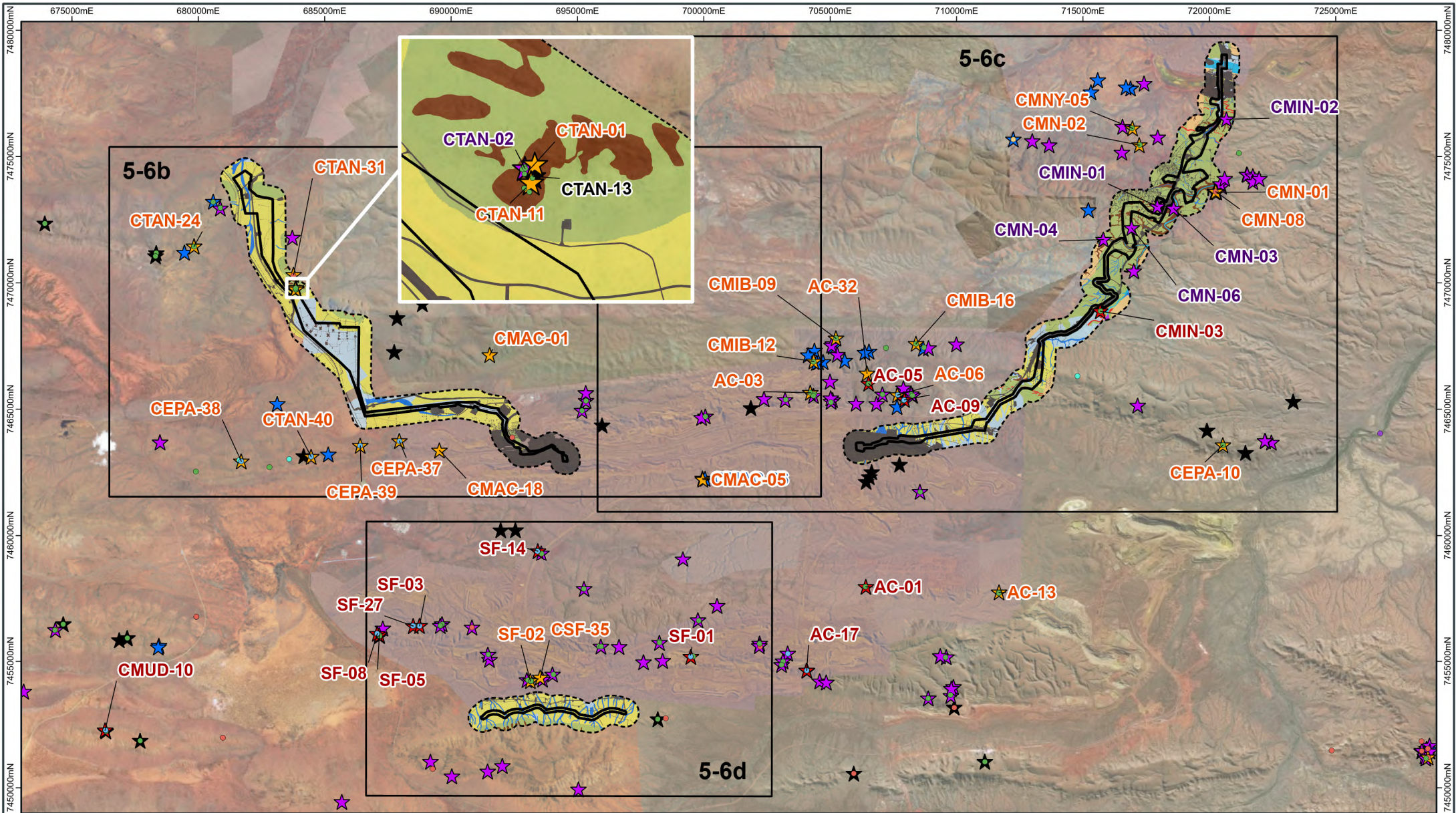
BHP

PUBLIC

GHOST BAT SURVEY AREA AND METHODS CPHSW1 VALIDATION NOTICE

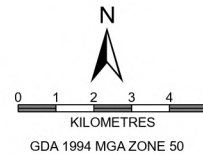
WAO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4:	1:185,000	PREPARED: GEOMATICS	FIGURE: 5-05
DATE:	18/06/2026	REQUESTOR: ENV APPROVALS	
		REVIEWED:	NO: A1440_010 RevD



- Activity Area
- Activity Area 500m Buffer
- Cleared Area
- Habitat Type
 - Breakaway/ Cliff
 - Drainage Area/ Floodplain
 - Gorge/ Gully
 - Hillcrest/ Hillslope
 - Major Drainage Line
 - Medium Drainage Line
 - Minor Drainage Line
- Stony Plain
- Undulating Low Hills

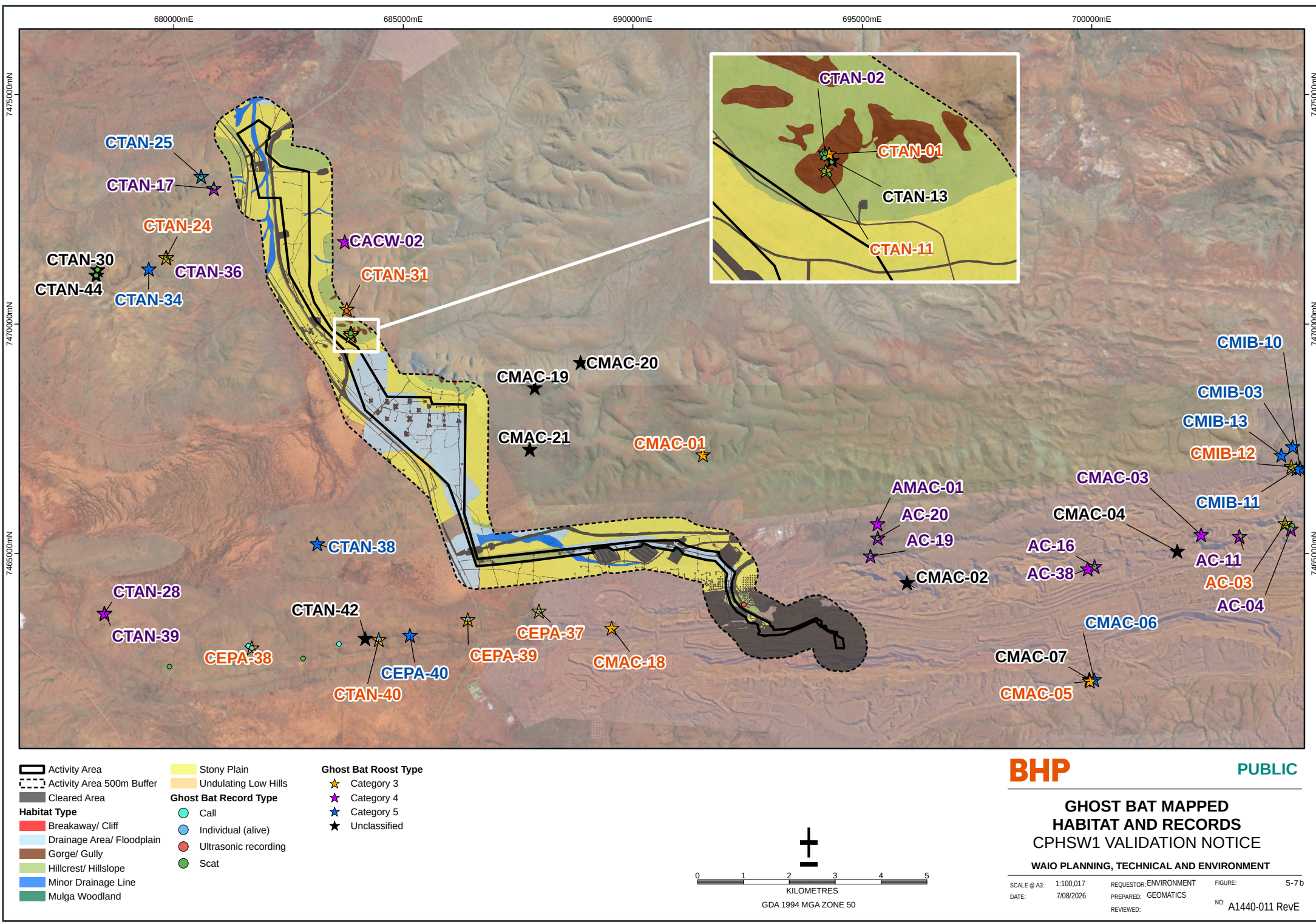
- Ghost Bat Record Type**
- Call
 - Foraging evidence
 - Individual (alive)
 - Ultrasonic recording
 - Scat
 - eDNA
- Ghost Bat Roost Type**
- Category 2
 - Category 3
 - Category 4
 - Category 5
 - Unclassified



GHOST BAT MAPPED HABITAT AND RECORDS CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3: 1:200,000	REQUESTOR: ENVIRONMENT	FIGURE: 5-6a
DATE: 18/08/2026	PREPARED: GEOMATICS	
	REVIEWED:	NO: A1440-011 RevF



BHP

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GHOST BAT MAPPED HABITAT AND RECORDS

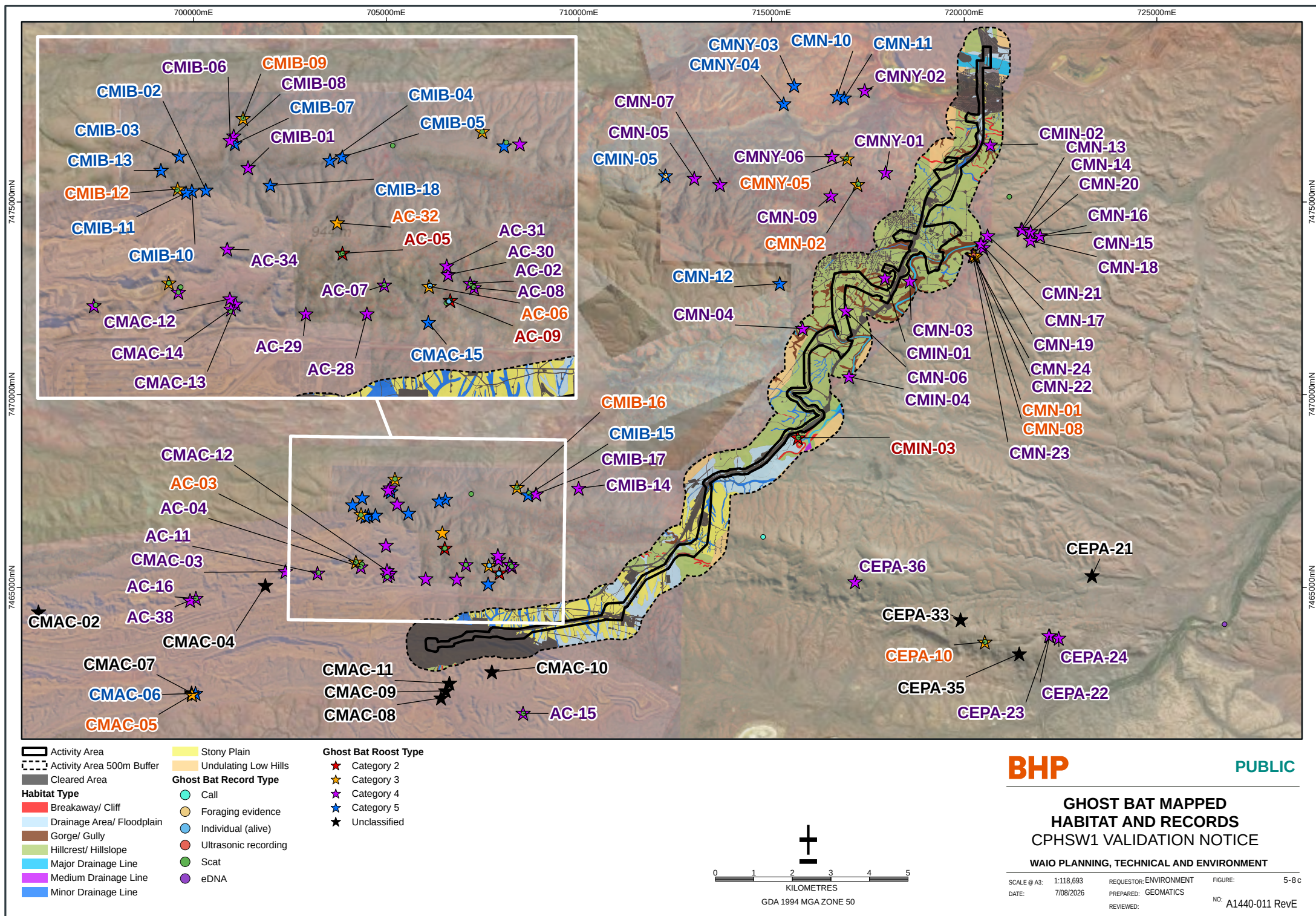
CPHSW1 VALIDATION NOTICE

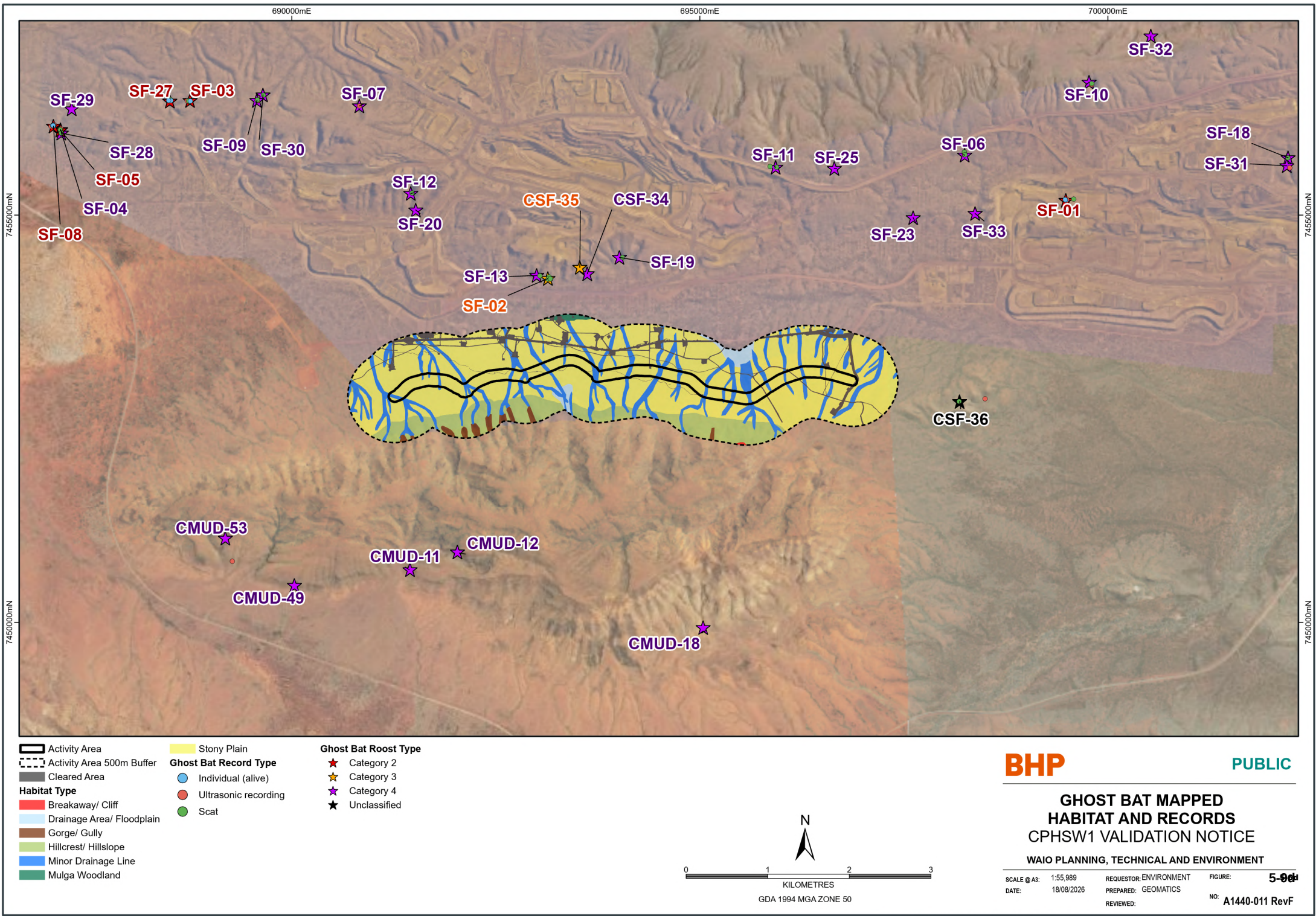
WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3: 1:100,017
DATE: 7/08/2026

REQUESTOR: ENVIRONMENT
PREPARED: GEOMATICS
REVIEWED:

FIGURE: 5-7b
NO: A1440-011 RevE





5.2.4 Ghost Bat records

There are no Ghost Bat records within the Activity Area; however, there are 26 Ghost Bat records within the 500 m buffer of the Activity Area (Table 5-4). A population of Ghost Bats likely occurs in the wider area which is likely to be an important population because it is a key source population for breeding given the presence of Category 2 caves (Biologic 2023a).

There is one detection of Ghost Bat via eDNA within the Weeli Wolli Creek area which is within the groundwater drawdown impact area (Biologic 2024b).

Table 5-4: Ghost Bat records in the Activity Area

Cave ID	Year	Description
CMIN-03	2010	Scats recorded (Biologic 2011) *Cave referred to as ACY1 in Biologic 2011
CTAN-11	2011	Scats recorded (Onshore/Biologic, 2011)
CTAN-11	2011	An ANABAT unit recording (Onshore/Biologic, 2011)
CTAN-11	2011	Historic*
CTAN-02	2011	Historic*
CTAN-11	2011	Historic*
CTAN-11	2011	Historic*
CTAN-13	2011	Scats Recorded (Onshore/Biologic, 2011)
CTAN-13	2011	Historic*
CTAN-13	2011	Historic*
CTAN-02	2011	Scats Recorded (Onshore/Biologic, 2011)
CTAN-02	2011	Scats Recorded (Onshore/Biologic, 2011)
CTAN-02	2011	Historic*
CTAN-02	2011	Historic*
CTAN-02	2014	Ghost Bat observed (Biologic 2015)
CTAN-01	2014	Ghost Bat observed (Biologic 2015)
CTAN-01	2014	Scat recorded (Biologic 2015)
CTAN-01	2014	Ghost Bat observed (Biologic 2015)

Cave ID	Year	Description
CTAN-01	2020	120 Scats in Cave ACW01 (now renamed CTAN-01) (Biologic 2021)
CTAN-01	2021	30 Scats in Cave (Biologic 2021)
Major outcropping	2022	Bat Detector. Call recorded on a single night. (Biologic 2023a)
CTAN-13	2022	Bat Detector. (Biologic 2023a)
CTAN-13	2022	Bat Detector (Biologic 2023a)
CTAN-01	2022	7 Scats collected (Biologic 2023a)
CTAN-01	2023/2024	53 Scats recorded on two occasions in annual monitoring (Biologic 2024a)
CTAN-01	2024/2025	22 Scats collected on two occasions in annual monitoring (Biologic 2025)

*further detail regarding the record is unavailable

5.2.5 Impact assessment

The potential direct and indirect impacts to the Ghost Bat from the Activity (see Section 2) are considered below.

Habitat loss and fragmentation

There are no caves within the Activity Area therefore, there will not be any direct impacts to caves as a result of the Activity.

The Activity will result in clearing of no more than 1,044 ha of Ghost Bat habitat within a 1,482 ha Activity Area. All habitat to be cleared is defined as critical given its proximity (within 12 km) of Category 2 caves or unclassified caves (assumed as critical habitat in the absence of adequate information).

The fauna habitats that will be subject to the greatest amount of clearing for this Activity include Stony Plain, Drainage Area/Floodplain and Hillcrest/Hillslope habitats.

There is some potential for the final location of elements of the Activity within the Activity Area to be modified; however, no more than 1,044 ha of Ghost Bat Habitat within the Activity Area will be cleared.

The GCOSA diversion structure may result in some minor fragmentation of habitat but is unlikely to create a barrier to movement given that it flanks a large OSA in an area surrounded by existing disturbances (Figure 2-5). Critical and supporting habitat for the Ghost Bat will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in the surrounding area.

Potential impacts to Ghost Bat habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to fragment habitat but are unlikely to create a barrier to movement for Ghost Bat. Habitat connectivity and dispersal pathways will be maintained as the pipelines will be buried at waterway crossings and areas of sheet flow.

Habitat degradation from alteration of groundwater regimes

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. There are no permanent or groundwater fed pools within the dewatering drawdown zone that will be impacted due to changing groundwater regimes beyond Weeli Wolli Springs (see Table 5-11 and Figure 5-15 in Section 5.4.3).

Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats, both of which represent critical habitat (where within 12 km of Category 2 caves) or supporting habitat (where there are no Category 2 caves within 12 km) for Ghost Bat. In addition, Weeli Wolli Springs (a permanent groundwater-fed spring) and its associated permanent and semi-permanent pools also occur within the predicted groundwater drawdown contours of the Activity (Figure 2-7). Weeli Wolli Spring and the area of Weeli Wolli Creek in the vicinity of the spring, are cumulatively impacted by the surrounding mining operations, including MACSF and RTIO Hope Downs. RTIO are currently mitigating impacts from their Hope Downs operation to Weeli Wolli Spring and the creek. Cumulative groundwater drawdown modelling predicts that up until 2045, a decline in groundwater levels of approximately 2.4-5.6 m could occur at Weeli Wolli Spring, without mitigation, as a result of drawdown associated with the MACSF and RTIO Hope Downs. These groundwater levels are currently mitigated through creek discharge at Hope Downs. Once RTIO closes Hope Downs, BHP will take over mitigation as described in Section 2.2.2. Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community (and the associated Ghost Bat habitat) attributable to the Activity.

.Dewatering drawdown is unlikely to change humidity within bat caves given that these occur high in the landscape in areas where the pre-mining depth to groundwater is greater than 20 mbgl. There are no suitable bat caves at Weeli Wolli Springs or Coondewanna Flats where the groundwater is equal to or less than 20 mbgl.

Increase of Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following components have the potential to impact terrestrial fauna habitats including critical habitat for Ghost Bat:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases, and groundwater levels decrease. Critical Ghost Bat habitats present within the 10-20 mbgl mounding contours at Northern RAV include Drainage Area/Floodplain, Medium Drainage Line, Mulga Woodland and Stony Plain (Table 5-5). There is no Ghost Bat supporting habitat present.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptusleucophloia* *subsp. leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions.

The degradation or loss of these trees could subsequently result in the degradation or loss of up to 160 ha of critical Ghost Bat habitat.

Table 5-5: Critical habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Drainage Area/Floodplain	30.5
Medium Drainage Line	35.8
Mulga Woodland	4.1
Stony Plain	90.0
Total critical habitat	160.4

The groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Ghost Bat habitat or caves within or surrounding Yandicoogina Gorge, but should prevent any further decline in the water level of permanent pools or vegetation health/condition which will allow for the continued persistence of these values within the Gorge.

As described in Section 2.2.2, there is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water will be monitored for any potential changes consistent with the EP Act Part V Operating Licence for the MACSF Mining Operations which may impact the water quality in the Gorge.

Habitat degradation from alteration of surface water regimes

The Activity involves surplus water discharge along creeklines as part of the water management strategy. This has the potential to alter surface water regimes via changes to water quality, quantity, flow rates, and/or physical or biological attributes. The construction of pipelines and diversion infrastructure for the Activity also have the potential to interfere with the natural sheetflow of water and increase erosion and sedimentation. These impacts have the potential to result in modification, degradation or even loss of Ghost Bat critical and supporting habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation (and the associated Ghost Bat habitats) through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway. The scheme will be operational for a 5-year period from commissioning and will observe a 90-day drying period annually commensurate with the Pilbara dry season.

The implementation of the Central Pilbara Hub Water Resource Management Plan (CPWRMP; BHP 2025b) will ensure compliance with the wetting front triggers and thresholds, drying period and monitor vegetation to avoid significant changes. A temporary change to the hydrological regime of Upper Marillana Creek in addition with proposed mitigation measures is unlikely to cause significant impact to Ghost Bat habitat.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Additional surplus water disposed at this location is unlikely to cause any additional impacts in this area due to its history of creek discharge use.

Construction of pipelines and GCOSA diversion structure

The GCOSA is unlikely to cause impacts to fauna habitat due to the small reduction in catchment area.

The diversion structure is unlikely to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated fauna habitats.

Pipelines are proposed to be buried at waterway crossing to not impede natural waterways.

Habitat degradation or species disturbance due to increased dust, noise, vibration or light

The Activity will result in a temporary increase in dust, noise, vibration and/or light associated with construction activities. Given that the Activity will take place within operational areas or areas with existing rail, roads and tracks, any impacts associated with species disturbance are expected to be minimal and unlikely to be significant.

Indirect impacts to Ghost Bats from excessive light are likely to be low given that construction will mostly be undertaken during the day. High dust levels also have the potential to affect foraging Ghost Bats; however, the construction period is only six months in duration and BHP will continue to implement existing dust suppression strategies, to minimise any potential impacts associated with an increase in dust levels.

Studies have shown that Ghost Bats are likely able to tolerate vibrations of up to 15 mm/s (R. Bullen *pers. comm*). Bullen and Creese (2014) suggested that sound levels up to 70 dB are unlikely to result in Ghost Bats leaving their roost. Noise modelling undertaken for the MACSF mining operations determined noise levels associated with mining activities were predicted to be below 70 dB at cave entrances (BHP 2017b). Micro-tunnelling, excavation activities and heavy vehicle movements associated with the Activity are unlikely to exceed noise levels associated with mining and are therefore likely to be within these limits.

Micro-tunnelling within the rail infrastructure corridor, will be undertaken in accordance with BHP WAIO Standards to ensure protection of BHP rail infrastructure.

No blasting will be required for the Activity, and standard management practices to minimise dust, noise and light will ensure that impacts are minimised as far as reasonably practical.

There are 10 caves located within 500 m of the Activity Area. The closest cave is cave CMN-06 which is a Category 4 cave. This cave is located approximately 15 m from the Activity Area, where construction activities will take place, and 1.6 km from micro-tunnelling activities (Figure 5-6a). The cave is located within a south-facing slope which faces away from the Activity. Given this, as well as the distance from micro-tunnelling activities and proposed management measures, it is unlikely to be significantly impacted by the Activity. No evidence of Ghost Bat use at this cave has been recorded to date and as such, any indirect impacts (should they occur) would be minor.

The closest cave to the proposed micro-tunnelling activities is the Category 4 cave CMN-03 (formerly ACY 3), located approximately 250 m from the proposed micro-tunnelling and 177 m from the Activity Area (Figure 5-6a). The cave is south facing, away from construction activities, and no evidence of Ghost Bats have been recorded to date. At these distances and given the cave faces away from construction activities, this cave is unlikely to be indirectly impacted by increases in dust, noise or vibration.

The Category 2 cave CMIN-03 is located 130 m from the Activity Area (Figure 5-6a). Whilst Ghost Bat scats were recorded in 2011, no subsequent evidence of use has been recorded despite ongoing monitoring (Astron 2025). This cave is located within Breakaway/Cliff habitat, with the entrance facing south. Given the proposed management measures, and that the cave is located 130 m from construction activities, any potential indirect impacts to this cave

(should they occur) would be minor. Micro-tunnelling is unlikely to indirectly impact this cave given it is located 2.5 km away.

Another two caves also occur within 150 m of the Activity Area and between 300 m to 2.5 km from the proposed micro-tunnelling locations (CTAN-11 [Category 3] and CMIN-01 [Category 4]). At these distances and given the tolerance levels of Ghost Bats along with the proposed mitigation to minimise dust, noise and vibration, potential indirect impacts to these caves are unlikely to occur.

The remaining caves are all located over 150 m from the Activity Area and over 1km from micro-tunnelling activities: CTAN-02 (Category 4), CTAN-13 (Category 4), CTAN-01 (Category 3), CMIN-02 (Category 4), and CMN-04 (Category 4). At these distances, indirect impacts to these caves are considered unlikely to occur.

Following mitigation, impacts associated with increased dust, noise, vibration or light can be managed and are unlikely to be significant.

Introduced species

Vegetation clearing, pipeline construction and surface water discharge associated with the Activity, all have the potential to displace native fauna, introduce feral fauna species and/or increase the extent and occurrence of weeds.

The displacement of fauna into adjacent territories inhabited by other individuals can result in increased predation and competition for food resources, shelter and breeding sites until equilibrium in the surrounding areas is reached.

Habitat clearing can enhance the ability of feral predators, such as feral cats (**Felis catus*) and/or the European Red Fox (**Vulpes vulpes*), to move through the landscape which can increase the potential for predation on native fauna. Predation by feral cats and foxes are both key threatening processes listed under the EPBC Act, with feral cats representing one of the greatest predatory threats to the species (DCCEEW 2026). Feral predators can also compete with Ghost Bats for resources such as prey, particularly for small native mammals, and may also spread disease (DCCEEW 2026).

Surface water discharge, vehicle movements and construction activities have the potential to spread weeds or assist in the rate of spread of the Cane Toad (**B. marinus*). Ghost bats are known to consume cane toads and there is some evidence that poisoning by cane toads has impacted Ghost Bats in the Northern Territory (DCCEEW 2026).; however, the Activity is not predicted to spread cane toads and so the risk to Ghost Bats from cane toads is considered low.

Introduced species including feral fauna and weeds can alter the condition of Ghost Bat foraging habitats through changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity.

Feral fauna currently known from the area include feral cats, dogs (**C. familiaris*), cattle (**B. taurus*), and the European rabbit (**O. cuniculus*) (Biologic 2023a). The Activity Area forms a part of the focus area for the Broadscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026) which will assist in managing potential impacts from feral cats, whilst the application of weed management procedures is expected to mitigate the spread of weeds to minimise risks to changes to Ghost Bat habitats. Given the absence of fox records in the Activity Area, the potential impact of feral foxes is considered low.

Vehicle and infrastructure interactions

The Activity will result in an increase in vehicle and machinery activity and movement, which may subsequently result in an increase in the risk of interactions with Ghost Bat, resulting in injury or death. However, existing roads, tracks and rail lines are already present throughout the Activity Area. Therefore, any potential impacts on fauna are expected to be minimal. Management measures will be implemented to reduce the risk to Ghost Bat species, including

restricting construction activities to daylight hours and imposing appropriate speed limits on all access tracks, roads and construction areas to minimise interactions with fauna that would result in injury or mortality.

Overall, the potential impacts on significant fauna due to increased risk of vehicle strike or from interactions with machinery or infrastructure as a result of the Activity are unlikely to be significant.

5.2.6 Mitigation hierarchy

Avoid

The Activity has been designed to avoid impacts to Ghost Bats and their habitats as far as practical.

The Activity Area has been designed to avoid direct impact to all confirmed and potential Ghost Bat caves. The Activity Area has been designed to avoid critical, supporting and/or high value habitat features such as south-facing slopes, Gorge/Gully and Breakaway/Cliff habitats as far as practical. The majority of the pipeline route follows existing roads, tracks or rail lines.

Vegetation clearing and earthworks outside the approved clearing boundaries will be avoided.

BHP will avoid using any barbed wire fencing for the purposes of the Activity, except where required by legislation, to avoid entanglement impacts on Ghost Bats. If use of barbed wire is required, bat reflectors will be installed to deter bats and minimise impacts.

Mitigate

The Activity has been designed to minimise clearing and fragmentation of fauna habitats by designing infrastructure within or adjacent to existing disturbed areas as far as practical.

To minimise impacts associated with clearing and fragmentation, and indirect disturbances associated with increased noise, dust, vibration and light, BHP proposes the following management measures:

- no clearing will occur outside the approved clearing areas
- construction will be mostly undertaken during day-light hours which will minimise impacts to Ghost Bats
- at this stage, no routine night-time construction activities are planned. Should the project require flexibility to undertake night works to meet a delivery schedule, these activities would be limited to targeted locations along the Northwest and Northeast scheme (not the GCOSA Diversion) rather than broadscale construction.
- night-time activities, if required, would be limited to low-impact pipeline construction tasks such as pipe laying (and associated activities) and HDPE welding. High-noise and high-vibration activities, such as drilling and micro-tunnelling, are not proposed to be undertaken during night-time periods.
- where night works are required, lighting would be managed to minimise light spill beyond the immediate work area, with illumination focused on active work fronts and safety-critical areas only. BHP will design and construct infrastructure using best management practices in order to minimise indirect impacts to terrestrial fauna habitats (i.e. sediment control, dust suppression measures, utilising existing cleared areas etc)
- all sightings and events involving Ghost Bats will be identified and captured in WAIOS Event Management System to provide personnel with awareness of Ghost Bat activity in the area and application of additional mitigation measures as appropriate.
- the Activity will be operated within the existing operating licence limits for surplus water discharge at the Lower Marillana Creek discharge point

- appropriate speed limits will be imposed on access roads and construction areas to minimise the risk of vehicle strike or fauna interactions with machinery
- excessive dust will be minimised as far as practical
- the presence of domestic pets or animals on site will be prohibited
- if feral cats are observed on site, a feral cat management program will be implemented
- if Cane Toads are observed on site, they will be reported to DBCA and humanely euthanised in accordance with DBCA guidelines
- standard hygiene practices will be implemented to minimise introduction and spread of weeds including annual weed control (if required) and vehicle hygiene measures when entering/leaving construction areas
- BHP have prepared and submitted the Fauna Management Plan (BHP 2025b) to the WA EPA which proposes ongoing monitoring and management of local Ghost Bat populations
- BHP have also prepared and submitted the Central Pilbara Water Resource Management Plan (BHP, 2025) to the WA EPA which proposes ongoing management of the groundwater supplementation scheme at Yandicoogina Gorge and Upper Marillana Creek wetting front management and vegetation condition. The Central Pilbara Water Resource Management Plan will be implemented for the Activity.
- For the Northern RAV MAR scheme, BHP proposes to ensure that groundwater levels do not rise above 10 mbgl. This will be informed by groundwater level monitoring and monitoring the tree health of *Eucalyptus xerothermica* or *Eucalyptus leucophloia* subsp. *Leucophloia* trees within the 0-10 mbgl mounding zone. The Northern RAV MAR Scheme will be managed through the Part V licence (L7851/2002/6) of the EP Act.

5.2.7 Residual impact

Following the application of avoidance and mitigation measures, residual impacts include the loss of 1044 ha of critical habitat and the potential degradation of 160 ha of critical habitat for the Ghost Bat due to mounding at Northern RAV MAR scheme. BHP considers these impacts warrant provision of offsets to ensure the Activity achieves the PMOs (as discussed in Section 7)

5.2.8 Review of Program Matter Outcomes

Following the impact assessment (Section 5.2.5) and application of the mitigation hierarchy (Section 5.2.6), a review of the Activity against the PMOs was undertaken. Table 5-6 identifies which PMOs are relevant for the Activity and considers further management.

Table 5-6: Review of Program Matter Outcomes (Ghost Bat)

Program Matter Outcomes	Applicable Notifiable Action Trigger	Assessment
Minimise loss of critical and supporting habitats of the Ghost Bat as a result of Program Activities within the SAA AND	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Ghost Bat critical habitat and or supporting habitat AND	The loss of up to 1,044 ha of critical habitat represents a residual impact and requires offsetting (Section 7). The potential degradation of 160 ha of critical habitat due to modification of groundwater regimes at Northern RAV

Program Matter Outcomes	Applicable Notifiable Action Trigger	Assessment
No loss (or maintain) Ghost Bat colony(s) as a result of program activities.	Presence or sign/s of Ghost Bat colony or residing individuals	represents a residual impact and requires offsetting should this occur. No loss of population will occur as a result of the Activity given there are no caves within the Activity Area.
Minimise loss of critical and supporting habitats of the Ghost Bat as a result of Program Activities within the SAA	Within the Activity Area there is: Presence of Ghost Bat critical habitat and or supporting habitat AND Presence or sign of Ghost Bat transient, infrequent or dispersing individual/s	Not applicable

5.2.9 Summary

BHP considers the Activity will meet the PMO to minimise loss of critical and supporting habitats of the Ghost Bat. In addition, offsets will be provided for the loss of critical foraging and dispersal habitat (Section 7). As a result, the PMOs will be achieved.

5.3 Northern Quoll

The following sections provide background information to demonstrate that Notifiable Action Triggers for Northern Quoll are met. Potential impacts to the Northern Quoll are assessed to illustrate that the Program Matter Objective for this species will be met.

Program Matter Objective: “To support the long-term persistence and viability of the Northern Quoll within the SAA.”

5.3.1 General species information

The Northern Quoll is listed as ‘Endangered’ under the EPBC Act. It is the smallest and most arboreal of the four Australian quoll species (van Dyck and Strahan 2008) and has undergone a dramatic range contraction since European settlement, including a 75% reduction in distribution during the 20th century. In the Pilbara, Northern Quoll distribution is bounded in the north, east and south by the Great Sandy Desert, Gibson Desert and Little Sandy Desert (DCCEEW 2024c). The potential invasion of the Pilbara by the Cane Toad is regarded as the most significant future threat to the persistence of the Northern Quoll in the region (Cramer *et al.* 2016a).

Northern Quolls primarily favour rocky habitats, such as escarpments, mesas, gorges, breakaways and boulder fields, and major drainage lines and treed creek lines, which they use as denning and shelter. Foraging typically occurs in the vegetated areas surrounding their dens (DCCEEW 2024c). Higher population densities are generally associated with rocky habitats as they offer protection from predators and greater resource availability (Braithwaite and Griffiths 1994, Oakwood 2002).

The ecology of Northern Quolls is complex as they use habitats in a variety of ways for denning and foraging, and an individual can use multiple den sites. Northern Quolls will den during the day and leave den sites to forage during

the night. They are generally considered to be solitary, with females having mutually exclusive denning areas, but can have overlapping foraging areas. Populations are observed to fluctuate annually and are likely influenced by abundance, dispersion and renewability of food resources (Oakwood 2002). Both sexes frequently change dens every night, with females known to use up to 55 different dens (Oakwood 2008).

Regional records and the distribution of Northern Quoll are shown in Figure 5-10.

5.3.2 Studies and sampling effort

Seven contemporary surveys have targeted the Northern Quoll within the Activity Area or 500 m buffer (Table 4-1), as well as numerous historical surveys (Appendix 1). Survey coverage for Northern Quoll is shown in Figure 5-11. Sampling methods for Northern Quoll within the Activity Area and 500 m buffer include habitat assessments, targeted searches and/ or transects, camera traps and nocturnal searches (Biologic, 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025; Figure 5-11).

5.3.3 Local habitat

The Activity Area falls within the current distribution of the Northern Quoll, whereby the species or species habitat may occur (Figure 5-10). The Northern Quoll is common in a range of habitats within its distribution, including rocky habitats and watercourses. Survey coverage for the Northern Quoll is shown in Figure 5-11, with local habitat and nearest record presented in Figure 5-12.

Critical habitat

For Northern Quoll, critical habitat is typically represented by denning and foraging habitat within the home range of low rocky hills - mesas, gorges, escarpments, ranges, breakaways, and boulder fields, or major drainage lines and tree-lined creeks.

Approximately 27.3 ha of critical habitat (Gorge/Gully, Breakaway/Cliff, Major Drainage Line) occurs within the Activity Area and is proposed to be cleared (Figure 5-10). A further 305 ha of critical habitat occurs in a 500 m buffer of the Activity Area.

Supporting habitat

Supporting habitat is typically represented by Artificial Wetland, Hillcrest/Hillslope, Medium Drainage Line, Minor Drainage Line, and Drainage Area Floodplain habitat types, which make up approximately 630.7 ha of habitat within the Activity Area to be cleared (Figure 5-10). Of this, a further 3,012 ha falls within 500 m of the Activity Area.

Table 5-7: Northern Quoll habitat

Habitat Type	Extent within Activity Area to be cleared(ha)	Extent within Activity Area 500 m Buffer
Critical habitat		
Gorge/Gully	15.0	206.5
Major Drainage Line	10.1	62.6
Breakaway/Cliff	2.2	36.1
Total critical habitat	27.3	305.2

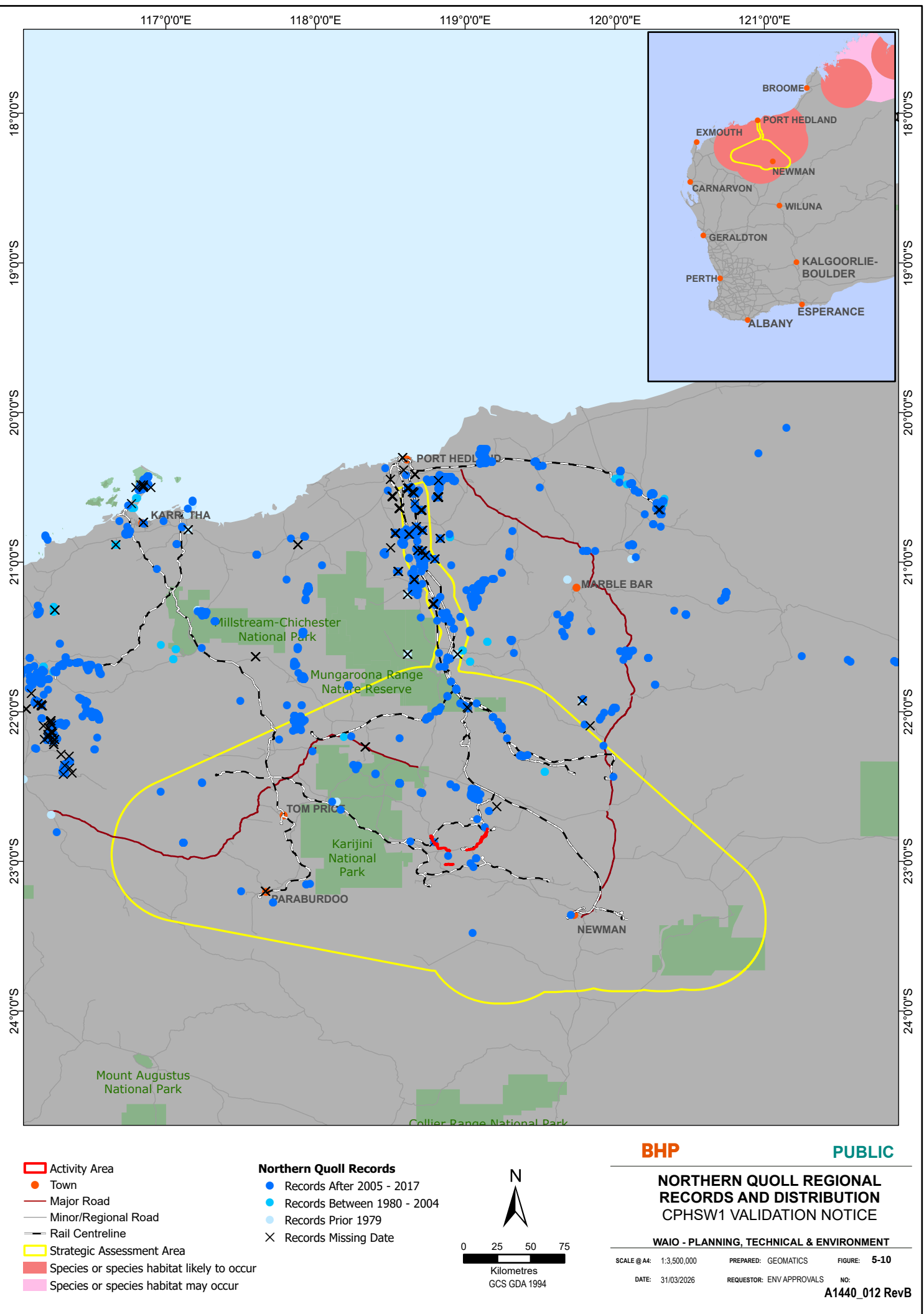
Habitat Type	Extent within Activity Area to be cleared(ha)	Extent within Activity Area 500 m Buffer
Supporting habitat		
Artificial wetland	1.0	0
Hillcrest/Hillslope	234.3	1770.4
Medium Drainage Line	0	4.3
Minor Drainage Line	38.9	377.2
Drainage Area/Floodplain	356.5	860.2
Total supporting habitat	630.7	3012.1

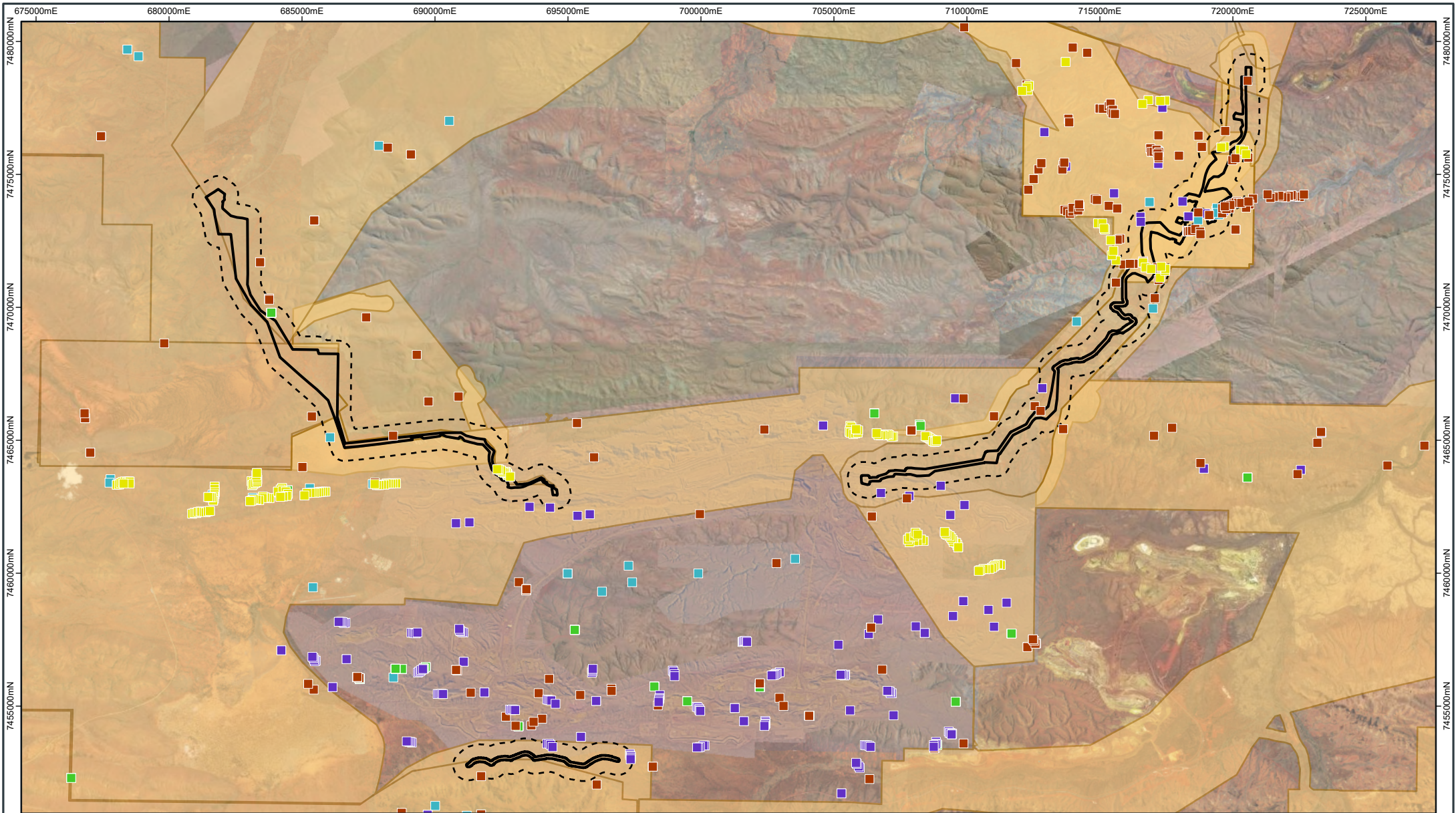
5.3.4 Northern Quoll records

Northern Quoll has been recorded on nine occasions within the Activity Area and within the 500 m Buffer.

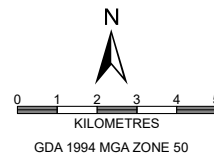
Recent biological surveys identified eight records of Northern Quoll at four locations, with seven records within the Activity Area and one immediately outside the boundary of the Activity Area, comprising multiple records at camera traps positioned at three locations, (Astron 2025) (Figure 5-12). The records occur within an approximately 1,500 m linear distance (east to west) and are associated with Yandicoogina Creek (and/or its tributaries). As reported by Astron (2025), photographic review of the spot patterning of the recorded Northern Quoll from the camera traps indicates that all records are likely to be of the same individual Northern Quoll and it was transient in behaviour.

There is also a historical record of a Northern Quoll, a scat was found in a rock overhang in Hillslope habitat within the Northwest scheme pipeline (Onshore/Biologic 2011;Figure 5-12). Subsequent surveys have not recorded any further records which suggests that Northern Quoll may be present in very low densities, or present only intermittently as a result of individuals moving from areas outside the Activity Area. This is supported by the lack of records over subsequent years relative to the number of surveys completed in the area (Biologic 2023a).





- Activity Area**
 — Activity Area
 - - - Activity Area 500m Buffer
 Survey Coverage
- Sample Method**
 Camera
 Elliot Trap
 Nocturnal Search
 Scat Sheet
 Targeted Search



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NORTHERN QUOLL SURVEY AREAS AND METHODS CPHSW1 VALIDATION NOTICE

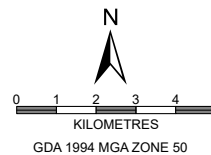
WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:190,000	REQUESTOR:	ENVIRONMENT	FIGURE:	5-11
DATE:	11/06/2026	PREPARED:	GEOMATICS	NO:	A1440-013 RevD
		REVIEWED:			



- Northern Quoll Records
- Activity Area
- Activity Area 500m Buffer
- Cleared Area
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hillcrest/ Hillslope
- Major Drainage Line
- Medium Drainage Line
- Minor Drainage Line
- Artificial Wetland
- Breakaway/ Cliff

Habitat Type



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**NORTHERN QUOLL MAPPED
HABITAT AND RECORDS
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3: 1:190,000	REQUESTOR: ENVIRONMENT	FIGURE: 5-1.2	
DATE: 10/06/2026	PREPARED: GEOMATICS		
	REVIEWED:	NO: A1440-014 RevD	

5.3.5 Impact assessment

The potential direct and indirect impacts to the Northern Quoll from the Activity (see Section 2) are considered below.

Habitat loss and fragmentation

The Activity will result in clearing no more than 668 ha of Northern Quoll habitat within a 1,482 ha Activity Area. This includes clearing up to 27 ha of critical habitat and 631 ha of supporting habitat for Northern Quoll.

The fauna habitats that will be subject to the greatest amount of clearing for this Activity include Hillcrest/Hillslope and Drainage Area/Floodplain habitats.

The Activity includes some flexibility to modify the final location of elements infrastructure; however, no more than 668 ha of Northern Quoll Habitat will be cleared.

The GCOSA diversion structure may result in some minor fragmentation of Northern Quoll habitat but is unlikely to create a barrier to movement given that it flanks a large OSA in an area surrounded by existing disturbances (Figure 2-5). Critical and supporting habitat for the Northern Quoll will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in the surrounding area.

Potential impacts to Northern Quoll habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to fragment habitat and create a barrier to movement for Northern Quoll; however, habitat connectivity and dispersal pathways will be maintained as the pipelines will be buried at waterway crossings and areas of sheet flow and fauna underpasses (i.e. areas where the pipeline will be raised off the ground) will be installed in areas of critical and/or supporting habitat (see Section 2.1.4).

Overall, potential impacts from the installation of pipelines or the GCOSA structure to the Northern Quoll are expected to be low.

Habitat degradation from alteration of groundwater regimes

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. There are no permanent or groundwater fed pools within the dewatering drawdown zone that will be impacted due to changing groundwater regimes beyond Weeli Wolli Springs.

Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats, which represent critical and supporting habitat for the Northern Quoll. In addition, Weeli Wolli Springs (a permanent groundwater-fed spring) and its associated permanent and semi-permanent pools also occur within the predicted groundwater drawdown contours of the Activity (Figure 2-7). Weeli Wolli Spring and the area of Weeli Wolli Creek in the vicinity of the spring, are cumulatively impacted by the surrounding mining operations, including MACSF and RTIO Hope Downs. RTIO are currently mitigating impacts from their Hope Downs operation to Weeli Wolli Spring and the creek. Cumulative groundwater drawdown modelling predicts that up until 2045, a decline in groundwater levels of approximately 2.4-5.6 m could occur at Weeli Wolli Spring, without mitigation, as a result of drawdown associated with the MACSF and RTIO Hope Downs. These groundwater levels are currently mitigated through creek discharge at Hope Downs. Once RTIO closes Hope Downs, BHP will take over mitigation as described in Section 2.2.2. Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community (and the associated fauna habitats) attributable to the Activity.

Increase in Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following could potentially alter fauna habitats:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases and groundwater levels decrease. Supporting Northern Quoll habitats present within the 10-20 mbgl mounding contours at Northern RAV include Drainage Area/Floodplain and Medium Drainage Line (Table 5-8). There is no critical Northern Quoll habitat present within the 10-20 mbgl mounding contours.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* *subsp. leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions. The degradation or loss of these trees could subsequently result in the degradation or loss of up to 66 ha of supporting Northern Quoll habitat.

Table 5-8: Supporting habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Drainage Area/Floodplain	30.5
Medium Drainage Line	35.8
Total supporting habitat	66.3

The Yandicoogina groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Northern Quoll habitat within Yandicoogina Gorge but should prevent any further decline in the permanent pools or vegetation health or condition which will allow for the continued persistence of these values within the Gorge.

As described in Section 2.2.2, there is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water will be monitored for any potential changes consistent with the EP Act Part V Operating Licence for the MACSF Mining Operations which may impact the water quality in the Gorge.

Habitat degradation from alteration of surface water regimes

The Activity involves surplus water discharge along creeklines as part of the surplus water management strategy. This has the potential to alter surface water regimes via changes to quantity, flow rates, and/or physical or biological

attributes. These impacts have the potential to result in modification, degradation or even loss of Northern Quoll critical and supporting habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation (and the associated Northern Quoll habitats) through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway. The scheme will be operational for a 5-year period from commissioning and will observe a 90-day drying period annually commensurate with the Pilbara dry season.

The implementation of the CPWRMP (BHP 2025c) will ensure compliance with the wetting front triggers and thresholds, drying period and monitor vegetation to avoid significant changes. A temporary change to the hydrological regime of Upper Marillana Creek in addition with proposed mitigation measures is unlikely to cause significant impact to Northern Quoll habitat.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Additional surplus water disposed at this location is unlikely to cause any additional impacts in this area due to its history of creek discharge use.

Construction of pipelines and GCOSA diversion structure

The GCOSA diversion structure is unlikely to cause impacts to fauna habitat due to the small reduction in catchment areas (i.e. <0.1%). It is not expected to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated fauna habitats.

The proposed pipelines will be buried at waterway crossings to not impede natural waterways and raised above ground to allow passage of fauna in critical habitats.

Habitat degradation or species disturbance due to increased dust, noise, vibration or light

The Activity will result in a temporary increase in dust, noise, vibration and/or light associated with construction activities. Given that the Activity will take place within operational areas or areas with existing rail, roads and tracks, any impacts associated with species disturbance are expected to be minimal.

Indirect impacts to Northern Quoll from excessive light are expected to be low given that construction will mostly be undertaken during the day. High dust levels also have the potential to affect habitat; however, the construction period is only six months in duration and BHP will continue to implement existing dust suppression strategies, to minimise any potential impacts associated with an increase in dust levels.

No blasting will be required for the Activity, and standard management practices to minimise dust, noise and light will ensure that impacts are minimised as far as reasonably practical.

Introduced species

Introduced species that may be harmful to the Northern Quoll include cane toads, feral cats, red foxes or weeds which increase fire risk (DotE 2016). Feral fauna currently known from the area include feral cats, dogs (**C. familiaris*), cattle (**B. taurus*), and the European rabbit (**O. cuniculus*) (Biologic 2023a).

Vegetation clearing, pipeline construction and surface water discharge associated with the Activity, all have the potential to introduce feral fauna species. Introduced species can alter the condition of Northern Quoll habitats through changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity.

Habitat clearing can enhance the ability of feral predators, such as feral cats or foxes to move through the landscape which can increase the potential for predation on native fauna. The displacement of fauna into adjacent territories inhabited by other individuals can result in increased predation and competition for food resources, shelter and breeding sites until equilibrium in the surrounding areas is reached.

Feral predators such as the feral cat and European fox may compete with the Northern Quoll for food or may predate on the species. However, the Activity Area forms a part of the focus area for the Browserscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026). Given the proposed feral cat management practices, the lack of European fox records, and given there are only transient/dispersing records of the Northern Quoll in the Activity Area, the potential impact of feral cats or foxes on Northern Quoll is considered low.

Surface water discharge has the potential to spread weeds, whilst construction activities may assist in the rate of spread of the Cane Toad (*B. marinus*) through vehicle movements and availability of surface water. Vehicle movements may also assist in the introduction or spread of weeds into areas of new disturbance associated with the Activity.

The Northern Quoll is vulnerable to lethal toxic ingestion of cane toad toxin, and this is considered the main threat to Northern Quoll populations outside of the Pilbara (Oakwood 2004; Hill and Ward 2010). The future predicted spread of the cane toad into the Pilbara bioregion may have comparable negative impacts to the Northern Quoll as observed in other areas of northern Australia. Some models predict that the cane toad's distribution will spread to include the Pilbara via the narrow coastal strip, but this spread will be dependent on the presence of artificial water bodies (Tingley et al. 2013). The Activity is not predicted to result in the spread of cane toad into the area and given that Northern Quoll is only present at low densities, any potential impacts on the Northern Quoll are considered low.

The application of weed management procedures is expected to mitigate the spread of weeds to minimise any risks to changes to Northern Quoll habitat composition.

Vehicle and infrastructure interactions

The Activity will result in an increase in vehicle and machinery activity and movement, which may subsequently result in an increase in the risk of interactions with Northern Quoll, resulting in injury or death. However, existing roads, tracks and rail lines are already present throughout the Activity Area. Therefore, any potential impacts on fauna are expected to be minimal.

Movement of fauna is provided by fauna underpasses and burial of the pipeline at creek crossings. Fauna underpasses have been situated to not encourage fauna movement to rail, highway and mining areas.

The GCOSA diversion structure will consist of an open drain with earthen batters that would not be expected to represent an entrapment risk for Northern Quolls. The species is an agile climber capable of traversing steep rocky terrain, and the proposed drain batters provide sufficient surface roughness and gradient to facilitate egress. The drain design avoids vertical walls and incorporates rough earthen/rock-lined surfaces, reducing the likelihood of fauna becoming trapped.

Other management measures will be implemented to reduce the risk to Northern Quoll species, including minimising construction activities to daylight hours and imposing appropriate speed limits on all access tracks, roads and construction areas to minimise interactions with fauna that would result in injury or mortality.

Overall, the potential impacts on Northern Quoll due to increased risk of vehicle strike or from interactions with machinery or infrastructure as a result of the Activity are considered to be minor.

5.3.6 Mitigation hierarchy

Avoid

The Activity has been designed to avoid impacts to Northern Quoll and their habitats as far as practical. The majority of the pipeline route follows existing roads, tracks or rail lines. However, in some areas, avoidance of fauna habitat is not possible, including areas of critical and supporting Northern Quoll habitat.

Vegetation clearing and earthworks outside the approved clearing boundaries will be avoided.

Mitigate

The Activity has been designed to minimise clearing and fragmentation of fauna habitats by designing infrastructure within or adjacent to existing disturbed areas as far as practical.

To minimise impacts associated with clearing and fragmentation, and indirect disturbances associated with increased noise, dust, vibration and light, BHP proposes the following management measures:

- no clearing will occur outside the approved clearing areas
- construction will be mostly undertaken during day-light hours which will minimise impacts to Northern Quoll
- suitably trained fauna spotters will be utilised for pre-clearance surveys undertaken 7 days prior to clearing in areas of critical and supporting Northern Quoll habitat including Yandicoogina Creek and Marillana Creek)
- BHP will design and construct infrastructure using best management practices in order to minimise indirect impacts to terrestrial fauna habitats (i.e. sediment control, dust suppression measures, utilising existing cleared areas etc)
- pipelines will be buried at creek crossings to maintain natural drainage lines and surface water flows and encourage fauna movement.
- fauna underpasses will be used along the pipeline within linear habitat types to encourage fauna movement
- all sightings and events involving Northern Quoll will be identified and captured in WAIOS Event Management System to provide personnel with awareness of Northern Quoll activity in the area and application of additional mitigation measures as appropriate.
- the Activity will be operated within the existing operating licence limits for surplus water discharge at the Lower Marillana Creek discharge point
- appropriate speed limits will be imposed on access roads and construction areas to minimise the risk of vehicle strike or fauna interactions with machinery
- excessive dust will be minimised as far as practical
- the presence of domestic pets or animals on site will be prohibited
- if feral cats are observed on site, a feral cat management program will be implemented
- if Cane Toads are observed on site, they will be reported to DBCA and humanely euthanised in accordance with DBCA guidelines
- standard hygiene practices will be implemented to minimise introduction and spread of weeds including annual weed mapping, weed treatment and control (if required) and vehicle hygiene measures when entering/leaving construction areas

- BHP have prepared and submitted the Central Pilbara Water Resource Management Plan (BHP, 2025) to the EPA (WA) which proposes ongoing management of the groundwater supplementation scheme at Yandicoogina Gorge and Upper Marillana Creek wetting front management and vegetation condition. The Central Pilbara Water Resource Management Plan will be implemented for the Activity.
- For the Northern RAV MAR scheme, BHP proposes to ensure that groundwater levels do not rise above 10 mbgl. This will be informed by groundwater level monitoring and monitoring the tree health of *Eucalyptus xerothermica* or *Eucalyptus leucophloia* subsp. *Leucophloia* trees within the 0-10 mbgl mounding zone. The Northern RAV MAR Scheme will be managed through the Part V licence (L7851/2002/6) of the EP Act.

5.3.7 Residual impact

Residual impacts include the potential loss of no more than 27.3 ha of critical habitat and 630.7 ha of supporting habitat for Northern Quoll. Groundwater mounding has the potential to degrade an additional 66.3 ha of supporting Northern Quoll habitat.

5.3.8 Review of Program Matter Outcomes

Following the impact assessment (Section 5.2.5) and application of the mitigation hierarchy (Section 5.2.6), a review of the Activity against the PMOs was undertaken. Table 5-9 identifies which PMOs are relevant for the Activity and considers further management.

Table 5-9: Review of Program Matter Outcomes (Northern Quoll)

Program Matter Outcomes	Applicable Notifiable Action Trigger	Assessment
Minimise loss of critical and supporting habitats of the Northern Quoll as a result of Program Activities within the SAA AND No loss (or maintain) Northern Quoll population(s) as a result of program activities.	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Northern Quoll critical habitat and or supporting habitat AND Presence or sign/s of Northern Quoll population or residing individuals	Not applicable
Minimise loss of critical and supporting habitats of the Northern Quoll as a result of Program Activities within the SAA	Within the Activity Area there is: Presence of Northern Quoll critical habitat and or supporting habitat AND Presence or sign of Northern Quoll transient, infrequent or dispersing individual/s	The loss of up to 27.3 ha of critical habitat and 630.7 ha of supporting habitat represents a residual impact and requires offsetting (Section 7). The potential degradation of 66.3 ha of supporting Northern Quoll habitat due to the Northern RAV MAR represents a residual impact and may require offsetting (Section 7). No loss of population will occur as a result of the Activity.

5.3.9 Summary

BHP considers the Activity will meet the PMO to minimise loss of critical and supporting habitats of Northern Quoll. In addition, offsets will be provided for the loss of critical foraging habitat and supporting habitats (Section 7). As a result, the PMOs will be achieved.

5.4 Pilbara Olive Python

The following sections provide background information to demonstrate that Notifiable Action Triggers for Pilbara Olive Python are met. Impacts to the Pilbara Olive Python are discussed to illustrate that the Program Matter Objective (as described below) for this species will be met.

Program Matter Objective: *“To support the long-term persistence and viability of the Pilbara Olive Python within the SAA.*

5.4.1 General species information

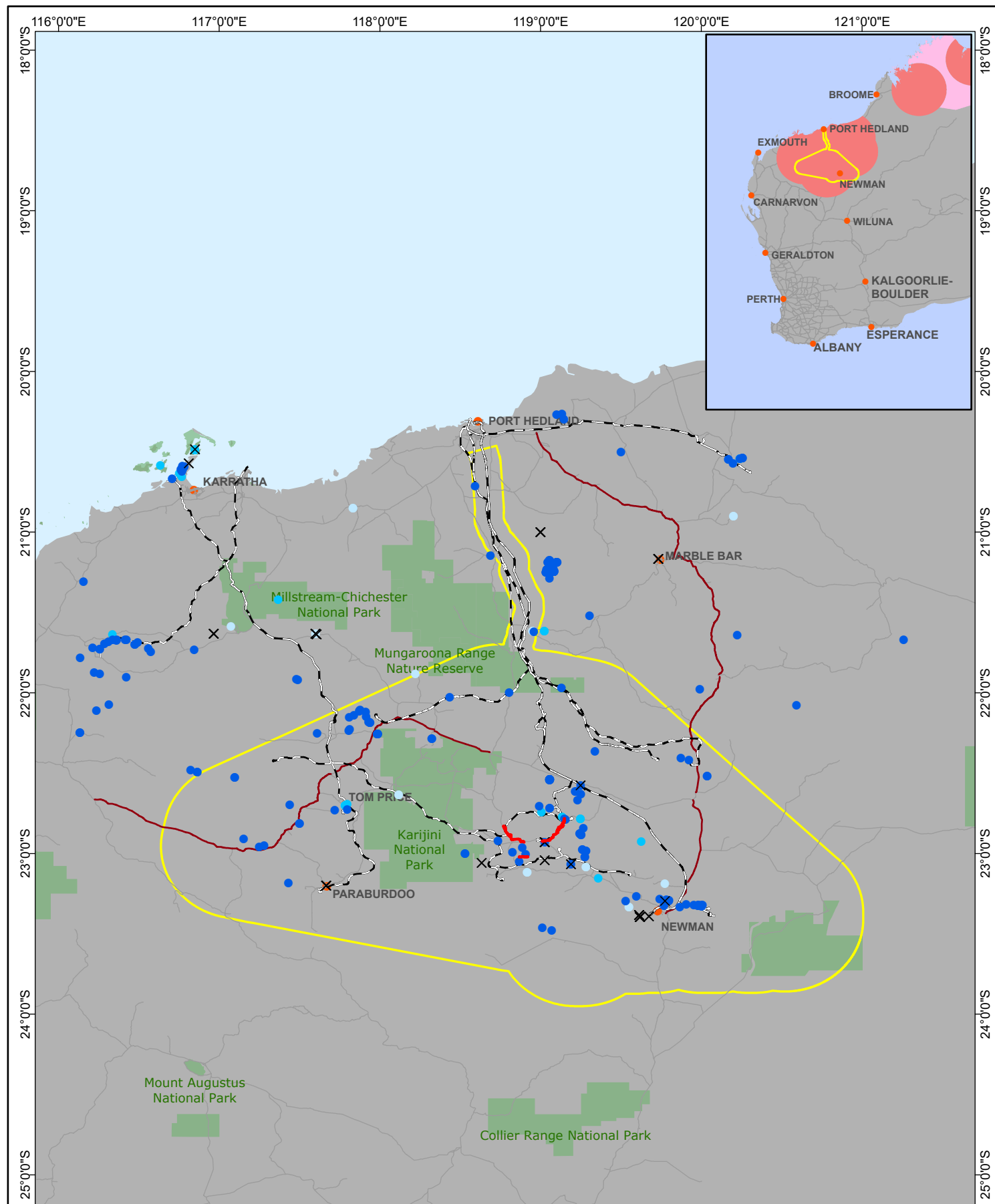
The Pilbara Olive Python is listed as ‘Vulnerable’ under the EPBC Act (DCEEW 2024d). It is largely restricted to ranges within the Pilbara bioregion, although an isolated population is thought to occur south at Mount Augustus in the Gascoyne region (Bush and Maryan 2011), with additional records exist in the north-eastern Carnarvon region. Within the Pilbara bioregion, the species has been recorded from the Hamersley Range, Dampier Archipelago, Pannawonica, Millstream, Tom Price, Burrup Peninsula, and approximately 70 km east of Port Hedland (Pearson 2006). The species is also known to inhabit riparian areas along the Fortescue River (Doughty *et al.* 2011).

The Pilbara Olive Python commonly inhabits rocky areas in proximity to water such as gorges, rivers, pools and surrounding hills, although it can be found in a range of habitats. In the Hamersley region, this species is most frequently encountered near permanent water features within rocky ranges or among riverine vegetation (DSEWPaC (2011b).

Pilbara Olive Pythons are known to occupy a distinct home range, typically from 85 ha to 450 ha, and move around frequently within these areas (Pearson 2006).

5.4.2 Studies and sampling effort

Seven contemporary surveys have targeted the Pilbara Olive Python (Table 4-1), as well as numerous historical surveys (Appendix 1). Survey coverage and sampling effort for the Pilbara Olive Python is shown in Figure 5-14. Sampling methods for Pilbara Olive Python within the Activity Area and 500 m buffer include habitat assessments (including water feature assessments), targeted searches and/ or transects, nocturnal searches, and eDNA sampling (Biologic, 2025a, 2025b 2025c, 2023a, 2023b; Astron 2023, 2025, Biota 2022; Figure 5-14).



 Activity Area

● Town

— Major Road

— Minor/Regional Road

— Rail Centreline

 Strategic Assessment Area

Species or species habitat likely to occur

Species or species habitat may occur

Pilbara Olive Python Records

● Records After 2005 - 2017

● Records Between 1980 - 2004

● Records Prior 1979

X Records Missing Date



0 25 50 75
Kilometres
GCS GDA 1994

BHP

PUBLIC

PILBARA OLIVE PYTHON REGIONAL RECORDS AND DISTRIBUTION CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4: 1:3,500,000

PREPARED: GEOMATICS

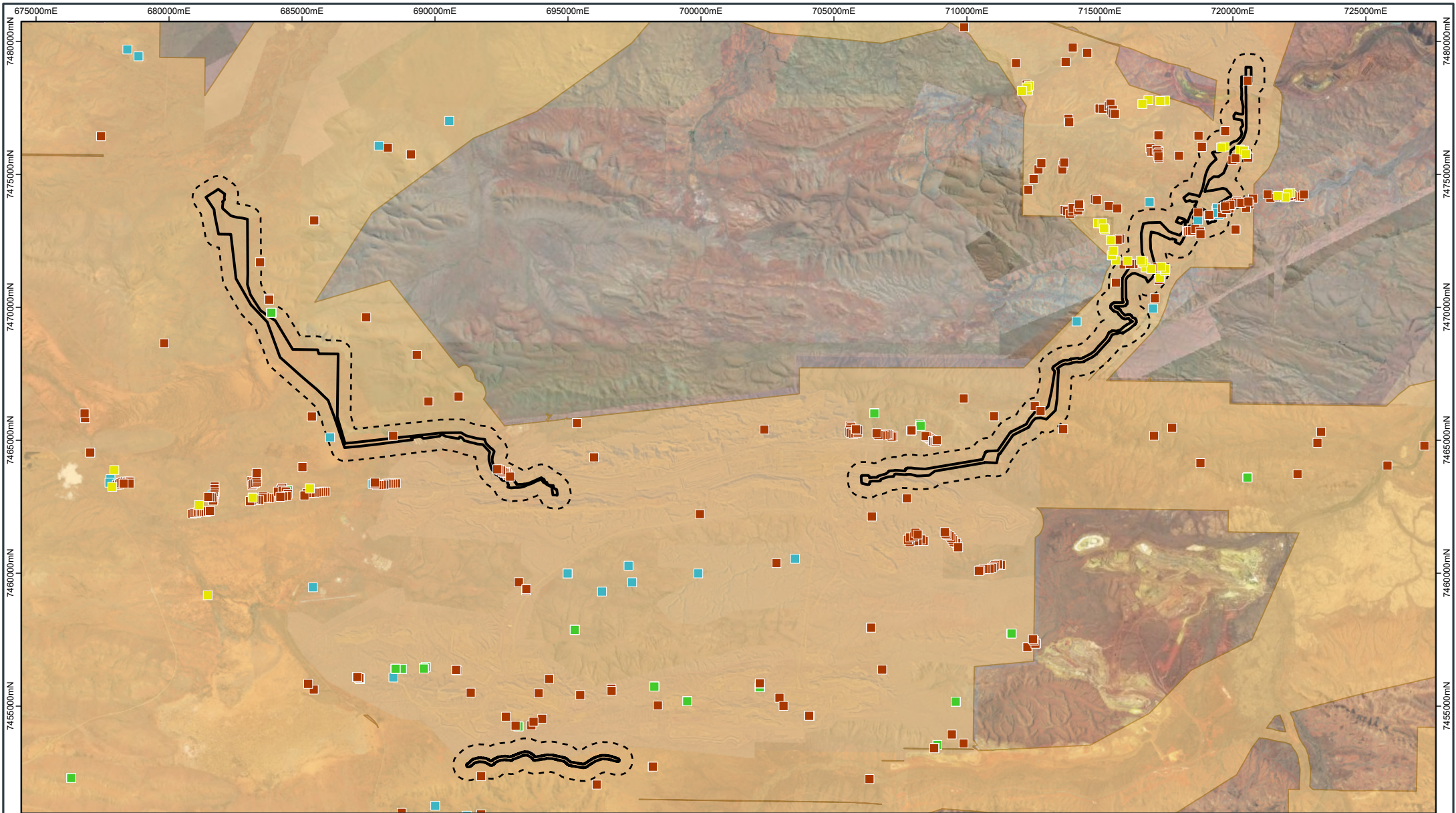
FIGURE: 5-13

DATE: 31/03/2026

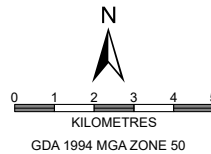
REQUESTOR: ENV APPROVALS

NO:

A1440_015 RevB



- Activity Area
- Activity Area 500m Buffer
- Survey Coverage
- Sample Method**
- Camera
- Nocturnal Search
- Scat Sheet
- Targeted Search



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PUBLIC

**PILBARA OLIVE PYTHON SURVEY
AREAS AND METHODS
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:190,000	REQUESTOR:	ENVIRONMENT	FIGURE:	5-14
DATE:	1/05/2026	PREPARED:	GEOMATICS		
		REVIEWED:			NO: A1440_016_RevB

5.4.3 Local habitat

The Activity Area falls within the current distribution of the Pilbara Olive Python, whereby the species or species habitat may occur (Figure 5-13). The Pilbara Olive Python is regularly encountered in the vicinity of rocky habitats and drainage systems, particularly areas with permanent and/or semi-permanent water features (including man-made) (Biologic 2023a). Survey coverage for the Pilbara Olive Python is shown in Figure 5-14, with local habitat and nearest records in Figure 5-15.

Critical habitat

Gorge/Gully, Breakaway/Cliff, Artificial Wetland and Major Drainage Line provide critical potential breeding and dispersal/foraging habitat for the species within the Activity Area and 500 m buffer (Biologic 2023a).

Approximately 28.3 ha of critical Pilbara Olive Python habitat occurs within the Activity Area and is proposed to be cleared. A further 309.2 ha of critical habitat occurs in a 500 m buffer of the Activity Area (Table 5-10 and Figure 5-15).

Supporting habitat

Medium Drainage Line habitat provides supporting breeding and foraging habitat for Pilbara Olive Python, particularly in areas where these habitats provide connectivity between areas of critical habitat and in area prone to pooling and ponding. Minor Drainage Line habitat may also be supporting habitat to the species in areas that are prone to pooling and ponding, particularly following large rainfall events, and providing dispersal corridors through the landscape (Biologic 2023a).

Approximately 38.9 ha of supporting Pilbara Olive Python habitat occurs within the Activity Area and is proposed to be cleared. A further 351.6 ha of supporting habitat occurs in a 500 m buffer of the Activity Area (Table 5-10 and Figure 5-15).

In addition, there are three permanent or semi-permanent water features within the Activity Area, eight within the 500 m buffer, six within the groundwater drawdown area and two within the groundwater mounding impact area (Table 5-11; Figure 5-15). These water features can often act as primary foraging locations, particularly when associated with rocky habitats, and provide critical habitat for the species (Biologic 2025a).

Table 5-10: Pilbara Olive Python habitat

Habitat Type	Extent within Activity Area to be cleared (ha)	Extent within 500m Buffer Area (ha)
Critical habitat		
Gorge Gully	15.0	206.5
Major Drainage Line	10.1	62.6
Breakaway/Cliff	2.2	36.2
Artificial Wetland	1.0	3.9
Total critical habitat	28.3	309.2
Supporting habitat		
Minor Drainage Line	38.9	347.3

Habitat Type	Extent within Activity Area to be cleared (ha)	Extent within 500m Buffer Area (ha)
Medium Drainage Line	0	4.3
Total supporting habitat	38.9	351.6

Table 5-11: Water features

Water feature ID	Permanency	Fauna habitat type	Location	Groundwater dependent vegetation present?
Activity Area				
WMIN-04	Permanent riverpool	Major Drainage Line in Gorge/Gully habitat	Northeast scheme	Yes
WYAN-10	Persistent (Artificial) pool – fed by Yandi surplus water discharge	Artificial Wetland located in Major Drainage Line	Partially occurs in the Activity Area (Northeast scheme)	Yes
WMN-06	Semi-permanent / Semi-persistent	Major Drainage Line	Northeast scheme	Yes
500m buffer				
WMIN-01	Semi-permanent / Semi-persistent	Major Drainage Line within Gorge/ Gully	Northeast scheme	Yes
WMIN-02	Semi-permanent / Semi-persistent	Major Drainage Line within Gorge/ Gully	Northeast scheme	No
WMIN-03	Semi-permanent / Semi-persistent	Major Drainage Line within Gorge/ Gully	Northeast scheme	Yes
WMYR-007	Persistent/permanent	Medium Drainage Line	Northeast scheme	Yes
WMYR-001	Persistent (Artificial) pool - fed by artificial water source	Artificial Wetland	Northwest scheme	No
WMYR-002	Ephemeral pool - fed from the artificial water source	Drainage Area/Floodplain	Northwest scheme	No

Water feature ID	Permanency	Fauna habitat type	Location	Groundwater dependent vegetation present?
WMYR-004	Persistent pool - fed by artificial water source	Minor Drainage Line	Northwest scheme	No
WMYR-005	Ephemeral pool (artificial dam) fed by artificial water source	Stony Plain	Northwest scheme	No
Groundwater drawdown impact area*				
WJIN-18	Persistent/permanent	Major Drainage Line	Weeli Wolli Springs	Yes
WJIN-17	Persistent/permanent	Major Drainage Line	Weeli Wolli Springs	Yes
WNECT-5	Semi-permanent / Semi-persistent	Major Drainage Line	Weeli Wolli Springs	Yes
WPSF-23	Semi-permanent / Semi-persistent	Gorge/Gully	Central MACSF mining area	No
WPSF-25	Semi-permanent / Semi-persistent	Gorge/Gully	Central MACSF mining area	No
WJIN-29	Semi-permanent / Semi-persistent	Major Drainage Line	South east corner of drawdown	No
Groundwater mounding impact area*				
WTAN-01	Semi-permanent / Semi-persistent	Medium Drainage Line	Groundwater mounding impact area	No
WCPH-41	Semi-permanent / Semi-persistent	Medium Drainage Line	Groundwater mounding impact area	No

* Ephemeral and semi-persistent/permanent water features that do not contain groundwater dependent features and are not considered further in relation to the groundwater drawdown or mounding impacts

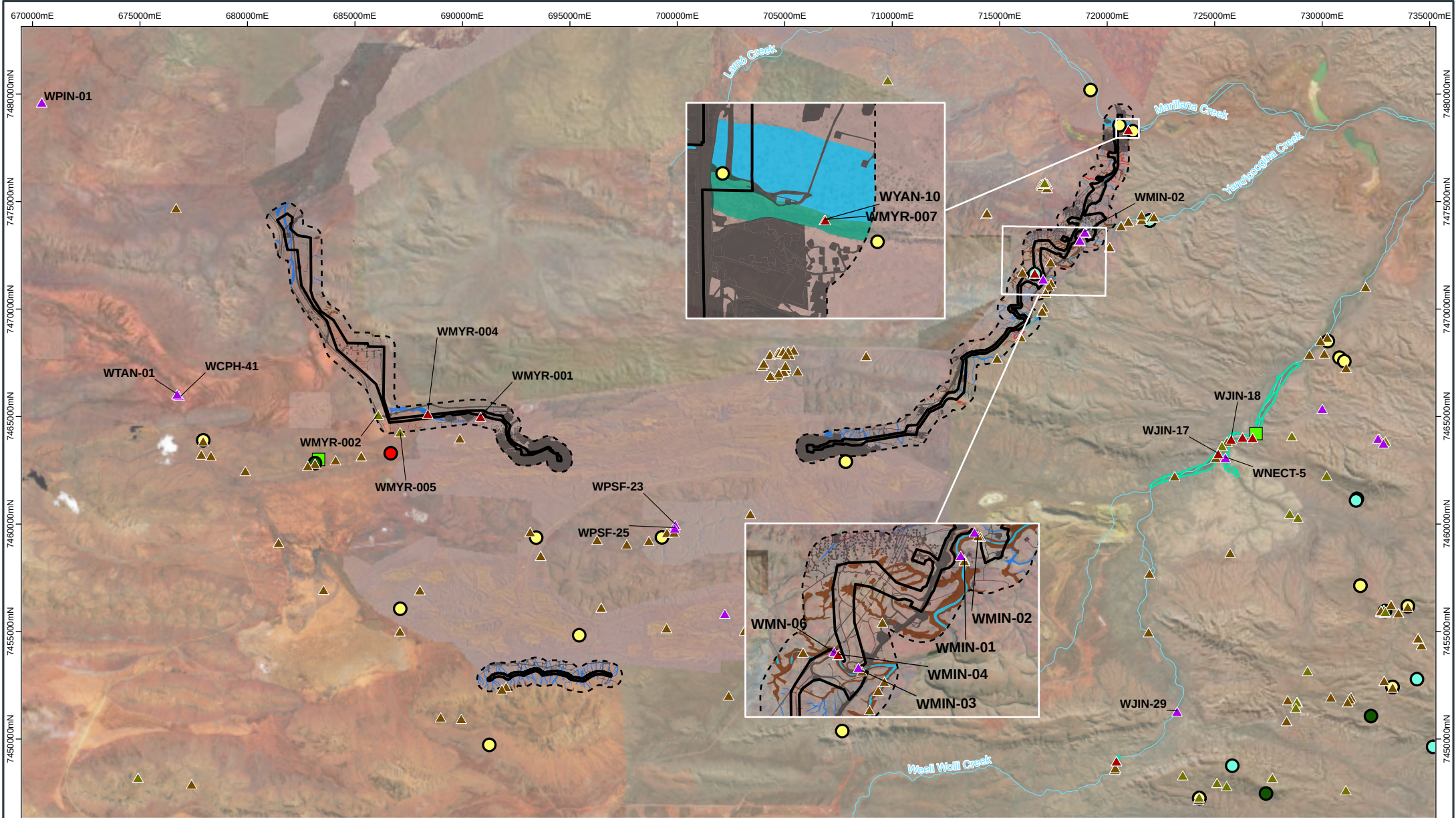
5.4.4 Pilbara Olive Python records

There are two records of Pilbara Olive Python within the Activity Area and no records within the 500m buffer (Figure 5-15).

In 2010, survey presence of this species within the Activity Area was determined from the presence of sloughed skins and scats (Biologic 2011d). One record was found in a small rocky outcrop near the water discharge point in Marillana Creek within the Northeast Scheme footprint (Figure 5-15). The other record is from 2023, and consists of a scat recorded in Major Drainage Line habitat within Yandicoogina Creek (Figure 5-15; Astron 2025). The scat was assessed as being approximately six months to one year old, and no further scat, sloughed skins or other evidence was identified.

Records of this species have previously been identified further east along Yandicoogina Creek (outside the Activity Area; Figure 5-15). The presence of scats along this river system indicates that the Creek is an important feature for foraging and dispersal opportunities for this species within the area (Astron 2025).

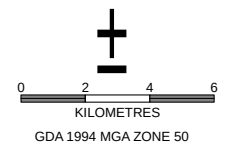
In the wider local area, there are two Pilbara Olive Python records approximately 60 m from the 500 m buffer, one to the east and one to the south of the northeastern pipeline (Figure 5-15). There is also one recent record of Pilbara Olive Python, recently captured by eDNA, within Weeli Wolli Creek (Figure 5-15; Biologic 2024b).



- Activity Area
- Activity Area 500m Buffer
- Cleared Area
- Pilbara Olive Python Records**
 - Individual (alive)
 - Individual (dead)
 - Other
 - Scat

- eDNA
- Watercourse
- Priority Ecological Community - Weeli Woll
- Water Features**
 - Permanent/ Persistent
 - Semi-permanent / Semi-persistent
 - Ephemeral

- Other Temporary or Ephemeral Pools
- Habitat Type**
 - Artificial Wetland
 - Breakaway/ Cliff
 - Gorge/ Gully
 - Major Drainage Line
 - Medium Drainage Line
 - Minor Drainage Line



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PILBARA OLIVE PYTHON MAPPED HABITAT AND RECORDS
CPHSW1 VALIDATION NOTICE
WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3: 1:235,074
DATE: 21/09/2026

REQUESTOR: ENVIRONMENT
PREPARED: GEOMATICS
REVIEWED:

FIGURE: 5-15
NO: A1440_017_RevI

5.4.5 Impact assessment

The potential direct and indirect impacts to the Pilbara Olive Python from the Activity (Section 2) are considered below.

Habitat loss and fragmentation

The Activity will result in clearing no more than 67.2 ha of Pilbara Olive Python habitat within a 1,482 ha Activity Area. This includes clearing up to 28.3 ha of critical habitat and 38.9 ha of supporting habitat for Pilbara Olive Python.

The critical fauna habitats that will be subject to the greatest amount of clearing for this Activity include Gorge/Gully (15 ha) and Major Drainage Line (10.1 ha) habitats.

The Activity includes some potential for the final location of infrastructure to be modified; however, no more than 67.2 ha of Pilbara Olive Python habitat will be cleared within the Activity Area.

There will be no loss of surface water features located within either the Activity Area or 500 m buffer. Water features within the Activity Area will have an exclusion zone placed around them where no clearing will be permitted. Clearing outside the Activity Area (i.e. within the 500 m buffer) will also be prohibited. Indirect impacts to water features are discussed below.

The GCOSA diversion structure may result in some minor fragmentation of habitat but is unlikely to create a barrier to movement given that it flanks a large OSA in an area surrounded by existing disturbances (Figure 2-5). Critical and supporting habitat for the Pilbara Olive Python will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in the surrounding area.

Potential impacts to Pilbara Olive Python habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to fragment habitat and create a barrier to movement for Pilbara Olive Python; however, habitat connectivity and dispersal pathways will be maintained as the pipelines will be buried at waterway crossings and areas of sheet flow and fauna underpasses (i.e. areas where the pipeline will be raised off the ground) will be installed in areas of critical and/or supporting habitat (see Section 2.1.4).

Habitat degradation from alteration of groundwater

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. There are no permanent or groundwater fed pools within the dewatering drawdown zone that will be impacted due to changing groundwater regimes beyond Weeli Wolli Springs (Table 5-11; Figure 2-7, Figure 5-18).

Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats, which represent critical and supporting habitat for the Pilbara Olive Python. In addition, Weeli Wolli Springs (a permanent groundwater-fed spring) and its associated permanent and semi-permanent pools also occur within the predicted groundwater drawdown contours of the Activity (Figure 2-7). Weeli Wolli Spring and the area of Weeli Wolli Creek in the vicinity of the spring, are cumulatively impacted by the surrounding mining operations, including MACSF and RTIO Hope Downs. RTIO are currently mitigating impacts from their Hope Downs operation to Weeli Wolli Spring and the creek. Cumulative groundwater drawdown modelling predicts that up until 2045, a decline in groundwater levels of approximately 2.4-5.6 m could occur at Weeli Wolli Spring, without mitigation, as a result of drawdown associated with the MACSF and RTIO Hope

Downs. These groundwater levels are currently mitigated through creek discharge at Hope Downs. Once RTIO closes Hope Downs, BHP will take over mitigation as described in Section 2.2.2. Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community (and the associated Pilbara Olive Python habitat) attributable to the Activity.

Increase in Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following components have the potential to impact terrestrial fauna habitats:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases, and groundwater levels decrease. Supporting Pilbara Olive Python habitats present within the 10-20 mbgl mounding contours at Northern RAV include Medium Drainage Line (Table 5-12).

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions. The degradation or loss of these trees could subsequently result in the degradation or loss of up to 35.8 ha of supporting Pilbara Olive Python habitat.

There is no critical Pilbara Olive Python habitat and no groundwater dependent surface water features that could be impacted by mounding. Pools WTAN-01 and WCPH-41 (Figure 2-7, Figure 5-15, Table 5-11: Water features As discussed in Section 2.2.3, changes to surface water quality are considered unlikely.

Table 5-12: Supporting habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Medium Drainage Line	35.8
Total critical habitat	35.8

The groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Pilbara Olive Python habitat within Yandicoogina Gorge but should prevent any further decline in the permanent pools or vegetation health or condition which will allow for the continued persistence of these values within the Gorge.

As described in Section 2.2.2, there is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water will be monitored for any potential changes consistent with the EP Act Part V Operating Licence for the MACSF Mining Operations which may impact the water quality in the Gorge.

Habitat degradation from alteration of surface water

The Activity involves clearing native vegetation, earthworks and surplus water discharge along creeklines as part of the water management strategy. These have the potential to alter surface water regimes via changes to water quality, quantity, flow rates, and/or physical or biological attributes. These impacts have the potential to result in modification, degradation or even loss of Pilbara Olive Python critical and supporting habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation (and the associated Pilbara Olive Python habitats) through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway.

The scheme will be operational for a 5-year period from commissioning and will observe a 90-day drying period annually during with the Pilbara dry season.

The implementation of the CPWRMP (BHP 2025c) will ensure compliance with the wetting front triggers and thresholds, drying period and monitoring vegetation to avoid significant changes to Pilbara Olive Python habitat. If anything, the presence of an additional water source throughout this discharge pathway may have a positive benefit for the Pilbara Olive Python which utilises water sources for foraging and dispersal. Regardless, any temporary changes to the hydrological regime of Upper Marillana Creek in addition with proposed mitigation measures is unlikely.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Discharges have created a short section of permanent flow which has resulted in changes to the composition of riparian vegetation, The Major Drainage Line and Artificial Wetland habitat located along this stretch of Marillana Creek provides critical and supporting habitat for Pilbara Olive Python.

The existing licence for this discharge location authorises 41.1 ML/day (L6168/1991/11). No changes to the licence allocation are required for the Activity as a maximum of 30 ML/day limited to a 5-year period will be discharged from the Activity, and up to 11 ML/day from the existing Yandi mine. Wetting front limits have not previously been set for this location, however the maximum recorded was 9 km in 2008, and more recently 2.5 km in 2023. There is anecdotal evidence from Traditional Owners that riparian vegetation (and the associated fauna habitats) downstream and off BHP tenure, has declined in health and composition since discharge volumes and the wetting front have decreased. The surplus water discharge will be operational for a 5-year period from commissioning and is unlikely to create a permanent impact to the landscape.

Construction of pipelines and GCOSA diversion structure

Installation of the GCOSA diversion structure for the Activity (described in Section 2.1) will cause a reduction in catchment area of 17% for the west catchment and 24% for the east catchment. The associated percentage reduction to regional catchments areas is 0.44% loss to the Coondewanna Catchment (west) and 0.05% to Weeli Wolli Catchment (east). This small reduction in catchment is unlikely to alter surface water flows in the area given the high variability of rainfall in the Pilbara. It is not expected to significantly impede flows to creek lines and therefore is unlikely to impact surface water pools or areas of critical or supporting Pilbara Olive Python habitat.

The proposed pipelines will be buried at waterway crossings to not impede natural waterways and will be raised above ground to allow passage of fauna in critical habitats.

Habitat degradation or species disturbance due to increased dust, noise, vibration or light

The Activity will result in a temporary increase in dust, noise, vibration and/or light associated with construction activities. Given that the Activity will take place within operational areas or areas with existing rail, roads and tracks, any impacts associated with species disturbance or habitat degradation are expected to be minimal.

Indirect impacts to Pilbara Olive Python from excessive light are expected to be low given that construction will mostly be undertaken during the day. High dust levels also have the potential to affect habitat; however, the construction period is only six months in duration and BHP will continue to implement existing dust suppression strategies, to minimise any potential impacts associated with an increase in dust levels.

No blasting will be required for the Activity, and standard management practices to minimise dust, noise and light will ensure that impacts associated with excessive noise, vibrations, light and/or dust are minimised as far as practical.

Introduced species

Vegetation clearing, pipeline construction and surface water discharge associated with the Activity, all have the potential to introduce feral fauna species. Habitat clearing can enhance the ability of feral predators to move through the landscape which can increase the potential for predation on native fauna. The displacement of fauna into adjacent territories inhabited by other individuals can result in increased predation and competition for food resources, shelter and breeding sites until equilibrium in the surrounding areas is reached.

Surface water discharge has the potential to spread weeds, whilst clearing and construction activities may assist in the rate of spread of the cane toad through vehicle movements and availability of surface water. Vehicle movements may also assist in the introduction or spread of weeds into areas of new disturbance associated with the Activity.

Feral predators such as feral cats and foxes may prey on the Pilbara Olive Python and/or compete with the Pilbara Olive Python for food (DEWHA 2008a, b; DCCEEW 2024, 2026a; Pearson 2006); however, the Activity Area forms a part of the focus area for the Broadscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026). In addition, foxes have not yet been recorded in this part of the Pilbara. As such, impacts associated with feral predators to Pilbara Olive Python is expected to be low.

Introduced species can also alter the condition of Pilbara Olive Python habitats through changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity. However, the application of standard weed management procedures is expected to mitigate the spread of weeds.

The Pilbara Olive Python may be vulnerable to lethal toxic ingestion of cane toad toxin. The future predicted spread of the cane toad into the Pilbara bioregion may have negative impacts to the Pilbara Olive Python, as observed in other species in other areas of northern Australia. Some models predict that the cane toad's distribution will spread to include the Pilbara via the narrow coastal strip, but this spread will be dependent on the presence of artificial water bodies (Tingley *et al.* 2012). This Activity is not predicted to increase impact of cane toad on the Pilbara Olive Python and the potential impact of cane toads on the python is considered low.

Feral fauna currently known from the area include feral cats, dogs (*C. familiaris*), cattle (*B. taurus*), and the European rabbit (*O. cuniculus*) (Biologic 2023a). Overall, the risk of the Activity resulting in the introduction or spread of introduced species is considered to be low.

Vehicle and infrastructure interactions

The Activity will result in an increase in vehicle and machinery activity and movement, which may subsequently result in an increase in the risk of interactions with Pilbara Olive Python, resulting in injury or death. However, existing roads, tracks and rail lines are already present throughout the Activity Area. Management measures will be implemented to reduce the risk to Pilbara Olive Python species, including limiting construction activities to daylight hours and imposing appropriate speed limits on all access tracks, roads and construction areas to minimise interactions with fauna that would result in injury or mortality.

The GCOSA diversion structure would not be expected to represent an entrapment risk for Pilbara Olive Pythons. The structure will consist of an open drain with earthen batters. The Pilbara Olive Python is capable of traversing steep rocky terrain, and the proposed drain batters provide sufficient surface roughness and gradient to facilitate egress. The drain design avoids vertical walls and incorporates rough earthen/rock-lined surfaces, reducing the likelihood of fauna becoming trapped.

Overall, vehicle and infrastructure interactions are considered unlikely to result in residual impacts to the Pilbara Olive Python.

5.4.6 Mitigation hierarchy

Avoid

The Activity has been designed to avoid impacts to Pilbara Olive Python and their habitats as far as practical. The Activity Area has been designed to avoid critical, supporting and/or high value habitat features as far as reasonably practical.

Vegetation clearing and earthworks outside the approved clearing boundaries will be avoided.

Mitigate

The Activity has been designed to minimise clearing and fragmentation of fauna habitats by designing infrastructure within or adjacent to existing disturbed areas as far as practical. The majority of the pipeline route follows existing roads, tracks or rail lines. However, in some areas, avoidance of fauna habitat is not possible, including areas of Pilbara Olive Python critical and supporting habitat.

To minimise impacts associated with clearing and fragmentation, and indirect disturbances associated with increased noise, dust, vibration and light, BHP proposes the following management measures:

- no clearing will occur outside the approved clearing areas
- construction will be mostly undertaken during day-light hours which will minimise impacts to Pilbara Olive Python which is mainly nocturnal
- suitably trained fauna spotters will be utilised for pre-clearance surveys undertaken 7 days prior to clearing in areas of critical and supporting Pilbara Olive Python habitat including Yandicoogina Creek and Marillana Creek)
- BHP will design and construct infrastructure using best management practices to minimise indirect impacts to terrestrial fauna habitats (i.e. sediment control, dust suppression measures, utilising existing cleared areas etc)
- pipelines will be buried at creek crossings to maintain natural drainage lines and surface water flows

- all sightings and events involving Pilbara Olive Python will be identified and captured in WAIOs Event Management System to provide personnel with awareness of Pilbara Olive Python activity in the area and application of additional mitigation measures as appropriate.
- the Activity will be operated within the existing operating licence limits for surplus water discharge at the Lower Marillana Creek discharge point
- appropriate speed limits will be imposed on access roads and construction areas to minimise the risk of vehicle strike or fauna interactions with machinery
- signage will be placed in areas of Pilbara Olive Python critical habitat and high traffic to alert drivers to slow-moving species to minimise the risk of vehicle strike
- excessive dust will be minimised as far as practical
- the presence of domestic pets or animals on site will be prohibited
- if feral cats are observed on site, a feral cat management program will be implemented
- if Cane Toads are observed on site, they will be reported to DBCA and humanely euthanised in accordance with DBCA guidelines
- standard hygiene practices will be implemented to minimise introduction and spread of weeds including annual weed mapping, weed treatment and control (if required) and vehicle hygiene measures when entering/leaving construction areas.
- BHP have also prepared and submitted the Central Pilbara Water Resource Management Plan (BHP 2025) to the WA EPA which proposes ongoing management of the groundwater supplementation scheme at Yandicoogina Gorge and Upper Marillana Creek wetting front management and vegetation condition. The Central Pilbara Water Resource Management Plan will be implemented for the Activity.
- For the Northern RAV MAR scheme, BHP proposes to ensure that groundwater levels do not rise above 10 mbgl. This will be informed by groundwater level monitoring and monitoring the tree health of *Eucalyptus xerothermica* or *Eucalyptus leucophloia* subsp. *leucophloia* trees within the 0-10 mbgl mounding zone. The Northern RAV MAR Scheme will be managed through the Part V licence (L7851/2002/6) of the EP Act.

5.4.7 Residual impact

Residual impacts include the loss of 28.3 ha of critical habitat and 38.9 ha of supporting habitat for the Pilbara Olive Python.

5.4.8 Review of Program Matter Outcomes

Following the impact assessment (Section 5.2.5) and application of the mitigation hierarchy (Section 5.2.6), a review of the Activity against the PMOs was undertaken. Table 5-13 identifies which PMOs are relevant for the Activity and considers further management.

Table 5-13: Review of Program Matter Outcomes (Pilbara Olive Python)

Program Matter Outcomes	Applicable Notifiable Action Trigger	Assessment
Minimise loss of critical and supporting habitats of the Pilbara Olive Python as a result of Program Activities within the SAA AND No loss (or maintain) Pilbara Olive Python population(s) as a result of program activities.	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Pilbara Olive Python critical habitat and/or supporting habitat AND Presence or sign/s of Pilbara Olive Python population or residing individuals	The loss of up to 28.4 ha of critical habitat and 38.9 ha of supporting habitat represents a residual impact and requires offsetting (Section 7). No loss of population will occur as a result of the Activity.
Minimise loss of critical and supporting habitats of the Pilbara Olive Python as a result of Program Activities within the SAA	Within the Activity Area there is: Presence of Pilbara Olive Python critical habitat and/or supporting habitat AND Presence or sign of Pilbara Olive Python transient, infrequent or dispersing individual/s	Not applicable

5.4.9 Summary

BHP considers the Activity will meet the PMO to minimise loss of critical and supporting habitats of the Pilbara Olive Python. In addition, offsets will be provided for the loss of critical foraging habitat and supporting habitats (Section 7). As a result, the PMOs will be achieved.

5.5 Pilbara Leaf-nosed Bat

The following sections provide information to demonstrate that Notifiable Action Triggers for Pilbara Leaf-nosed Bat are not met. Impacts to the Pilbara Leaf-nosed Bat are discussed to illustrate that the Program Matter Objective (as described below) for this species will be met.

Program Matter Objective: *“To support the long-term persistence and viability of the Pilbara Leaf-nosed Bat within the SAA.”*

5.5.1 General species information

The Pilbara Leaf-nosed Bat is listed as ‘Vulnerable’ under the EPBC Act. The species occurs over an estimated area of 120 million hectares (Eco Logical 2014) and is restricted to the Pilbara bioregion of Western Australia (DCCEEW 2024e). The Pilbara population is considered to represent a single interbreeding population comprising multiple colonies (TSSC 2016c). Individual colonies vary significantly, ranging in size from 10 individuals to as many as 20,000

individuals, although the latter is exceptional (Armstrong 2001, Ecologia Environment 2005, Ecologia Environment 2006a, Ecologia Environment 2006b). The size of the Pilbara Leaf-nosed Bat population is currently unknown (TSSC 2016c).

The most updated conservation advice (Bat Call WA 2021b) indicates there are 48 confirmed permanent day roosts, including maternity roosts. Of these, 38 are located in banded iron formations in the Hamersley Ranges and eastern Pilbara, and six in disused underground gold and copper mines of the eastern Pilbara. Figure 5-16 illustrates the regional records and distribution of Pilbara Leaf-nosed Bat. The species area of occupancy in the Pilbara has been calculated by Woinarski *et al.* (2014) as under 110,000 km².

Pilbara Leaf-nosed Bats roost in undisturbed caves, deep fissures or abandoned mine shafts that maintain a stable, warm and humid microclimate, due to their limited ability to regulate heat and water balance (Kulzer *et al.* 1970; Churchill *et al.* 1988; Jolly 1988; Churchill 1991; Baudinette *et al.* 2000; Armstrong 2001). Caves/abandoned mines with seeps of water, moist wall surfaces and or flooded lower levels are usually of ideal humidity (Bat Call WA 2021b).

The species forages within and in the vicinity of roost caves and more broadly along waterbodies with suitable fringing vegetation that support prey species (TSSC 2016c). Pilbara Leaf-nosed Bats are predicted to travel up to 20 km from roost caves during night foraging (Cramer *et al.* 2016b); however, seasonal variation is known to occur, with foraging occurring up to 20 km in the dry season and up to 50 km during the wet season (Bullen 2013).

5.5.2 Studies and sampling effort

At least six contemporary surveys have targeted the Pilbara Leaf-nosed Bat within the Activity Area (Table 4-1), as well as numerous contemporary and historical surveys in the wider area (Appendix 1). Survey coverage and sampling effort for the Pilbara Leaf-nosed Bat is shown in Figure 5-15. Sampling methods for Pilbara Leaf-nosed Bat within the Activity Area and 500 m buffer include habitat assessments (including water and cave feature assessments), targeted searches and/ or transects, and ultrasonic recorders (Biologic, 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025; Figure 5-17). Where suitable caves or overhangs that may be utilised by the species were located, detailed cave assessments and searches were undertaken to search for evidence of occurrence and determine the likely use of the cave as a roost site. Where a cave was not deemed safe for entry, efforts were made to assess the cave without entering (Biologic 2023a).

5.5.3 Local habitat

The Activity Area is located at the eastern extent of the current distribution of the Pilbara Leaf-nosed bat whereby the species or species habitat may occur (Figure 5-16). Critical foraging habitat and supporting habitat for the Pilbara Leaf-nosed Bat are shown in Figure 5-18 and described below.

Critical habitat

There are no caves within the Activity Area. There are 10 caves within 500 m of the Activity Area, including seven Category 4 caves and three unsuitable caves (Table 5-15 and Figure 5-18). Caves within 500 m have been considered in this assessment as they could potentially be subject to indirect impacts associated with the Activity such as increased dust, noise, or vibration. Caves outside the 500 m distance are considered highly unlikely to be impacted by the Activity.

There is 27.3 ha of critical Pilbara Leaf-nosed Bat habitat in the Activity Area including; Gorge/Gully, Breakaway/Cliff, and Major Drainage Line (Table 5-14 and Figure 5-18) (Biologic 2023a). These habitats provide potential roosting, foraging and dispersal habitat for the Pilbara Leaf-nosed Bat (Biologic 2023a).

Supporting habitat

There is 1016.9 ha of supporting Pilbara Leaf-nosed Bat in the Activity Area including Drainage Area/Floodplain, Stony Plain, Hillcrest/Hillslope and Minor Drainage Line (Table 5-14 and Figure 5-18). There is 5374.7 ha of supporting habitat in the 500m buffer including those mentioned above, as well as Medium Drainage Line, Mulga Woodland and Undulating Low Hills.

Table 5-14: Pilbara Leaf-nosed Bat habitat

Habitat Type	Extent within Activity Area to be cleared (ha)	Extent within the 500m Buffer
Critical habitat		
Gorge/Gully	15.	206.5
Major Drainage Line	10.1	62.6
Breakaway/Cliff	2.2	36.1
Total critical habitat	27.3	305.2
Supporting habitat		
Medium Drainage Line	0	4.3
Mulga Woodland	0	2.5
Drainage Area/Floodplain	356.5	860.2
Stony Plain	387.2	2208.3
Hillcrest/Hillslope	234.3	1770.4
Minor Drainage Line	38.9	347.2
Undulating Low Hills	0	181.8
Total supporting habitat	1016.9	5374.7

Table 5-15: Caves with potential and recorded Pilbara Leaf-nosed Bat use outside of the Activity Area

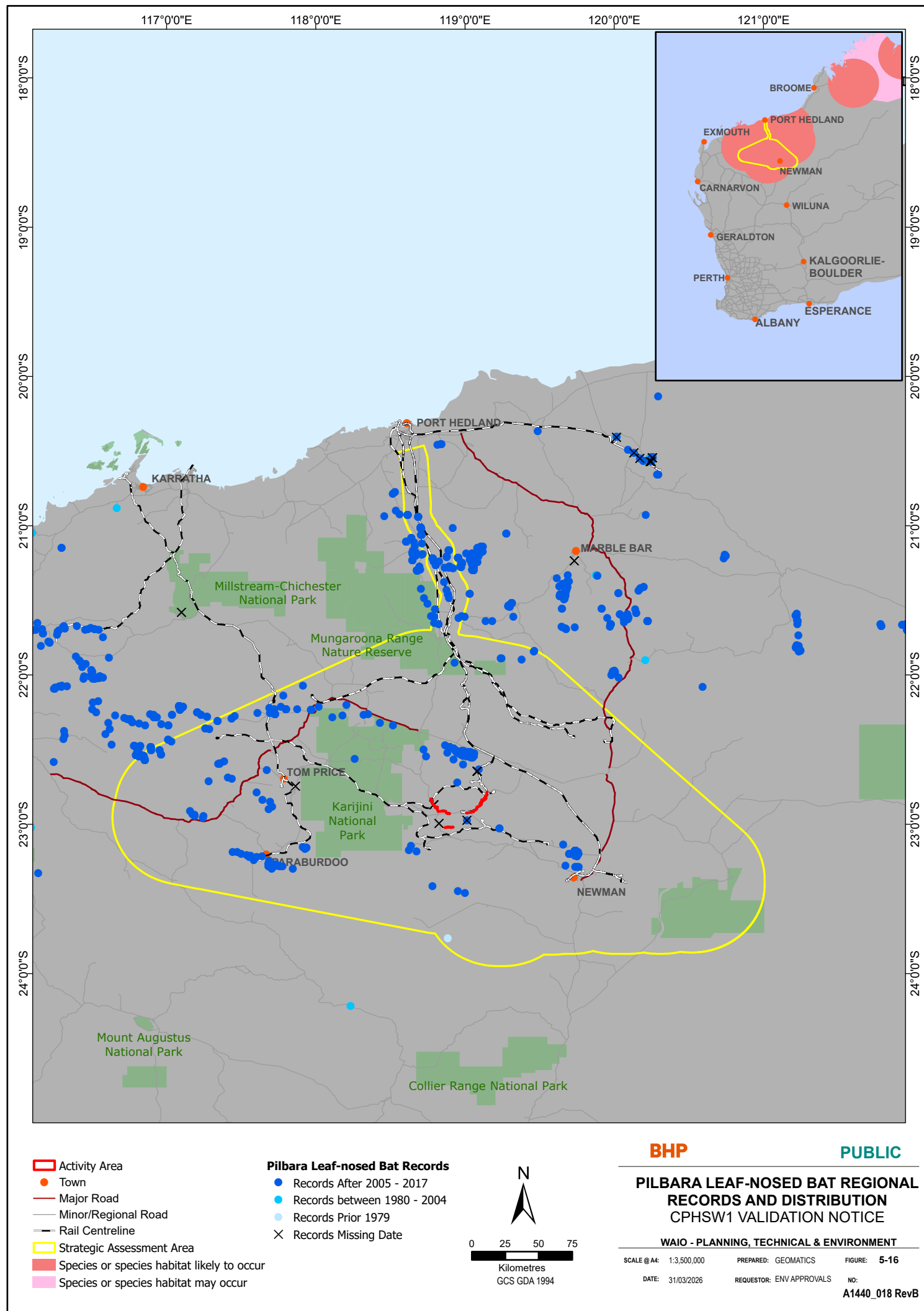
Cave ID	Roost Classification	Distance from Activity Area	Evidence of use by Pilbara Leaf-nosed Bat
Caves within 500 m of the Activity Area			
CTAN-02	Not suitable	172 m	No evidence of use.
CTAN-13	Category 4	165 m	No evidence of use.
CTAN-01	Category 4	176 m	No evidence of use
CTAN-11	Category 4	126 m	Call recorded in 2011 (Onshore/Biologic 2011)
CMN-03	Not suitable	177 m	No evidence recorded.
CMIN-03	Category 4	130 m	No evidence recorded
CMIN-01	Category 4	300 m	No evidence of use
CMIN-02	Not suitable	223 m	No evidence of use
CMN-06	Category 4	15 m	No evidence of use
CMN-04	Category 4	383 m	No evidence of use

5.5.4 Pilbara Leaf-nosed Bat records

The nearest permanent diurnal roost is believed to be the East Turee Creek roost, located in the south-east corner of Karijini National Park, approximately 20 km west of the Activity Area (Biologic 2023a). Pilbara Leaf-nosed Bat regional records are shown in Figure 5 14.

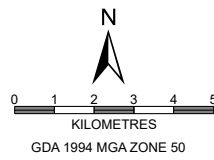
There are no records of the Pilbara Leaf-nosed Bat in the Activity Area. There is one record of Pilbara Leaf-nosed Bat within the 500 m buffer of the Activity Area. In 2011, a Pilbara Leaf-nosed Bat call was recorded from an unidentified cave (likely CTAN-11 based on geographic coordinates provided) (Onshore/Biologic 2011).

The Pilbara Leaf-nosed Bat was recorded more times in subsequent surveys outside the Activity Area and buffer; however, the number of calls is still very low (Biologic 2023a). The Pilbara Leaf-nosed bat is relatively scarce in the area due to the limited occurrence of potential roosting habitat. The scarcity of records in the broader vicinity of the Activity Area (and buffer) suggests that the occurrence of the Pilbara Leaf-nosed Bat in 2011 may be restricted to foraging and/or dispersal events only.





- Activity Area**
 - Activity Area
 - Activity Area 500m Buffer
 - Survey Coverage
- Sample Method**
 - Camera
 - Nocturnal Search
 - Scat Sheet
 - Targeted Search

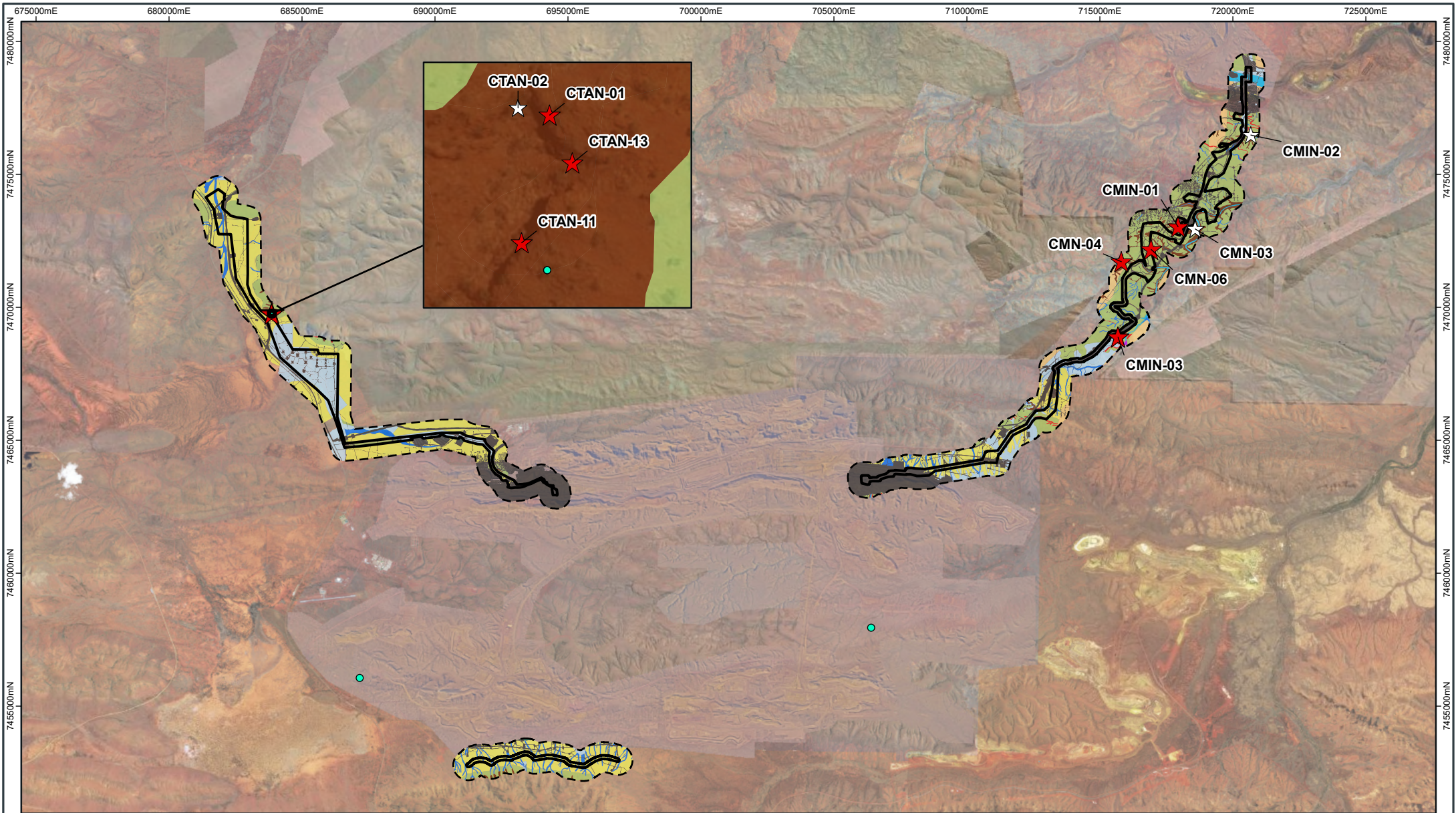


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PILBARA LEAF-NOSED BAT SURVEY
AREAS AND METHODS
CPHSW1 VALIDATION NOTICE

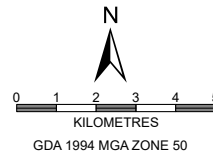
WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:190,000	REQUESTOR:	ENVIRONMENT	FIGURE:	5-17
DATE:	19/06/2026	PREPARED:	GEOMATICS		
		REVIEWED:			NO: A1440_019_RevA



- Activity Area
- Activity Area 500m Buffer
- Cleared Area
- Pilbara Leaf-nosed bat records
- Pilbara Leaf-nosed Bat Records**
- Category 4
- Not suitable

- Habitat Type**
- Breakaway/ Cliff
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hillcrest/ Hillslope
- Major Drainage Line
- Medium Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Stony Plain
- Undulating Low Hills



BHP

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PILBARA LEAF-NOSED BAT MAPPED HABITAT AND RECORDS CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:190,000	REQUESTOR:	ENVIRONMENT	FIGURE:	5-18
DATE:	11/06/2026	PREPARED:	GEOMATICS	NO:	A1440-020 RevD
		REVIEWED:			

5.5.5 Impact assessment

The potential direct and indirect impacts to the Pilbara Leaf-nosed Bat from the Activity (see Section 2) are considered below.

Habitat loss and fragmentation

No caves will be directly impacted by the Activity.

The Activity will result in the loss of up to 27.3 ha of critical habitat including Gorge/Gully, Major Drainage Line and Breakaway Cliff and a loss of up to 1,016.9 ha of supporting habitat including Drainage Area/Floodplain, Stony Plain, Hillcrest/Hillslope, Minor Drainage Line and Undulating Low Hills.

There will be no loss of surface water features located within either the Activity Area or 500 m buffer. Water features within the Activity Area will have an exclusion zone placed around them where no clearing will be permitted. Clearing outside the Activity Area (i.e. within the 500 m buffer) will also be prohibited. Indirect impacts to water features are discussed in the sections below.

The GCOSA diversion structure may result in some minor fragmentation of habitat but is unlikely to create a barrier to movement given that it flanks a large OSA in an area surrounded by existing disturbances (Figure 2-5). Critical and supporting habitat for the Pilbara Olive Python will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in the surrounding area.

Potential impacts to Pilbara Leaf-nosed Bat habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to fragment habitat but are unlikely to create a barrier to movement for the Pilbara Leaf-nosed Bat. Habitat connectivity and dispersal pathways will be maintained as the pipelines will be buried at waterway crossings and areas of sheet flow.

Habitat degradation from alteration of groundwater regimes

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. There are no permanent or groundwater fed pools within the dewatering drawdown zone that will be impacted due to changing groundwater regimes beyond Weeli Wolli Springs. Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats, which represent critical and supporting habitat for the Pilbara Leaf-nosed Bat. In addition, Weeli Wolli Springs (a permanent groundwater-fed spring) and its associated permanent and semi-permanent pools also occur within the predicted groundwater drawdown contours of the Activity (Figure 2-7). Weeli Wolli Spring and the area of Weeli Wolli Creek in the vicinity of the spring, are cumulatively impacted by the surrounding mining operations, including MACSF and RTIO Hope Downs. RTIO are currently mitigating impacts from their Hope Downs operation to Weeli Wolli Spring and the creek. Cumulative groundwater drawdown modelling predicts that up until 2045, a decline in groundwater levels of approximately 2.4-5.6 m could occur at Weeli Wolli Spring, without mitigation, as a result of drawdown associated with the MACSF and RTIO Hope Downs. These groundwater levels are currently mitigated through creek discharge at Hope Downs. Once RTIO closes Hope Downs, BHP will take over mitigation as described in Section 2.2.2. Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community (and the associated Pilbara Leaf-nosed Bat habitat) attributable to the Activity.

BHP will manage dewatering drawdown to ensure that there are no changes to groundwater levels in Karijini National Park consistent with the Central Pilbara Water Resource Management Plan (BHP 2024c).

Dewatering drawdown is unlikely to change humidity within bat caves given that these generally occur high in the landscape in areas where the pre-mining depth to groundwater is greater than 20 mbgl. There are no suitable bat caves at Weeli Wolli Springs or Coondewanna Flats where the groundwater is equal to or less than 20 mbgl.

Increase in Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following components have the potential to impact terrestrial fauna habitats:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases and groundwater levels decrease. Supporting Pilbara Leaf-nosed Bat habitats present within the 10-20 mbgl mounding contours at Northern RAV include Drainage Area/Floodplain, Medium Drainage Line, Mulga Woodland, and Stony Plain (Table 5-16). There is no critical Pilbara Leaf-nosed Bat habitat present.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions. The degradation or loss of these trees could subsequently result in the degradation or loss of up to 160.7 ha of supporting Pilbara Leaf-nosed Bat habitat.

Table 5-16: Supporting habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Drainage Area/Floodplain	30.5
Medium Drainage Line	35.8
Mulga Woodland	4.1
Stony Plain	90.0
Total Supporting Habitat	160.7

The groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Pilbara Leaf-nosed Bat habitat or caves within Yandicoogina Gorge but should prevent any further decline in the permanent pools or vegetation health or condition which will allow for the continued persistence of these values within the Gorge.

As described in Section 2.2.2, there is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water will be monitored for any potential changes consistent with the EP Act Part V Operating Licence for the MACSF Mining Operations which may impact the water quality in the Gorge.

Habitat degradation from alteration of surface water regimes

The Activity involves surplus water discharge along creeklines as part of the water management strategy. This has the potential to alter surface water regimes via changes to water quality, quantity, flow rates, and/or physical or biological attributes. The construction of pipelines and diversion infrastructure for the Activity also have the potential to interfere with the natural sheetflow of water and increase erosion and sedimentation. These impacts have the potential to result in modification, degradation or even loss of Pilbara Leaf-nosed Bat critical and supporting habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation (and the associated Pilbara Leaf-nosed Bat habitats) through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway.

The scheme will be operational for a 5-year period from commissioning and will observe a 90-day drying period annually commensurate with the Pilbara dry season.

The implementation of the CPWRMP (BHP 2025c) will ensure compliance with the wetting front triggers and thresholds, drying period and monitor vegetation to avoid significant changes. A temporary change to the hydrological regime of Upper Marillana Creek in addition with proposed mitigation measures is unlikely to cause impact to Pilbara Leaf-nosed Bat habitat.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Discharges have created a short section of permanent flow which has resulted in changes to the composition of riparian vegetation. Major Drainage Line and Artificial Wetland habitat located along this stretch of Marillana Creek provides critical and supporting habitat for Pilbara Leaf-nosed Bat.

The surplus water discharge will be operational for a 5-year period from commissioning and is unlikely to create a permanent impact to the landscape.

Construction of pipelines and GCOSA diversion structure

The GCOSA diversion structure is unlikely to cause impacts to Pilbara Leaf-nosed Bat habitat due to the small reduction in catchment area and is unlikely to create a barrier to dispersal given the species is aerial.

The diversion structure unlikely to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated fauna habitats.

Potential impacts to Pilbara Leaf-nosed Bat habitats associated with the construction of the pipelines will be mostly associated with habitat clearing which is addressed under 'habitat loss'. The pipelines will not create a barrier to dispersal for the Pilbara Leaf-nosed Bat, given the species is aerial.

Overall, potential impacts from the installation of pipelines and the GCOSA diversion structure to the Pilbara Leaf-nosed Bat are expected to be low.

Habitat degradation or species disturbance due to increased dust, noise, vibration or light

High dust levels have the potential to affect foraging Pilbara Leaf-nosed Bat; however, the construction period is only six months in duration and BHP will continue to implement existing dust suppression strategies, to minimise any potential impacts associated with an increase in dust levels.

The Activity will introduce noise and vibration sources to the Activity Area. Noise and vibration have the potential to flush roosting Pilbara Leaf-nosed Bats from caves, however, there are no critical caves/diurnal roosts for the species (Biologic 2023, 2025a) present in the Activity Area. The construction phase of the pipeline is anticipated to be over a 6-month period and will be predominantly in daytime hours. The potential for direct or indirect impacts to Pilbara Leaf-nosed Bat associated with noise and vibration is low.

Indirect impacts to Pilbara Leaf-nosed Bat from excessive light are expected to be low given that construction will mostly be undertaken during the day.

Introduced Species

Currently there are no known impacts from introduced species on the Pilbara Leaf-nosed Bat (Bat Call 2021b). However, it is assumed that feral predators such as cats and foxes could predate on the species, whilst feral herbivores and weeds could degrade foraging habitat.

Vegetation clearing, pipeline construction and surface water discharge associated with the Activity, all have the potential to introduce feral fauna species. Introduced species can alter the condition of Pilbara Leaf-nosed Bat habitats through increased predation, changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity. Habitat clearing can enhance the ability of feral predators to move through the landscape which can increase the potential for predation on native fauna. The displacement of fauna into adjacent territories inhabited by other individuals can result in increased predation and competition for food resources, shelter and breeding sites until equilibrium in the surrounding areas is reached.

The Activity Area forms a part of the focus area for the Broadscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026). Given the proposed feral cat management practices, the lack of European fox records, and given there are no critical Pilbara Leaf-nosed Bat roosts in the area, with the species activity in the area being limited for foraging, the potential impact of feral cats or foxes on the Pilbara Leaf-nosed Bat is considered low.

Feral fauna currently known from the area include feral cats, dogs, cattle, and the European rabbit (Biologic 2023a). Overall, the risk of the Activity resulting in the introduction or spread of introduced species is considered to be low.

The future predicted spread of cane toad in the Pilbara bioregion (Kearney *et al* 2008, Tingley *et al* 2012) is not expected to result in a negative impact to the Pilbara Leaf-nosed Bat as they have an insectivorous diet and are considered unlikely to prey on cane toad (Eco Logical 2016). The potential risk of impact to Pilbara Leaf-nosed Bat associated with the potential future establishment of Cane Toads in the Pilbara bioregion is considered to be very low.

The application of weed management procedures is expected to mitigate the potential for introduction or spread of weeds associated with the Activity and will minimise risks to Pilbara Leaf-nosed Bat habitat.

Vehicle and infrastructure interactions

Interaction of fauna with vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality to fauna individuals. Pilbara Leaf-nosed Bats are understood to fly low to the ground when foraging and therefore may be vulnerable to vehicle strike. The risk of interaction with vehicles is greatest where roads occur in proximity to roosts or critical foraging habitat. There are not critical caves suitable for roosting in the Activity Area and the species may use the area for occasional foraging.

BHP will avoid using any barbed wire fencing for the purposes of the Activity, except where required by legislation, to avoid entanglement impacts on Pilbara Leaf-nosed Bats. If use of barbed wire is required, bat reflectors will be installed to deter bats and minimise impacts.

5.5.6 Summary

The Notifiable Action Triggers are not applicable for Pilbara Leaf-nosed Bat, as the record of Pilbara Leaf-nosed Bat is within the 500 m buffer of the Activity Area and is a dispersing individual. The record is from 2011, extensive contemporary targeted searching has been undertaken in the area and a very low number of records has been reported which indicates that it is unlikely that a colony or residing population is present in the area (Biologic 2023a).

5.6 Greater Bilby

The following sections provide background information to demonstrate that Notifiable Action Triggers for Greater Bilby are not met. Impacts to the Greater Bilby are discussed and the mitigation hierarchy applied to illustrate that the Program Matter Objective (as described below) for this species will be met.

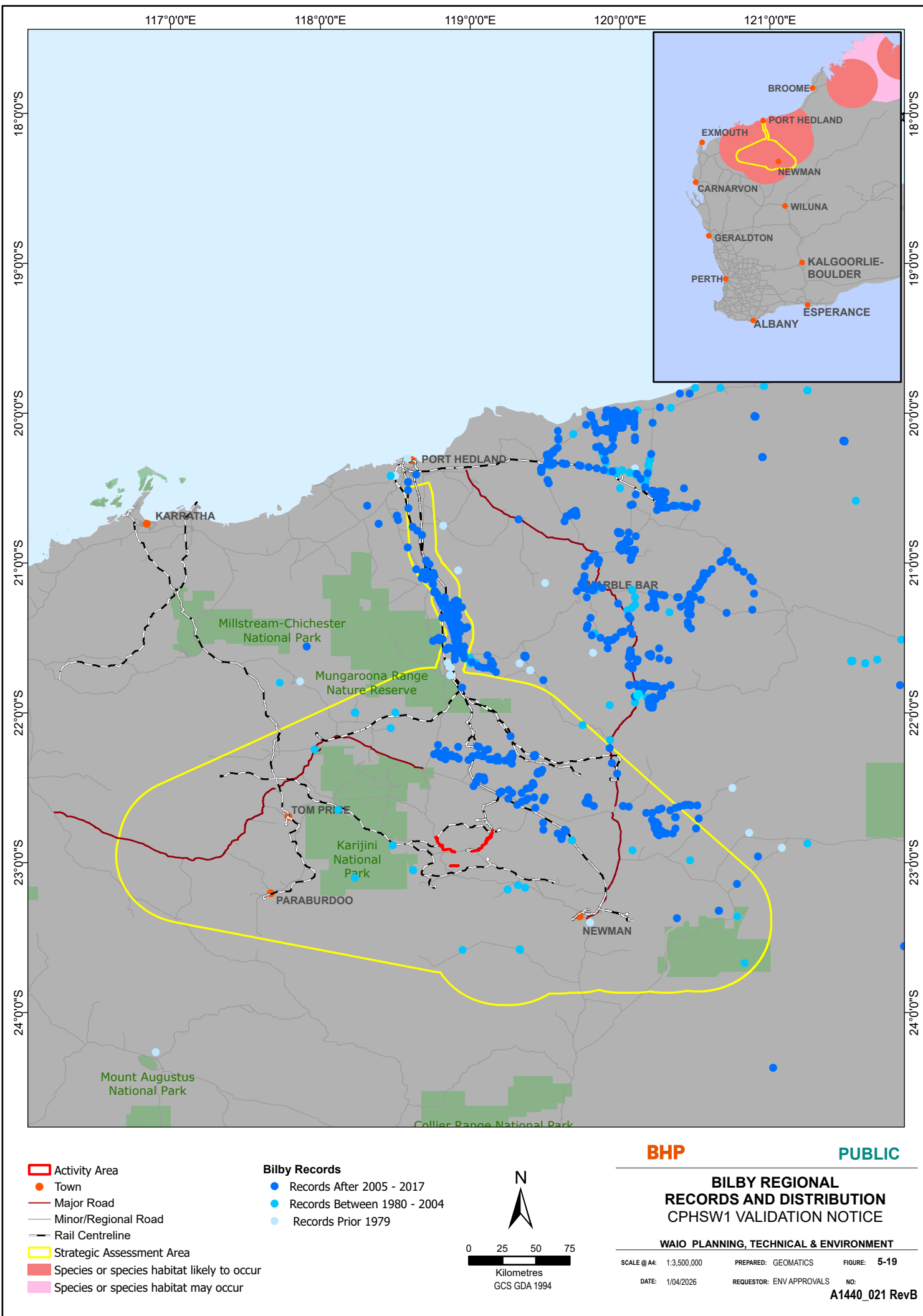
Program Matter Objective: *“To support the long-term persistence and viability of the Greater Bilby within the SAA.”*

5.6.1 General species information

The Greater Bilby is listed as ‘Vulnerable’ under the EPBC Act. In the Pilbara bioregion, its distribution extends along the Fortescue River and north-east to Shay Gap (DCCEEW 2023) (Figure 5-19). The extent of occurrence for the Greater Bilby is thought to have remained relatively stable over the last 20 years. This mammal was common throughout most of its range until the early 1900s when there was a sudden and widespread collapse (Abbott 2001; Johnson 2008). This collapse and range contraction has been attributed to predation from cats and foxes, habitat degradation from introduced herbivores and changed fire regimes. Feral cats have been linked to the reduced success of reintroduced populations (DCCEEW 2023).

The Greater Bilby is a highly mobile species, with home ranges varying between 1 km² to 3 km² (DCCEEW 2023). The movement patterns of the Greater Bilby are thought to be influenced by resource availability (Strahan 1995). The species may also persist in areas of low productivity (Southgate and Carthew 2006, Southgate *et al.* 2007 and Southgate *et al.* 2018).

The presence of the Greater Bilby is strongly associated with substrate type as it is generally restricted to areas that contain suitable burrowing habitat, such as sandy loam plains, alluvial creeks, dunes and sand ridges (TSSC 2016b). Within the Pilbara region the species is sparsely distributed and often associated with level or undulating plains including watercourses and dune systems, composed of cracking clay, soil or sand that allows burrowing, with vegetation consisting of hummock grassland (spinifex), with low shrubland, usually *Acacia* dominated (Dziminski and Carpenter 2017). The Greater Bilby has also been recorded within mulga woodlands and stony plain habitats in the Abydos Plains region, further north in the Pilbara. Food sources for the Greater Bilby include, but are not limited to, grass, sedge seeds, ants, fungi, termites, beetles, insect larva and spiders (Dziminski and Carpenter 2017, Southgate *et al.* 2018).



5.6.2 Studies and sampling effort

Six contemporary surveys have targeted the Greater Bilby (Table 4-1), as well as numerous historical surveys (Appendix 1). Survey coverage for Greater Bilby is shown in Figure 5-20. Sampling methods for Greater Bilby within the Activity Area and 500 m buffer include habitat assessments, targeted Bilby plots and targeted transects (Biologic, 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025; Figure 5-20).

5.6.3 Local habitat

Critical habitat for the Greater Bilby does not occur in the Activity Area with only marginal supporting habitat occurring in Sand Plain, Drainage Area/Floodplain, and Major, Medium and Minor Drainage Line habitats where patches of sandy substrate occur as shown in Table 5-17 and Figure 5-20. Areas of marginal supporting habitat were isolated, relatively small and lacked connectivity to other areas of suitable habitat (Biologic 2023a, 2025a).

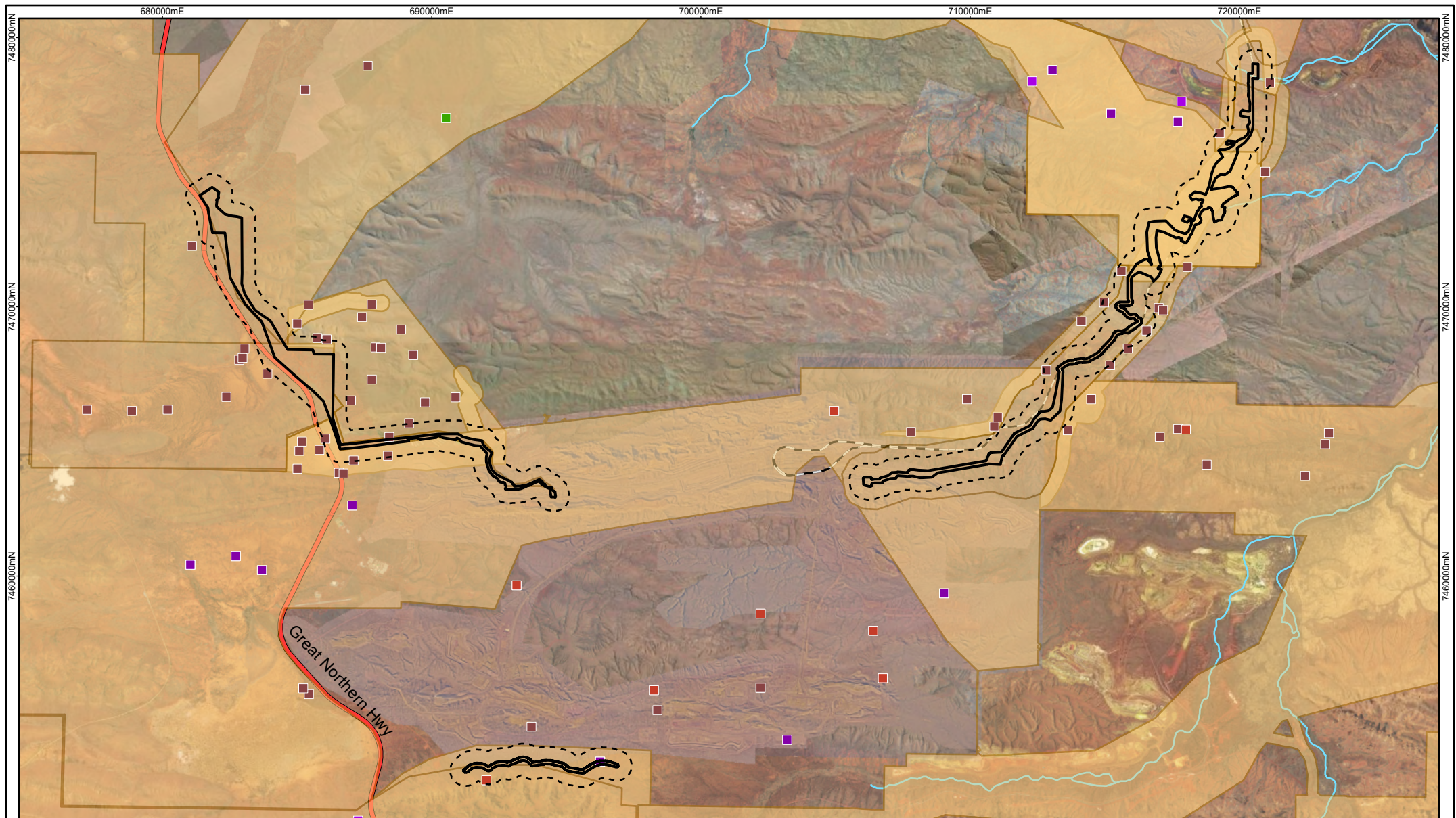
In total, there is approximately 407.2 ha of marginal supporting habitat within the Activity Area, and 1,290.1 ha of marginal supporting habitat within the 500 m buffer (Table 5-17).

Table 5-17: Greater Bilby habitat

Habitat Type	Extent within Activity Area to be cleared (ha)	Extent within the 500 m Buffer (ha)
Supporting habitat		
Sand Plain	1.7	15.7
Drainage Area/Floodplain	356.5	860.2
Major Drainage Line	10.1	62.6
Medium Drainage Line	0	4.3
Minor Drainage Line	38.9	347.3
Total supporting habitat	407.2	1,290.1

5.6.4 Greater Bilby records

There is no direct or indirect evidence of Greater Bilby individuals or populations within the Activity Area or within a 500 m buffer (Biologic, 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025). There are 18 records of the species within 50 km of the Study Area, with the closest (and most accurate) records occurring approximately 20 km north east at Marillana, and 38 km east of the Activity Area within the Fortescue Valley (Figure 5-21). Other historical records do exist, approximately 30-40 km to the south west and south east but were recorded in 1983-1984 (see Biologic 2023a). The species has not been recorded in these areas since. Given the lack of records and lack of critical habitat to support the species, it is considered unlikely that the Greater Bilby occurs within the Activity Area.



- Activity Area
- Activity Area 500m Buffer
- Vertebrate Fauna Survey Coverage
- Rail Centrelines
- Watercourse
- Great Northern Highway

- Sample Method**
- Bilby Plot
 - Hair Trap
 - Nocturnal Search
 - Targeted Search



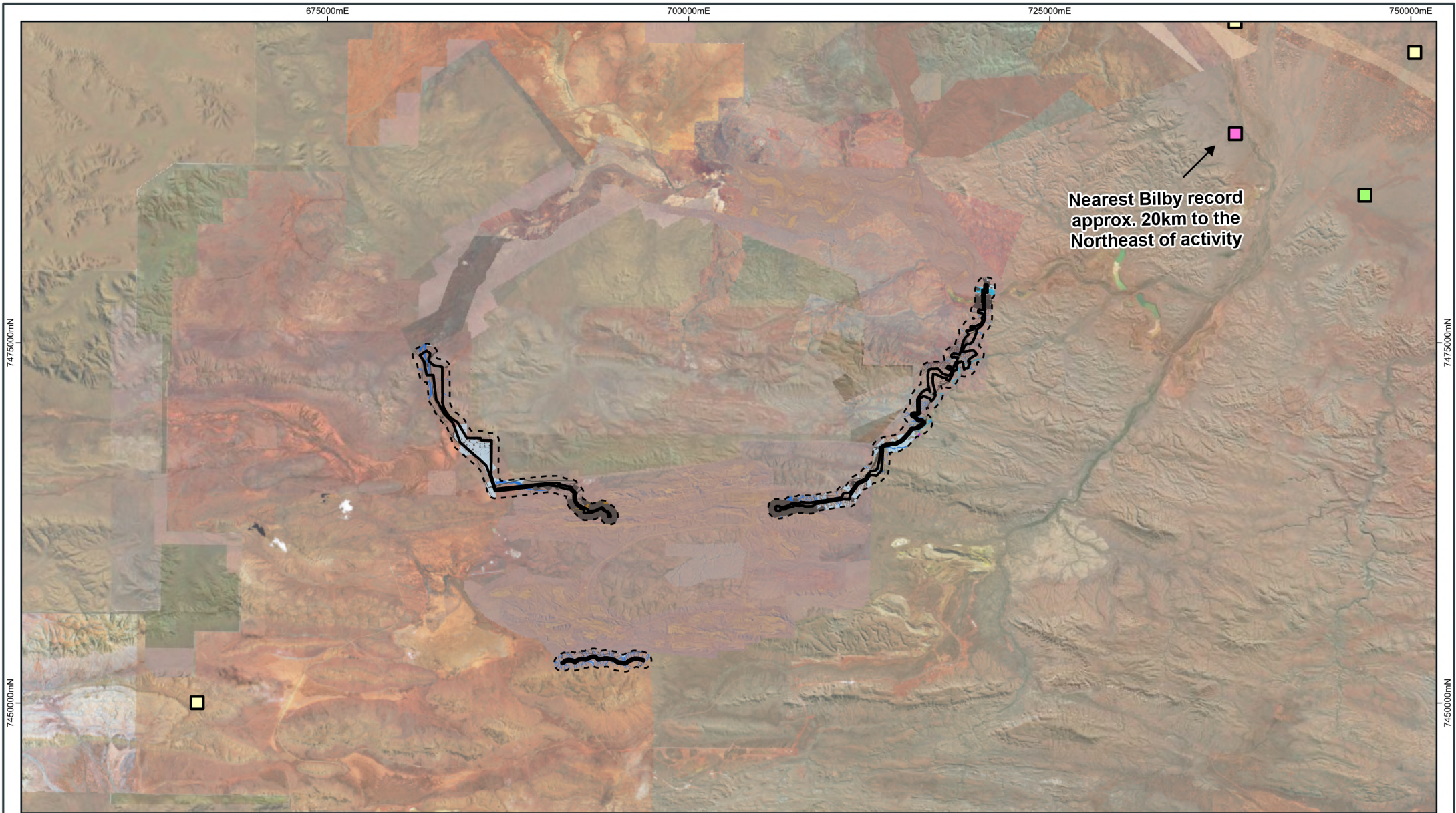
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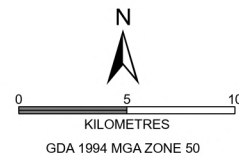
BILBY SURVEY AREAS AND METHODS CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4:	1:190,000	PREPARED:	GEOMATICS	FIGURE:	5-20
DATE:	18/06/2026	REQUESTOR:	ENV APPROVALS	NO:	A1440_022 RevE
		REVIEWED:			



- Activity Area
 - Activity Area 500m Buffer
 - Cleared Area
 - Bilby Record**
 - Burrow (active)
 - Digging
 - Unknown (DBCA data)
- Supporting Habitat**
- Drainage Area/ Floodplain
 - Major Drainage Line
 - Medium Drainage Line
 - Minor Drainage Line
 - Sand Plain



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BILBY HABITAT CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3: 1:350,000	REQUESTOR: ENVIRONMENT	FIGURE: 5-21	
DATE: 1/09/2026	PREPARED: GEOMATICS	NO: A1440-023 RevF	
	REVIEWED:		

5.6.5 Impact assessment

The potential direct and indirect impacts to the Greater Bilby from the Activity (see Section 2) are considered below.

Habitat loss and fragmentation

The Activity will result in the direct loss of up to 407.2ha of marginal Greater Bilby supporting habitat (Sand Plain, Drainage Area/Floodplain, Major and Minor Drainage Lines). Given the lack of records of Greater Bilby within the Activity Area or within a 500 m buffer of the Activity Area, the proposed disturbance is not predicted to have residual impact on the species.

The GCOSA diversion structure may result in some minor fragmentation of habitat but is unlikely to create a barrier to movement given that it flanks a large OSA in an area surrounded by existing disturbances (Figure 2-5). Some supporting habitat for the Bilby will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in the surrounding area (noting that the species is not known to occur in this area).

Potential impacts to Bilby habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to fragment habitat and create a barrier to movement; however, habitat connectivity and dispersal pathways will be maintained as the pipelines will be buried at waterway crossings and areas of sheet flow and fauna underpasses (i.e. areas where the pipeline will be raised off the ground) will be installed in areas of critical and/or supporting habitat (see Section 2.1.4).

Habitat degradation from alteration of groundwater

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats which are not considered critical or supporting habitat for Greater Bilby.

Increase in Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following components have the potential to impact terrestrial fauna habitats:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases, and groundwater levels decrease.). Supporting Greater Bilby habitats present within the 10-20 mbgl mounding contours at Northern RAV include Drainage Area/Floodplain (Table 5-18). There is no critical Greater Bilby habitat present.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions.

The degradation or loss of these trees could subsequently result in the degradation or loss of up to 30.5 ha of supporting Greater Bilby habitat.

Table 5-18: Supporting habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Drainage Area/Floodplain	30.5
Total Supporting Habitat	30.5

The groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Greater Bilby within Yandicoogina Gorge but should prevent any further decline in the permanent pools or vegetation health or condition which will allow for the continued persistence of these values within the Gorge. There is limited suitable habitat for the Greater Bilby in this Area.

Habitat degradation from alteration of surface water

The Activity involves surplus water discharge along creeklines as part of the water management strategy. This has the potential to alter surface water regimes via changes to water quality, quantity, flow rates, and/or physical or biological attributes. The construction of pipelines and diversion infrastructure for the Activity also have the potential to interfere with the natural sheetflow of water and increase erosion and sedimentation. These impacts have the potential to result in modification, degradation or even loss of Greater Bilby supporting habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway. No potential Greater Bilby habitat is likely to be impacted as the extent of Drainage Area/Floodplain habitat is beyond the low-flow creek channel.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Discharges have created a short section of permanent flow which has resulted in changes to the composition of riparian vegetation. There is no habitat for the Greater Bilby located along this stretch of Marillana Creek and impacts are considered unlikely.

Construction of pipelines and GCOSA diversion structure

The GCOSA is unlikely to cause impacts to fauna habitat due to the small reduction in catchment area.

The diversion structure is unlikely to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated fauna habitats.

Pipelines are proposed to be buried at waterway crossing to not impede natural waterways.

The GCOSA diversion structure will consist of an open drain with earthen batters that would not be expected to represent an entrapment risk for Greater Bilbies or create a barrier to movement, especially given that the species is not known to occur within this area and the diversion structure flanks an existing OSA (Figure 2-5). The proposed

drain design avoids vertical walls and incorporates rough earthen/rock-lined surfaces to facilitate fauna egress and reduce the likelihood of fauna becoming trapped.

The GCOSA diversion structure is unlikely to cause impacts to Greater Bilby habitat due to the small reduction in catchment areas (i.e. <0.1%). It is not expected to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated fauna habitats.

Potential impacts to Greater Bilby habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to create a barrier to movement for fauna, including the Greater Bilby. However, the pipelines are proposed to be buried at waterway crossings and areas of sheet flow to not impede natural waterways and fauna underpasses (i.e. areas where the pipeline will be raised above off the ground) will be installed to allow passage of fauna in areas of critical habitats to allow dispersal of fauna (see Section 2.1.4). The application of weed management procedures is expected to mitigate the spread of weeds associated with pipeline or GCOSA infrastructure and will minimise risks to Greater Bilby habitat.

Overall, potential impacts from the installation of pipelines to the Greater Bilby are expected to be low.

Habitat modification, fire, weeds and dust

Fire and weed encroachment have the potential to degrade Greater Bilby habitat, which can result in population decline (Bradley et al. 2015). Hot work activities onsite, vegetation clearing, and the introduction and increased vehicle movements may increase the risk of fire and spread of weeds, which may result in the degradation of Greater Bilby supporting habitat (Drainage Area/Floodplain) within the Activity Area.

Given the lack of records within the Activity Area and the 500 m buffer, and the distance to the nearest records of the species, the potential risk of impact to Greater Bilby from habitat degradation associated with the proposed Activity is considered to be very low and unlikely to result in residual impacts to Greater Bilby from fire and weeds. The Activity will be conducted in adherence to standard BHP fire management and weed control practices which will serve to minimise risk associated with the potential introduction of weeds and risk of fire.

Vegetation clearing and vehicle movements have the potential to result in an increase of airborne particulate matter. Increased levels of dust have the potential to impact vegetation health and therefore fauna habitats. Airborne particulates in the Activity Area are expected to increase temporarily during construction over a 6-month period but will not create a long-term change to dust levels in the area. However, given the absence of Greater Bilby records in the Activity Area and the 500 m buffer, the potential risk of impact to the species from potential increased dust is considered to be very low.

Introduced Species

Vegetation clearing, pipeline construction and surface water discharge associated with the Activity, all have the potential to introduce feral fauna species. Introduced species can alter the condition of Greater Bilby habitats through changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity. Feral predators such as feral cats and foxes may prey on the Greater Bilby (TSSC 2016b). Habitat clearing can enhance the ability of feral predators to move through the landscape which can increase the potential for predation on native fauna. The displacement of fauna into adjacent territories inhabited by other individuals can result in increased predation and competition for food resources, shelter and breeding sites until equilibrium in the surrounding areas is reached.

The Activity Area forms a part of the focus area for the Broadscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026). Based on this, as well as foxes not being known to occur within the general area, risks associated with increased feral predators on the

Bilby are expected to be low. Surface water discharge and increased vehicle movements have the potential to spread weeds or assist in the rate of spread of the cane toad. Cane toads are a major threat to bilbies which may feed on them, whilst weeds can degrade habitat and increase fire frequency or intensity. However, the risk of spreading or introducing cane toads is considered to be low whilst the application of weed management procedures is expected to mitigate the spread of weeds to minimise risks to changes to habitat composition.

Feral fauna currently known from the area include feral cats, dogs (*C. familiaris*), cattle (*B. taurus*), and the European rabbit (*O. cuniculus*) (Biologic 2023a). Overall, potential risks to bilbies from introduced species are considered to be low.

Injury or mortality of fauna from vehicle strike

Interaction of fauna with vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality to fauna individuals. Greater Bilby are susceptible to mortality from vehicle strikes (Bradley et al 2015). There are no records of the Greater Bilby in the Activity Area, and the species is unlikely to occur. As such, residual impacts associated with vehicle strike are considered unlikely to occur.

5.6.6 Summary

The Greater Bilby Notifiable Action triggers are not applicable as there are no records of Greater Bilby within the Activity Area or within the 500 m buffer of the Activity Area. The Activity is not predicted to result in residual impacts to Greater Bilby through either direct or indirect impacts to Greater Bilby supporting habitat. No critical habitat will be impacted.

5.7 Grey Falcon

The following sections provide background information to demonstrate that Notifiable Action Triggers for Grey Falcon are not met. Impacts to the Grey Falcon are discussed to illustrate that the Program Matter Objective (as described below) for this species will be met.

Program Matter Objective: “To support the long-term persistence and viability of the Grey Falcon within the SAA.”

5.7.1 General Species information

The Grey Falcon occurs at low densities in arid and semi-arid regions of Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia (Marchant and Higgins 1993 as cited in TSSC 2020). The species is typically confined to the arid and semi-arid zones where annual rainfall is less than 500 millimetres (mm) (Schoenjahn 2018 as cited in TSSC 2020). The species frequents timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined water courses (Garnett *et al.* 2011; Watson 2011; Schoenjahn 2013, 2018; Janse *et al.* 2015; Ley and Tynan 2016 as cited in TSSC 2020). The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland (Olsen and Olsen 1986; Schoenjahn 2018 as cited in TSSC 2020). Eggs are laid in the old nests of other birds, usually in the tallest trees along watercourses or in telecommunication towers (Marchant and Higgins 1993; Schoenjahn 2013, Schoenjahn 2018, Falkenberg 2011 as cited in TSSC 2020) or other similar artificial structures. River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*) are favoured nesting trees.

5.7.2 Studies and sampling effort

Six contemporary surveys have targeted the Grey Falcon within the Activity Area (Table 4-1; Figure 5-23), as well as numerous contemporary and historical surveys in the wider area (Appendix 1). Survey coverage and sampling effort for the Grey Falcon is shown in Figure 5-23. Sampling methods for Grey Falcon within the Activity Area and 500 m buffer include habitat assessments (including water feature assessments), bird census surveys, targeted transects

and opportunistic observations taken throughout each survey (Biologic 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025; Figure 5-23).

5.7.3 Local habitat

The Activity Area is within the current distribution of the Grey Falcon where species habitat is likely to occur (Figure 5-22). Critical and supporting habitat for the Grey Falcon is shown on Figure 5-24 and described below.

Critical habitat

There is 366.6 ha of critical Grey Falcon habitat in the Activity Area (Table 5-19 and Figure 5-24). Critical habitat is comprised of Major Drainage Line and Medium Drainage Line habitats where suitable tall trees for nesting are present, however, no evidence of nests was recorded (Biologic 2023a, 2025a).

Supporting habitat

There is 661.4 h of supporting Grey Falcon habitat in the Activity Area (Table 5-19 and Figure 5-23). The Stony Plain, Hillcrest/Hillslope, Drainage Area/Floodplain, Artificial Wetland and Minor Drainage Line may provide supporting habitat for foraging and dispersal of the species as the Grey Falcon is likely to only occur transiently within the Activity Area (Biologic 2025a).

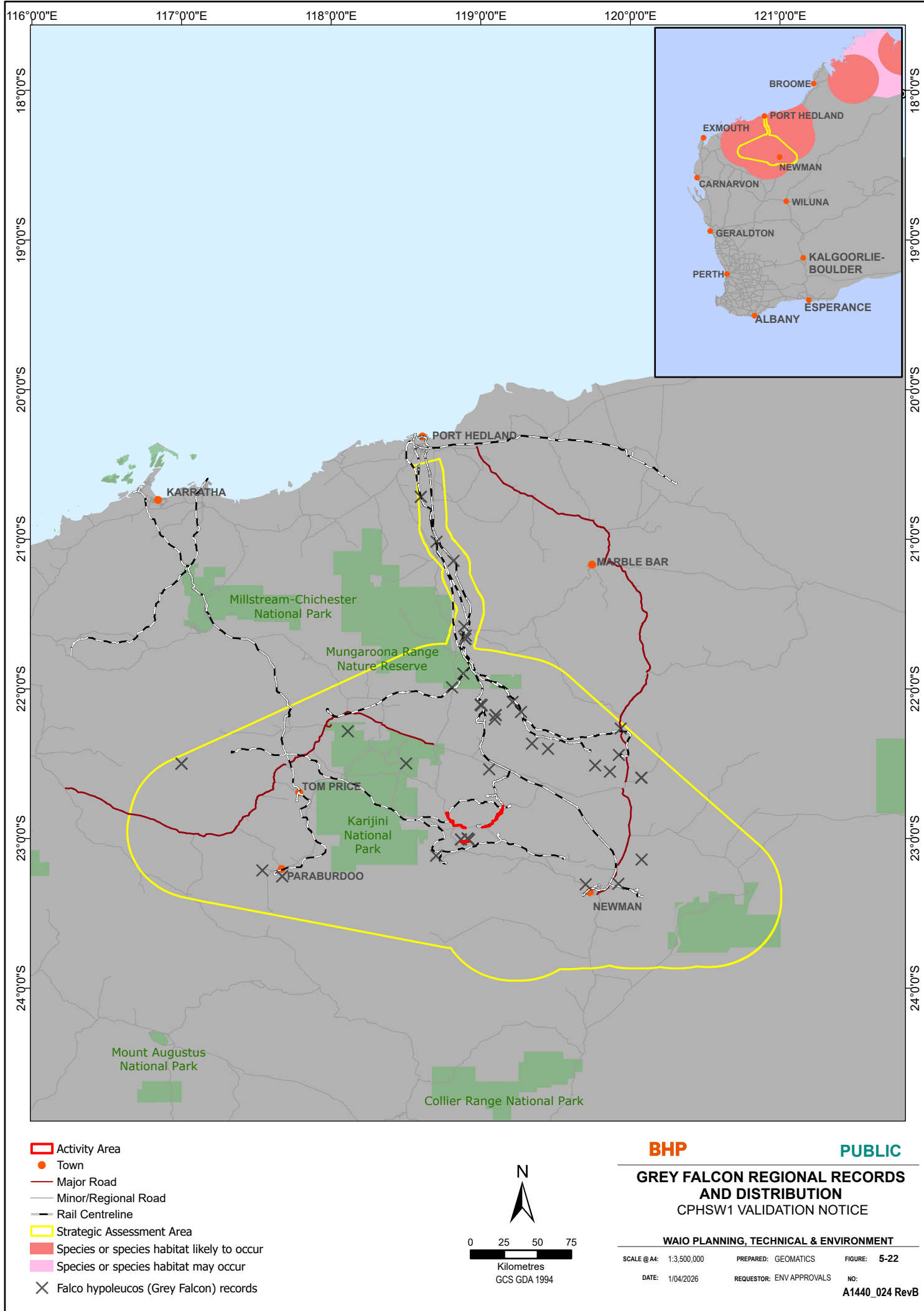
Table 5-19: Grey Falcon habitat

Habitat Type	Extent within Activity Area to be cleared (ha)	Extent within 500 m Buffer of Activity Area
Critical habitat		
Major Drainage Line	10.1	62.6
Medium Drainage Line	0	4.3
Drainage Area/Floodplain	356.5	860.2
Total critical habitat	366.6	927.1
Supporting habitat		
Stony Plain	387.2	2208.3
Hillcrest/Hillslope	234.3	1770.4
Minor Drainage Line	38.9	347.3
Artificial Wetland	1.0	0
Total supporting habitat	661.4	4326.0

5.7.4 Grey Falcon records

There is no direct or indirect evidence of Grey Falcon individuals or populations within the Activity Area or within a 500 m buffer. There are four records of Grey Falcon within 10 km of the Activity Area, including three records within the MACSF Validation Notice Activity Area, located approximately 2 km north of the GCOSA diversion structure, and one approximately 8 km west of the northwest scheme (Figure 5-24).

Given the lack of records, it is considered unlikely that the Grey Falcon is reliant on habitat in the Activity Area for long-term survival on a local or regional scale.





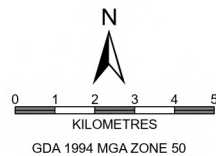
- Activity Area
- Activity Area 500m Buffer
- Terrestrial Vertebrate Fauna Surveys
- Cleared Area
- Transect

Grey Falcon Sample Method

- Habitat Assessment
- Targeted Search

Habitat Type

- Artificial Wetland
- Drainage Area/ Floodplain
- Hillcrest/ Hillslope
- Major Drainage Line
- Medium Drainage Line
- Minor Drainage Line
- Stony Plain
- Undulating Low Hills



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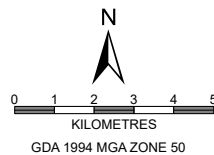
**GREY FALCON SURVEY
AREAS AND METHODS
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:190,000	REQUESTOR:	ENVIRONMENT	FIGURE:	5-23
DATE:	8/09/2026	PREPARED:	GEOMATICS	NO:	A1440-025 RevD
		REVIEWED:			



- Activity Area
- Activity Area 500m Buffer
- Grey Falcon
- Habitat Type**
- Cleared/ Disturbed
- Breakaway/ Cliff
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Wetland



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**GREY FALCON
HABITAT AND RECORDS
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

SCALE @ A3:	1:190,000	REQUESTOR: ENVIRONMENT	FIGURE: 5-24
DATE:	24/06/2026	PREPARED: GEOMATICS	
		REVIEWED:	NO: A1440-026 RevB

5.7.5 Impact assessment

The potential direct and indirect impacts to the Grey Falcon from the Activity are considered below.

Habitat loss and fragmentation

The Activity would result in the direct loss of up to 366.6 ha of critical habitat and 661.4 ha of supporting habitat as detailed in Table 5-19.

The nearest records of Grey Falcon are approximately 2 km from the GCOSA diversion structure, with another record approximately 8 km west of the northwest scheme (Figure 5-24). There are no records of Grey Falcon within the Activity Area or within a 500 m buffer of the Activity Area. As such, the proposed disturbance is not predicted to have residual impact on the species.

There will be no loss of surface water features located within either the Activity Area or 500 m buffer. Water features within the Activity Area will have an exclusion zone placed around them where no clearing will be permitted. Clearing outside the Activity Area (i.e. within the 500 m buffer) will also be prohibited. Indirect impacts to water features are discussed in the sections below.

The GCOSA diversion structure may result in some minor fragmentation of habitat but is unlikely to create a barrier to movement given that it flanks a large OSA in an area surrounded by existing disturbances (Figure 2-5). Critical and supporting habitat for the Grey Falcon will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in the surrounding area.

Potential impacts to Grey Falcon habitats associated with the construction of the pipelines will be temporary and localised. The pipelines will be installed in areas where existing tracks and rail lines exist as far as practicable. The proposed pipelines are above-ground structures that have the potential to fragment habitat but are unlikely to create a barrier to movement for the Grey Falcon. Habitat connectivity and dispersal pathways will be maintained as the pipelines will be buried at waterway crossings and areas of sheet flow.

Habitat degradation from alteration of groundwater

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats which represent critical and supporting habitat for the Grey Falcon. In addition, Weeli Wolli Springs (a permanent groundwater-fed spring) and its associated permanent and semi-permanent pools also occur within the predicted groundwater drawdown contours of the Activity (Figure 2-7). Weeli Wolli Spring and the area of Weeli Wolli Creek in the vicinity of the spring, are cumulatively impacted by the surrounding mining operations, including MACSF and RTIO Hope Downs. RTIO are currently mitigating impacts from their Hope Downs operation to Weeli Wolli Spring and the creek. Cumulative groundwater drawdown modelling predicts that up until 2045, a decline in groundwater levels of approximately 2.4-5.6 m could occur, without mitigation, at Weeli Wolli Spring as a result of drawdown associated with the MACSF and RTIO Hope Downs. These groundwater levels are currently mitigated through creek discharge at Hope Downs. Once RTIO closes Hope Downs, BHP will take over mitigation as described in Section 2.2.2. Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community (and the associated Grey Falcon habitat) attributable to the Activity.

Increase in Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following components have the potential to impact terrestrial fauna habitats:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases, and groundwater levels decrease.). Critical Grey Falcon habitats present within the 10-20 mbgl mounding contours at Northern RAV include Drainage Area/Floodplain and Medium Drainage Line (Table 5-20). There is no supporting Grey Falcon habitat present.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions. The degradation or loss of these trees could subsequently result in the degradation or loss of up to 66.3 ha of critical Grey Falcon habitat.

Table 5-20: Critical habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Drainage Area/Floodplain	30.5
Medium Drainage Line	35.8
Total Supporting Habitat	66.3

The groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Grey Falcon within Yandicoogina Gorge but should prevent any further decline in the permanent pools or vegetation health or condition which will allow for the continued persistence of these values within the Gorge.

As described in Section 2.2.2, there is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water will be monitored for any potential changes consistent with the EP Act Part V Operating Licence for the MACSF Mining Operations which may impact the water quality in the Gorge.

Habitat degradation from alteration of surface water

The Activity involves surplus water discharge along creeklines as part of the water management strategy. This has the potential to alter surface water regimes via changes to water quality, quantity, flow rates, and/or physical or biological attributes. The construction of pipelines and diversion infrastructure for the Activity also have the potential to interfere with the natural sheetflow of water and increase erosion and sedimentation. These impacts have the

potential to result in modification, degradation or even loss of Grey Falcon habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation (and the associated Grey Falcon habitats) through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway.

The scheme will be operational for a 5-year period from commissioning and will observe a 90-day drying period annually commensurate with the Pilbara dry season.

The implementation of the CPWRMP (BHP 2025c) will ensure compliance with the wetting front triggers and thresholds, drying period and monitor vegetation to avoid changes. A temporary change to the hydrological regime of Upper Marillana Creek in addition with proposed mitigation measures is unlikely to cause impact to Grey Falcon habitat.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Additional surplus water disposed at this location is unlikely to cause any impacts in this area due to its history of creek discharge use.

Construction of pipelines and GCOSA diversion structure

The GCOSA is unlikely to cause impacts to fauna habitat due to the small reduction in catchment area.

The diversion structure is unlikely to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated fauna habitats.

Pipelines are proposed to be buried at waterway crossing to not impede natural waterways.

Habitat modification, fire, weeds and dust

Fire and weed encroachment have the potential to degrade Grey Falcon habitat, which can result in population decline (Bradley et al. 2015). Hot work activities onsite, vegetation clearing, and the introduction and increased vehicle movements may increase the risk of fire and spread of weeds, which may result in the degradation of Grey Falcon habitat within the Activity Area.

The Activity will be conducted in adherence to standard BHP fire management and weed control practices which will serve to minimise risk associated with the potential introduction of weeds and risk of fire.

Vegetation clearing and vehicle movements have the potential to result in an increase of airborne particulate matter. Increased levels of dust have the potential to impact vegetation health and therefore fauna habitats. Airborne particulates in the Activity Area are expected to increase temporarily during construction over a 6-month period but will not create a long-term change to dust levels in the area. Standard management practices to minimise dust will be implemented and assist in minimising potential impacts to Grey Falcon habitat.

Given the lack of records within the Activity Area and the 500 m buffer, and the proposed mitigation measures to manage impacts from fire, weeds and dust, residual impacts to Grey Falcon are considered unlikely.

Introduced species

Predation by feral cats is considered to be a very high risk to the Grey Falcon as the species is known to roost on bare ground, and Grey Falcon remains have been documented in the gut contents of cats (TSSC 2020). Chicks may be vulnerable to cat predation at accessible nests. Introduced species can also alter the condition of Grey Falcon

habitats through changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity.

Vegetation clearing, pipeline construction and surface water discharge associated with the Activity, all have the potential to introduce feral fauna or weed species..

The application of weed management procedures can mitigate the spread of weeds to minimise risks to changes to habitat composition, whilst the Browserscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026) will assist in managing impacts associated with feral cats.

Feral fauna currently known from the area include feral cats, dogs (**C. familiaris*), cattle (**B. taurus*), and the European rabbit (**O. cuniculus*) (Biologic 2023a). The Activity is not predicted to result in an increase in these species, and is unlikely to increase the risk of spread of the cane toad.

5.7.6 Summary

The Notifiable Action Triggers for the Grey Falcon are not applicable as no records exist within the Activity Area or within the 500 m buffer of the Activity Area boundary. The Activity is not predicted to result in residual impacts to the Grey Falcon through either direct or indirect impacts to Great Falcon critical and supporting habitat.

5.8 Night Parrot

The following sections provide background information to demonstrate that Notifiable Action Triggers for Night Parrot are not met. Impacts to the Night Parrot are discussed to illustrate that the Program Matter Objective (as described below) for this species will be met.

Program Matter Objective: *“To support the long-term persistence and viability of the Night Parrot within the SAA.”*

5.8.1 General species information

The Night Parrot is listed as Endangered under the EPBC Act. The Night Parrot has long been considered one of Australia’s most mysterious birds. The species was presumed extinct until 2013, when, after more than a century since the last widely accepted sighting of a live individual, a population was discovered in south-west Queensland. Since then, the species has been recorded from isolated populations in south-west Queensland and northern inland Western Australia (TSSC 2016d).

Within the SAA, there are two known records of the Night Parrot: one from 1967 located in the far south-western portion of the SAA (DBCA) and another from 2005 from Minga Well in the northern portion of the SAA, approximately 2.5 km north of the Fortescue Marsh (Birdlife). Due to confidentiality constraints, the location of any additional records within the SAA boundary are not accessible via external databases.

The Night Parrot requires access to reliable food sources, shelter for breeding, protection from predators and the elements, and access to either free water or water-rich plant foods (Burbidge 2020). The spatial configuration requirements of Night Parrot habitat features have become increasingly evident through recent records of the species by Paruku Rangers, Birriliburu Rangers and others (Davis and Metcalfe 2008; Jakkett *et al.* 2017; Murphy *et al.* 2017; Michelmores and Birch 2020 as cited in Burbidge 2020). The records indicate that suitable habitat typically comprises productive feeding habitat (such as ephemeral grasslands, herb-fields or samphire, gilgais, run-on areas, flood plains, or salt lake systems) interspersed with old-growth, dense hummock-forming spinifex used for roosting/nesting. These spinifex patches are often fire-isolated by features such as ironstone, rocky bars, salt lakes or samphire flats, and are located within 50 km of free water (Burbidge 2020). The species also appears to depend on long-unburnt vegetation for roosting and nesting (TSSC 2016d).

The distribution of the Night Parrot is very poorly understood in Western Australia; however, the Activity Area occurs within the species' potential distribution (Figure 5-23). The nearest record of the Night Parrot is approximately 50 km to the north-east adjacent to the Cloudbreak Mine (Figure 5-25; Biologic 2023a).

5.8.2 Studies and sampling effort

At least five contemporary surveys have targeted the Night Parrot in the local area (Table 4-1; Appendix 1), as well as numerous historical surveys. Survey coverage for Night Parrot is shown in Figure 5-26. Sampling methods for Night Parrot include habitat assessments, targeted searches to determine the presence of suitably sized spinifex patches likely to be used by night parrot and targeted passive acoustic surveys using Autonomous Recording Units (ARU) placed in the most prospective habitats (Biologic 2025a, 2025b 2025c, 2023a; Biota 2022; Astron 2023, 2025; Figure 5-26). The ARUs took recordings 1-hour pre-sunset to 1-hour post-dawn and covered the frequency range 100 kHz to 21,000 kHz, which brackets the night parrot call frequency range of 1,500 kHz to 3,500 kHz.

5.8.3 Local habitat

The Activity Area is within the potential distribution of the Night Parrot where species habitat is likely to occur (Figure 5-25). Habitat within the Study Area was considered marginal for the species, as there are limited instances of *Triodia* grasslands that are considered suitable (i.e. large, long-unburnt hummocks) for the species, with areas of suitable habitat being small in size with no connectivity to other areas of suitable habitat. Critical and supporting habitat for the Night Parrot is described below.

Critical habitat

There is no critical habitat in the Activity Area or the 500 m buffer for the Night Parrot.

Supporting habitat

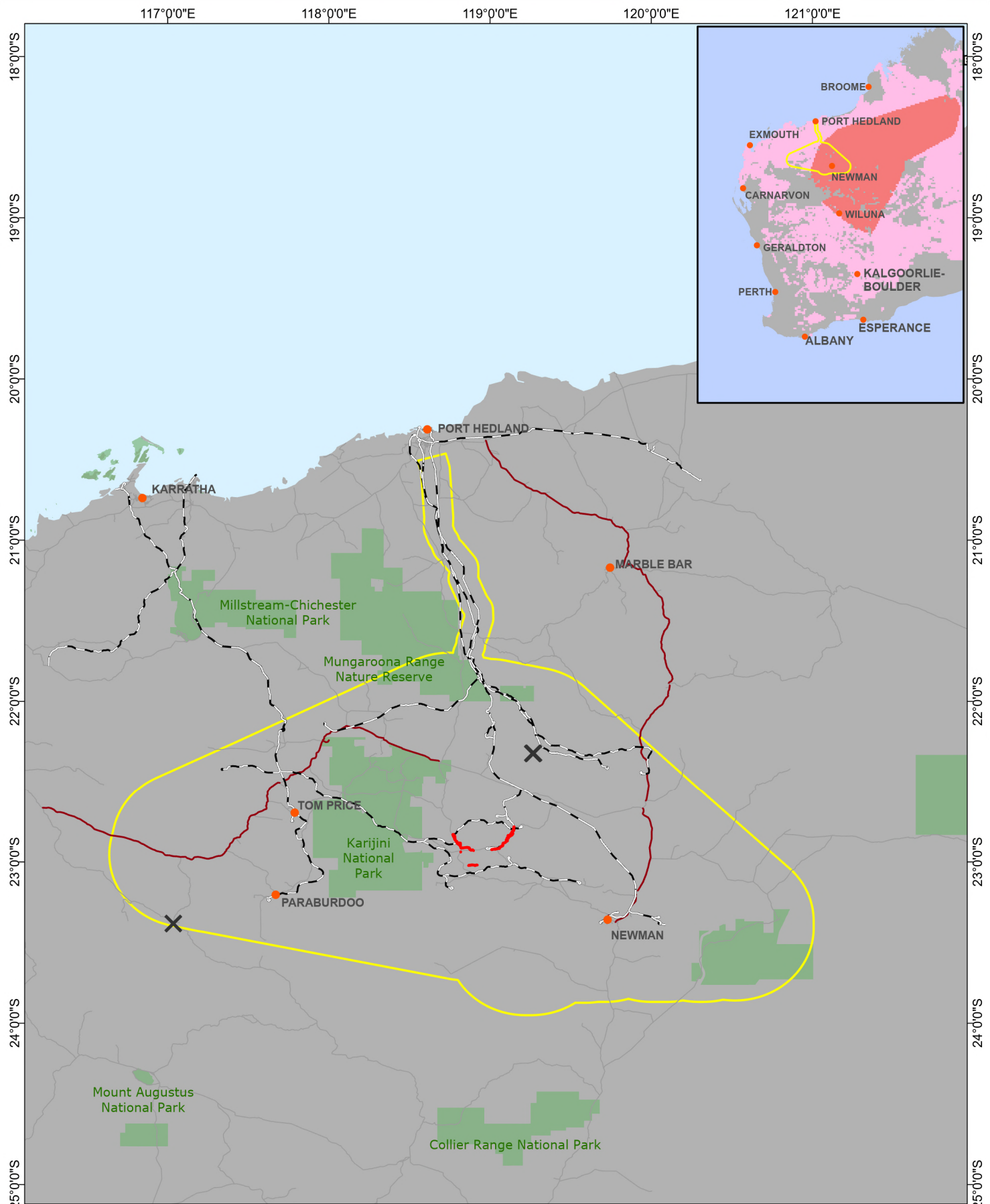
There is 743.7 ha of potential, but marginal, supporting Night Parrot habitat consisting of Stony Plain and Drainage Area/ Floodplain within the Activity Area, and a further 3068.5 ha of supporting (marginal) habitat in the 500m buffer (Table 5-21).

Table 5-21: Night Parrot habitat

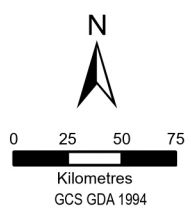
Habitat Type	Extent within Activity Area to be cleared (ha)	Extend within the 500 m Buffer (ha)
Supporting habitat		
Stony Plain	387.2	2208.3
Drainage Area/Floodplain	356.5	860.2
Total supporting habitat	743.7	3068.5

5.8.4 Night Parrot records

There is no direct or indirect evidence of Night Parrot individuals or populations within the Activity Area or within a 500 m buffer. The closest known regional records occur 50 km away at Cloudbreak Mine (Figure 5-25). Given the lack of records, it is considered unlikely that the Night Parrot is reliant on habitat in the Activity Area for long-term survival on a local or regional scale.



- Activity Area
- Town
- Major Roads
- Rail Centreline
- Strategic Assessment Area
- Species or species habitat likely to occur
- Species or species habitat may occur
- X Night Parrot Record



BHP
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**NIGHT PARROT REGIONAL
RECORDS AND DISTRIBUTION**

CPHSW1 VALIDATION NOTICE

WAIO PLANNING, TECHNICAL & ENVIRONMENT

SCALE @A4: 1:3,500,000

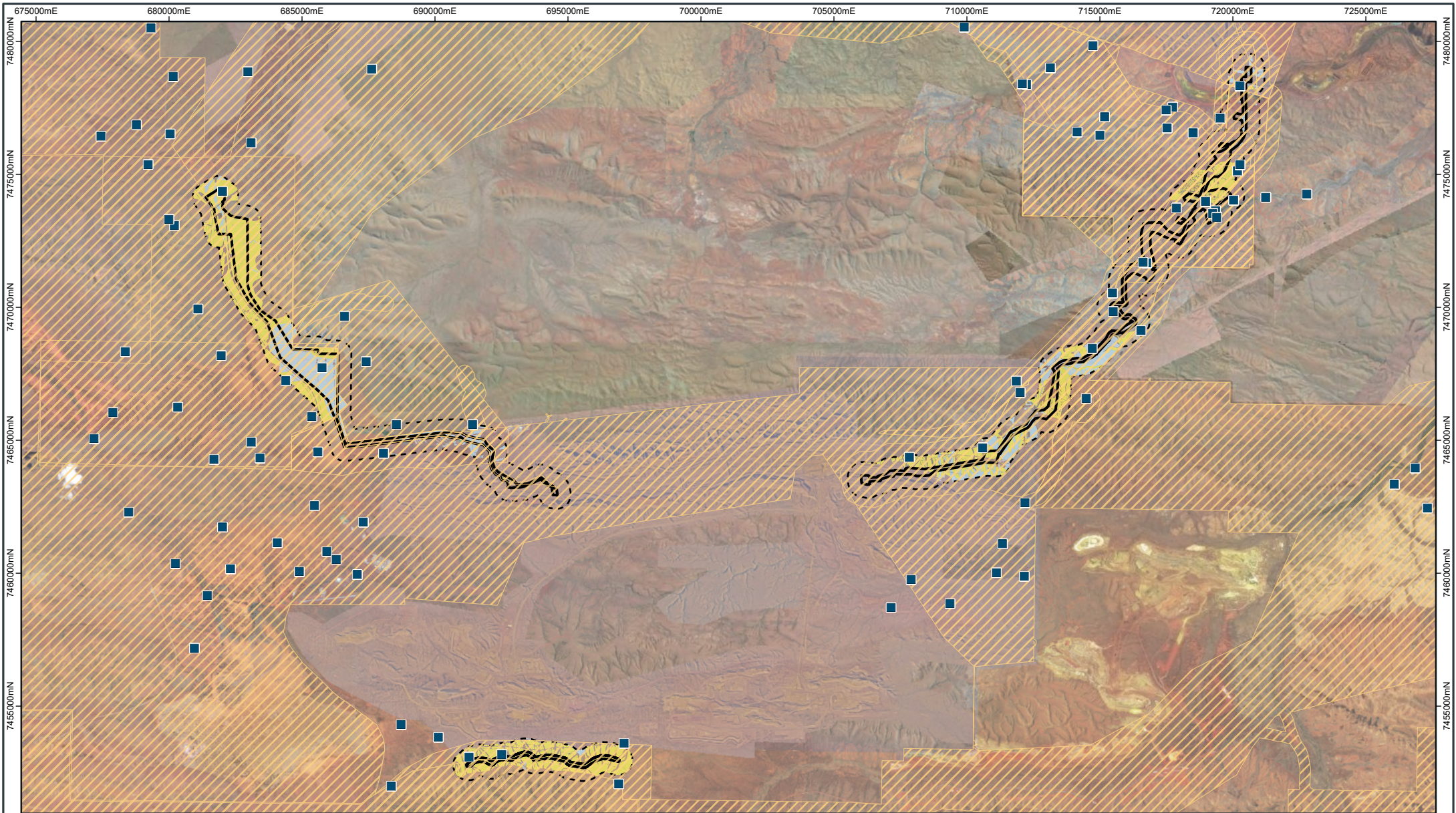
PREPARED: GEOMATICS

FIGURE: **5-25**

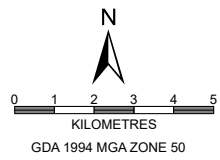
DATE: 1/04/2026

REQUESTOR: ENV APPROVALS

NO: **A1440_027 RevA**



- Activity Area
- Activity Area 500m Buffer
- Terrestrial Vertebrate Fauna Surveys
- Acoustic recorder
- Habitat Type**
- Drainage Area/ Floodplain
- Stony Plain



**NIGHT PARROT SURVEY
COVERAGE AND METHODS
CPHSW1 VALIDATION NOTICE**

WAIO PLANNING, TECHNICAL AND ENVIRONMENT

PUBLIC

SCALE @ A3: 1:190,000

DATE: 11/06/2026

REQUESTOR: ENVIRONMENT

PREPARED: GEOMATICS

REVIEWED:

FIGURE: **5-26**

NO: **A1440-028 RevB**

5.8.5 Impact assessment

The potential direct and indirect impacts to the Night Parrot from the Activity (see Section 2) are considered below.

Habitat loss and fragmentation

The Activity will not result in the loss of critical habitat for the Night Parrot within the Activity Area. Up to 743.7 ha of Night Parrot potential supporting habitat comprising of Stony Plain habitat will be directly impacted by the Activity. The GCOSA diversion structure and pipelines may result in some minor fragmentation of habitat; however, given the lack of records of Night Parrot within the Activity Area or within a 500 m buffer of the Activity Area, the proposed disturbance is not predicted to have a residual impact on the species.

Habitat degradation from alteration of groundwater

Decrease of Groundwater Levels from Dewatering Drawdown

A decrease in groundwater levels has the potential to impact water features connected to the groundwater table and degradation of groundwater dependent habitat. Areas of high likelihood groundwater dependent vegetation (presence of *Melaleuca argentea*) intersect the groundwater drawdown contours at two locations along Weeli Wolli Creek and Weeli Wolli Spring. These areas are associated with Major and Medium Drainage Line fauna habitats which do not provide critical or supporting habitat for the Night Parrot.

Increase in Groundwater Levels from Aquifer Injection

The Activity involves a water management strategy to manage surplus water including reinjection of dewatering surplus to aquifers. The impact on water quality of reinjection is not expected to have any impact on fauna habitat as described in Section 2.2.2.

The following components have the potential to impact terrestrial fauna habitats:

- Changes to groundwater regimes from groundwater mounding due to the Northern RAV MAR scheme and/or the Yandicoogina GDE Supplementation Scheme.

Mounding less than 20 mbgl has the potential to alter the extent or composition of vegetation (and associated fauna habitats) within these areas, either due to waterlogging and depriving roots of oxygen or from increasing water availability and therefore dependency, which can have negative consequences when the MAR scheme ceases, and groundwater levels decrease.). Potential supporting Night Parrot habitats present within the 10-20 mbgl mounding contours at Northern RAV includes Stony Plain (Table 5-22). There is no critical habitat present.

These habitat types contain, to varying degrees, scattered *Eucalyptus xerothermica* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees which have deep roots capable of accessing groundwater. These species may be positively impacted while mounding is occurring due to increased availability of water; however, once the mounding recedes, these trees could become water stressed and suffer negative impacts from the creation of drought-like conditions. The degradation or loss of these trees could subsequently result in the degradation or loss of up to 90 ha of supporting Night Parrot habitat.

Table 5-22: Critical habitat potentially impacted by mounding at Northern RAV

Habitat Type	Extent within Mounding Footprint Potentially Impacted (ha)
Stony Plain	90
Drainage Area/Floodplain	30.5
Total Supporting Habitat	120.5

The groundwater supplementation scheme is intended to increase and then maintain groundwater levels at Yandicoogina Gorge, to those observed in 2018. As a result, mounding is not anticipated to negatively impact Night Parrot habitat within Yandicoogina Gorge but should prevent any further decline in the permanent pools or vegetation health or condition which will allow for the continued persistence of these values within the Gorge.

Habitat degradation from alteration of surface water

The Activity involves surplus water discharge along creeklines as part of the water management strategy. This has the potential to alter surface water regimes via changes to water quality, quantity, flow rates, and/or physical or biological attributes. The construction of pipelines and diversion infrastructure for the Activity also have the potential to interfere with the natural sheetflow of water and increase erosion and sedimentation. These impacts have the potential to result in modification, degradation or even loss of Night Parrot habitat. There are no impacts anticipated from changes to surface water quality as discussed in Section 2.2.3.

Upper Marillana Creek Discharge

As described in Section 2.1, surplus water discharge into Upper Marillana Creek may cause indirect impacts to riparian vegetation through water logging and inundation, or from a change in vegetation composition due to an increase in weeds or riparian shrubs, sedges, grasses, and/or mulga vegetation along the discharge pathway. This area is not known as Night Parrot habitat and any impacts are unlikely to impact the species.

Lower Marillana Creek

Discharge to Lower Marillana Creek is currently approved and has been operating for approximately 15 years as part of the Yandi mine. Discharges have created a short section of permanent flow which has resulted in changes to the composition of riparian vegetation. This area is not known as Night Parrot habitat and any impacts are unlikely to impact the species.

Construction of pipelines and GCOSA diversion structure

The GCOSA diversion structure is unlikely to cause impacts to Night Parrot habitat due to the small reduction in catchment areas (i.e. <0.1%). It is not expected to significantly impede flows to creek lines and therefore is unlikely to impact areas of vegetation and associated Night Parrot habitat.

Pipelines are proposed to be buried at waterway crossing to not impede natural waterways.

Overall, impacts to surface water regimes as a result of construction of pipelines and the GCOSA diversion structure are expected to be minor. No residual impacts from altered surface water regimes to the Night Parrot are expected.

Habitat modification, fire, weeds and dust

Fire and weed encroachment have the potential to degrade Night Parrot habitat, which can result in population decline (Bradley et al. 2015). Hot work activities onsite, vegetation clearing, and the introduction and increased vehicle

movements may increase the risk of fire and spread of weeds, which may result in the degradation of Night Parrot habitat within the Activity Area.

Given the lack of records of Night Parrot within the Activity Area and the 500 m buffer, and the distance to the nearest records of the species, the potential risk of impact from habitat degradation associated with the proposed Activity is very low and unlikely to result in residual impacts from fire and weeds.

The Activity will be conducted in adherence to standard BHP fire management and weed control practices which will serve to minimise risk associated with the potential introduction of weeds and risk of fire.

Vegetation clearing and vehicle movements have the potential to result in an increase of airborne particulate matter. Increased levels of dust have the potential to impact vegetation health and therefore fauna habitats. Airborne particulates in the Activity Area are expected to increase temporarily during construction over a 6-month period but will not create a long-term change to dust levels in the area. However, given the absence of Night Parrot records in the Activity Area and the 500 m buffer, the potential risk of impact to the species from potential increased dust is considered to be very low.

Feral predators

The Night Parrot is vulnerable to predation by feral cats (TSSC 2016d). The Activity Area forms a part of the focus area for the Broadscale Feral Cat Control (aerial baiting) programme that is proposed by BHP in the Mining Area C-South Flank Offset Management Plan (BHP 2026). As such, potential impacts to Night Parrot from feral cats is expected to be low.

Introduced species can also alter the condition of Night Parrot habitats through changes in vegetation structure, health, and composition, changes in native fauna species composition, diversity or abundance, or result in increased fire frequency or intensity. However, the application of weed management procedures is expected to mitigate the spread of weeds to minimise risks to fauna habitat.

The implementation of the Activity is not expected to result in a residual impact to Night Parrot as no records exist and the nearest records are located greater than 50 km from the Activity Area.

5.8.6 Summary

The Notifiable Action Triggers for the Night Parrot are not applicable as no records exist within the Activity Area or within the 500 m buffer of the Activity Area boundary. The Activity is not predicted to result in residual impacts to the Night Parrot through either direct or indirect impacts to Night Parrot supporting habitat.

6 Compliance tracking and annual reporting

BHP will monitor compliance with this Validation Notice at an Activity scale to ensure that the Program Matter Objectives and Outcomes are being achieved. An Annual Environmental Report will be prepared to address all environmental obligations for each Notifiable Action under the SAA.

As a minimum, the following aspects relevant to this Validation Notice will be included in the Annual Environmental Report:

- status of implementation of the Notifiable Action (planned start date, action commenced and planned completion date; and action completed)
- offsets implemented for the Notifiable Action
- where applicable, accumulated disturbance against each PMO
- disturbance to critical and supporting fauna habitat for each of the Program Matter species that meet the Notifiable Actions Trigger criteria, from the date the Validation Notice becomes effective. Disturbance information will be reported in ha (to two decimal places) for the past financial year reporting period and provide a cumulative total disturbance for the Activity. Figures will be included to support disturbance data.
- monitoring, management and corrective actions implemented during the reporting period to avoid, mitigate and offset impacts to Program Matters
- attainment of PMOs and Outcomes
- summary of any exceedances of the PMO relevant to each Notifiable Action, including any corrective actions taken
- deviations from the Program or from information and management commitments contained in a Validation Notice for the Notifiable Action.

7 Offset proposal

7.1 Residual impacts

Following implementation of the mitigation hierarchy, BHP has determined that residual impacts requiring offset are associated with the following Program Matter values:

- Ghost Bat critical foraging habitat and supporting habitat.
- Northern Quoll critical habitat and supporting habitat.
- Pilbara Olive Python critical and supporting habitats.

Habitat types to be offset are illustrated in Figure 7-1.

7.2 Offset requirements

BHP has developed the following objectives for each of the relevant Program Matters based on *the Standards for Accreditation of Environmental Approvals under the Environment Protection and Biodiversity Conservation Act 1999* and in consultation with the DCCEEW (Section 3.1.1 of the Program):

- *‘To support the long-term persistence and viability of the Ghost Bat within the strategic assessment area’*
- *‘To support the long-term persistence and viability of the Northern Quoll within the strategic assessment area’*
- *‘To support the long-term persistence and viability of the Pilbara Olive Python within the strategic assessment area’.*

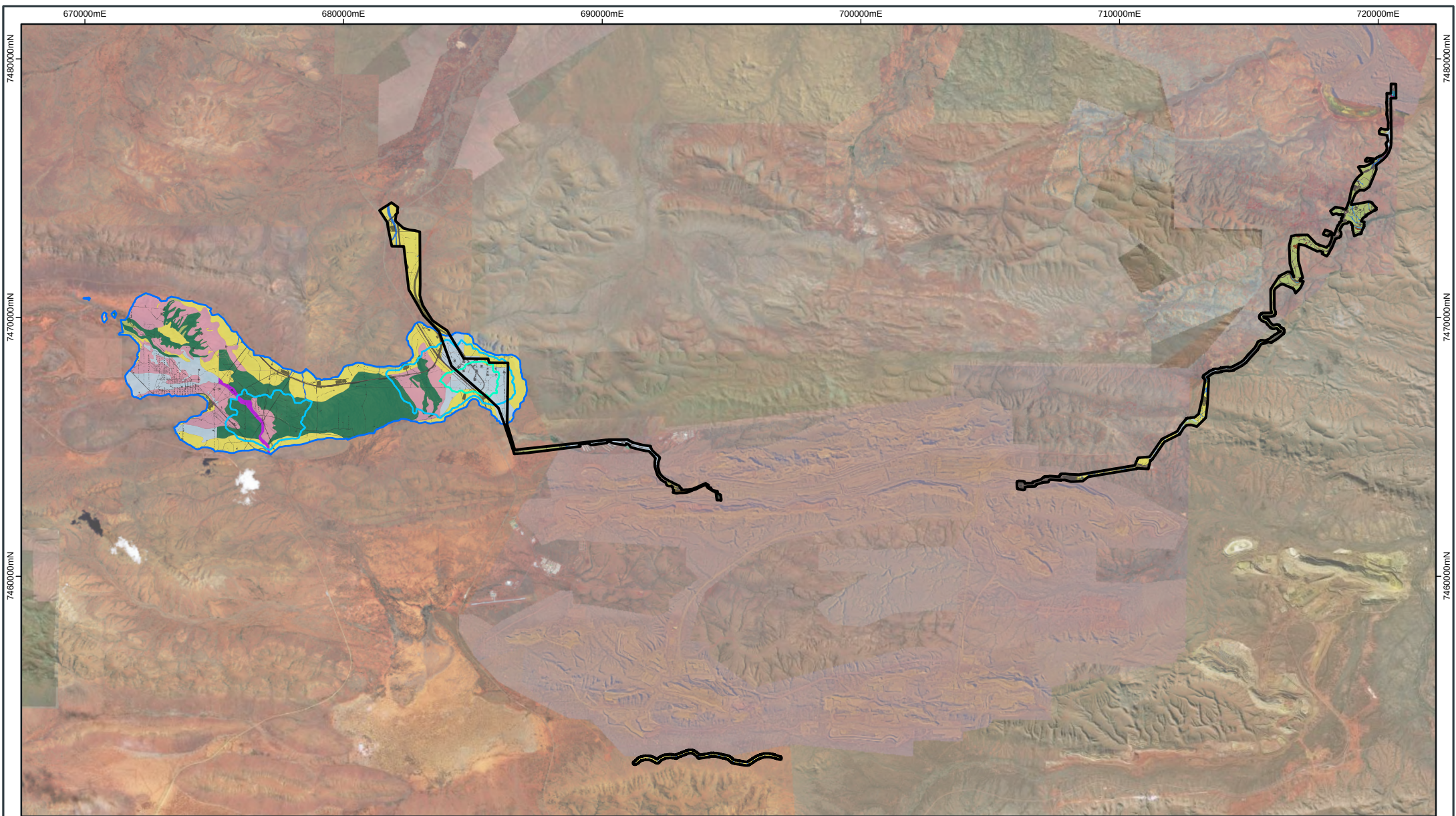
Offsets applied to residual impacts to the Program Matter values identified in Table 7-1, are required to achieve these Program Matter Objectives.

Table 7-1: Residual impacts to Program Matters requiring offset

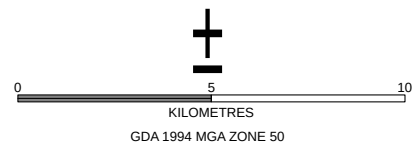
Residual Impact	Habitat types and extent to be offset (ha)	Total area to be offset (ha)	Habitat Rating	Current Offset Rate (\$ per ha) excluding GST (rate to be adjusted annually with CPI)	Total minimum estimated financial offset (\$) excluding GST
Ghost Bat					
Clearing of Critical Habitat	Gorge/Gully (15.0) Breakaway/Cliff (2.2) Major Drainage Line (10.1) Drainage Area/Floodplain (356.5) Stony Plain (387.2) Minor Drainage Line (38.9) Hillcrest/Hillslope (234.3)	1044.2	Critical	\$3,306	\$3,451,464.00
Degradation of habitat from changes to groundwater regimes (mounding)	Drainage Area/Floodplain (30.5) Medium Drainage Line (35.8) Mulga Woodland (4.1) Stony Plain (90.0)	160.4	Critical	\$3,306	\$530,282.40
Northern Quoll					
Clearing of Critical Habitat	Gorge/Gully (15.0) Major Drainage Line (10.1) Breakaway/Cliff (2.2)	27.3	Critical	\$3,306	\$90,253.80

Residual Impact	Habitat types and extent to be offset (ha)	Total area to be offset (ha)	Habitat Rating	Current Offset Rate (\$ per ha) excluding GST (rate to be adjusted annually with CPI)	Total minimum estimated financial offset (\$) excluding GST
Clearing of Supporting Habitat	Artificial Wetland (1.0) Hillcrest/Hillslope (234.3) Minor Drainage Line (38.9) Drainage Area/Floodplain (356.5)	630.7	Supporting	\$1,653	\$1,042,547.10
Degradation of habitat from changes to groundwater regimes (mounding)	Drainage Area/Floodplain (30.5) Medium Drainage Line (35.8)	66.3	Supporting	\$1,653	\$109,593.90
Pilbara Olive Python					
Clearing of Critical Habitat	Gorge/Gully (15.0) Major Drainage Line (10.1) Breakaway/Cliff (2.2) Artificial Wetland (1.0)	28.3	Critical	\$3,306	\$93,559.80
Clearing of Supporting Habitat	Minor Drainage Line (38.9)	38.9	Supporting	\$1,653	\$64,301.70
Degradation of habitat from changes to groundwater regimes (mounding)	Medium Drainage Line	35.8	Critical	\$3,306	\$118,354.80
Total Amount to be offset					\$5,500,357.50

Residual Impact	Habitat types and extent to be offset (ha)	Total area to be offset (ha)	Habitat Rating	Current Offset Rate (\$ per ha) excluding GST (rate to be adjusted annually with CPI)	Total minimum estimated financial offset (\$) excluding GST
Initial 10% advance payment					\$550,035.75



- | | | |
|--------------------------------------|---------------------------|----------------------|
| Activity Area | Habitat Type | Medium Drainage Line |
| Cleared Area | Artificial Wetland | Minor Drainage Line |
| Groundwater Mounding Contours | Breakaway/ Cliff | Mulga Woodland |
| 10 mbgl | Drainage Area/ Floodplain | Sand Plain |
| 20 mbgl | Gorge/ Gully | Stony Plain |
| 30 mbgl | Hardpan Plain | Undulating Low Hills |
| | Hillcrest/ Hillslope | |
| | Major Drainage Line | |



BHP **PUBLIC**

FAUNA HABITAT CLEARING OFFSET
CPHSW1 VALIDATION NOTICE

WAIO - PLANNING, TECHNICAL & ENVIRONMENT

SCALE @ A4:	1:195,358	REQUESTOR:	Env Approval	FIGURE:	7-1
DATE:	11/08/2026	PREPARED:	Geomatics	NO:	A1440-033 RevC

7.3 Proposed offset contributions

Typical offset methods available in the Pilbara that BHP may use include, financial, land management and research offsets. The DCCEE has agreed that financial contributions to the PEOF are an appropriate mechanism to address clearing of critical and supporting habitat. The loss of critical and supporting habitat (Table 7-1) is therefore proposed to be offset by a financial contribution to the PEOF (habitat types to be offset are shown in Figure 7-1).

The financial contribution will comprise of the following components:

- **Advance payment of 10%** of the estimated total offset contribution to be paid into the PEOF within one month of the Validation Notice becoming effective. This is to ensure timely commencement of offset obligations.
- **Biennial (every two years) payment** for each hectare of clearing to Program Matter values described in Table 7-1].

BHP is proceeding on the basis that offsets will be acquitted via payment to the PEOF.

Financial contributions to the PEOF will support on-ground conservation projects in the Pilbara, benefitting relevant Program Matters. These contributions will achieve the Program Matter Objectives and Outcomes through investment in one or more of the following project types:

- Landscape scale programs targeting key threats such as invasive weeds, feral animals, and inappropriate fire regimes.
- Priority area programs build on the landscape-scale outcomes to further improve and protect vegetation and species habitat in identified priority areas.
- Site specific projects aimed at protecting and improving specific environmental values such as Priority Ecological Communities or a particular habitat with unique attributes.

A summary of any financial contribution to the PEOF for Notifiable Actions, will be included in the Annual Environmental Report.

7.4 Offset processes

7.4.1 Baseline datasets

As part of the assessment process, fauna habitat survey data for each relevant Program Matter is collected. This includes the identification and mapping of critical and supporting habitats within the Activity Area for each of the Program Matters.

The following baseline spatial datasets will be provided to the PEOF to assist in determining the offset value to be applied:

- the Activity Area boundary,
- existing disturbance areas (as of FY 2024),
- fauna habitat mapping and relevant Program Matter records within the Activity Area or nominated buffer, and
- baseline aerial photography (as of FY 2024).

The baseline spatial datasets will be provided with the EPBC Act Impact Reconciliation Report for the first reporting period.

7.4.2 Offset methodology

The methodology used to calculate direct impacts to the Program Matter values that require offsets via the PEOF, includes the following steps:

1) Land disturbance data is captured

BHP captures and prepares a land disturbance dataset to quantify the impacts within the reporting period, through:

- Financial Year-based aerial imagery capture of the Validation Notice Activity Area.
- Digitisation of land disturbance using the aerial imagery closest to the beginning and end of each financial year.
- Preliminary attribution and categorisation of land disturbance data in accordance with the *Instructions for preparing Impact Reconciliation Procedures and Impact Reconciliation Reports* (EPA 2021) and associated templates, the APOP and any previous feedback from the PEOF.
- Further digitalisation, consolidation and analysis of the land disturbance data at a 1:1,000 scale, meaning that 1 mm on the computer screen is equivalent to 1 m on the ground². This ensures consistency with the precision of all BHP datasets.
- Preparation of the land disturbance dataset for impact reconciliation and validation.

2) Data reconciliation and validation

The land clearing dataset is further reconciled and validated to ensure that all land disturbance activities for the reporting period have been streamlined, categorised and attributed for further processing.

3) Processing of datasets

BHP uses an automated methodology to assess the land clearing dataset against the baseline dataset. This process calculates:

- the hectares of land disturbance for each area of the Program Matter value requiring offsets, and
- areas subject to offset exclusions.

The automated methodology ensures the process of deriving the final product is consistent and repeatable, across other approvals and reporting periods.

4) Production of Impact Reconciliation Report final dataset

An EPBC Act Impact Reconciliation Report spatial dataset is produced for the reporting period. This dataset is used for calculating and documenting the number of hectares for each Financial Year, within the reporting period, and deriving the cumulative totals. The final EPBC Act Impact Reconciliation Report dataset will be provided with the EPBC Act IRR document, for review and assessment by PEOF.

7.4.3 Offset rates

The relevant financial offset rates, as determined by the DCCEEW, apply per ha of Program Matter habitat loss:

- Critical habitat or critical foraging habitat: A minimum of \$3,306 per ha
- Supporting habitat: A minimum of \$1,653 per ha

2 BHP captures baseline land disturbance at 1:1,000 (i.e. +/- 0.5m on the ground) hence any polygon slivers or gaps in the dataset under one square metre are ignored and are considered acceptable in the context of analysing datasets at vastly different scales.

7.5 Proposed schedule

Key anticipated steps and the schedule for the provision of the biennial EPBC Act Impact Reconciliation Reports, to enable PEOF to determine the financial contributions payable are outlined in Table 7-2 and Table 7-3.

Table 7-2: Reporting Timeframes

Reporting Period	Action	Timing
Biennial (Two-Yearly)	EPBC Act Impact Reconciliation Reporting and Financial Contributions	First period commences on day Validation Notice is effective and ends on the second 30 June following (30 June 2028). Successive reporting 1 July to second 30 June following, unless otherwise agreed.

Table 7-3: Offset contributions schedule

Validation Process Stage	Action	Timing
Consultation on PEOF contributions	Provision of the Validation Notice, inclusion of Offset Activity (Section 7) with proposed contribution process.	During 28-day public comment period
Authorisation	Validation Notice becomes effective	20 business days after publication of Final Validation Notice.
Implementation Advanced Payment	Advanced Payment (10% of the estimated total contribution), in accordance with the APOP	Within one month of Validation Notice becoming effective
	BHP to report Advanced Payment in the AER	3 October 2026
Implementation Period 1* (Financial Years 2027 and 2028)	Disturbance undertaken during period	3 September 2026 to 30 June 2028
	Aerial survey/ground truthing	30 June 2026 and 30 June 2028
	EPBC Act Impact Reconciliation Report and dataset submitted to PEOF and DCCEEW	30 October 2028
	BHP to provide Offset Payment to PEOF	20 business days of receipt of invoice
	BHP to report Offset Payment for Period 1 in next AER	By 1 September 2029
Implementation Period 2 (Financial Years 2029 and 2030)	Disturbance undertaken during period	1 July 2028 to 30 June 2030
	Aerial survey/ground truthing	30 June 2028 and 30 June 2030

Validation Process Stage	Action	Timing
	EPBC Act Impact Reconciliation Report and dataset submitted to PEOF and DCCEEW	30 October 2030
	BHP to provide Offset Payment to PEOF	20 business days of receipt of invoice
	BHP to report Offset Payment for Period 2 in AER	By 30 September 2030
Implementation Period 3 (Financial Years 2031 and 2032) <i>and so forth until final offset contributions are completed</i>	Disturbance undertaken during period	1 July 2030 to 30 June 2032
	Aerial survey/ground truthing	30 June 2030 and 30 June 2032
	EPBC Act Impact Reconciliation Report and dataset submitted to PEOF and DCCEEW	30 October 2032
	BHP to provide Offset Payment to PEOF	20 business days of receipt of invoice
	BHP to report Offset Payment for Period 3 in AER	By 1 October 2033

*Period 1 is less than two years to align with a financial year reporting period.

7.6 Offsets reporting

7.6.1 Content of Impact Reconciliation Report

Each EPBC Act IRR will include:

- Identification of the relevant Validation Notice and applicable commitments.
- Summary of the Program Matter values covered by the EPBC Act IRR.
- Purpose of clearing undertaken within the reporting period.
- A table showing the current extent of clearing during the reporting period in ha, the offset rate (\$/ha) for each Program Matter value (shown in Table 7-1) and an estimate of the total amount due.
- A table estimating the clearing expected in the next reporting period.
- A figure(s) illustrating the clearing extent for the reporting period, against the Program Matter fauna habitat baseline dataset.
- A spatial data package, as supporting information.

The IRR and accompanying spatial data package will be prepared in accordance with the '*Instructions on how to prepare Environmental Protection Act 1986 Part IV Impact Reconciliation Procedures and Impact Reconciliation Reports*' (EPA 2021) or equivalent guidance published by DWER and DCCEEW applicable at the time of preparing the IRR.

7.6.2 Implementation of PEOF projects

BHP will provide a progress summary of the offsets implemented and achievement of outcomes from the funding provided to the PEOF in the AER. Annual reports, evaluations or other progress reports provided by the PEOF and its delivery agents to BHP, will be retained for auditing purposes.

8 Commitments

Key commitments of the Validation Notice are summarised in the following sections. Implementation of each of the commitments will be reported in the SEA AER.

8.1 Monitoring commitments

For the proposed Activity Area, potential impacts to Program Matters have been assessed and are considered capable of being effectively managed through the application of the mitigation hierarchy, including targeted management measures (see Section 8.3) and the implementation of appropriate offsets (see Section 8.4) to address any residual impacts.

BHP do propose to monitor Program Matter critical and supporting habitat within the 10-20 mbgl mounding contours at Northern RAV to ensure that if impacts do occur, no more than 160 ha of Program Matter habitat is affected (Table 8-1). For MAR schemes, BHP implements a risk management process for the project development in an accordance with the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge (NRMMC-NHMRC 2009). Tree health (and corresponding fauna habitat health) will be monitored to ensure that potential impacts on vegetation from the Northern RAV MAR scheme are identified and managed to minimise the impact and ensure that impacts are not greater than predicted (Table 8-1).

Ongoing monitoring of Program Matters is undertaken for MACSF including monitoring of Ghost Bat caves within the MACSF Activity Area as outlined in the Mining Area C Validation Notice (BHP 2018) and the Fauna Management Plan (Ghost Bats) (BHP 2025). No additional cave monitoring is proposed for this Activity given that there are no additional impacts to Ghost Bat caves.

Implementation of the Central Pilbara Water Resource Management Plan (BHP 2025) will also minimise potential impacts to Program Matters from changes to groundwater and surface water regimes as a result of the Activity.

The key monitoring commitments which form part of this Validation Notice are presented in Table 8-1.

Table 8-1: Proposed monitoring commitments - Ghost Bat, Northern Quoll and Pilbara Olive Python

Monitoring Commitment	Action	Frequency	Performance target	Contingency	Reporting
Minimise impacts to Program Matter critical and supporting habitat as a result of groundwater mounding at the Northern RAV MAR scheme	Monitor habitat for Program Matters within the Northern RAV mounding contours	Biannual	No more than 160 ha of Program Matter habitat significantly ³ impacted by groundwater mounding at the Northern RAV MAR scheme. This will be achieved through a combination of monitoring groundwater levels and tree health of <i>Eucalyptus xerothermica</i> or <i>Eucalyptus leucophloia</i> subsp. <i>Leucophloia</i> trees within the 0-10 mbgl mounding zone.	If the performance target is not met, contingency actions may include, but are not limited to: - Investigate the decline to evaluate whether change is due to BHP mounding activities or other factors (e.g. drought, fire, pathogens etc.); and/or - In the event that change is due to BHP mounding activities, BHP will investigate reducing or ceasing reinjection rates - Increase the frequency of riparian vegetation health monitoring if appropriate; and/or - Monitor and review to ensure management actions are successful and review procedures, if appropriate.	If the performance target is not achieved, it will be detailed in the SEA Annual Environmental Report.

³ A significant decline in Program Matter habitat is considered to be where the average crown score is <3, or where it has fallen by more than three points since baseline AND where the percent foliage cover decline is statistically significant (P<0.05) (BHP 2024)

Monitoring Commitment	Action	Frequency	Performance target	Contingency	Reporting
Minimise impacts to Program Matter critical and supporting habitat as a result of surplus water discharge	Undertake annual monitoring to assess if surplus water discharge has ceased for 90 days (coincident with the dry season between April to November)	Biannual during dry season	Ensure a 90-day no discharge period coincident with the dry season (between April to November) is implemented: Trigger: On 1 August of each calendar year assess if the discharge has ceased. Threshold: On 1 September of each calendar year assess if the discharge has ceased.	If the performance target is not met, contingency actions may include, but are not limited to: Review surplus water discharge to determine if the 90-day dry period has commenced. Review and implement modification to surplus water management and creek discharge regime including ceasing discharge to maintain 90-day dry period and avoid reaching the threshold point. Increase review frequency of dewatering discharge to weekly. Review the distribution of surplus water to other Mining Area C hub surplus schemes.	If the performance target is not achieved, it will be detailed in the SEA Annual Environmental Report.
	Monitor creek flow and the wetting front extent (from natural flow and from the discharge of surplus water) Monitor natural creek flow Visually inspect the wetting front extent and	Quarterly (when flowing) during 5 year operational period of the scheme. Maintenance, as required, to ensure gauging	Ensure that the wetting front does not extend to Marillana Creek Pool (UMC2): Trigger: The wetting front along the Upper Marillana Creek reaches 24 km at location UMC1.	If the performance target is not met, contingency actions may include, but are not limited to: Trigger level contingency actions: Review surplus water discharge, rainfall data, streamflow/hydrographs to make a	If the performance target is not achieved, it will be detailed in the SEA Annual Environmental Report.

Monitoring Commitment	Action	Frequency	Performance target	Contingency	Reporting
	presence of calcium carbonate scale during period for surplus discharge.	stations are operational.	Threshold: The wetting front along the Upper Marillana Creek reaches 27 km (location UMC2).	determination as to whether the event is natural flow. • Increase review frequency of the wetting front data until it can be demonstrated that the extent of the wetting front has stabilised, or the rate of advance of the wetting front has slowed to avoid reaching the threshold point. • Review potential modification to surplus water management and creek discharge regime. • Reduce discharge rate or cease discharge temporarily. Threshold contingency actions: • If exceedance of threshold criterion is considered likely to be attributable to discharge of surplus water into the Upper Marillana Creek, cease discharge within 24hrs (temporarily). • Review wetting front post 24hr period. • Reduce surplus discharge.	

Monitoring Commitment	Action	Frequency	Performance target	Contingency	Reporting
				Monitor to ensure contingency measure are successful and review procedures, if appropriate.	
Minimise impacts to Program Matter critical and supporting habitat as a result of groundwater drawdown	Monitor groundwater levels (mbgl) during operations (i.e. active dewatering / surplus water discharge)	Monthly	Further investigate the water requirements to maintain the ecohydrological function of the Weeli Wolli Springs and associated fauna habitat values.	If the performance target is not met, contingency actions may include, but are not limited to: - Investigate the cause of the performance target not being met; - Increase the frequency of groundwater level/riparian vegetation health monitoring if appropriate; and/or - Monitor and review to ensure management actions are successful and review procedures, if appropriate.	If the performance target is not achieved, it will be detailed in the SEA Annual Environmental Report.
	Monitor tree health and species richness during operations	Biannual basis to include the wet season and the dry season.			

8.2 Clearing commitments

The key clearing commitments which form part of this Validation Notice, inclusive of proposed clearing allowances for each habitat type, are presented in Table 8-2.

Table 8-2: Proposed clearing commitments – Ghost Bat, Northern Quoll and Pilbara Olive Python

Clearing Commitment	Action	Monitoring And Frequency	Reporting
Clearing no more than 1,076 ha of native vegetation including no more than 1,044 ha of Ghost Bat habitat, 668 ha of Northern Quoll habitat and 68 ha of Pilbara Olive Python habitat.	Implement BHP's land disturbance permit system to ensure clearing does not exceed the identified limits	Annual review of land clearing undertaken	SEA AER
No clearing or direct impact to permanent or semi-permanent water features within the Activity Area or groundwater impact area.	Apply exclusion zones around permanent or semi-permanent water features within the Activity Area. Implement BHP's land disturbance permit system to ensure clearing does not occur within any permanent or semi-permanent water features.	Annual review of land clearing undertaken	SEA AER

8.3 Management commitments

The key management commitments which form part of this Validation Notice are presented in Table 8-3.

Table 8-3: Proposed management commitments – Ghost Bat, Northern Quoll and Pilbara Olive Python

Management Commitment	Action	Monitoring And Frequency	Reporting
Minimise risk of injury or mortality to Program Matters (i.e. Northern Quoll and Pilbara Olive Python) as a result of the Activity	Pre-clearance surveys will be undertaken by a suitably trained fauna spotter within critical and supporting habitats for Northern Quoll and Pilbara Olive Python, seven days prior to clearing. This includes, but is not limited to, the drainage line habitats associated with Marillana and Yandicoogina creeks. . In the event that significant fauna species are observed within the clearing area, clearing will not commence until it is confirmed that the individual has moved on.	Seven days prior to clearing	SEA AER
Minimise the risk of injury or mortality to Ghost Bats from entanglement in barbed wire fences	No new barbed wire fencing installed, unless required by legislation. Where new barbed wire fencing is required by legislation, bat reflectors or other mitigation device installed.	Inspect any areas which require barbed wire fencing after installation, to ensure that bat reflectors have been installed	SEA AER
Minimise risk of vehicle related mortality of Program Matters (access roads).	Light vehicle speed limits restricted on unsealed access roads (60km/h), and speed limit signage installed, to minimise vehicle-strike risks to Program Matters.	Site inspections to verify speed limit signage. Site Vehicles and plant will have IVMS which will report any speed breach incidents in a specific area. Reported light vehicle fauna strike incidents.	SEA AER
Education	On site inductions and education of Pilbara Olive Python, Ghost Bat and Northern Quoll and measures to take if individuals are observed.	Continuous for duration of Activity. Reported light vehicle fauna strike incidents.	SEA AER

Management Commitment	Action	Monitoring And Frequency	Reporting
Implement weed management	Implement BHP WAIO Weed Management Procedure for the duration of the Activity including annual weed mapping, weed control (if required) and vehicle hygiene measures when entering/leaving construction areas.	Continuous for duration of the Activity.	SEA AER
Targeted feral cat control program implemented to reduce predation impacts on Program Matters	Feral cat control program implemented in accordance with the WAIO Animal and Pest Management Plan. Environmental induction provided to site personnel. Report sightings of feral cats in the BHP Event Management System (EMS) as an environment event. Baiting and/or trapping implemented as approved on a risk-based, site-specific basis in accordance with animal welfare and regulatory requirements.	Annual assessment of feral cat sightings and the feral animal control program implementation status. Periodic review of feral cat management actions.	SEA AER
Minimise risk of mortality of Program Matters as a result of entrapment within turkey's nests	Turkey's nests fenced to exclude fauna and fauna egress points installed (for operational, long-term turkey's nests) to minimise entrapment risks.	Site inspections to verify fencing and egress points. Reported fauna entrapment incidents.	SEA AER
Implement fire management	Maintenance of firebreaks. Ensure designated smoking areas are available (during construction).	During construction phase.	SEA AER
Event Management System – reporting sightings and events of Program Matters	All sightings and events involving Program Matters and Cane Toads (including vehicle strike) will be identified and captured in WAIOs Event Management System. Program Matter sightings will be recorded in BHP's internal GIS system within 60 days of finding.	Continuous for duration of Activity	SEA AER

Management Commitment	Action	Monitoring And Frequency	Reporting
Site personnel to be informed of Program Matters and other aspects of environmental awareness	Site personnel will undertake inductions containing environmental awareness information (which includes information on conservation significant fauna (Program Matters and prohibited keeping of domestic animals) and sighting/event reporting).	Continuous for duration of Activity	SEA AER
Implement dust management measures	Management to be undertaken during the construction phase including: - Apply water to exposed land surfaces to minimise the generation of particulate air emissions, including access roads - Dust suppression chemicals added to the water, if required and appropriate - Light vehicle speed limits restricted on unsealed access roads to reduce particulate air emissions.	During life of operations	SEA AER
Implement the Central Pilbara Hub Water Resource Management Plan (BHP 2025c)	Implementation of management measures for Upper Marillana Creek discharge to manage the wetting front and vegetation condition. Implementation of management measures for preventing groundwater drawdown into Karijini National Park. Implementation of management measures for Weeli Wolli Springs and its associated groundwater dependant vegetation, fauna habitats, and permanent and semi-permanent water features.	Ongoing during operations	SEA AER

8.4 Offset commitments

The key offset commitments which form part of this Validation Notice are presented in Table 8-4.

Table 8-4: Proposed offset commitments – Ghost Bat, Northern Quoll and Pilbara Olive Python

Offset Commitment	Action	Monitoring And Frequency	Reporting
Payment of financial contribution to PEOF	Advanced payment of 10% off offset amount within one month of the Validation Notice becoming effective.	One off payment within one month of Validation Notice becoming effective.	EPBC Act Impact Reconciliation Report Provide DCCEEW with receipt of payment to PEOF
	Biennial submission of EPBC IRR and subsequent payment for clearing of relevant habitat for Notifiable Action Program Matters.	Disturbance captured during each Financial Year. EPBC Act IRR provided biennially (every 2 years). Financial contribution to PEOF for EPBC Act IRR reporting period, upon receipt of invoice.	
Provide PEOF funding progress summary	A progress summary of offsets implemented and achievement of outcomes from the funding provided to the PEOF will be provided in the AER	Annually	SEA AER

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Appendices

Appendix 1: Contemporary MNES Fauna Survey Reports

Appendix 2: Central Pilbara Hydrogeological Assessment (BHP 2025)

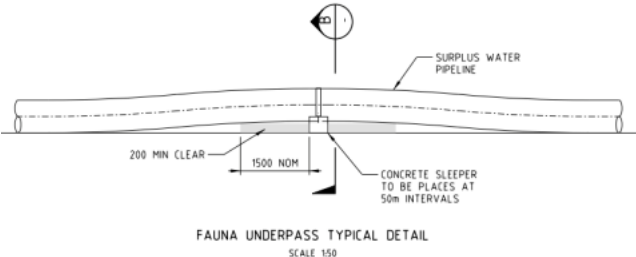
Appendix 3: Yandicoogina Gorge Mitigation Water Quality Desktop Review (Biologic 2023c)

Appendix 4: Update of South Flank Grand Central Overburden Storage Area Surface Water Management Plan and Surface Water Impact Assessment (WSP 2024)

Appendix 5: Public Consultation Response to Comments

Comments from the National EPA on CPHSW1 Validation Notice DRAFT

Comment Number	Comments	BHP Response
General comments		
	Uncertainty remains regarding the extent and effects of mounding, drawdown and surface-flow impact zones beyond the Activity Area, potential drawdown effects on cave humidity and habitat condition, for habitat provision and Grey Falcon occurrence within the Activity Area.	Thank you for your comments. BHP has responded to this general comment in detail below and provided additional information to clarify the matters raised.
1.0 Introduction		
1.4 Activity overview (p.15)	State the purpose of the Activity, including its role in managing MAC-SF dewatering surplus and whether it is driven by increased groundwater abstraction.	Noted and updated with the following: The purpose of the Activity is to facilitate continued mining of below water table orebodies which requires a dewatering uplift and associated surplus water management infrastructure.
	Define and quantify the dewatering uplift component.	Noted and updated with the following: dewatering uplift of an additional 28.4 gigalitres (GL) per annum (GL/a).
1.5 Activity Area (p. 15)	Provide the spatial extent of the existing/disturbed areas within the Indicative Footprint.	Noted and updated with the following: The Activity Area (Figure 1-2) encompasses a total of 1,482 ha of which 406 ha is already disturbed.
Figure 1-2 (p. 17)	Please amend the Northeast Scheme and Northwest scheme text labels.	Noted and updated.
2.0 Project description and disturbance		
2.1 Activity Description (p. 27)	Include the purpose of the Activity so that it is clear to the reader (i.e. to enable the disposal of dewatering surplus from the existing MAC-SF mine) and whether the activity is required due to the increase in groundwater abstraction.	Noted and updated with the following: The purpose of the Activity is to facilitate continued mining of below water table orebodies which requires a dewatering uplift and associated surplus water management infrastructure.
	Please specify the spatial extent of new disturbance or clearing that will occur on previously disturbed areas and describe the approval history for those previously disturbed areas.	Existing disturbance within the Activity Area is associated with mining operations at MACSF and Yandi and exploration activities. It has occurred both prior to and after the commencement of the EPBC Act. BHP has interpreted activities within the scope of existing state approvals as falling within the intended meaning of “previously approved” activities for the purposes of the Program. In accordance with BHP’s practices at the time, no referral was made for MACSF, Yandi or its exploration programs.
	Consider providing additional maps at a finer scale for the three Activity Areas that identify non-pipeline planned infrastructure and all surplus water discharge or MAR sites, as have been prepared for the Fauna Habitat map figures on pp. 64-66.	Noted and updated. Please see Figure 2-1, 2-2 and 2-3 which show the Activity Area at a finer scale.
2.1.3 Mine dewatering and surplus water discharge (p.28)	Describe how surplus water will be used operationally at MAC-SF.	Noted and updated as follows: Provision of water for operational use including at MACSF (approximately 26 ML/day) and the proposed future Ministers North mine (up to 15 ML/day). Operational water use includes (but not limited to) activities such as dust suppression on haul roads, construction, ore processing, washdown facilities, and equipment cooling
2.1.4 Pipeline (p. 30)	Specify the extent of elevated pipeline, how high-value habitat will be identified, and how fauna movement will be maintained.	Noted and updated as follows: The pipeline will be elevated by placing a concrete sleeper underneath the pipeline which will provide sufficient clearance underneath the pipeline to allow fauna passage underneath the pipeline. Please see sketch below for a typical configuration.

Comment Number	Comments	BHP Response
		 BHP determined that high value habitat potentially impacted by the pipeline was linear type habitat such as drainage lines and gorge/gully or in areas with good vegetation cover either side of the pipeline. Fauna underpasses at these location will maintain habitat connectivity and provide enough vegetation cover to allow safe passage for fauna and reduce the risk of predation. BHP has not located fauna underpasses in areas highly disturbed by rail, Great Northern Highway and existing mining operations where fauna could potentially be directed into high traffic areas and increase the risk of fauna strike. Figures 2-5 and 2-6 have been included in the Validation Notice which show the habitat types and the indicative locations for fauna underpasses.
	Describe all watercourse crossings, including location, timing, construction method, duration and potential ecological and hydrological impacts.	Noted and updated as follows: The pipeline is to be buried under all watercourses as shown in Figure 2-5 and 2-6. Waterway crossings will be designed and constructed to minimise impacts to natural drainage and creek flows. Crossing methods will be selected based on site-specific conditions, constructability and environmental requirements. Buried pipeline crossings will be constructed in accordance with applicable BHP standards, while above-ground crossings (where applicable) will maintain natural flow paths beneath the pipeline. Measures to minimise scour and disturbance to creek beds and drainage lines will be incorporated into the design.
2.2.2 Alteration of groundwater regimes Groundwater Drawdown from Dewatering (p. 31):	Groundwater Drawdown from Dewatering (p. 31): Assess dewatering impacts on Weeli Wolli Spring to 2070, including predicted post-2045 drawdown, habitat impacts and any additional mitigation measures	Noted and updated in Section 2.2.2. To summarise the updated text in the document, BHP propose to mitigate potential impacts through the use of MAR post Hope Downs closure so that groundwater levels and spring baseflow are such that there is no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community attributable to the Activity.
	Figure 2-2 Groundwater drawdown and fauna habitat features (p. 32): itemise and describe the water features in and around the Northwest Scheme activity area and include a discussion of any adverse impacts or disturbance of any water features.	Water features within the Activity Area, 500m buffer, groundwater mounding impact area and groundwater drawdown area have been itemised in Table 5-11 in Section 5.4.3 (Pilbara Olive Python local habitat) in the Validation Notice. For permanent or semi-permanent pools, there are three within the Activity Area, eight within the 500m buffer, six in the groundwater drawdown impact area and two in the groundwater mounding impact area. Four water pools occur within the 500m buffer of the Activity Area along the northwest scheme including: • WMYR-001 –persistent Artificial Wetland fed by surplus discharge • WMYR-002 - ephemeral pool located in Drainage Area/Floodplain habitat, fed from the artificial water source • WMYR-004 – persistent river pool located in Minor Drainage line, fed by artificial water source • WMYR-005 – ephemeral pool (artificial dam) located in Stony Plain habitat, fed by artificial water source None of the pools itemised in Table 5-11 will be directly impacted by the Activity. Exclusion zones will be placed around these pools so clearing or direct impacts will be avoided. Indirect impacts to these pools could potentially occur from increased dust, erosion and/or sediment; however, through the implementation of BHP’s standard management measures such as sediment control, dust suppression, utilising cleared areas as far as practicable, any of these impacts, should they occur would be minor. Permanent or semi-permanent surface water pools have the potential to be indirectly impacted through groundwater drawdown. Of the above-mentioned pools, only WMYR-01 and WMYR-05 occur within the 1-5m groundwater drawdown impact area; however, given these are artificial water features created by the artificial ponds, they are unlikely to be impacted by groundwater drawdown. A further six permanent or semi-permanent surface water pools occur within the groundwater drawdown impact area (outside the Activity Area). This includes the groundwater dependant pool at Weeli Wolli Springs, and its associated permanent and semi-permanent pools, and

Comment Number	Comments	BHP Response
		two semi-persistent pools located in the central area of the groundwater drawdown impact area (see Figure 5-12 in Section 5.4). Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community attributable to the Activity (see Section 2.2.2 in final Validation Notice). Outside Weeli Wolli Springs, there are no permanent or groundwater dependent water pools within the groundwater drawdown area. The two semi-persistent water pools located in the central section of the groundwater drawdown impact area are not groundwater dependent, have no groundwater dependent vegetation present and are unlikely to be adversely impacted by drawdown. Two pools (WTAN-01 and WCPH-41) are located within the groundwater mounding impact area but are unlikely to be impacted due to groundwater mounding being limited to 10 mbgl. Commitments to maintain the surface water pools and associated areas of critical habitat include: - no clearing will occur outside the approved clearing areas - suitably trained fauna spotters will be utilised for pre-clearance surveys undertaken 7 days prior to clearing in areas of critical and supporting Pilbara Olive Python habitat including Yandicoogina Creek and Marillana Creek - BHP will design and construct infrastructure minimise direct and indirect impacts to fauna habitats and water features (e.g. sediment control, dust suppression measures, utilising existing cleared areas etc) - pipelines will be buried at creek crossings to maintain natural drainage lines and surface water flows (See Figure 2-5 and Figure 2-6). - groundwater mounding at Northern RAV MAR will be limited to no more than 10mbgl. Given that none of the pools, outside Weeli Wolli Springs, are groundwater dependant, they are unlikely to be adversely impacted by groundwater drawdown or mounding.
Yandicoogina Gorge Groundwater Supplementation Scheme (pp. 37-38)	Include reasoning as to why Yandicoogina Gorge groundwater supplementation trial is out of scope of the Program and whether an assessment of whether the trial was likely to have a significant impact on matters of national environmental significance, or a referral to the department to determine whether further assessment and approval was required under the EPBC Act, were undertaken. Please detail any components of the supplementation activities that are not considered to be in scope of the Program.	The Yandicoogina Gorge groundwater supplementation trial (the Activity) is considered to be within the scope of the Program. In accordance with the approved APOP, activities proposed under the endorsed Program will require a Validation Notice if: - The action is within scope of the Program as defined in Section 2 of the Program; and - One or more Notifiable Action Triggers for the Program Matters (as defined in the APOP) are met. Although it is within the scope of the Program, the proposed Activity does not require a Validation Notice as no Notifiable Action Triggers are met. There are no records or sign of any Program Matters within the Activity Area or within a 500 m buffer of the Activity Area (Astron 2024; Biologic 2023; Figure 2). Where Notifiable Action Triggers are not met, a Decision Report will be prepared. The purpose of the Decision Report is to outline the basis for BHP concluding that the Activity is not a Notifiable Action. As such, a Decision Report was prepared in accordance with Section 6 of the APOP (BHP 2024 '<i>Jugari (Yandicoogina) Gorge Supplementation Trial Project Decision Report</i>').
	Describe the physico-chemical parameters of the source groundwater, including any exceedances such as nitrates.	The physico-chemical parameters of the source water are summarised on p39 of the Validation Notice as follows: The assessments found that source groundwater quality from MACSF was broadly similar to that of the Gorge receiving environment groundwaters, on average pH being circum-neutral (albeit slightly higher at MACSF), fresh and clear, with relatively low concentrations of dissolved metals (in comparison to ANZG DGVs). The most notable difference in groundwater quality was the markedly higher concentrations of nitrates (N_NO3) in MACSF groundwaters (Biologic 2023c). However, the risk of eutrophication in groundwater is negligible due to the absence of light. A more detailed explanation is provided in Appendix 3 <i>Yandicoogina Gorge Mitigation: Water Quality Desktop Review</i> (Biologic 2023). Please see Section 4.1.2, Section 5.2, and Table 5.3 (itemises where values outside the ANZG 2018 guideline default values. Table 5.6 provides an analysis of residual risk to receptors as result of MAR/groundwater injection. The following text has been added to the Validation Notice to clarify the residual risk: Based on the analysis of source water and existing water quality at the Gorge, there is negligible risk to environmental receptors as a result

Comment Number	Comments	BHP Response
		of changes in water quality (pH, salinity, ions, nutrients, metals and calcite) There is a low eutrophication risk to surface water pools as a result of reinjection due to nutrient enriched source water. The injection point and the existing surface water pool is approximately 3 km apart and some nitrate is also likely to be taken up/assimilated in the groundwater before expressing at surface. As such impacts to fauna habitats as a result of change to water quality within Yandicoogina Gorge are considered low.
	Please confirm when the Condition Outcome for the groundwater-dependent ecosystem at Yandicoogina Gorge will be available and advise what data or information is standing in as a proxy baseline (see Table 7; Central Pilbara Water Resource Management Plan).	The condition outcome refers to the outcome of the assessment of the Activity by the WA Environmental Protection Authority which is still under assessment. Ministerial Statement 1278 was issued by the Western Australia Minister for Environment on 18 September 2026 with the following condition: <i>B1-1 (6) no increase or decrease to groundwater levels at Yandicoogina Gorge beyond historical recorded water levels attributable to the proposal.</i> The CPWRMP (BHP 2025c) proposes monitoring in the regional aquifer as a proxy for the water levels in the Gorge, BHP has historical record of water levels in the aquifer and will limit groundwater rise to 565.5 mAHD. As a second line of assurance, BHP will also monitor Gorge aquifer levels and undertake contingency actions should water levels rise to surface to prevent waterlogging of the area. No additional action required.
	Please confirm if any surface water discharge, trial or otherwise, occurred or is being considered at Yandicoogina Gorge, in addition to the proposed groundwater supplementation.	No surface water discharge trial or otherwise has occurred or is being considered as part of this Activity. In the early phases of assessment of options for the Activity, the option of surplus water discharge was considered and potential impacts to water quality are included in the <i>Yandicoogina Gorge Mitigation: Water Quality Desktop Review</i> (Biologic 2023). However, surplus discharge was removed from consideration based on consultation with Traditional Owners and subsequently is not part of the Activity proposed in this Validation Notice. No additional action required.
Alteration of surface water regimes (pp. 39-40)	What monitoring or controls are planned to manage potential increase in hardness or calcite precipitation and nitrate eutrophication of surface waters to avoid impact to Program Matter habitat and habitat features such as major and minor drainage line and water features?	As clarified in the comment above there is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water quality will be monitored in accordance with the EP Act Part V Operating Licence for the MACSF Mining Operations to detect any changes that may increase the risk of eutrophication and to ensure potential impacts are appropriately managed. As detailed in Table 14 of the CPWRMP (BHP 2025c), a quarterly visual inspection of the wetting front extent and presence of calcite precipitation will be undertaken during the 5- year operational period of the scheme. No additional action required.
4.0 Validation Process		
4.2 Surveys and Studies	Please correct inconsistencies in year sub-referencing for survey reports in Figure 4.1 (p. 54) and ensure that Figure 4.1 and Table 4.1 (pp. 55-59) both contain all contemporary surveys that are referred to in the validation notice.	Figure 4.1 and Table 4.1 have been updated to include all contemporary surveys referenced in the Validation Notice. Note that the following surveys have been removed from Figure 4.1 as they are older than five years and are not considered ‘contemporary’: - MAC 4 Pipeline Level 1 Vertebrate Fauna Survey (Biologic 2019a) - Ministers North Fauna Survey Level (GHD 2021).
	Please ensure that all Program Matters recorded during surveying are included in Table 4.1. The summary should include the survey outcomes and not be limited to the Activity Area or buffer zones as Program Matter records in the survey areas surrounding Activity Areas are relevant considerations for validation purposes, offsite indirect impacts are stated possible consequences of the described activities.	The summary provided in Table 4-1 includes Program Matters recorded during each survey and does not limit the discussion to Program Matter records within the Activity Area or buffer. Additional wording has been added to Table 4-1 to clarify this.
	4.2.1 Contemporary surveys (p. 53) - Please confirm what technical guidance for ecological surveying were applied to the contemporary survey effort supporting this validation notice. We note the field survey methodology followed for Aston 2024c survey was the ‘ <i>BHP Technical</i>	Astron 2024c was provided in Appendix 1 but should be correctly referenced as Astron 2025. As quoted by Astron 2025, Astron conducted the fauna surveys in accordance with the regulatory guidance detailed in Table 1 (pp2-3) of the survey report, as well as BHP WAIO’s internal guidance document (BHP 2023a) and Spatial Data Requirements (BHP 2023b). Table 1 (pp2-3) in the survey report includes the

Comment Number	Comments	BHP Response
	<i>Process Instruction: Vertebrate Fauna Surveys in Western Australia’.</i>	regulatory guidance listed in Section 4.1 of the Validation Notice. As described in Section 4.2.1, all of the survey reports (including Astron 2025) were undertaken in accordance with relevant State and Commonwealth guidelines and policy documents including those listed in Section 4.1 of the Validation Notice. Further information can be found within each of the contemporary survey reports which have been provided in Appendix 1: • CPH Stage 2 (Biologic 2025c) followed guidance listed in Section 1.2 (pp1-2) of the report • MAC to Yandi Corridor Target MNES Survey (Biologic 2025a) followed guidance listed in Section 1.3 (pp1-2) of the report • Mining Area C Targeted Vertebrate MNES Fauna Survey (Biologic 2025b) followed guidance listed in Section 1.3 (pp1-2) of the report • Jinidi Targeted Vertebrate Fauna Survey (Biologic 2024b) followed guidance listed in Section 1.3 (pp12-13) of the report • CPH MNES Survey (Biologic 2023a) followed guidance listed in Section 1.3 of the report • Targeted Pilbara Olive Python Survey (Biologic 2023b) – followed guidance listed in Section 1.2 (p6) of the report • Yandi 45C Targeted Significant Vertebrate Fauna Survey (Astron 2023) followed regulatory guidance detailed in Table 1 (pp2-3) of the report • MAC Phase 4 Marillana Creek Targeted MNES Survey (Biota 2022) In addition, the majority of surveys also considered BHP WAIO procedures, where relevant, including: • BHP WAIO (2023a) Vertebrate fauna surveys in Western Australia procedure (Document Number: SPR-IEN-EMS-012) Version: 12.0 • BHP WAIO (2023b) Biological survey spatial data requirements (SPR-IEN-EMS-015) Version 12.0.
5.0 Existing Environmental Values (Program Matters)		
All Program Matters	The following applies for impact assessment for all Program Matters: a. Ensure each <i>Introduced Species</i> section refers to the correct Program Matter. b. Clarify whether the drawdown zone extends to, or affects, permanent or groundwater-fed pools at Weeli Wolli Springs. c. Discuss cumulative groundwater drawdown (2045–2070) at Weeli Wolli Springs and associated pools, including the duration of any dewatering uplift beyond 2045. d. Provide evidence that a 90-day annual drying period for Upper Marillana Creek reflects Pilbara dry- season conditions. e. Assess impacts from pipelines and the GCOSA diversion structure, including barriers to fauna movement, weed spread, drainage disruption, crossing methods and mitigation measures. f. Discuss potential habitat impacts from nitrate eutrophication and calcium carbonate precipitation, with reference to Appendix 3 (Biologic, 2023c).	Please note the following responses: a) Noted and updated throughout b) Weeli Wolli Springs (a permanent groundwater-fed spring) and its associated permanent and semi-permanent pools occur within the predicted groundwater drawdown contours of the Activity (Figure 2 2). Over the past two decades, Weeli Wolli Spring has been influenced by dewatering and discharge activities at Rio Tinto’s Hope Downs Operations. Rio Tinto currently mitigates these impacts and sustains the Spring and associated fauna habitats through discharge. As such, the predicted dewatering drawdown proposed by the Activity does not influence the water levels at Weeli Wolli Spring during the operation of Hope Downs mine. Once Rio Tinto closes the Hope Downs Mine and cease mitigation measures, groundwater drawdown associated with the Activity has the potential to occur; however, BHP will take control of mitigation measures to ensure there is no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community attributable to the Activity (see Section 2.2.2 of the revised Validation Notice for further details). c) Noted and updated throughout d) The Pilbara dry season generally extends from May to October, which is substantially longer than the proposed 90-day drying period. The drying period has been proposed as a mitigation measure to prevent permanent inundation of the watercourse during its period of operation, while still providing MACSF with the flexibility required to manage surplus water. This measure was developed in response to Traditional Owner feedback regarding the discharge of water to the creek. BHP is not aware of any scientific evidence that specifically supports the effectiveness of a 90-day drying period in mitigating potential impacts associated with creek discharge. However, BHP has committed, through the CPWRMP (BHP 2025c), to monitor vegetation within the Upper Marillana Creek waterway to verify that discharge activities do not result in adverse impacts to riparian vegetation or associated fauna habitat values. e) Noted and updated throughout f) There is a low risk of eutrophication to surface water pools as a result of groundwater supplementation into Yandicoogina Gorge. Source water will be monitored for any potential changes consistent with the EP Act Part V Operating Licence for the MACSF Mining Operations which may impact the water quality in the Gorge. As detailed in Table 14 of the CPWRMP (BHP 2025c), a quarterly visual inspection of the wetting front extent and presence of calcium carbonate scale will be undertaken during the 5-year operational period of the scheme. No additional action required.
5.2 Ghost Bat		

Comment Number	Comments	BHP Response
5.2.3 <u>Local Habitat</u> Critical Habitat (p68)	Please provide the number of unclassified caves recorded within 12km of the Activity Area (to be treated as Category 2 caves in the absence of classification data) and confirm that all unclassified caves are included on Figure 5-08 (p. 75)	There are 32 unclassified caves within 12 km of the Activity Area which are treated as potential Category 2 caves with all suitable foraging and dispersal habitat within 12km of these caves being defined as critical habitat in accordance with Bat Call WA (2021). There are nine known Category 2 caves within 12km of the Activity Area, and so all suitable Ghost Bat habitat has been classified as critical habitat and appropriate offsets provided. For clarity additional figure have been prepared, Figure 5-6a provides an overview of the Activity Area and caves, Figure 5-6b, Figure 5-6c and Figure 5-6d provide the caves near the northwest, northeast and GCOSA areas and all caves labelled and unclassified caves shown.
5.2.3 <u>Local Habitat</u> Critical Habitat (p68)	There appear to be Category 2 and 3 caves associated with Ghost Bat records in Figure 5-08 (p. 75) with no cave IDs. Please provide cave identifiers for all Category 2 and 3 caves.	Noted and updated. Please also see Figure 5-6b, Figure 5-6c and Figure 5-6d as noted above.
Critical Habitat (p68)	Please confirm whether any of the new caves identified in the surveys appended to this validation notice are in the zones that will be affected by either groundwater mounding or drawdown. Cave CEPA-038/CMAC-005, <i>a Category 3 ghost bat day roost in close proximity to two newly-identified semi-persistent water resources (WEPA-001 and WEPA-003 – Biologic, 2025b) where one live individual, one ultrasonic recording and some 10,000 scats were recorded (Biologic, 2025b)</i> , appears to be in both the Northern RAV MAR zone	A large portion of caves do occur within the drawdown contours of the Activity. Cave CEPA-038/CMAC-005 is located in West Packsaddle, outside the groundwater mounding contours of the Northern RAV MAR scheme, but within the drawdown area (predicted 1 m of drawdown). Depth to groundwater around this location is over 60mbgl. Caves are generally considered unlikely to be impacted by drawdown given they are often feature high in the landscape, in ranges or hills, where depth to groundwater is over 20mbgl. There are no caves within Weeli Wolli Springs, Coondewanna Flats or Northern RAV in areas where groundwater is less than 20mbgl. Regardless, factors affecting cave humidity include temperature, air flow, type of rock and presence of water. None of the caves that have been assessed have water present within them, with any water presence most likely coming from the surface, and none occur in areas where they are close to the groundwater table (i.e. less than 20mbgl). Surface water pools have the potential to be impacted by groundwater drawdown if they are groundwater dependant; however, as stated in the Validation Notice, there are no groundwater-dependant pools (outside Weeli Wolli Springs) present in the groundwater drawdown or groundwater mounding area. WEPA-001 and WEPA-003 are not groundwater dependant pools and occur in an area where depth to groundwater is over 60mbgl. They are unlikely to be impacted by groundwater drawdown. These pools do not occur within the groundwater mounding impact area of Northern RAV MAR.
Critical Habitat (p68)	Outline ongoing monitoring for newly identified caves with evidence of use and for unclassified caves.	Given there are no direct or indirect impacts to caves as a result of the Activity, ongoing monitoring is not proposed. It is unlikely that any new caves would be identified within the Activity Area or Indicative Footprint as these areas have been well surveyed and mostly occur within Drainage Area/Floodplain and Stony Plain habitats which are not cave forming habitats and do not contain caves.
Supporting habitat (p. 68)	Table 5.1 indicates that Sand Plain is present in the Activity Area. This is not identified as supporting habitat for the Ghost Bat in this section. Please confirm if this habitat type is within 12km of Category 2 caves, as suggested by Figure 5-6 (p. 74). If so, please include it in the identified offsets and in Table 5.3 for critical foraging habitat.	Sand Plain habitat is not considered suitable habitat for the Ghost Bat. Whilst some instances of Sand Plain habitat may at times represent supporting habitat for the species, these areas would be characterised by ‘Productive plain areas with thin mature woodland over patchy or clumped tussock or hummock grass (Triodia spp.) on sand or stony Ground’. The Sand Plain habitats mapped within the Activity Area do not contain thin mature woodland and have not been identified as supporting or critical habitat for the species (Astron 2023, 2025, Biologic 2023a, 2025a, 2025b, 2024b, 2025c, Biota 2022). Figure 5-6 of the draft Validation Notice shows all fauna habitat types within the Activity Area. This has been updated to show only critical and/or supporting habitats for Ghost Bat which include: Gorge/Gully, Breakaway/Cliff, Major Drainage Line, Medium Drainage Line, Mulga Woodland, Drainage Area/Floodplain, Stony Plain, Minor Drainage Line, Undulating Low Hills and Hillcrest / Hillslope.
5.2.5 <u>Impact Assessment</u> <i>Decrease of Groundwater Levels from Dewatering Drawdown</i> (pp. 76-77)	Describe the anticipated effects of dewatering drawdown on all existing bat caves within the drawdown footprint (not only those to the west of MAC-SF) and itemise any caves where the pre-mining depth to groundwater is not greater than 20mbgl	There are no anticipated effects of drawdown on Ghost Bat caves as these generally occur high in the landscape, often in ranges or hillslopes/hillcrests, and occur in areas where depth to groundwater is deeper than 20mbgl. Cave humidity is usually determined by temperature, type of rock, airflow and presence of water. None of the caves within the drawdown area occur in areas where pre-mining depth to groundwater is less than 20mbgl. Given that all of the caves occur in areas where depth to groundwater is greater than 20mbgl, groundwater would be unlikely to affect humidity. The text in Section 5.2.5 has been updated to reflect the above.
<i>Habitat degradation or species disturbance due</i>	Will the 6-month construction stage overlap with the breeding period and if so, what avoidance or other management measures will be taken to ensure that pregnant or lactating female bats are	There is only one potential Category 2 cave within the 500 m buffer of the Activity Area, which is CMIN-3. CMIN-3 has been consistently

Comment Number	Comments	BHP Response
<i>to increased dust, noise, vibration or light</i> (pp. 78-79)	not disturbed or otherwise impacted?	monitored since 2011 when scats were originally recorded and there has been no subsequent usage of this cave. This cave occurs approximately 130m south of the Activity Area and 2.5km from any creek crossing, in an area where no blasting or drilling is proposed, and where there are existing, ongoing disturbances from rail lines, rail access tracks and roads. Whilst it is possible that construction will overlap with the breeding period, given there has been no evidence of use since 2011, and given impacts will be limited to construction activities rather than blasting or drilling, no further management measures are proposed.
Introduced species (pp. 79-80)	The discussion of potential impacts to Ghost Bats from feral predators and other introduced species is inadequate. It should include specific threats to this Program Matter and refer to potential increased impacts due to the proposed Activities.	This section has been updated to remove mention of Northern Quoll. The section has also been expanded to include consideration of feral cats, foxes, cane toads and spread of weeds.
2.6 Ghost Bat Mitigation Hierarchy	Please update the wording about barbed wire use to be consistent with Section 5.5.5 (PLNB) and make it clear that any new barbed wire fencing will be used only when specified by legislation	Updated
<i>Mitigate</i> (p. 80-81)	Update the wording regarding barbed wire use to be consistent with Section 5.5.5 (PLNB) and make clear that any new barbed wire fencing will be used only when required by legislation.	Same question as above. Updated as per response above.
<i>Mitigate</i> (p. 80-81)	Include more detail about the nature of any night-time construction work that may be required. Please advise or include what additional mitigation measures will be applied should Ghost Bats be present in an active construction or works zone	Noted and updated as follows: At this stage, no routine night-time construction activities are planned. Should the project require flexibility to undertake night works to meet a delivery schedule, these activities would be limited to targeted locations along the Northwest and Northeast scheme (not the GCOSA Diversion) rather than broadscale construction. Night-time activities, if required, would be limited to low-impact pipeline construction tasks such as pipe laying (and associated activities) and HDPE welding. High-noise and high-vibration activities, such as drilling and micro-tunnelling, are not proposed to be undertaken during night-time periods. Where night works are required, lighting would be managed to minimise light spill beyond the immediate work area, with illumination focused on active work fronts and safety-critical areas only.
<i>Mitigate</i>	Describe what management options will be considered or undertaken should groundwater mounding associated with the Northern RAV MAR scheme exceed the 10mbgl threshold	BHP will manage groundwater mounding at the Northern RAV MAR through the use of triggers and thresholds. Should groundwater levels reach a trigger level of 20 mbgl BHP will manage injection rates (i.e. reduce or cease mounding) to arrest groundwater mounding. In the event that groundwater mounding reaches or exceeds the 10mbgl threshold, contingency actions may include, but are not limited to (see Section 8.1 Monitoring Commitments in Table 8-1): - Investigate the decline to evaluate whether change is due to BHP mounding activities or other factors (e.g. drought, fire, pathogens etc.); and/or - In the event that change is due to BHP mounding activities, BHP will investigate reducing or ceasing reinjection rates and utilising other surplus water management schemes (if necessary); and/or - Increase the frequency of riparian vegetation health monitoring if appropriate; and/or - Monitor and review to ensure management actions are successful and review procedures, if appropriate. The above information is provided in Section 8 of the final Validation Notice which describes management commitments.
Northern Quoll		
5.3.3 <u>Local Habitat</u> (p. 83):	Stony Plain and Sand Plain are listed as supporting habitat for this program matter in the current Program Assurance Plan and Offsets Plan (Table 12.1 Program Matters and Offset Pathways, Northern Quoll p. 76) but the identified Sand Plain and Stony Plain within the Activity Area (Table 5.1, pp. 61-63) have not been included in Table 5.7 (Northern Quoll habitat) which instead describes Sandy/Stony Plain as supporting habitat. Consider providing offsets for these two supporting habitat types, update the inconsistency or provide a rationale for the non-inclusion of the habitat types in the offset requirements for habitat loss.	Within the APOP, Sand Plain and Stony Plain are listed as ‘possible’ BHP names for supporting habitats that comprise: - basalt hills, mesas (and buttes of limonites), high and low plateaus and lower slopes - tor fields and stony plains supporting either hard or soft spinifex grasslands - sandstone and dolomite hills and ridges, shrublands, sandy plains, clay plains and tussock grasslands and coastal fringes including dunes islands and beaches. Neither Sand Plain or Stony Plain habitats have been identified as supporting habitat for Northern Quoll in any of the nine supporting technical documents that have targeted this species. As such, these habitat types have not been included in offset requirements for habitat loss. Sandy/Stony Plain habitat is not present within the Activity Area and has been removed from section 5.3.3.

Comment Number	Comments	BHP Response
5.3.5 <u>Impact Assessment</u>	The following applies for impact assessment for all Program Matters: a. Ensure each Introduced Species section refers to the correct Program Matter. b. Clarify whether the drawdown zone extends to, or affects, permanent or groundwater-fed pools at Weeli Wolli Springs. c. Discuss cumulative groundwater drawdown (2045–2070) at Weeli Wolli Springs and associated pools, including the duration of any dewatering uplift beyond 2045. d. Provide evidence that a 90-day annual drying period for Upper Marillana Creek reflects Pilbara dry- season conditions. e. Assess impacts from pipelines and the GCOSA diversion structure, including barriers to fauna movement, weed spread, drainage disruption, crossing methods and mitigation measures. f. Discuss potential habitat impacts from nitrate eutrophication and calcium carbonate precipitation, with reference to Appendix 3 (Biologic, 2023c).	See response above under ‘5.0 Existing Environmental Values (Program Matters) - All Program Matters’
	Habitat degradation from alteration of surface water regimes (pp. 89-90): o The linear extent of the GCOSA diversion structure may create barriers for movement and increase habitat fragmentation for ground-dwelling program matters such as the Northern Quoll. What design or monitoring considerations have been given to maintaining faunal mobility through the landscape surrounding Mount Robinson?	The GCOSA diversion structure will consist of an open drain with earthen batters that is unlikely to be an entrapment risk for Northern Quolls or other small to medium sized ground-dwelling animals. The species is an agile climber capable of traversing steep rocky terrain, and the proposed drain batters provide sufficient surface roughness and gradient to facilitate fauna egress. The drain design avoids vertical walls and incorporates rough earthen/rock-lined surfaces, reducing the likelihood of fauna becoming trapped. The GCOSA diversion structure is unlikely to create a barrier to movement for the Northern Quoll, or other Program Matters, given that it flanks a large OSA within existing disturbances (Figure 2-3). Supporting habitat for Northern Quoll will remain in areas surrounding the OSA and associated GCOSA diversion structure, which will continue to provide suitable connected habitat in landscape surrounding Mount Robinson.
	Introduced species (p. 90): o Expand the assessment of cane toad risks and describe monitoring and management measures for early detection and response.	The assessment has been expanded to include more information on cane toad risks. Management measures for early detection and response for cane toads are already described in Section 5.3.6 Mitigation Hierarchy which states: <i>if Cane Toads are observed on site, they will be reported to DBCA and humanely euthanised in accordance with DBCA guidelines.</i> Overall, the risk of introduction or spread of cane toads into the Activity Area is considered low.
5.4 Pilbara Olive Python		
5.4.3 Local Habitat (p. 94)	• List all permanent and semi-persistent water features within activity and impact areas and identify commitments to maintain critical habitat.	Water features within the Activity Area, 500m buffer, groundwater mounding impact area and groundwater drawdown area have been itemised in Table 5-11 in Section 5.4.3 (Pilbara Olive Python local habitat) in the final validation notice. For permanent or semi-permanent pools, there are three within the Activity Area, eight within the 500m buffer, six in the groundwater drawdown impact area and two in the groundwater mounding impact area. Four water pools occur within the 500m buffer of the Activity Area along the northwest scheme including: • WMYR-001 –persistent Artificial Wetland fed by artificial ponds • WMYR-002 - ephemeral pool located in Drainage Area/Floodplain habitat, fed from the artificial water source • WMYR-004 – persistent river pool located in Minor Drainage line, fed by artificial water source • WMYR-005 – ephemeral pool (artificial dam) located in Stony Plain habitat, fed by artificial water source There are no water features within the northwest portion of the Activity Area. None of the pools itemised in Table 5-11 will be directly impacted by the Activity. Exclusion zones will be placed around these pools so clearing or direct impacts will be avoided. Indirect impacts to these pools could potentially occur from increased dust, erosion and/or sediment; however, through the implementation of BHP’s standard management measures such as sediment control, dust suppression, utilising cleared areas as far as practicable, any of these impacts, should they occur would be minor.

Comment Number	Comments	BHP Response
		Permanent or semi-permanent surface water pools have the potential to be indirectly impacted through groundwater drawdown. Of the above-mentioned pools, only WMYR-01 and WMYR-05 occur within the 1-5m groundwater drawdown impact area; however, given these are artificial water features created by the artificial ponds, they are unlikely to be impacted by groundwater drawdown. A further six permanent or semi-permanent surface water pools occur within the groundwater drawdown impact area (outside the Activity Area). This includes the groundwater dependant pool at Weeli Wolli Springs, and its associated permanent and semi-permanent pools, and two semi-persistent pools located in the central area of the groundwater drawdown impact area (see Figure 5-12 in Section 5.4). Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community attributable to the Activity (see Section 2.2.2 in final Validation Notice). Outside Weeli Wolli Springs, there are no permanent or groundwater dependent water pools within the groundwater drawdown area. The two semi-persistent water pools located in the central section of the groundwater drawdown impact area are not groundwater dependent, have no groundwater dependent vegetation present and are unlikely to be adversely impacted by drawdown. Commitments to maintain the surface water pools and associated areas of critical habitat include: - no clearing will occur outside the approved clearing areas - suitably trained fauna spotters will be utilised for pre-clearance surveys undertaken 7 days prior to clearing in areas of critical and supporting Pilbara Olive Python habitat including Yandicoogina Creek and Marillana Creek - BHP will design and construct infrastructure using best management practices to minimise direct and indirect impacts to fauna habitats and water features (e.g. sediment control, dust suppression measures, utilising existing cleared areas etc) - pipelines will be buried at creek crossings to maintain natural drainage lines and surface water flows - groundwater mounding at Northern RAV MAR will be limited to no more than 10mbgl. Given that none of the pools, outside Weeli Wolli Springs, are groundwater dependant, they are unlikely to be adversely impacted by groundwater drawdown or mounding.
5.4.5 Impact assessment	- Habitat loss (p. 99): - Explain how the lowering of the water table due to drawdown at Weeli Wolli Spring (after Rio Tinto mitigation ceases) is consistent with the Program Matter Outcome to minimise loss of critical and supporting habitats of the Pilbara Olive Python as a result of Program activities within the Strategic Assessment Area.	Groundwater levels at Weeli Wolli Springs are currently mitigated through creek discharge at Hope Downs by RTIO. Once RTIO closes Hope Downs, BHP will implement mitigation as described in Section 2.2.2 including: - Further investigate the water requirements to maintain the ecohydrological function of the Weeli Wolli Springs and associated fauna habitat values. - Adopt an adaptive management approach integrated into a Water Environmental Management Plan to establish triggers, thresholds and criteria to maintain fauna habitats. - Adhere to the surplus water management hierarchy with the goal to store as high a proportion as possible of surplus dewatering into suitable aquifers for recovery. - Prioritise pit finish and fill to reduce dewatering and water deficit. Following mitigation, there will be no adverse impact to the Weeli Wolli Springs occurrence of the Weeli Wolli Spring Priority Ecological Community (and the associated Pilbara Olive Python critical and supporting habitats) attributable to the Activity.
	Please describe any impacts on aquatic habitat connectivity that may result from the Activity on the major drainage and artificial wetland habitat depicted in the map inset on Figure 5-12 (p. 98).	There will be minimal impacts on habitat connectivity from the Activity on the major drainage line and artificial wetland habitats shown on Figure 5-12. Whilst some of the vegetation associated with these habitat types may be cleared for the Activity, there will be no direct impact to the permanent water feature associated with the Artificial Wetland (WYAN-10). There are existing road crossings and disturbances within this area. The clearing will not disconnect the Artificial Wetland habitat from the Major drainage line habitat. Habitat connectivity and ecological function will be maintained within this section of Marillana Creek through use of creek crossings for the Yandi haul roads and light vehicle access tracks (not part of this activity). The Marillana Creek crossings include culverts which convey flows and do not prevent or restrict the movement of water or fauna in the creek. These will not be impacted by this Activity.
5.5 Pilbara Leaf-nosed Bat		

Comment Number	Comments	BHP Response
Impact Assessment	The following applies for impact assessment for all Program Matters: a. Ensure each Introduced Species section refers to the correct Program Matter. b. Clarify whether the drawdown zone extends to, or affects, permanent or groundwater-fed pools at Weeli Wolli Springs. c. Discuss cumulative groundwater drawdown (2045–2070) at Weeli Wolli Springs and associated pools, including the duration of any dewatering uplift beyond 2045. d. Provide evidence that a 90-day annual drying period for Upper Marillana Creek reflects Pilbara dry- season conditions. e. Assess impacts from pipelines and the GCOSA diversion structure, including barriers to fauna movement, weed spread, drainage disruption, crossing methods and mitigation measures. f. Discuss potential habitat impacts from nitrate eutrophication and calcium carbonate precipitation, with reference to Appendix 3 (Biologic, 2023c).	See response above under ‘5.0 Existing Environmental Values (Program Matters) - All Program Matters’
5.6 Greater Bilby		
5.6.3 Local Habitat (p. 117)	• Please clarify the direction to the nearest greater bilby record in the text of this section and/or in Figure 5-17 (p. 119) as they are currently inconsistent.	The closest record of Greater Bilby is approximately 20km northeast of the Activity Area, with other records occurring approximately 38km east of the Activity Area within the Fortescue Valley. Other historical records also exist, approximately 30-40km west-southwest and southeast and are records from the 1980’s (see Biologic 2023a). Section 5.6.4 and Figure 5-18 have been updated to clarify nearest Greater Bilby records (20 km northeast).
5.6.5 Impact Assessment	The following applies for impact assessment for all Program Matters: a. Ensure each Introduced Species section refers to the correct Program Matter. b. Clarify whether the drawdown zone extends to, or affects, permanent or groundwater-fed pools at Weeli Wolli Springs. c. Discuss cumulative groundwater drawdown (2045–2070) at Weeli Wolli Springs and associated pools, including the duration of any dewatering uplift beyond 2045. d. Provide evidence that a 90-day annual drying period for Upper Marillana Creek reflects Pilbara dry- season conditions. e. Assess impacts from pipelines and the GCOSA diversion structure, including barriers to fauna movement, weed spread, drainage disruption, crossing methods and mitigation measures. f. Discuss potential habitat impacts from nitrate eutrophication and calcium carbonate precipitation, with reference to Appendix 3 (Biologic, 2023c).	See response above under ‘5.0 Existing Environmental Values (Program Matters) - All Program Matters’ Section updated accordingly.
Habitat modification, fire, weeds and dust (pp. 121-122)	• This section discusses feral fauna impacts, but the title does not make this clear. • The discussion of feral fauna impacts should address specific threats to this Program Matter	Introduced species heading added. Section updated.
5.7 Grey Falcon		
5.7.2 Studies and sampling effort (p. 123)	• Given records within 2 km of the Activity Area, the potential for breeding, extensive clearing of Grey Falcon habitat (1,028 ha) and limited targeted survey effort during the breeding season, provide evidence supporting the conclusion that the species is absent. Consider additional targeted surveys for Grey Falcons and nesting habitat to improve confidence in the impact assessment.	The Validation Notice does not make the conclusion that the species is absent; however, there are no records within the Activity Area or 500m buffer despite adequate survey effort. The following surveys targeted Grey Falcon and were undertaken during the breeding season (June to November): • Jinidi Targeted Vertebrate Fauna Survey (Biologic 2024b) • CPH Targeted Matters of National Environmental Significance Vertebrate Fauna Survey (Biologic 2023a)

Comment Number	Comments	BHP Response
		- Yandi 45C Targeted Significant Vertebrate Fauna Survey (Astron 2023) - MAC Phase 4 Marillana Creek Targeted MNES Fauna Survey (Biota 2022). The majority of the remaining surveys listed in Table 4-1 of the final Validation Notice were undertaken outside the breeding season but still targeted the Grey Falcon. Sampling methods included habitat assessments (including water feature assessments), bird census surveys and opportunistic observations taken throughout each survey and included searching tall trees for signs or nests. Given that the species has not been recorded in the Activity Area or 500m buffer, either recently or historically, it does not meet the notifiable action triggers of the APOP. No additional targeted surveys are considered necessary.
5.7.4 Grey Falcon records (p. 124)	Please amend the reference to Figure 5-18 in this section.	The reference already states Figure 5-18 but is incorrectly referenced. It has been amended to Figure 5-21.
	This section states that there are four records within 50km of the Activity Area, but Section 5.7.5 states that the nearest record is 2km away. Please update the text accordingly.	Section has been updated to state ‘ <i>There are four records of Grey Falcon within 10 km of the Activity Area, including three records within the MACSF Validation Notice Activity Area, located approximately 2 km north of the GCOSA diversion structure, and one approximately 8 km west of the northwest scheme (Figure 5 21).</i> ’.
5.7.5 Impact assessment (pp. 128-130):	The following applies for impact assessment for all Program Matters: a. Ensure each Introduced Species section refers to the correct Program Matter. b. Clarify whether the drawdown zone extends to, or affects, permanent or groundwater-fed pools at Weeli Wolli Springs. c. Discuss cumulative groundwater drawdown (2045–2070) at Weeli Wolli Springs and associated pools, including the duration of any dewatering uplift beyond 2045. d. Provide evidence that a 90-day annual drying period for Upper Marillana Creek reflects Pilbara dry- season conditions. e. Assess impacts from pipelines and the GCOSA diversion structure, including barriers to fauna movement, weed spread, drainage disruption, crossing methods and mitigation measures. f. Discuss potential habitat impacts from nitrate eutrophication and calcium carbonate precipitation, with reference to Appendix 3 (Biologic, 2023c).	See response above under ‘5.0 Existing Environmental Values (Program Matters) - All Program Matters’ Section updated accordingly.
5.8 Night Parrot		
	The following applies for impact assessment for all Program Matters: a. Ensure each Introduced Species section refers to the correct Program Matter. b. Clarify whether the drawdown zone extends to, or affects, permanent or groundwater-fed pools at Weeli Wolli Springs. c. Discuss cumulative groundwater drawdown (2045–2070) at Weeli Wolli Springs and associated pools, including the duration of any dewatering uplift beyond 2045. d. Provide evidence that a 90-day annual drying period for Upper Marillana Creek reflects Pilbara dry- season conditions. e. Assess impacts from pipelines and the GCOSA diversion structure, including barriers to fauna movement, weed spread, drainage disruption, crossing methods and mitigation measures. f. Discuss potential habitat impacts from nitrate eutrophication and calcium carbonate precipitation, with reference to Appendix 3 (Biologic, 2023c).	See response above under ‘5.0 Existing Environmental Values (Program Matters) - All Program Matters’ Section updated accordingly.
7.0 Offset Proposal		

Comment Number	Comments	BHP Response
7.1 Residual impacts (p. 139) 7.2 Offset requirements (pp. 139-141)	Please include the affected habitat types and delineate the boundary of the groundwater mounding zone at Northern RAV on Figure 7-1 (p. 143).	Noted and updated in Figure 7-1.
7.3 Proposed offset contributions (p. 143):	Financial contributions alone may not constitute an adequate offset; conservation outcomes for impacted Program Matters must be demonstrated and delivered in a timely manner.	Consistent with the Offset Pathways set out in section 12 of BHP's Pilbara Strategic Assessment Assurance Plan and Offset Plan, BHP's financial contribution to offset residual impacts to Program Matters habitat will be made to the Pilbara Environmental Offsets Fund (PEOF). The administration of the PEOF and the offset projects funded by it are managed by the Department of Water and Environmental Regulation.
7.4.1 Baseline datasets (in 7.4 Offset processes) (p. 143)	How will baseline datasets for existing disturbance and baseline aerial photography be validated or verified to ensure that any further disturbance or clearing that has occurred between 1 July 2024 and the commencement of these works is identified to ensure that no Category 2 or 3 ghost bat caves are brought into closer proximity with habitat clearance or disturbance?	Clearing for this Activity can only occur within the Activity Area/Indicative Footprint. BHP will implement its internal land disturbance permit system to ensure clearing does not exceed the identified limits. There are no Category 2 or 3 caves within the Activity Area and therefore, no chance that Category 2 or 3 ghost bat caves will come into closer proximity with habitat clearance or disturbance than identified in the Validation Notice. Offset methodology for capturing, verifying and reconciling land disturbance data is described in detail in Section 7.4.2 of the Validation Notice (p151). This includes producing an EPBC Act Impact Reconciliation Report spatial dataset for the reporting period. This dataset is used for calculating and documenting the number of hectares for each Financial Year, within the reporting period, and deriving the cumulative totals. The final EPBC Act Impact Reconciliation Report dataset will be provided with the EPBC Act IRR document, for review and assessment by PEOF.
8 Commitments		
8.1 Monitoring Commitments		
Table 8.1 Proposed monitoring commitments (p. 149)	- Identify management actions, corrective measures and trigger thresholds if impacts extend beyond the predicted 160 ha mounding zone. - Consider monitoring for the creek discharge for adherence to the dry period cessation and wetting front targets. - Consider monitoring for adverse impacts of groundwater mounding or drawdown on permanent and semi-permanent waterholes or features.	Noted and updated as follows in Table 8-1 For the Northern RAV MAR scheme, BHP proposes to ensure that groundwater levels do not rise above 10 mbgl. This will be informed by groundwater level monitoring and monitoring the tree health of <i>Eucalyptus xerothermica</i> or <i>Eucalyptus leucophloia</i> subsp. <i>Leucophloia</i> trees within the 0-10 mbgl mounding zone. Corrective measures if impacts extend beyond the predicted 160ha mounding zone are already provided in Table 8-1 of the Validation Notice and include. - Investigating the decline to evaluate whether change is due to BHP mounding activities or other factors (e.g. drought, fire, pathogens etc.); - In the event that change is due to BHP mounding activities, BHP will investigate reducing or ceasing reinjection rates (noting this has been added to the final Validation Notice) - Increasing the frequency of riparian vegetation health monitoring if appropriate; and/or - Reviewing and updating procedures, if appropriate. Monitoring of creek discharge and wetting front targets and thresholds are provided in the CPWRMP (BHP 2025c) and include: 90-day no discharge coincident with the dry season (with April to November): - Trigger Criteria: On 1 August of each calendar year assess if the discharge has ceased - Threshold Criteria: On 1 September of each calendar year assess if the discharge has ceased. Wetting front extent: - Trigger criteria: The wetting front along the Upper Marillana Creek reaches 24 km at location UMC1 - Threshold criteria: The wetting front along the Upper Marillana Creek reaches 27 km at location UMC2. Groundwater drawdown impacts to permanent and semi-permanent pools at Weeli Wolli Springs are currently managed by Rio Tinto as drawdown in this area is predominantly associated with abstraction from Hope Downs as such trigger and threshold groundwater levels are not nominated. However, BHP propose to undertake monthly monitoring of groundwater levels and tree health and species richness during

Comment Number	Comments	BHP Response
		operations to increase understanding and ensure ongoing cumulative impacts from Hope Downs and Mining Area C hub are managed. This will be done in accordance with the CPWRMP (BHP 2025c). There are no permanent or semi-permanent water features outside of the Weeli Wolli Springs that could be impacted by drawdown from the Activity. There are no permanent or semi-permanent water features within the groundwater mounding area. The monitoring commitments within the CPWRMP have been added to Table 8-1 in the final Validation Notice.
8.2 Clearing Commitments		
Table 8.2 Clearing Commitments (p. 150)	- Consider including a clearing commitment for grey falcon critical habitat, as discussed in comments above, as their absence from the Activity Areas has not been definitively established. - Add a clearing commitment to maintain all recorded water features within the Activity Areas and groundwater drawdown and mounding impact zones.	The Activity Area has been extensively surveyed, including surveys undertaken during the breeding season, and Grey Falcons records do not exist within the Activity Area or 500m buffer. As such, and in line with BHP's Pilbara Strategic Assessment Assurance Plan and Offset Plan, separate clearing commitments for the Grey Falcon for this Activity are not proposed as the notifiable action triggers have not been met. A clearing commitment to maintain all permanent and semi-persistent water features within the Activity Area and groundwater impact zone has been added to Table 8-2. This commitment has not been extended to include all water features within the groundwater drawdown zone as there are numerous ephemeral and temporary water features that are not impacted by changes to groundwater regimes.
8.3 Management Commitments		
Table 8.3 Management Commitments (pp. 150-153)	- Quolls and Pilbara Olive Pythons can be mobile through their local range. Please include more detail about the how the proximity to Program Matter records will apply to the fauna spotter protocols (p. 150). - Please add environmental awareness induction for site personnel to the commitment to minimise risk of vehicle related mortality of Program Matters. - Weed management: specify what monitoring and management of weeds will be undertaken along the diversion structure, new pipeline extents and (for both riparian and aquatic weeds) the creeks where increased surface flow will occur. - Consider a management commitment to collaborate with RTIO to prevent lowering of the groundwater table at Weeli Wolli Spring over the course of both companies' operations in the vicinity.	Table 8.3 has been updated as follows: - Given that Northern Quoll and Pilbara Olive Python are mobile throughout their range, the requirement for fauna spotters in proximity to records has been removed. The commitment for Pilbara Olive Python and Northern Quoll fauna spotters has been updated to align with the Ministerial Statement 1278 issued under Part IV of the EP Act and includes <i>suitably trained fauna spotters will be utilised for pre-clearance surveys undertaken 7 days prior to clearing in areas of critical and supporting Northern Quoll and Pilbara Olive Python habitat (including Yandicoogina Creek and Marillana Creek)</i>. - Environmental awareness inductions for Pilbara Olive Python, Northern Quoll and Ghost Bat have been added to Table 8.3. - Standard hygiene practices will be implemented in accordance with BHPs Environmental Weed Management in Western Australia Procedure to minimise the introduction and spread of weeds. This includes annual weed mapping, weed control (if required) and vehicle hygiene measures when entering/leaving construction areas. This will be undertaken across the entire Activity Area, including the diversion structure, new pipeline extents, in and around creeks where increased surface flow could occur, and throughout the groundwater impact areas. A management commitment to implement the Central Pilbara Water Resource Management Plan (BHP 2025c) is included in Table 8-3. As part of the CPWRMP (BHP 2025c), BHP have several a management actions to collaborate with RTIO including: - To initiate and support collaboration with RTIO for the purpose of developing an optimised water management approach dedicated to mitigating cumulative impacts within the catchment, involving: - Sharing of monitoring and modelling data - Methods and options for ensuring compliance with the water management objectives - Site-scale and catchment-scale management strategies. - To evaluate and select practical and suitable management options, in collaboration with RTIO, for the implementation of an adaptive and aquifer recovery approach for Weeli Wolli Spring that may include: - Source water supply (source, volume, quality and timeframes) - Methodology and design (re-injection methods and locations) - Operational and monitoring plan (recharge rates, timeframes, monitoring requirements, recovery monitoring and contingency measures) - To review provisions for Weeli Wolli (and revise if required) at notification of pre-closure of Rio Tinto Iron Ore's Hope Downs mining operation. A separate management commitment to collaborate with RTIO has not been put into Table 8-3 of the Validation Notice, as this is already provided for in the management commitment to implement the CPWRMP (BHP 2025c).