Environmental Management Plan

Brockman Syncline Proposal

May 2024

RTIO-1013962

Hamersley Iron Pty Limited

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Disclaimer and Limitation

This Environmental Management Plan has been prepared by Rio Tinto's Iron Ore group (Rio Tinto), on behalf of Hamersley Iron Pty Limited (the Proponent), specifically for the Brockman Syncline Amended Proposal. Neither the document nor its content may be referred to without the express approval of Rio Tinto unless Rio Tinto has submitted the document to the relevant government regulator for assessment in connection with the Brockman Syncline Amended Proposal.

Document Status					
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				To Whom	Date
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EXECUTIVE SUMMARY

This Environmental Management Plan (EMP) has been prepared by Rio Tinto on behalf of Hamersley Iron Pty Limited (the Proponent) for the Brockman Syncline Amended Proposal (the Amended Proposal). This EMP specifically addresses the following environmental factors associated with the Amended Proposal:

- Inland Waters
  - Surplus water discharge and riparian vegetation of Boolgeeda Creek
  - Hydrology of Duck Creek and Boolgeeda Creek; and aquatic fauna values of Duck and Caves Creek
  - Groundwater dependent vegetation of Duck and Caves Creek
  - Plunge Pool (permanent water body with critical habitat for MNES terrestrial fauna)
  - Ridge Pool surface water catchment partially within the Development Envelope (seasonal - intermittent or episodic water body with critical habitat for MNES terrestrial fauna)
- Terrestrial Fauna
  - Matters of National Environmental Significance (MNES) fauna species and their critical (denning, roosting and breeding) habitats:
    - Northern Quoll (*Dasyurus hallucatus*)
    - Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)
    - Ghost Bat (*Macroderma gigas*) and
    - Pilbara Olive Python (*Liasis olivaceus barroni*).
- Flora and Vegetation
  - Priority 1 Flora: *Tetratheca butcheriana*
- Subterranean Fauna
  - Groundwater monitoring program

Executive summary Table 1 presents the relevant approval/s, and the purpose of this EMP. Executive summary Table 2 presents the environmental outcomes and objectives for each environmental factor to be met through implementation of this EMP, as well as the environmental criteria and management targets to measure the achievement of the associated environmental outcomes and objectives.

ES Table 1: Summary of Approvals and Purpose of this EMP

Item	Details
Proposal title	Brockman Syncline Amended Proposal
Proponent	Hamersley Iron Pty Limited
Ministerial Statement/s	New Ministerial Statement to replace MS 131, 867, 925 and 1000
EPBC Act Approval	Under assessment
Purpose of this EMP	This EMP provides management for environmental values with the potential to be impacted by the Brockman Syncline Amended Proposal. This EMP fulfils the anticipated requirements of a new Ministerial Statement which will incorporate and supersede Condition 6 of MS 1000 and Conditions 6, 7 and 8 of MS 925.
Key Environmental Factors	There are four key environmental factors associated with the Amended Proposal addressed in this EMP: • Inland Waters • Terrestrial Fauna • Flora and Vegetation • Subterranean Fauna (stygofauna) The outcomes and objectives for the values associated with these factors are outlined in ES Table 2.

Proposed Construction Date	2024
EMP required pre-construction?	EMP required pre-construction for items relevant to the Brockman Syncline Proposal (the Proposal) EMP not required pre-construction for items relevant to Existing Operations (already approved under existing Ministerial Statements).

ES Table 2: Environmental Criteria to Measure Achievement of Environmental Outcomes and Objectives

Inland Waters – Surplus Water Discharge and Riparian Vegetation of Boolgeeda Creek **Condition clauses:** Condition 6 of MS 1000 **EPA Objective**: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*		
Outcome based provisions	**Environmental outcome**	The Proponent will ensure that changes in hydrological regime will have no adverse-long term impacts to the Riparian Vegetation of Boolgeeda Creek as a result of implementation of the Amended Proposal.
	Early response criteria	15% decrease in mean foliage cover at potential impact sites[1] relative to baseline[2], in excess of change in reference areas, attributable to the Amended Proposal.
		15% decline in the number[3] of common [4] native perennial riparian understorey and groundcover species at potential impact sites[1], in excess of declines in reference areas, attributable to the Amended Proposal.
	Trigger criteria	25% decrease in mean foliage cover at potential impact sites[1] relative to baseline[2] in excess of change in reference areas, attributable to the Amended Proposal.
		20% decline in the number[2] of common[3] native perennial riparian understorey and groundcover species at potential impact sites[1], in excess of declines in reference areas, attributable to the Amended Proposal.
		Weed species recorded at a potential impact site[1], which has not previously been recorded within the vegetation survey area of Boolgeeda Creek, attributable to the Amended Proposal.
	Threshold criteria	40% decrease in mean foliage cover at potential impact sites[1] relative to baseline[2], in excess of change in reference areas, attributable to the Amended Proposal.
		25% decline in the number[2] of common[3] native perennial riparian understorey and groundcover species at potential impact sites[1], in excess of declines in reference areas, attributable to the Amended Proposal.
		Weed species not previously recorded within the Boolgeeda Creek survey area and classified by DPaW (2013) as having High Ecological Impact and Low Feasibility of Control for the Pilbara region in excess of 60% of total understorey cover, attributable to the Amended Proposal.

[1] Refer to Figure 2-1 and Figure 2-2 for locations of Boolgeeda Creek potential impact monitoring sites.

[2] Baseline values are the mean % canopy foliage cover of all measurements in the predicted dewatering discharge footprint prior to discharge. This activity is currently occurring under existing approval MS 1000 and baseline is already set from previous approval.

[3] Number of species present relative to baseline

[4] Species present at ≥50% of potential impact monitoring transects on Boolgeeda Creek during baseline

Inland Waters – Hydrology of Duck Creek and Aquatic Fauna Values Associated with Duck and Caves Creek[5] **Condition Clauses:** MS 925 Condition 7 **EPA Objective**: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*		
Outcome based provisions	**Environmental outcome**	Discharge of surplus water as a result of mining does not cause long term impacts on the environmental values of the Duck Creek system.
		Ensure water discharged to Duck Creek meets specified agreed water quality requirements developed in accordance with the ANGZ (2018) framework.
	Trigger criteria	Toxicant - Rolling annual median concentration is statistically higher than the SSTV[6] OR a single value is above the 95th percentile of baseline[7] of ANZG (2018) framework or its updates DGV 90% species protection level; and resampling confirms the value still exceeds the SSTV (Appendix C), local baseline[7] and reference sites[8], attributable to the Amended Proposal. OR Stressor - Rolling annual median concentration is statistically higher than the SSTV and resampling confirms the value still exceeds the TV, local baseline[7] and reference sites[8], attributable to the Amended Proposal.
		Aquatic fauna assemblage patterns are outside variation measured during baseline and statistically significant differences are observed between potential impact and reference sites[8], attributable to the Amended Proposal.
	Threshold criteria	Toxicant - The bioavailable concentration also exceeds the SSTV; discharge water is likely to be the cause of the exceedance and expert advice indicates an increased risk to biota, attributable to the Amended Proposal. OR Stressor - A significant upward trend is apparent; discharge water is likely to be the cause of the exceedance and expert advice indicates an increased risk to biota, attributable to the Amended Proposal.
		Changes in aquatic fauna assemblages are localised to the potential impact areas[8], are increasing in severity or downstream extent for successive monitoring events and a relationship is established with altered water quality, flow regime or habitat characteristic, attributable to the Amended Proposal.

[5] The low number of semi-permanent or permanent pools observed on Boolgeeda Creek indicate that impacts on aquatic faunal communities are likely to be low, therefore the focus of the monitoring is on Duck and Caves Creek. One site on Boolgeeda Creek, downstream of the maximum predicted B4 discharge footprint, near the confluence with Duck Creek, has been monitored annually since 2010 (and will continue to be so) as part of monitoring for Duck Creek.

[6] SSTVs are currently being reviewed in accordance with the Adaptive Management Framework of the EMP and will be updated if deemed appropriate

[7] This activity is currently occurring under existing approval MS 925 and baseline is already set from previous approval.

[8] Refer to Figure 2-3 for locations of Duck Creek water quality monitoring locations and Duck and Caves Creek aquatic fauna monitoring sites.

Inland Waters – Groundwater Dependent Vegetation of Duck and Caves Creek **Condition Clauses:** MS 925 Condition 6 **EPA Objective**: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*		
Outcome based provisions	**Environmental outcome**	Prevent long term impact on the health and abundance of groundwater dependent vegetation communities in Caves Creek from drawdown. Prevent long term impact on the health and abundance of groundwater dependent vegetation communities in Duck Creek from discharge.
	Early Response Criteria	Duck or Caves Creek - ≥15% decrease in indicator tree species mean foliage cover from baseline mean cover at any monitoring site[9], attributable to the Amended Proposal. OR Caves Creek Only – Groundwater level in bore MB11SILV023[9] falls below 536 mAHD, attributable to the Amended Proposal.
	Trigger criteria	Duck or Caves Creek - ≥25% decrease in indicator tree species foliage cover from baseline (Appendix D) at two or more monitoring sites[9] within a creek reach, the decline is not part of a regional climatic trend or due to other perturbation, attributable to the Amended Proposal. OR Duck or Caves Creek - Shift in composition, declines in abundance, cover or condition of native vegetation outside the variation measure during baseline and significantly different to reference areas[9], attributable to the Amended Proposal. OR Caves Creek Only - Groundwater level in bore MB11SILV019[9] falls below 527.3 mAHD, attributable to the Amended Proposal.
	Threshold criteria	Duck or Caves Creek - ≥40% decrease in indicator tree species foliage cover from baseline within more than one creek reach for successive monitoring events, decline is not part of regional climatic trend or due to other perturbation and no evidence of seasonal recovery, attributable to the Amended Proposal. OR Duck or Caves Creek - Shift in composition, declines in abundance, cover or condition of native vegetation outside variation measured during baseline and increasing in severity and downstream extent for successive monitoring events, attributable to the Amended Proposal.
Inland Waters – Plunge Pool hydrological regime **Condition Clauses:** TBD **EPA Objective**: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*		

[9] Refer to Figure 2-4 and Figure 2-5 for locations of Duck and Caves Creek vegetation monitoring, and groundwater dependent vegetation and groundwater monitoring locations.

Outcome based provisions	**Environmental outcome**	No measurable drawdown of groundwater levels at Plunge Pool as a result of mine dewatering, attributable to the Amended Proposal. Minimise changes to the hydrological regime of Plunge Pool catchment to ensure environmental and cultural heritage values are supported. Avoid, where possible, and otherwise minimise, impacts to water quality and sedimentation in Plunge Pool as a result of mining. No direct disturbance to Plunge Pool MEZ.
	Early Response criteria	Groundwater level at Bore MB19BS3X0001 (5.2 km from Plunge Pool) falls below 583.92 mAHD (2m less than lowest level observed in baseline data – 586.17 to 585.92 mAHD), attributable to the Amended Proposal.
		Direct disturbance within 30 m of the boundary of the Plunge Pool MEZ, attributable to the Amended Proposal.
	Trigger criteria	Groundwater level at Monitoring Bore MB19BS30010 (2.9 km from Plunge Pool) falls below 573.24 mAHD (2m less than lowest level observed in baseline data – 576.21 to 575.24 mAHD), attributable to the Amended Proposal.
		Effective catchment area of Plunge Pool is reduced to less than 7.5 km^2, attributable to the Amended Proposal.
		Direct disturbance within 15 m of the boundary of the Plunge Pool MEZ, attributable to the Amended Proposal.
	Threshold criteria	Groundwater level at MB19BS30007 (1.7 km from Plunge Pool) falls below 567.80 mAHD (2m less than lowest level observed in baseline data 569.80 to 570.15 mAHD), attributable to the Amended Proposal.
		Effective catchment area of Plunge Pool is reduced to less than 7 km^2, attributable to the Amended Proposal.
		Direct disturbance within the boundary of the Plunge Pool MEZ, attributable to the Amended Proposal.
Inland Waters – Ridge Pool surface water catchment partially within the Development Envelope **Condition Clauses:** TBD **EPA Objective**: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*		
Outcome based provisions	**Environmental outcome**	No direct disturbance to Ridge Pool surface water catchment MEZ within the Development Envelope.
	Early Response criteria	Direct disturbance within 30 m of the boundary of the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.
	Trigger criteria	Direct disturbance within 15 m of the boundary of the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.
	Threshold criteria	Direct disturbance to the Ridge Pool surface water catchment MEZ within the Development Envelope within the Development Envelope, attributable to the Amended Proposal.

Flora and Vegetation – Priority 1 Species – *Tetratheca butcheriana* (Butcher's Tetratheca) **Condition Clauses:** TBD **EPA Objective**: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained*		
Outcome based provisions	**Environmental outcome**	No direct impacts associated with the Amended Proposal to known individuals of *Tetratheca butcheriana*.
	Early Response Criteria	Direct disturbance within 30 m of the boundary of the *Tetratheca butcheriana* MEZ, attributable to the Amended Proposal.
	Trigger criteria	Direct disturbance within 15 m of the boundary of the *Tetratheca butcheriana* MEZ, attributable to the Amended Proposal.
	Threshold criteria	Direct disturbance to the *Tetratheca butcheriana* MEZ, attributable to the Amended Proposal.
Objective based Provisions	**Environmental objective**	No measurable change in the presence or condition of known *Tetratheca butcheriana* individuals , attributable to the Amended Proposal.
	Management target	No significant indirect impacts to known *Tetratheca butcheriana* individuals within the MEZ, attributable to the Amended Proposal.
Terrestrial Fauna – Ghost Bat (*Macroderma gigas*) and Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) **Condition Clauses:** TBD **EPA Objective**: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained*.		
Outcome based provisions	**Environmental outcome**	No direct or significant indirect impacts to identified Ghost Bat and Pilbara Leaf-nosed Bat[10] roosts retained within Mining Restriction Zones (MRZ) and Mining Exclusion Zones (MEZ), attributable to the Proposal.
	Early Response Criteria	Mining activities[11] attributable to the Proposal approach within 20 m of a MRZ boundary.
	Trigger criteria	Mining activities attributable to the Proposal (other than existing and approved low impact activities[12]), intersect a MRZ boundary.

[10] The Upper Beasley River Roost (UBRR) Pilbara Leaf-nosed Bat roost is located ~670m outside of the Development Envelope. This is the only significant Pilbara Leaf-nosed Bat roost is proximity to the Proposal.

[11] All reference to Mining Activities under management criteria, does not include monitoring actions associated with the EMP

[12] No mining excavation is permitted within a MRZ. Only low impact activities such as access tracks may be implemented. No more than 5% of the MRZ can be cleared for low impact activities.

		Identified Apartment Block Caves <350 m from active mining / blasting Vibration levels at caves as listed in Table 2-9 exceed[13]: • Category 2 cave/s – 10 mm/s peak particle velocity (PPV) during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months, attributable to the Proposal. • Category 3 cave/s – 50 mm/s PPV, attributable to the Proposal. OR • Decline in visual structural integrity[14] at retained Apartment Block cave/s as listed in Table 2-9), attributable to the Proposal.
		Identified Isolated Category 2 and Category 3 Caves <350 m from active mining / blasting Vibration levels at isolated Category 2 or Category 3 caves as listed in Table 2-9 exceed: • Isolated Category 2 cave/s – 10 mm/s PPV during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months attributable to the Proposal. • Isolated Category 3 cave/s – 50 mm/s PPV, attributable to the Proposal. OR • Decline in visual structural integrity[14] at any Isolated Category 2 or Category 3 cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal.
	Threshold criteria	**Identified Apartment Block Caves <350 m from active mining / blasting** • Significant compromise in the structural integrity[15] of Apartment Block cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal .
		Identified Isolated Category 2, or Category 3 Caves <350 m from active mining / blasting • Significant compromise in the structural integrity[15] of identified Isolated Category 2 or Category 3 cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal .

[13] Bob Bullen (Bat Call WA) conducted a review of the Brockman Syncline caves and provided cave classifications (following Bat Call WA 2021 A review of ghost bat ecology, threats and survey requirements, DAWE), vibration limits (PPV) and any seasonal specifications. Vibration levels have been set at the most conservative peak particle velocity levels as precautionary measures. Trigger criteria will be updated according to results from geotechnical assessments conducted prior to blasting.

[14] Decline in visual structural integrity is defined as a negative change to the integrity of the cave. The trigger will be exceeded where changes are observed after a blast event, including significant rockfalls (in comparison to baseline data).

[15] Significant compromise in the structural integrity of a cave is defined as damage that negatively impacts the structural integrity and microclimate of the cave such that future Ghost Bat use of the site is prevented.

Terrestrial Fauna – Northern Quoll (*Dasyurus hallucatus*) and Pilbara Olive Python (*Liasis olivaceus barroni*) **Condition Clauses:** TBD **EPA Objective**: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained*		
Outcome-based provisions	**Environmental objective**	Minimise impacts to EPBC Act listed threatened species (Northern Quoll and Pilbara Olive Python) associated with implementation of the Action
	Management target	Manage threatening processes associated with implementation of the Action, where relevant to minimising impacts to EPBC Act listed threatened species (Northern Quoll and Pilbara Olive Python)

Subterranean Fauna –groundwater monitoring program **Condition Clauses:** TBD **EPA Objective**: *To protect Subterranean fauna so that biological diversity and ecological integrity are maintained.*		
Outcome based provisions	**Environmental outcome**	Retain below water table habitat to support potentially restricted stygofauna species.
	Early Response Criteria	Groundwater levels in any of the bores listed in Table 2-11 decrease below respective early response criteria water levels, attributable to the Amended Proposal.
	Trigger criteria	Groundwater levels in any of the bores listed in Table 2-11 decrease below respective trigger criteria water levels, attributable to the Amended Proposal.
	Threshold criteria	Groundwater levels in any of the bores listed in Table 2-11 decrease below respective threshold criteria water levels (maximum drawdown presented in the ERD), attributable to the Amended Proposal.

Corporate endorsement

I hereby certify that to the best of my knowledge, the provisions within this Brockman Syncline Amended Proposal Environmental Management Plan are true and correct

Name: Josh Bennett **Signed:** 

Designation GM: Brockman **Date:** 10/05/2024

Name: Daniel Benefer **Signed:** 

Designation GM: Brockman **Date:** 10/05/2024

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Appendices

Abbreviations and Terminology

Abbreviation	Description
ACAR	Annual Compliance Assessment Report
Amended Proposal	The Amended Proposal incorporates both the Existing Operations and the Proposal
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
AWT	Above Water Table
BC Act	*Biodiversity Conservation Act 2016*
BS2	Brockman Syncline 2
BS4	Brockman Syncline 4
BS4 MMP	Brockman Syncline 4 Revised Proposal Monitoring and Management Plan
BWT	Below Water Table
Conceptual Footprint	Refers to the indicative layout of the direct disturbance footprint of the Proposal, which includes mine pits, waste rock landforms (WRLs), stockpiles, roads and infrastructure. This footprint is indicative only and therefore, the final location of infrastructure may occur outside of the Conceptual Footprint within the Development Envelope and within any approval limits.
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCP	Digital Cover Photography
Development Envelope	Refers to the land parcel in which the existing operations, new mine areas, and associated facilities of the Proposal are located and the full range of impacts.
DGV	Default Guideline Value
DWER	Department of Water and Environmental Regulation
EC	Electrical Conductivity
EMP	Environmental Management Plan
EP Act	*Environmental Protection Act 1986*
EPA	Western Australian Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERD	Environmental Review Document
Existing Operations	Refers to the Approved Proposals (BS2, BS4 and Nammuldi-Silvergrass), approved under MS 131, 867, 925 and 1000 and includes components of the Approved Proposals that have and those that are yet to be implemented.
GDE	Groundwater Dependent Ecosystems
GDV	Groundwater Dependent Vegetation
IUCN	International Union for Conservation of Nature
km	kilometre
m	metre
mAHD	metres Australian Height Datum
MAR	Managed Aquifer Recharge

Management level	Level of management appropriate for an environmental value, as determined by assessment described in the Rio Tinto Framework for EMPs
mm/s	Millimetres per second
MEZ	Mining Exclusion Zone - Refers to an area within the Development Envelope where no direct disturbance is permitted unless for low impact activities associated with monitoring and management only.
MNES	Matters of National Environmental Significance
MRZ	Mining Restriction Zone - Refers to a demarcated zone where no mining excavation will occur, and only low impact activities such as access tracks may be implemented. No more than 5% of the MRZ can be cleared for low impact activities.
MS	Ministerial Statement
NAP	Nammuldi Agriculture Project
NS MMP	Nammuldi-Silvergrass Monitoring and Management Plan
P	Priority
PPV	Peak Particle Velocity
Proponent	Hamersley Iron Pty Limited
Proposal	The Brockman Syncline Proposal - The Proposal includes the extension and development of new above and below water table deposits as an extension and overarching modernisation to existing iron ore operations at BS2 and BS4 and Nammuldi-Silvergrass as approved under MS 131, 867, 1000 and 925.
Responsible	Indicative team within the Proponent's organisation responsible for implementing monitoring and management actions to demonstrate compliance with criterion. A responsible team is provided to facilitate internal Proponent management only; the identified responsible team is subject to amendment without resubmission of the EMP in line with adaptive management processes.
VPZ	Vegetation Protection Zone - A demarcated zone where no direct disturbance is permitted except for activities associated with linear infrastructure (e.g. conveyor, roads, pipelines). Linear infrastructure implemented in a VPZ must not impede water flows or create a barrier to fauna movement. No more than 10% of a VPZ can be cleared for linear infrastructure activities.
WA	Western Australia
WoNS	Weeds of National Significance

1. CONTEXT, SCOPE AND RATIONALE

Hamersley Iron Pty Limited (the Proponent) is proposing to develop the Brockman Syncline Proposal (the Proposal). The Proposal includes a proposed consolidation and modernisation of the Ministerial Statements (MS) for three existing operations, namely:

- Brockman Syncline 2 (BS2) – authorised under MS 131 and MS 867
- Brockman Syncline 4 (BS4) – authorised under MS 1000
- Nammuldi-Silvergrass – authorised under MS 925.

A new consolidated MS for the Existing Operations and the Proposal will be published, with new conditions that supersede MS 131, 867, 925 and 1000 (Appendix A).

This Environmental Management Plan (EMP) has been prepared by Rio Tinto on behalf of the Proponent as a consolidated and modernised EMP for the Existing Operations as approved under MS 131, 867, 925 and 1000 and the Proposal (collectively termed the Amended Proposal). This EMP was produced to support assessment of the Proposal under the WA *Environmental Protection Act 1986* (EP Act) and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). This EMP describes the environmental management of the key environmental factors of the Amended Proposal, providing a single overall contemporary EMP in line with the Proponent's conceptual framework for the development of EMPs.

This EMP was developed in accordance with Western Australian (WA) Policy and Guidance, including:

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2021 (EPA 2021a)
- Environment Protection Authority's (EPA) Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA 2021c)
- EPAs Interim Guidance for Environmental outcomes and outcomes-based conditions (EPA, 2021)
- Environmental Impact Assessment (Divisions 1 and 2) Procedures Manual (EPA 2021b)

This EMP also addresses Commonwealth requirements, described in the *Environmental Management Plan Guidelines* (Australian Government 2014), as presented in Table 1-1.

This EMP is expected to meet future conditions and therefore will be subject to approval prior to implementation by the Western Australian Environmental Protection Authority (EPA) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Table 1-1: Commonwealth Content Requirements within this EMP

Commonwealth Requirement	Section of this EMP
Conditions of the Approval reference table	Appendix A
Project description	Section 1.2
Objectives	Section 2
Roles and responsibilities	HSEC Operational Delivery – PMO (Environment Operations Team)
Reporting	Section 2.3
Potential environmental impacts and risks	Table 1-2 in Section 1.3
Environmental management measures Environmental management activities Performance targets Environmental monitoring Corrective actions	Table 2-4 to Table 2-12 in Section 2

Commonwealth Requirement	Section of this EMP
Maps and diagrams	Figure 1-1 to Figure 2-8
Audit and review	Section 3

1.1. Terminology

The following terminology is used throughout this document:

- **Development Envelope**: Refers to the area in which the Existing Operations and the new mine areas and associated facilities of the Proposal are located. All direct impacts associated with the Amended Proposal will be contained within the Development Envelope.
- **Proposal**: The Proposal is the significant amendment to the Approved Proposals and includes the extension and development of new above and below water table deposits and associated activities to extend the life of the Existing Operations.
- **Existing Operations**: Refers to the existing iron ore operations that form the Approved Proposals (BS2, BS4 and Nammuldi-Silvergrass as approved under MS 131, 867, 1000 and 925) and includes components of the Approved Proposals that have and those that are yet to be implemented.
- **Amended Proposal**: The Amended Proposal incorporates both the Existing Operations and the Proposal.
- **Mining Restriction Zone** (MRZ): Refers to a demarcated zone where no mining excavation will occur, and only low impact activities associated with environmental monitoring and management may be implemented. No more than 5% of the MRZ can be cleared for low impact activities.
- **Mining Exclusion Zone (MEZ):** Refers to an area within the Development Envelope where no direct disturbance is permitted, unless in response to a contingency action associated with monitoring and management.
- **Vegetation Protection Zone (VPZ):** A demarcated zone where no direct disturbance is permitted except for activities associated with linear infrastructure (e.g. conveyor, roads, pipelines). Linear infrastructure implemented in a VPZ must not impede water flows or create a barrier to fauna movement. No more than 10% of a VPZ can be cleared for linear infrastructure activities.
- **Baseline**: Where baseline condition refers to activities associated with Existing Operations, baseline has been approved and set by the associated existing approval instrument.
- **Direct Impact:** Direct impact refers to direct disturbance and/or clearing of a value.
- **Indirect Impact:** Indirect impacts are secondary impacts that may result from direct impacts (e.g. noise, dust etc.)

1.2. Amended Proposal Description

The Amended Proposal is located approximately 60 km west north-west of Tom Price, in the central Pilbara region of Western Australia (WA). The Proposal is located within the Native Title Determination Areas of the Puutu Kunti Kurrama and Pinikura People and the Eastern Guruma People (Figure 1-1).

The Amended Proposal includes but is not limited to the following:

- Existing iron ore operations that form part of the Approved Proposal
- Development of new deposits and extensions of existing operations, including above water table and below water table mining
- Ore processing, transport and handling infrastructure
- Ore, topsoil and subsoil stockpiles

- Mineral waste management, including but not limited to:
  - Waste rock dumps
  - Storage of waste fines
  - Land bridges
  - Low-grade ore dumps
- Surface water management infrastructure, including but not limited to:
  - Diversion drains
  - Levees
  - Culverts
- Infrastructure for groundwater abstraction and utilisation
- Dewatering and surplus water management, including but not limited to:
  - Use in ore processing
  - On-site use, including discharge to disused pits
  - Use at the Nammuldi irrigated agriculture project
  - Infiltration to the aquifer
  - Provision to other users
  - Discharge to creek lines
- Other associated mine infrastructure and support facilities and upgrades, including but not limited to:
  - Accommodation Camps
  - Workshops
  - Hydrocarbon and ANFO storage
  - Laydown areas, offices and accommodation facilities
  - Linear infrastructure including but not limited to:
    - Heavy and light vehicle access roads
    - Crushing and conveying systems
    - Pipe and power lines (including sub-stations)
    - Utilities and communications distribution networks
    - Rail and associated infrastructure
    - Renewable energy infrastructure.

This EMP outlines the management for the Amended Proposal.

Figure 1-2 shows Existing Operations and proposed elements of the Proposal, including the following:

- Brockman Syncline 1 (new development)
- Brockman Syncline 2 (existing and extension)
- Brockman Syncline 3 (new development)
- Brockman 4 (existing and extension)
- Nammuldi-Silvergrass (Silvergrass) (existing).

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Figure 1-1
Location of the Brockman Syncline Proposal

Drawn: GIS Team
Plan: PDE0182233v1
Date: June 2022

Proj: GDA 1994 MGA Zone 50
Scale: 1:1,250,000 @A3
GIS.Team@riotinto.com

Legend

- Rio Tinto Mine
- Rio Tinto Port
- Town
- Development Envelope
- Native Title Determination Area
- National Park
- Rio Tinto Railway
- Conveyor
- Highway
- Major Road
- Minor Road
- Site Access Road

Enlargement

Mount Brockman Road
Eastern Guruma
Silvergrass
Nammuldi
Brockman 2
Brockman Syncline
Brockman 4
White Quartz Road
Puutu Kunti Kurrama and Pinikura
Western Turner Syncline
0 5 10 15 20 Kilometres

Murujuga National Park
Cape Lambert
Dampier
Wickham
Karratha
Roebourne
North West Coastal Highway
Millstream-Chichester National Park
Pannawonica
Mesa A
Mesa J

Great Northern Highway

See Enlargement

Silvergrass
Nammuldi
Brockman 2
Brockman 4
Eastern Guruma
Puutu Kunti Kurrama and Pinikura
Brockman Syncline
Western Turner Syncline
Tom Price
Mount Tom Price
Marandoo
Gudai-Darri
Yandicoogina
Karijini National Park
Hope Downs 1
Hope Downs 4
West Angelas
Paraburdoo
Eastern Range
Channar
Newman

N
0 15 30 45 60 Kilometres

Map units in metres

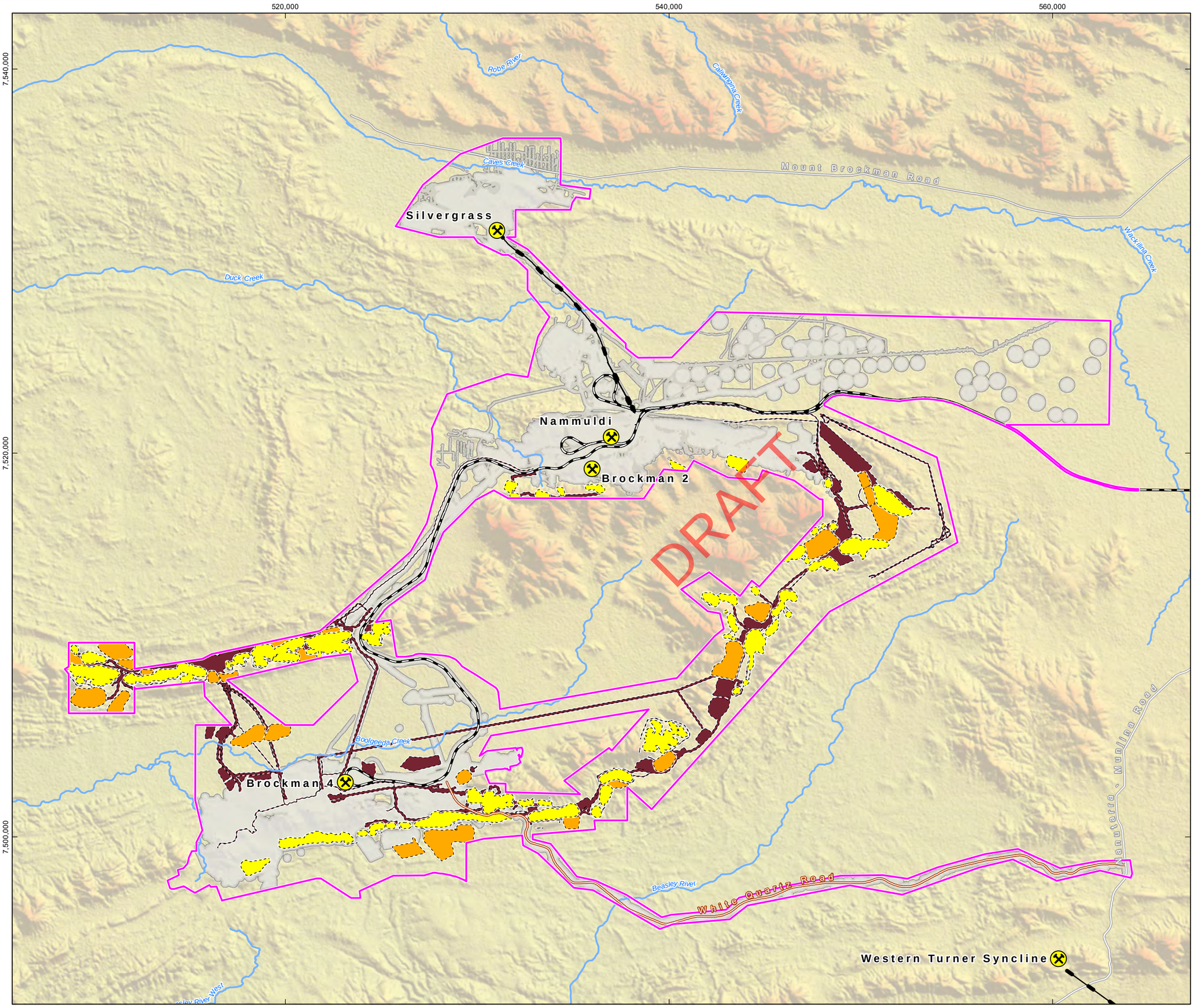

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Figure 1-2 Development Envelope and Indicative Location of Key Proposal Elements

Drawn: L.Fuentes
Plan: PDE0182235v1
Date: July 2022

Proj: GDA 1994 MGA Zone 50
Scale: 1:185,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Part IV Indicative Approved Footprint

Conceptual Footprint

- Pit
- Waste Rock Landform
- Infrastructure
- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Minor Road
- Site Access Road
- Major Creek

N

0 2 4 6 8

Kilometres

Map units in metres

1.3. Existing Operations Environmental Management Plans

There are two approved management plans for the Existing Operations within the Amended Proposals Development Envelope, namely the:

- The Brockman Syncline 4 Revised Proposal Monitoring and Management Plan (BS4 MMP), which includes the monitoring and managing of dewatering discharge from the Brockman Syncline 4 Revised Proposal. This EMP focused on the surface discharge of surplus water to Pulykati Wuntu (Boolgeeda Creek) to ensure that the BS4 proposal would not cause long term impacts to the values of the creek.
- The Nammuldi-Silvergrass Monitoring and Management Plan (NS MMP), which includes:
    - The monitoring and management of dewatering discharge from the Nammuldi-Silvergrass mining operations to Kartajirri Wuntu (Duck Creek).
    - The monitoring of riparian vegetation along Narraminju Wuntu (Caves Creek) with a focus to prevent long term impacts on the health and abundance of groundwater dependent vegetation (GDV) communities as a result of dewatering beneath Caves Creek.

This EMP aims to consolidate these management measures in addition to the inclusion of new management measures required for the Proposal. Monitoring and management under the BS4 MMP and NS MMP have been ongoing since the implementation of these management plans in 2014 and 2016 respectively and is considered to have been successful in managing the identified values. As such, the management provisions outlined in these management plans are considered appropriate and relevant for the Amended Proposal, and hence the provisions have been updated only to reflect any additional requirements of the Proposal.

1.4. Key Environmental Factors

This EMP addresses the key environmental factors relevant to the Amended Proposal, and the potential impacts of the Amended Proposal that require management, as identified in the Environmental Review Document (ERD) (Rio Tinto 2023). The environmental factors, values and potential impacts of the Amended Proposal are outlined in Table 1-2.

Table 1-2: Key Environmental Factor, Associated Environmental Values and Potential Impacts from the Amended Proposal as Addressed in this EMP

Environmental Value (environmental receptor)	Proposal activities and potential impacts	
	Direct	**Indirect**
Inland Waters		
Boolgeeda Creek	**Surplus water discharge** • Continuation of discharge to surface within the approved wetting front in Boolgeeda Creek to a maximum of 37 km (MS 1000). **Changes to surface water catchments, surface water flow paths, flooding and sheet flows from infrastructure** • Reduction in surface water catchment area of Boolgeeda Creek	• No indirect impacts expected.

Duck Creek (Hydrology, Flora and Vegetation and Terrestrial Fauna)	**Surplus water discharge**
	• Continuation of discharge within the approved wetting front (MS 925) in Duck Creek to a maximum of 67 km.
	Changes to surface water catchments, surface water flow paths, flooding and sheet flows from infrastructure
	• The Proposal will not significantly further truncate the surface water catchment of Duck Creek.
		Surplus water discharge
		• Waterlogged/saturated soil conditions may result in:
		  ○ Decline in health and/or mortality of some overstorey riparian species (e.g., *Eucalyptus victrix*)
		  ○ Increased abundance of vegetation and flora species adapted to saturated soil conditions (e.g., groundwater dependant riparian species, sedges, rushes and weed species)
		  ○ Root truncation
		• Increased water availability may result in:
		  ○ Alteration of vegetation structure and species composition
		  ○ Increased abundance of existing weed species and/or introduction of new weed species
		  ○ Increased presence of feral herbivores that may impact native vegetation via trampling and/or grazing
		Changes to surface water quality within pools downstream from surface water discharge points
		• Changes to surface water quality may impact aquatic fauna.

Caves Creek (Flora and Vegetation)	**Changes to surface water catchments, surface water flow paths, flooding and sheet flows from infrastructure** • The Proposal will not significantly further truncate the surface water catchment of Caves Creek.	**Dewatering drawdown** • GDE features have been identified as having moderate or high potential groundwater dependence • Reduce the availability of water to species which access groundwater (*Eucalyptus camaldulensis, Eucalyptus victrix,* and *Melaleuca argentea*)

Environmental Value (environmental receptor)	Proposal activities and potential impacts	
	Direct	**Indirect**
Plunge Pool	**Changes to groundwater levels from mine pit dewatering** • Due to hydraulic compartmentalisation and avoidance strategies, the Proposal is not anticipated to lower groundwater levels in Plunge Pool **Changes to surface water catchments, surface water flow paths, flooding and sheet flows from infrastructure** • The Proposal is predicted to result in the removal of up to 66% of the Plunge Pool surface water catchment.	**Increased sediments in runoff from infrastructure and drainage** • Potential reduced water quality of Plunge Pool resulting in decreased environmental (and associated cultural heritage) value. **Impacts to critical fauna habitat at Plunge Pool** • Potential indirect impacts to critical fauna habitat at Plunge Pool through factors such as dewatering; changes to surface water catchment and flows; sedimentation; and dust resulting in decreased environmental (and associated cultural heritage) value.
Ridge Pool (outside of Development Envelope)	**Changes to surface water catchment** • The Amended Proposal will not impact the surface water catchment of Ridge Pool where within the Development Envelope.	• No indirect impacts expected.
Flora and Vegetation		
Tetratheca butcheriana (P1)	**Proposed clearing and ground disturbance** • All known records of *Tetratheca butcheriana* within the Development Envelope are protected within a single connected MEZ and therefore will not be directly impacted by the Proposal	**Dust deposition** • Reduced plant condition due to smothering from dust related to the Proposal **Introduced flora** • Spread and/or establishment of weed species may outcompete this species.
Terrestrial Fauna		
Northern Quoll (*Dasyurus hallucatus*)	**Proposed clearing and ground disturbance** • Removal of critical Gorge/Gully and Debris Slope/Rocky Outcrop (denning and breeding) habitat	**Other threatening processes (increase of introduced flora (weeds) and fauna (predators), fire, noise, dust and light** • Changes to the environment (including weeds, fire, dust and light) from activities related to the Proposal may influence/change animal behaviour and/or use of fauna habitat in the Development Envelope • Fauna injury or death due to vehicle movements and/or infrastructure • Fauna injury or death due to feral predators (cats and foxes)
Ghost Bat (*Macroderma gigas*)	**Proposed clearing and ground disturbance**	**Mine activities, including blasting, causing vibration**

Environmental Value (environmental receptor)	Proposal activities and potential impacts	
	Direct	**Indirect**
	• Removal of critical Gorge/Gully and Debris Slope/Rocky Outcrop (roosting and breeding) habitat • Removal of 25 non-significant Ghost Bat roosts[16].	• Alteration of the structure of Ghost Bat roosts - Blasting and/or mine pit development may create instability or structural damage to caves, including collapse or generation of cracks / new openings which may change microclimate (i.e., temperature and humidity) **Other threatening processes (increased levels of introduced flora and fauna (predators), noise, dust and light)** • Changes to the environment (including weeds, fire, dust, noise and light) from activities related to the Proposal may influence/change bat behaviour and/or use of caves and/or fauna habitat in the Development Envelope. • Fauna injury or death due to vehicle movements and/or infrastructure (including barbed wire).
Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)	**Proposed clearing and land disturbance** • Removal of critical Gorge/Gully and Debris Slope/Rocky Outcrop (roosting and breeding) habitat • Removal of 25 non-significant Pilbara Leaf-nosed Bat roosts[17].	**Mine activities, including blasting, causing vibration** • Alteration of the structure of Pilbara Leaf-nosed Bat roosts - Blasting and/or mine pit development may create instability or structural damage to caves, including collapse or generation of cracks/new openings which may change microclimate (i.e., temperature and humidity) **Other threatening processes (increased levels of introduced flora and fauna (predators), noise, dust and light)** • Changes to the environment (including weeds, fire, dust and light) from activities related to the Proposal may influence/change bat behaviours and/or use of caves and/or fauna habitat in the Development Envelope. • Fauna injury or death due to vehicle movements and/or infrastructure (including barbed wire)
Pilbara Olive Python (*Liasis olivaceus barroni*)	**Proposed clearing and ground disturbance** • Removal of critical Gorge/Gully and Debris Slope/Rocky Outcrop (shelter and breeding) habitat	**Other threatening processes (increase of introduced flora (weeds) and fauna (predators), fire, noise, dust and light)**

[16] The 25 caves that the Proposal will remove have been assessed as lower value habitats (14 Category 3 Roosts and 11 Category 4 Roosts) and not considered significant to the survival of the Ghost Bat.

[17] The 25 caves that the Proposal will remove have been assessed as lower value habitats, either being nocturnal refuge (category 4) or of no usage and not considered significant to the survival of the Pilbara Leaf-nosed Bat.

Environmental Value (environmental receptor)	Proposal activities and potential impacts	
	Direct	**Indirect**
		• Changes to the environment (including weeds, fire, dust and light) from activities related to the Proposal may influence/change animal behaviour and/or use of fauna habitat in the Development Envelope • Fauna injury or death due to vehicle movements and/or infrastructure • Fauna injury or death due to feral predators (cats and foxes) and other interaction with feral predators such as predation of food sources • Misidentification as a venomous snake.
Subterranean Fauna		
Stygofauna - below water table habitat	**Proposed mining and dewatering** • Dewatering drawdown resulting in loss of below water table stygofauna habitat • Removal of habitat through pit development in areas of dewatering	No indirect impacts expected.

1.5. Condition Requirements

The Proposal is currently being assessed under Part IV of the EP Act and the EPBC Act. The Existing Operations were assessed under Part IV of the EP Act and this EMP addresses previous conditions included in MS 925 and 1000 as described in Appendix A. Considering the information provided in the ERD (Rio Tinto 2023), this EMP proposes environmental management and monitoring to ensure environmental outcomes and objectives are achieved.

1.6. Rationale and Approach

This EMP has been developed in accordance with the Conceptual Framework for the Development of Rio Tinto Environmental Management Plans (internal guidance described in Appendix B). This conceptual approach to management considers the conservation significance of the environmental value (receptor) based on conservation status at local, state and regional levels. Management level (low, moderate or high) is assigned in order to achieve the environmental objective according to the conservation significance of the environmental value and the significance of impact/s predicted over spatial and temporal scales. Assessment of the pathways over which impacts may occur provides the rationale for choice of provisions and choice of appropriate indicators to measure against the environmental outcome.

This EMP provides provisions for potential impacts to environmental values specific to the Proposal. The significance of all potential threats to environmental values present within the Development Envelope, including threatening processes to MNES fauna (that is: presence of weed species and feral fauna, vibration, dust, light, noise, fire and fauna interactions), are considered during the conceptual framework assessment to ensure appropriate provisions.

This EMP addresses the key environmental factors and their associated values that have been identified as potentially being impacted by the Amended Proposal and requiring management, as outlined in the ERD (Rio Tinto 2023).

As outlined in the ERD, maximum clearing limits are proposed for the clearing of Priority 1 and 2 flora species, high value vegetation types and critical fauna habitats. These clearing limits have been proposed to apply to the Proposal and compliance with this condition will be reported annually. No further specific management or monitoring is required in relation to those limits and they are not addressed in this EMP.

The Proponent has also proposed Mining Restriction Zones and Vegetation Protection Zones around some potential GDE features and areas of riparian vegetation. These restriction/protection zones are proposed to apply to the Amended Proposal and will be subject to the disturbance reporting provisions of the Amended Proposal.. No further specific management or monitoring is required in relation to these restriction/protection zones and they are not addressed further in this EMP.

This EMP adopts a combination of outcome-based and objective-based provisions to achieve the proposed environmental outcomes.

Outcome-based provisions are applied where sufficient information exists to establish an achievable environmental outcome which is measurable (EPA 2021c). Environmental criteria are defined to assess performance against the environmental outcome. These are:

Early response criteria — Provide information on changes that are precursors to an environmental impact, used to initiate early response action before or at the onset of environmental impacts. Early response criteria (if appropriate) may be defined for indicators for the environmental value (e.g., groundwater depth) or the environmental value itself (e.g., vegetation status).

Trigger criteria	Measures are set at a conservative level to forewarn the approach of threshold criteria and ensure trigger level actions are implemented well in advance of the compromised environmental outcome.
Threshold criteria	Framed to represent the limit of acceptable impact beyond which there is likely to be a significant effect on the environment. This indicates there is a risk that the environmental outcome will not be met.

Objective-based provisions are applied where it is more effective to monitor an action, rather than a measurable impact or outcome. In this case, management targets are established to measure the success of management actions in achieving the environmental objective.

Complementary supporting provisions are monitoring and management commitments that will assist in the achievement of outcomes and objectives but are not directly tied to them. The rationale for the choice of provisions is provided in Table 1-3.

Table 1-3: Rationale for Choice of Provisions

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
Environmental Value – Inland Waters – Surplus Water Discharge and Riparian Vegetation of Boolgeeda Creek **Environmental Outcome:** *The Proponent will ensure that changes in hydrological regime will have no adverse-long term impacts to the Riparian Vegetation of Boolgeeda Creek as a result of implementation of the Amended Proposal.*		
Key Surveys and Studies: WRM 2020b, Rio Tinto 2019a, WRM 2019a, WRM 2019a, Stantec 2021, Biologic 2021b, Biologic 2020b, Mattiske 2019		
Both the Existing Operations and the Proposal intend to continue discharge of surplus water to Boolgeeda Creek; however, the Proposal will not result in an increase to the already approved wetting front of 37 km. Boolgeeda Creek is an ephemeral creekline in the central valley of the Brockman Syncline and is a major tributary of Duck Creek. Boolgeeda Creek catchment covers an area of approximately 1,650 km^2 and drains in a westerly to south-westerly direction to its point of confluence with Duck Creek. The Boolgeeda Creek catchment is relatively steep and therefore it is expected that a relatively high proportion of rainfall will be converted into runoff. There is only one known deep semi-permanent pool on Boolgeeda Creek, located 9.6 km upstream of the confluence with Duck Creek (outside, and downstream of the Development Envelope). During wetter years, this pool persists over the dry season but dries out completely during drought years. There is an existing surplus water discharge point located within Boolgeeda Creek as part of the existing operations. Water will be discharged into the upper reach of Boolgeeda creek at a maximum discharge rate of 17.5 ML/day. The potential impact of waterlogging is expected to be confined to vegetation growing within or immediately adjacent to the low flow channel. Prolonged saturated soil conditions may cause a decline in the health and abundance of flora species that are not adapted to waterlogged/saturated soil conditions. Potential impacts on vegetation communities include: • Increased abundance of waterlogging tolerant native species • Establishment of new weed species and/or expansion of existing weed populations due to increased water availability • Attraction of feral herbivores to increased water availability • Decline in health and/or death of overstorey eucalypts	**Assumptions:** Hydrological modelling and historical monitoring has been used to provide an indicative extent of continuous flow under natural no-flow conditions for surplus water discharge to Boolgeeda Creek. The hydrological model will be reviewed as additional data becomes available, and revisions to management may be required. **Uncertainties:** • There is insufficient scientific knowledge available to determine irreversible impact thresholds with absolute certainty. Over the life of the Amended Proposal, these thresholds and their suitability will be reviewed and updated where appropriate. • There is a limited understanding of the response of riparian vegetation to cumulative stressors, such as groundwater abstraction, climate variability and surplus water discharge.	There are existing outcome-based provisions for the riparian vegetation of Boolgeeda Creek in the approved BS4 Ministerial Statement 1000 MMP. The Proposal is not expected to result in an increase to the wetting front of Boolgeeda Creek, and the existing provisions for the approved operations are therefore considered appropriate for the Amended Proposal. Outcome-based provisions have been proposed. The assessment of groundwater levels and impacts to riparian vegetation is considered easily measurable and reportable. The outcome-based provisions aim to ensure the following irreversible impact thresholds are not reached • Mature tree death resulting from the impacts of surplus water discharge on Boolgeeda Creek will not exceed 40% in excess of mature tree death in reference areas • Loss of common native perennial riparian understorey and groundcover species resulting from the impacts of surplus water discharge on Boolgeeda Creek will not exceed 25% in excess of losses in reference areas Invasion and domination of weed species not previously recorded within the Boolgeeda Creek survey area and classified by DPaW (2013) (now DBCA) as having High Ecological Impact and Low Feasibility of Control for the Pilbara region, will not exceed >60% of total understorey cover. Trigger criteria (Table 2-1, Table 2-2 and Table 2-3) have been set at a level sufficient to identify if impacts may occur, with time to implement required actions and prevent threshold criteria from being reached. Trigger and threshold criteria will be updated as required with the consideration of additional baseline data and adaptive management practices.
Environmental Value – Inland Waters – Hydrology of Duck Creek and Aquatic Fauna Values Associated with Duck and Caves Creek **Environmental Outcome/s:** *Discharge of surplus water as a result of mining does not cause long-term impacts on the environmental and conservation values of the Duck Creek system; Ensure water discharged to Duck Creek meets specified water quality requirements developed in accordance with the ANZG (2018) framework.*		
Key surveys and studies: Rio Tinto 2021a, WRM 2020b, Rio Tinto 2019b, WRM 2019a, WRM 2019a		
Duck Creek is a largely ephemeral watercourse with semi-permanent and permanent pools supported by groundwater flows and surface runoff. The catchment area of approximately 7,000 km^2 drains from east to west and discharges into the Ashburton River approximately 190 km downstream of the Development Envelope. The major tributaries are Caves Creek and Boolgeeda Creek. Surplus water discharge to Duck Creek has the potential to impact the environmental values associated with the creek. Three vegetation types associated with Duck Creek are considered of higher local significance due to permanent water, the P4 species *Livistona alfredii* and the obligate groundwater dependent tree species *Melaleuca argentea*. These vegetation types are: • *Eucalyptus victrix* and *E. camaldulensis* subsp. *refulgens* woodland to open forest over *Acacia coriacea* subsp. *pendent*, *A. citrinoviridis* and *Melaleuca glomerate* tall open shrubland to tall shrubland over a very open mixed tussock grassland. This vegetation unit predominately occurs in the upper reaches of Duck Creek. Semi-permanent and permanent pools occur in association with this vegetation. • *Eucalyptus camaldulensis* subsp. *refulgens* woodland to open forest over *Acacia coriacea* subsp. *pendens*, *A. citrinoviridis* and *Melaleuca glomerate* tall open shrubland to tall shrubland over *Cyperus vaginatus* open sedgeland. This	**Assumptions:** • Baseline surveys of the flora and vegetation and aquatic fauna values of Duck Creek provide representative species inventories and reflect sampling over variable seasonal conditions. However, these baselines may not capture the full range of climatic variable experiences in the environment (which may be on a decade-scale). **Uncertainties:** • Anticipated daily discharge volumes do not account for short-term events (e.g., rainfall events or emergencies that may interrupt operation)	Existing outcome-based provisions for the values of Duck Creek are outlined in the NS MMP, as per Condition 7 of MS 925. These provisions have been in place since 2016 and the management measures are considered to have been effective. The Proposal is expected to extend the timeframe of the existing approved wetting front to Duck Creek, noting that the Amended Proposal will seek to modernise conditions and apply a formal wetting front of 67 km (previously no set wetting front limit in Schedule 1 of MS 925). The discharge will be continued from the same discharge location in Duck Creek; therefore, the existing monitoring and management provisions are considered appropriate and therefore will continue to apply to the Amended Proposal. Outcome-based provisions are considered appropriate to achieve the environmental outcome. The environmental outcome intends to ensure that the Amended Proposal will not adversely impact significant flora and vegetation and aquatic fauna values associated with Duck Creek as a result of discharging surplus water. To ensure that changes in water quality do not result in long-term impacts to the values of Duck Creek, surplus water discharged to Duck Creek will be monitored and managed to ensure it meets specified agreed water quality requirements developed in accordance with the ANZG (2018) framework or its updates. The assemblages of aquatic fauna within Duck Creek will also be monitored to ensure that no statistically significant changes occur attributable to the Amended Proposal. Trigger criteria (Table 2-4) have been established at a level sufficient to inform when potential impacts may occur, with sufficient time to implement response actions to prevent threshold criteria from being reached. The location of Site 1 (water quality monitoring point, Figure 2-3) was chosen downstream of the discharge point to allow for discharge water to mix with the receiving environment, whilst still being close to where surplus water discharge enters the main Duck Creek Channel to detect any changes as close to the discharge outlet as possible to enable early

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
vegetation occurs downstream of the confluence of Duck and Caves Creek. Scattered juvenile *Livistona alfredii* palms occur within this vegetation unit. • *Eucalyptus victrix* and *E. camaldulensis* subsp. *refulgens* woodland to open woodland over *Melaleuca argentea*, *A. citrinoviridis* low open woodland to scattered low trees over *Melaleuca linophylla* with scattered *Cenchrus spp*. Five priority flora species also occur along Duck Creek: *Oxalis sp. Pilbara* (ME Trudgen 12725) (P2), *Eragrostis surreyana* (P3), *Indigofera sp.* Bungaroo Creek (S. van Leeuwen 4301) (P3), *Rostellularia adscendens var. latifolia* (P3) and *Livistonia alfredii* (P4). There are also fauna values associated with Duck Creek. The riparian woodland and ephemeral nature of Duck Creek provides habitat for a range of fauna, including terrestrial, avian, aquatic, and subterranean. Three IUCN-listed species occur at Duck Creek: Fortescue grunter (*Leiopotherapon aheneus*) (EN), Pilbara emerald dragonfly (*Hemicordulia koomina*) (VU) and Pilbara pin damselfly (*Eurysticta coolawanya*) (VU). Species potentially considered restricted to the hyporheos include potential stygobitic amphipods *Melitidae sp., Paramelitidae sp.,* and the candonid ostracods *Areacandona sp.* Aquatic fauna communities of downstream (outside of Development Envelope) permanent and semi-permanent water bodies at Palm Springs and in the lower reaches of Caves Creek are also well represented at other permanent regional reference sites within the Pilbara.		detection of any potential water quality changes. Additional regular monitoring is undertaken of the overall catchment with the scope focussing on water quality and ecology (aquatic fauna) of the system. The environmental criteria were formulated by considering the baseline conditions of the potential impact and reference sites. Baseline monitoring of water quality in Duck Creek was used to derive site specific trigger values (SSTVs), as described in Appendix C and WRM (2014a). Water quality at Site 1 in Duck Creek is compared to the SSTVs; the response to measurements outside of the SSTVs is as specified by the management triggers in Table 2-4. The ANZG (2018) *Australian Water Quality Guidelines* specify that the impact of discharge water to the environment should be assessed after mixing with receiving waters. Therefore, water quality at the Nammuldi discharge point and dewatering bores is compared to the SSTVs to help interpret any changes seen in the water quality in Duck Creek, but do not have environmental criteria assigned. Similarly, water quality in Duck Creek at sites downstream of Site 1 will help identify the extent of any potential changes due to surplus water discharge and will be responded to as part of the environmental criteria associated with Site 1 (Table 2-4). The above is also managed under Part V of the EP Act.
Environmental Value – Inland Waters – Groundwater Dependent Vegetation of Duck and Caves Creek **Environmental Outcome:** *Prevent long term impact on the health and abundance of GDV communities in Caves Creek from drawdown; Prevent long term impact on the health and abundance of GDV communities in Duck Creek from discharge.*		
Key Surveys and Studies: Biota 2019b, Rio Tinto 2021a, WRM 2020b, Rio Tinto 2019b, RPS 2021, Stantec 2021, Biologic 2021a, Biologic 2021b, Rio Tinto 2022a		
Groundwater dependent vegetation along Duck Creek and Caves Creek is considered locally significant due to the relatively limited extent of this vegetation type compared with other locally occurring vegetation types and the ecological services which they provide. For management purposes, the riparian vegetation condition is considered to be representative of the wider ecological condition and functionality of riparian ecosystems. Discharge activities associated with the Amended Proposal can potentially indirectly impact groundwater-dependent vegetation along Duck Creek. Whilst surplus water discharge from existing operations can potentially indirectly impact groundwater dependent vegetation along Caves Creek. Dewatering causes localised groundwater drawdown extending out from the points of abstraction (cone of drawdown). The discharge causes groundwater mounding and/or prolonged saturation conditions in all or part of the soil profile within affected parts of the riparian zone. Groundwater drawdown within the Silvergrass pit can alter vegetation structure and species composition, with the possibility of the survival and recruitment of some vegetation species favouring others during groundwater drawdown. Furthermore, groundwater drawdown may reduce water availability to vegetation that can access groundwater, with three species on Caves Creek identified as groundwater dependent: *Eucalyptus camaldulensis, E. victrix* and *Melaleuca argentea.* The two *Eucalyptus* species occur within the predicted dewatering footprint and may be adversely affected by groundwater drawdown. The Proposal will not result in any impacts to the groundwater of Caves Creek; therefore, any impacts are associated only with the Existing Operations and no change is proposed to these existing monitoring or management provisions. The surplus water discharge to Duck Creek increases water availability in the unsaturated zone of the creek-bed alluvium. It can result in persistent waterlogged conditions in the soil profile within channel sections. This has the potential to cause a decline in the health and abundance of mature overstorey vegetation, depending on degree and duration of waterlogged conditions. Furthermore, the vegetation structure and species composition may be impacted if there is an increased establishment of	**Assumptions:** The hydrogeological modelling of groundwater abstraction from the Caves Creek aquifer and ongoing monitoring provides an appropriate estimate of the extent and depth of groundwater drawdown at Caves Creek. The hydrogeological models will be updated as additional data becomes available, and revisions to management may be required. **Uncertainties:** • There are uncertainties of the response of riparian and groundwater dependent vegetation to cumulative stressors, such as groundwater abstraction, climate variability and surplus water discharge.	There are existing outcome-based provisions for the GDV of Duck Creek and Caves Creek in the NS MMP, as per Condition 6 of MS 925. The Proposal will not have any additional impacts to Caves Creek and, although the Proposal is expected to result in the continuation of the wetting front of Duck Creek up to 67 km, the existing provisions are considered appropriate given that discharge will be occurring at the same discharge location and the current provisions have been successfully implemented for multiple years. Outcome-based provisions are considered appropriate to achieve the environmental outcomes. Therefore, the existing provisions have been brought into this EMP. Riparian Eucalyptus tree health and groundwater level monitoring will continue to be undertaken to monitor potential adverse impacts to groundwater dependent vegetation. This method has been utilised by the Proponent at other mining operations in the Pilbara and has been successful in monitoring the health and abundance of GDV communities. The groundwater level of bores along Caves Creek will be monitored to measure the aquifer response to dewatering in the Caves Creek aquifer. Trigger criteria (Table 2-5) have been established at a level sufficient to inform when impacts may occur, with sufficient time to implement response actions to prevent threshold criteria from being reached.

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
waterlogging tolerant species and/or weed species; decline in health and abundance of waterlogging intolerant understorey species; and the enhanced recruitment of tree seedlings or other species on stream banks due to increased availability of water.		
Environmental Value – Inland Waters – Plunge Pool Hydrological Regime **Environmental Outcomes:** No measurable drawdown of groundwater levels at Plunge Pool as a result of mine dewatering attributable to the Proposal. Minimise changes to the hydrological regime of Plunge Pool catchment to ensure environmental and cultural heritage values are supported. **Environmental Objective:** *Avoid, where possible, and otherwise minimise, impacts to water quality and sedimentation in Plunge Pool as a result of mining.*		
Key Surveys and Studies: Rio Tinto 2021a, Rio Tinto 2021b, Rio Tinto 2022b, Rio Tinto 2022c, WRM 2019b		
Plunge Pool is a permanent water body at the base of a small gorge within the Development Envelope on Muntulgura Guruma Country. The Pool has ecological importance to fauna, including MNES species and cultural significance to the Muntulgura Guruma Traditional Owners. The pool is fed by surface water from an approximately 21 km^2 sub-catchment of the Hardey River catchment, however the Proposal is predicted to result in the removal of up to 66% of the Plunge Pool surface water catchment. The pool is, however, predominantly supported by groundwater connected to the aquifer in the underlying unmineralised Marra Mamba Iron Formation. The measured groundwater levels in areas adjacent to Plunge Pool indicate the aquifers are all compartmentalised in the area by the occurrence of dolerite dykes. The Existing Operations have no impact on Plunge Pool. Plunge Pool is separated from all BWT mining by dolerite dykes but given there is some uncertainty regarding the hydraulic conductivities, additional measures are proposed to ensure there will be no change in groundwater levels that support the base water level in the pool. In addition, the surface water flushing effect of the pool is also proposed to be retained. These measures include: • Limit mining at BS3 deposit (1 km north of Plunge Pool) to AWT • Backfill BS3 Extension pits (MM-J and Creekside, 9 km northeast of Plunge Pool) to above post mining recovered water levels to minimise long-term drawdown in the upstream aquifer, and any potential for a reduction in inputs to the Plunge Pool aquifer compartment • Maintaining a minimum catchment of 7 km^2 to ensure flushing of the pool is continued • Providing protection from direct impacts through the provision of a MEZ These measures are expected to be effective in ensuring there is no significant change in the groundwater levels and quality in the aquifer that supports Plunge Pool, however groundwater levels, pool levels and water quality will be monitored to ensure expected outcomes are achieved. The potential for increased sediment loads affecting water quality or sedimentation of Plunge Pool will be managed through the installation of leaky weir sediment traps (or similar).	**Assumptions:** The mode of occurrence for Plunge Pool is that its permanent base water level is supported by groundwater and it relies on surface water to fill and flush the pool. **Uncertainties:** • Hydraulic conductivities of dolerite dykes • The effectiveness of management measures in preventing sedimentation downstream of mining.	The Proposal has been designed to avoid changes to the water levels at Plunge Pool so outcome-based provisions are considered appropriate to monitor and ensure this outcome is met. Early warning, trigger and threshold criterion has been selected to detect deviations from the Amended Proposal's conceptual hydrogeological model and have been set at a level sufficient to identify if impacts may occur, with time to implement required action and prevent threshold criteria from being reached. Water level criterion have been applied to monitoring bores located in compartments where a change in groundwater level would indicate the requirement to implement management actions. If the dolerite dykes act as hydraulic barriers (as predicted), when dewatering commences, slight declines on the upstream side of the compartment due to cessation of overtopping from the upstream compartment may be observed; however, it would not be expected for groundwater levels to drop lower than the over-topping point created by the downstream dolerite dyke (Rio Tinto 2024).. Water level criterion (Table 2-6) is also intentionally associated with monitoring bores located in compartments a sufficient distance from significant values to identify if impacts may occur, with time to implement required action and prevent threshold criteria from being reached. For example, the Early Response criteria has been set at a groundwater monitoring bore which is sufficient distance from proposed BWT mining (MM-J) yet far enough away from Plunge Pool (> 2.9 km) and in what is believed to be an isolated aquifer compartment bounded by dolerite dykes either side. In addition, the Threshold criteria has been set based on a monitoring bore > 600 m from Plunge Pool and in an aquifer compartment which is still upgradient to Plunge Pool. Two metre fluctuations have been observed seasonally in baseline data, therefore a decline greater than two metres is considered appropriate for criterion (Rio Tinto 2024). Surface water flows and sediment loads are highly variable in the Pilbara and therefore, objective based provisions are proposed in relation to the hydrological regime, water quality and sedimentation in Plunge Pool. It is noted that Plunge Pool is of significant value to Traditional Owners; any monitoring or access to Plunge Pool and surrounds will be subject to Traditional Owner consent.
Environmental Value – Inland Waters – Ridge Pool Hydrological Regime **Environmental Outcomes:** No direct disturbance to Ridge Pool surface water catchment MEZ where within the Development Envelope. **Environmental Objective:** *Avoid impacts to water quality and sedimentation in Ridge Pool as a result of mining.*		
Key Surveys and Studies: Rio Tinto 2021b, Rio Tinto 2022c		
Ridge Pool is located in a gully high within the vicinity of the BS4 assessment area but is 140 m outside the Development Envelope on Muntulgura Guruma Country. It is a seasonal - intermittent or episodic water body with critical habitat for MNES terrestrial fauna, providing drinking and foraging resources for most of the year. The pool measured approximately 8 m by 4 m and 1 m deep in November 2016. The elevation of the pool is approximately 670 mRL, which is 160 m higher than the pre-mining groundwater level (510 mRL) in the BS4 deposits to the south (Rio Tinto 2022c). This indicates that the pool is either not groundwater dependent or relies on perched groundwater not connected to the broader aquifer. The pool has a catchment area of 0.5 km^2. It is understood to be fed by surface water that collects after rainfall events in a hollow in the low permeability Dales Gorge Member of the Brockman Iron Formation. The water in the pool is protected from	**Assumptions:** • Ridge Pool is either not groundwater dependent or relies on perched groundwater not connected to the broader aquifer level.	There is no direct disturbance to Ridge Pool or any activity within its catchment as part of the Amended Proposal, due to the application of a MEZ to the portion of the surface water catchment within the Development Envelope Therefore, no impact is expected to Ridge Pool itself and hence it is not further discussed in this EMP. Criterion have been included to ensure no direct disturbance to the portion of the Ridge Pool surface water catchment within the Development Envelope.

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
evaporation by an overhanging rock shelf. A small portion of the Ridge Pool surface water catchment is within the Development Envelope. Ridge Pool is located approximately 500 m south-east of the Upper Beasley River PLNB Roost (outside of the Amended Proposal's Development Envelope) and is considered as critical habitat for the Pilbara Leaf-nosed Bat.		
Environmental Value – Flora and Vegetation - Priority 1 Species: *Tetratheca butcheriana* (Butcher's Tetratheca) **Environmental Outcome:** *No direct impacts associated with the Amended Proposal to known individuals of* Tetratheca butcheriana. **Environmental Objective:** *No measurable change in the presence or condition of the known* Tetratheca butcheriana *protected in the MEZs.*		
Key surveys and studies: Biota 2019b; Mattiske 2019; Stantec 2019; Rio Tinto 2021		
Tetratheca butcheriana is currently listed a Priority 1 species by DBCA, however meets International Union for Conversation of Nature (IUCN) criteria to be recognised as Endangered/Critically Endangered; therefore, there is potential for it to be formally listed as such under the BC Act and/or the EPBC Act in the future. The species is restricted to the Hamersley subregion of the Pilbara bioregion, with 3,640 plant records currently known. The species' area of occupancy has been calculated at 24 km^2 and its extent of occurrence as 10,317 km^2. Targeted surveys undertaken for the Proposal identified 202 individuals within the Development Envelope. This species prefers ironstone cliff faces and upper ridgelines, with analysis indicating it tends to prefer a north to north-eastern (to eastern) aspect at elevations ranging from 750 m to 1,050 m. Field observations suggest the species tends to occur on un-mineralised geologies. Due to the potential for the species to be listed as Critically Endangered, the Proponent has undertaken comprehensive targeted searches within the Development Envelope for the species and committed to avoiding the 202 known individuals within the Development Envelope. All of the recorded locations within the Development Envelope will be protected within a single combined MEZ. The MEZ ensures each known record is a minimum 300 m away from potential direct disturbance within the Development Envelope (Figure 1-3). The MEZ will be uploaded to the Proponent's GIS system to ensure that any future alterations to the footprint will avoid these areas (Figure 1-3). MEZs will protect *Tetratheca butcheriana* individuals by: • Avoiding direct disturbance • Preventing fragmentation of populations • Minimising the potential impacts of dust deposition and the spread and/or introduction of weeds.	**Assumptions:** • Protection of all known *Tetratheca butcheriana* individuals will allow the species to persist within the Development Envelope **Uncertainties:** • Although comprehensive targeted surveys have been undertaken, it is recognised that these may not have recorded every individual present within the Development Envelope.	Outcome-based provisions have been proposed to meet the environmental outcome of no direct impacts to *Tetratheca butcheriana* within the Development Envelope attributable to the Proposal. This environmental outcome intends to ensure that the Amended Proposal will not adversely impact the population/s of *Tetratheca butcheriana* within the Development Envelope. Disturbance in proximity to the MEZ is considered an appropriate indicator as it is easily measurable, noting that the species prefers ironstone cliff faces and upper ridgelines ranging from 750 m to 1,050 m which sits at elevation above proposed mining activities and that the species tends to occur on un-mineralised geologies. The Early Response Criteria has been set as direct disturbance within 30 m of the MEZ boundary to ensure that activities can be rectified without direct disturbance to *Tetratheca butcheriana* within the MEZ. Trigger criteria (Table 2-7) have been set at a level sufficient to identify if impacts may occur, with time to implement required action and prevent threshold criteria (i.e., direct disturbance within the MEZ) from being reached. In this case, the trigger criteria has been set as direct disturbance within 15 m of the MEZ boundary. Trigger and threshold criteria will be updated as required with the consideration of additional baseline data and adaptive management practices.
Environmental Value – Terrestrial Fauna: Ghost Bat (*Macroderma gigas*) and Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) **Environmental Outcome:** *No direct or significant indirect impacts to Ghost Bat and Pilbara Leaf-nosed Bat roosts retained within MRZs and MEZs.*		
Key surveys and studies: Biologic 2022, Bat Call WA 2021, Biologic 2020a, Biologic 2021c, Stantec 2020a, Stantec 2020b, Biota 2019a,		
Ghost Bat Evidence of Ghost Bats have been recorded from multiple caves within the Development Envelope. The species is listed as Vulnerable under the BC Act (WA) and EPBC Act and is a MNES. Surveys for the Proposal identified 131 Ghost Bat roosts within the Development Envelope, comprising: • Eight Category 2 roosts (one maternity and seven potential maternity roosts) • 78 Category 3 roosts (six diurnal and 54 potential diurnal roosts, and 18 roosts of unknown value) • 45 Category 4 roosts (32 night and 13 potential night roosts). The Proposal will remove 25 Ghost Bat roosts out of 131 in the Development Envelope, comprising: • 14 Category 3 roosts • 11 Category 4 roosts. The Proposal will avoid direct impacts to 106 Ghost Bat roosts in the Development Envelope comprising:	**Assumptions:** • Blast management measures will be effective to prevent disturbance to the structural integrity of retained roosts. The Proponent has a strong record of managing and maintaining landform stability • Protection of roosting habitat will enable the persistence of Ghost Bats and Pilbara Leaf-nosed Bats within the Development Envelope • Protection of nearby maternity roosts will enable the persistence of the Pilbara Leaf-nosed Bat in the surrounding area • Protection of moderate significant foraging habitat, including pools (Plunge Pool), will enable the persistence of the	Outcome-based provisions have been proposed to manage impacts to Ghost and Pilbara Leaf-nosed Bats, and their roosts which occur within the Development Envelope. The Proponent shall maintain the structural integrity of all significant Ghost Bat roosts (Isolated Category 2 abd Category 3, and Apartment Blocks) in the Development Envelope. This includes establishing MRZs and MEZs around 93 roosts (Table 1-4 and Figure 1-4). These significant Ghost Bat roosts may also be utilised as Category 4 roosts for the Pilbara Leaf-nosed Bat. The protection of cave stability and habitat can be measured and reported; therefore, an outcome-based provision is considered suitable. For all significant caves that are retained, when within 350 m of an active ming/blasting, blast management plans will be implemented in accordance with the PPV limits outlined in Table 1-4 and visual inspections of stability to ensure no impact, as predicted, including monitoring of the cave microclimates whereby a significant step change in temperature and humidity may be an indication of potential changes to the structural integrity of a cave and its ongoing suitability. Data collected at other operations indicates temperature and humidity naturally vary significantly. A change in structural integrity independent of a change in temperature and humidity (and vice versa) may not indicate the cave is no longer suitable. As such, trigger and threshold criteria have been developed that reflect a combined change in structural integrity supported by a step change in microclimate values to identify a change in cave suitability. The Proponent is not proposing to monitor temperature or humidity at the Pilbara Leaf-nosed Bat UBRR (outside the Development Envelope). The UBRR entrance is approximately 0.5m in height and 0.75m in width and progressively gets smaller with an unknown crawl space length before reaching the roost chamber (roost entrance image below). Due to

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
• Eight Category 2 roosts • 64 Category 3 roosts • 34 Category 4 roosts. Overall, 12 Apartment Block roost complexes (comprising a total of 47 roosts) and four isolated Category 2 (without a roost complex) roosts were identified within the greater survey area. Of these, six Apartment Block roost complexes (comprising a total of 20 roosts) and two isolated Category 2 roosts occur within the Development Envelope. For the Proposal, the Proponent has established MRZs and MEZs around significant roosts within the Development Envelope to ensure operations do not directly impact the roosts (Figure 1-4). A MRZ refers to a demarcated zone where no mining excavation will occur, only low impact activities (such as access tracks) may be implemented. A MEZ refers to an area where no direct disturbance is permitted (outside of monitoring actions associated with this EMP). Each significant roost will be surrounded by a central MEZ which is also further surrounded by a MRZ. All significant caves will have PPV limits set to manage the effects of vibration from the mining operation on the roosts. The MEZ, MRZ and PPV for each category of Ghost Bat roost is outlined in Table 1-4, proposed monitoring for all caves retained within the Development Envelope is outlined in Table 2-10. Although these measures have been established for the Proposal, this management will be applied to all retained caves within the Development Envelope (i.e., for the Amended Proposal). Vibration will be managed to ensure the structural integrity of significant caves is maintained throughout the life of mining. Table 1-4 outlines the PPV limits (including limits based upon seasonality for Category 2 and apartment blocks) for bat roosts that will be retained within the Development Envelope. Proposed monitoring for all caves retained within the Development Envelope is outlined in Table 2-10. Noise will be monitored as a complementary measure to ensure that operational noise does not significantly indirectly impact significant caves retained within the Development Envelope throughout the life of mining. Mitigation of indirect impacts from general activities (including the increased presence of introduced flora, dust and light) are largely managed through existing internal procedures such as environmental performance standards which guide our management approach to operations, including securing and maintaining license to operate and achieve successful closure. The standards include water quality protection (E11), air quality (E12), chemically reactive mineral waste control (E13), land disturbance and rehabilitation control (E14), Hazardous material and non-mineral waste control (E15) and Biodiversity and natural resources management (E16).	Pilbara Leaf-nosed Bat within the Development Envelope • The exclusion zone around Plunge Pool will further assist in the protection of high value habitat for the Pilbara Leaf-nosed Bat **Uncertainties:** • Limited data on sensitivity of Ghost Bats and Pilbara Leaf-nosed Bats to light, noise and vibration • Limited understanding of the long-term behaviour of Ghost Bats and Pilbara Leaf-nosed Bats in relation to use of roosts and movement between or abandonment of roosts • Limited data on the likely impact of climate change and drought on the Ghost Bat and Pilbara Leaf-nosed Bat.	the restricted shape and size of the UBRR, accessing the roost chamber is not possible. Any temperature or humidity data collected would therefore only record conditions from the entry tunnel which are unlikely to be reflective of the conditions in the roosting chamber. The Proponent therefore does not consider this data collection (due to the entrance limitations in for human entry) to be meaningful in supporting management approaches or outcomes for the Pilbara Leaf-nosed Bat at the UBRR. Instead, provisions are proposed to maintain the structural integrity of the Pilbara Leaf-nosed Bat permanent diurnal (Category 2) roost, along with Pilbara Leaf-nosed Bat presence within the Development Envelope.  **Image 1:** The Upper Beasley River Roost (UBRR) entrance is approximately 0.5m in height and 0.75m in width making it not possible to access the roost chamber. The criteria and targets presented in Table 2-8 will be updated as required with consideration of additional baseline data and adaptive management. Potential impacts to surface water features utilised by the Pilbara Leaf-nosed Bat for foraging are discussed above and assessed in Table 2-6. In addition to the measures included in this plan, clearing limits on critical (breeding and roosting) habitat are included in the limits proposed in the ERD. For caves within 350 m of the conceptual pit footprint provisions include implementation of Mining Restriction Zones and measures to manage vibrations from blasting activities. Vibration levels for caves within 350 m of the conceptual pit footprint have been conservatively set according to Cave categories. Proposed monitoring for all caves retained within the Development Envelope is outlined in Table 2-10. Additional management parameters to address other threatening processes (feral animals, changed fire regimes human presence, and vehicle strikes) and support this objective are included in Table 2-12 and include (but are not limited to): **Management of feral animals**. Vegetation clearing can increase access of feral predators to fauna habitats, resulting in increased competition and predation causing injury or mortality to Ghost Bats and Pilbara Leaf-nosed Bats. To reduce these potential impacts to the population within the Development Envelope, feral cat monitoring and management will be undertaken in the Development Envelope based on consultant advice. The Proponent will engage a consultant to assist in the development of a survey and control program to ensure a robust approach to identifying and managing feral animals, including feral cats and cane toads and is undertaken. This will program will also consider survey and control options for the Pilbara Leaf-nosed Bat UBRR (located ~670m outside the Development Envelope). The survey and control program will include a review to identify and target high risk areas (e.g. environmental value, and potential for further transfer/dispersal). The survey and control program will also consider opportunities to utilise automated feral cat control technology (e.g. Felixers), or other technologies on the advice of consultants in high value areas (subject to regulatory approval). Traditional trapping will still be utilised as required in other areas (e.g. accommodation and waste storage facilities). The requirement to report sightings of feral cats (and other feral animals) will be included in site inductions. **Management of changed fire regimes**. Brockman and surrounds have been an operational mine site for several decades, and there has been changes to fire regime during this time. The Proponent does not propose to actively undertake prescribed burning within the Development Envelope due to the inaccessibility of areas to control prescribed burns, and the risk prescribed burns pose to personnel, active mining areas and the surrounding land uses. The
Pilbara Leaf-nosed Bat Evidence of Pilbara Leaf-nosed Bat has been recorded within the Development Envelope through echolocation recordings and observations of individual bats. The species is listed as Vulnerable under the BC Act and EPBC Act and is a Matter of National Environmental Significance (MNES). A permanent diurnal roost (Category 2), referred to as the Upper Beasley River Roost (UBRR), occurs approximately 670 m outside of the Development Envelope, east of the BS4 assessment area. There are 131 known roosts/overhangs within the Development Envelope, of which 12 are nocturnal refuges (Category 4), 90 are potential nocturnal refuges (Category 4) and 29 are of no usage. Category 4 roosts are not considered critical habitat for the Pilbara Leaf-nosed Bat. No higher priority roosts have been identified within the Development Envelope. The Proposal will remove 25 of these Category 4 roosts, with 93 Category 4 roosts retained within the Development Envelope. The roosts within the Development Envelope overlap with those utilised by the Ghost Bat, described above. Permanent water sources (such as pools) provide foraging habitat for Pilbara Leaf-nosed Bat. Of the 25 known water features within the survey area, all may provide foraging and drinking resources for the species; however, those naturally more persistent and closer to the Upper Beasley River Roost are likely to be of increased significance (i.e., Plunge Pool and Ridge Pool). Ridge Pool itself is located outside of the Development Envelope but the surface water catchment intersects the Development Envelope; the Ridge Pool surface water		

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
catchment will not be impacted by the Amended Proposal. Management for the Ridge Pool surface water catchment and for Plunge Pool is outlined above.		management actions ensure procedures are in place and equipment available to reactively control and manage localised outbreaks of fire, including potential fire impacts to high value areas (where safe to do so). Having procedures in place (including a hot work permit system) and equipment available is considered the most appropriate way to reduce potential impacts to high value areas from fire. **Management of human presence and vehicle strikes**. Human presence, particularly at Ghost Bat caves, may result in disturbance and flushing of bats. Vehicle strike may directly impact Ghost Bat / Pilbara Leaf-nosed Bat numbers. Administrative tools will manage these potential impacts. To reduce these potential impacts to the population within the Development Envelope, access to high value areas (MRZ and MEZ) will be limited to authorised personnel, and speed limits will be implemented based on a risk assessment that considers environmental values (in addition to safety/other required legislation). **Supporting/complementary monitoring parameters** The Proponent continues to note that, based on preliminary operational site data collected, noise limits and associated monitoring is not an effective way to identify, measure or mitigate impacts to Ghost Bats. A 70 dB(Z) noise level parameter has been included at the request of the regulator, Proposed monitoring for all caves retained within the Development Envelope is outlined in Table 2-10. As a supporting parameter, the Proponent will monitor sound noise levels at retained bat roosts to identify if sound noise levels continuously exceed 70 dB(Z) at significant roosts (isolated category 2 roosts, and the primary cave (as advised by SME) within an Apartment Block)), attributable to the Proposal. A noise meter will be placed inside and another outside each cave identified for monitoring. The Proponent has also proposed acoustic monitoring as a supporting criterion for Ghost Bat persistence within the Development Envelope. All retained significant roosts (isolated category 2 roosts and apartment block roosts) within the Development Envelope are utilised by Ghost Bats; Ghost Bats do not consistently call on leaving the roost (unlike Pilbara Leaf-nosed Bats), they don't show roost site fidelity and they naturally abandon roosts throughout the year/season. In addition, genetic analysis undertaken for the Proposal estimated the Ghost Bat population to be 75 individuals within the Survey Area, with 69% of those recorded being single records, indicating a predominantly transient population. A population of this size and fluctuating nature is not statistically sufficient to apply a Lower Call Limit (LCL). As such, call count monitoring is not a reliable or appropriate measure of Ghost Bat population numbers, and therefore cannot be reliably utlised in conjunction with noise monitoring to identify whether noise at roosts is having an observed impact on the Ghost Bat population. Instead, acoustic monitoring for presence/absence of Ghost Bats is considered more appropriate. The Proponent has initial monitoring data from other sites that indicates environmental noise (wind, thunder, birds, insects etc.) regularly exceeds 70 dB(Z) with Pilbara Leaf-nosed Bat populations still persisting. Further, advice from BatCall experts is that bats will return to roosts as long as roost integrity remains (i.e. microclimate). The Proponent has proposed microclimate (temperature and humidity) monitoring at retained high value caves within the Development Envelope. Therefore, the Proponent believes inclusion of sound noise level monitoring as a supporting provision is suitable and will review in conjunction with acoustic data (presence/absence) if there is continual exceedance of the 70 dB(Z) value.
Environmental Value – Threatened Fauna (Northern Quoll (*Dasyurus hallucatus*) and Pilbara Olive Python (*Liasis olivaceus barroni*) **Environmental Objective:** *Minimise direct and indirect impacts to the Northern Quoll and Pilbara Olive Python.*		
Key Surveys and Studies: Biologic 202, Biologic 2020a, Stantec 2020a, Stantec 2020b, Biota 2019a,		
Northern Quoll The Northern Quoll is listed as Endangered under the BC Act and EPBC Act and is a Matter of National Environmental Significance (MNES). Evidence of Northern Quolls have been recorded throughout the Development Envelope by scats and sightings. During the baseline surveys conducted for the Proposal, Northern Quolls were recorded 12 times in the Development Envelope. Northern Quoll population numbers can fluctuate substantially on both annual and inter-annual cycles. This variability is driven by individual'' reproductive biology and long-term cycles in response to regional processes such as rainfall, fire, and related changes to prey populations. Critical habitat to the Northern Quoll comprises Gorge/Gully and Debris Slope/ Rocky Outcrop habitats which provide suitable denning habitat. Adjacent plains and vegetated areas provide foraging and dispersal habitat but are considered to be less important for the species survival. **Pilbara Olive Python** The Pilbara Olive Python is listed as Vulnerable under the BC Act and the EPBC Act and is an MNES species. Evidence of the species has been recorded within the Development Envelope on 12 occasions via direct observation and secondary evidence (sloughs and scats).	**Assumptions:** • Protection of critical habitat will enable the persistence of MNES species within the Development Envelope. **Uncertainties:** The Northern Quoll populations within the Development Envelope is consistent with being a low-density population that undergoes natural boom/bust cycles, which makes it difficult to consistently monitor and understand long-term natural population variability, habitat use and movement of this species within the Development Envelope Limited data on the sensitivity of MNES species to light, noise and vibration Limited data on the likely impacts of climate change and drought on MNES species.	An Objective-based provision is considered appropriate to manage impacts (direct and indirect) to Northern Quoll and Pilbara Olive Python. The objective-based provision is: Northern Quoll and Pilbara Olive Python will continue to persist within the Development Envelope and be monitored through opportunistic sightings and/or camera recordings Complementary provisions including the collection of climatic data, management of feral animals and management of fauna interactions on site are proposed to support the achievement of the environmental outcomes and objective. In addition to the measures included in this plan, clearing limits on high value potential breeding and denning habitat are included in the limits proposed in Condition 1 of the draft Ministerial Statement.

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
Gorge/Gully and Debris Slope/Rocky Outcrop habitats provide critical breeding and denning habitat for the Pilbara Olive Python. In addition, Major Creekline and Minor Creekline habitats provide moderate significance supporting critical foraging and dispersal habitat for the species, particularly in areas adjacent to or that provide connectivity between Gorge/Gully and Debris Slope/Rocky Outcrop habitats. Baseline surveys indicate the Pilbara Olive Python use Plunge Pool. An exclusion zone will protect Plunge Pool to: • Avoid direct disturbance • Mitigate threatening processes, including light, noise and vibration, dust and vehicle and machinery movements • Protect the integrity of the habitat values of Plunge Pool.		

Summary of Current Knowledge	Key Assumptions and Uncertainties	Rationale for Choice of Provision, Indicator/s and/or Management Action/s
Environmental Value – Subterranea+n Fauna – stygofauna **Environmental Objective:** *Retain below water table habitat*		
Key Surveys and Studies: Biologic 2022d, Biologic 2022b, RPS 2021a, Rio Tinto 2022c		
Suitable stygofauna habitat has been identified within the Development Envelope. A unique combination of geological, hydrological, and topographical factors that have contributed to the size, extent, and complexity of habitat available for stygofauna above and below the water table. To inform the impact assessment, 3D habitat modelling was undertaken of above and below water table geologies. Subterranean fauna require suitable porous geology (cavities, fractures and porous zones) to exist. The 3D subterranean habitat model was based on an assessment of porosity of the following data sources – visual inspection of diamond drill cores, lithological information derived from downhole drill logging data and bore logs, hydrogeological information, geophysical survey information, and structural information. As many of these data sources are also utilised, where available, to cross-check and reinforce the validity of the interpretation, in a similar manner to geological resource modelling. Subterranean fauna sampling information was cross-checked where available, with the results of groundwater profiling surveys and the 3D habitat modelling. In most sections of the syncline, the available information correlated with stygofauna records showed that potential viable stygofauna habitat could occur up to 150 m below the surface. However, in the BS1W compartment, groundwater occurs lower/deeper in the stratigraphic profile, and available data suggested that 100 m from surface was more suitable for defining the conceptual system basement of the aquifer relevant for stygofauna in this compartment (Biologic 2022d). The 3D model of below water table stygofauna habitats is based on a large amount of drill-hole information. Modelling the BWT habitats with such a large amount of data resulted in a high degree of confidence in the habitat assessment and assessment of impacts to habitats. There are two key caveats to 3D subterranean habitat modelling – 3D models rely on geological data that are highly variable in nature and the model may not necessarily represent the actual environment, and the modelled area is conservatively constrained to available geological data and habitat/fauna are likely to exist beyond. A total of 760 stygofauna specimens (including higher order identifications) were recorded throughout the greater Study Area. Of these, 22 stygofauna were considered singletons. The high species diversity is attributable to the large size of the Development Envelope, the occurrence of suitable habitats throughout the Development Envelope, the complexity of habitats (i.e., via dykes), the high rate and quality of sampling and taxonomic effort undertaken, and the poor state of invertebrate taxonomy. Most of the animals recorded belong to undescribed species in groups with minimal to absent taxonomic frameworks, which has meant a conservative approach was taken towards species designations and the true number of species may be inflated.	**Assumptions:** • Subterranean fauna 3D habitat mapping identifies connected suitable below water table habitat. • Protection of below water table habitat will enable the persistence of subterranean fauna species within the Development Envelope. **Uncertainties:** • Stygofauna species are cryptic in nature and difficult to monitor.	An outcome-based provision has been proposed to meet the environmental outcome of retaining below water table habitat to support potentially restricted stygofauna species. This environmental outcome intends to measure groundwater levels as a proxy for availability of below water table habitat for restricted stygofauna species to ensure that the Amended Proposal will not have a greater impact than predicted on the availability of below water table habitat for restricted stygofauna within the Development Envelope. Due to their cryptic nature, general habitat locations, low population density, seasonal variability, and unavailability of suitable sampling points etc., stygofauna are difficult to monitor. Instead, groundwater drawdown as an indicator of below water table habitat remaining is considered a suitable indicator as it is easily measurable and can be correlated with groundwater and drawdown models. Early warning criteria (Table 2-11) for groundwater levels have been set at a level sufficient to identify if impacts may occur, and allowing time to identify and investigate potential mitigation options to prevent threshold criteria (i.e., exceedance of the maximum drawdown levels identified in the ERD) from being reached. Trigger criteria (Table 2-11) have been set at a level sufficient to identify if impacts may occur, and allowing time to implement required management actions and prevent threshold criteria (i.e., exceedance of the maximum drawdown levels identified in the ERD) from being reached. Trigger and threshold criteria will be updated as required based on the results of additional baseline monitoring data and adaptive management practices.

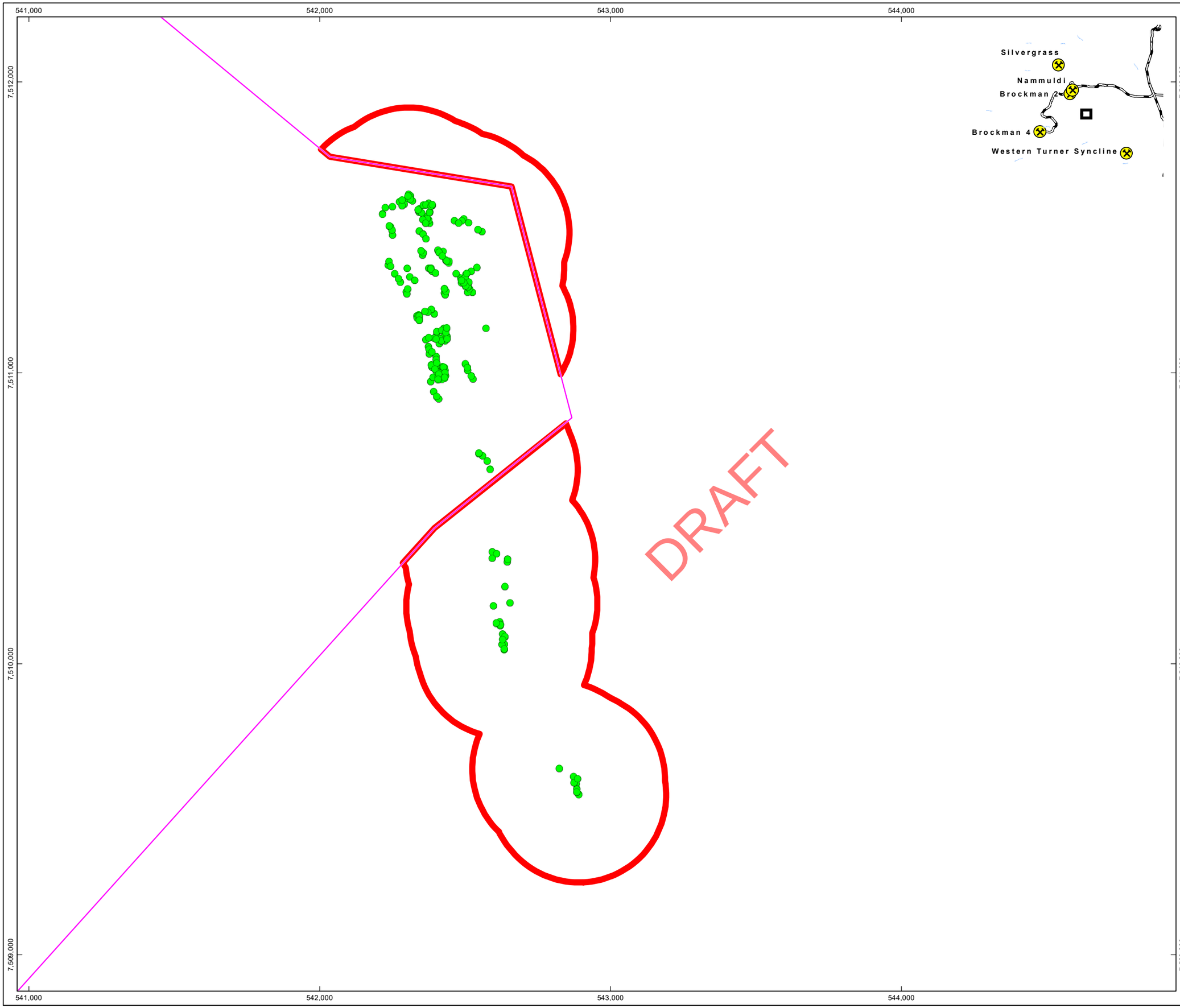

Figure 1-3
300m MEZ Around Population of Tetratheca butcheriana (P1)

Drawn: L.Fuentes
Plan: PDE0191319v2
Date: March 2024

Proj: GDA 1994 MGA Zone 50
Scale: 1:12,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Mine Exclusion Zone (*Tetratheca Butcheriana*)
- *Tetratheca butcheriana* (P1)

Conceptual Footprint

- Pit
- Waste Rock Landform
- Infrastructure

Figure provided as supplementary information to Figure 7-18 in the ERD (Rio Tinto 2023)

N

0 100 200 300 400 500

Metres

Map units in metres

Table 1-4: Mining Restriction Zones and Peak Particle Velocity Threshold for Roosts (Figure 2-7)

Roost Category	Mining Exclusion Zone and Mining Restriction Zone (m)	Peak Particle Velocity (PPV) Thresholds (when cave within 350 m of active mining/blasting)
Apartment Block – Category 2 Roosts	• **MRZ**: Mining activities permitted up to 150 m of primary Category 2 roosts • **MEZ**: Ground disturbance is restricted within 100 m of primary Category 2 roosts.	• 10 mm/s PPV during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months.
Apartment Block – Category 3 and 4 Roosts	• **MRZ**: Mining activities permitted up to 150 m of secondary Category 3 roost • **MEZ**: Ground disturbance is restricted within 100 m of secondary Category 3 roosts • **MRZ**: Mining activities permitted up to 75 m of secondary Category 4 roosts • **MEZ**: Ground disturbance is restricted within 65 m of secondary Category 4 roosts.	• 10 mm/s PPV during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months • Category 3 roosts – 50 mm/s PPV • Category 4 roosts – N/A.
Isolated Category 2 Roosts	• **MRZ**: Mining activities permitted up to 150 m of Isolated Category 2 roosts • **MEZ**: Ground disturbance is restricted within 100 m of Isolated Category 2 roosts.	• 10 mm/s PPV during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months.
Retained isolated Category 3 Roosts	• **MRZ**: Mining activities permitted up to 75 m of retained Category 3 roosts • **MEZ**: Ground disturbance is restricted within 65 m of retained Category 3 roosts.	• 50 mm/s PPV.
Retained isolated Category 4 Roosts	• **MRZ**: Mining activities permitted up to 20 m of retained Category 4 roosts.	• N/A.

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Figure 1-4
Mine Restriction and Exclusion Zones Roosts, Connecting Habitat and Water Features

Drawn: L.Fuentes
Plan: PDE0189741v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:185,000 @A3
GIS.Team@riotinto.com

520,000
540,000
560,000
7,520,000
7,500,000

Silvergrass
Nammuldi
Brockman 2
Brockman 4
Plunge Pool
Duck Creek
Boolgeeda Creek
Beasley River West
Wackiina Creek

DRAFT

0 0.25 0.5 0.75 1 Kilometres

Legend

- Development Envelope
- Ghost Bat Roost
- Bat Cave Exclusion Zone
- MNES Critical Habitat Exclusion Zone

Water Features

- Ephemeral
- Permanent
- Year-round (artificial)
- Unknown

Conceptual Footprint

- Pit
- Waste Rock Landform
- Infrastructure

- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Major Creek
- Minor Creek

N

0 2 4 6 8 10 Kilometres

Map units in metres

2. EMP PROVISIONS

This section of the EMP identifies the provisions that the Proponent will implement to ensure that the defined environmental outcomes and objectives are met during the Amended Proposal's implementation. Outcome and objective-based provisions are detailed in Table 2-1 to Table 2-11. Whilst general provision for EPBC Act listed species related to threatening processes are described in Table 2-12.

The EMP will be updated to align with the adaptive management approach (refer to Section 3).

2.1. Outcome-based Provisions

2.1.1. Boolgeeda Creek

Table 2-1: EMP Provisions – Inland Waters: Boolgeeda Creek Riparian Vegetation (Overstorey) Health and Abundance

Rationale: Discharge of surplus water to Boolgeeda Creek has the potential to result in impacts to health and abundance of the riparian vegetation of Boolgeeda Creek. The Amended Proposal will be managed to avoid long term impacts. Management actions consistent with those currently being implemented under approved management plans.

EPA Factor: Inland Waters, Flora and Vegetation
EPA objective: To protect flora and vegetation so that biological diversity and ecological integrity are maintained **Key environmental values:** Riparian vegetation (overstorey) health and abundance **Key impacts and risks:** Decrease in health and/or death of riparian vegetation as a result of the impacts of dewatering discharge on Boolgeeda Creek
Outcome-based provisions
Outcome: Surface discharge of surplus dewatering water to Boolgeeda Creek will not cause long term impacts to the environmental values of the Boolgeeda Creek system.

Indicators	Management Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Reference and Monitoring Sites (Figure 2-1 and Figure 2-2)					
Early Response Criteria					
15% decrease in mean foliage cover at potential impact sites relative to baseline[18], in excess of change in reference areas (Appendix E), attributable to the Amended Proposal	Investigate potential cause of exceedance by: • Reviewing degree of exposure of impacted trees to dewatering discharge, via review of site-specific surface inundation extent and duration, discharge volumes and hydrological model • Reviewing reference site data to ascertain if changes have also occurred at reference sites • Reviewing site and tree condition information from impact and reference sites to determine if other environmental factors may have caused the change (i.e., fire, storm damage, insect activity, etc.)	Monitoring of riparian vegetation; tree health (overstorey): • Digital Cover Photography (DCP) analysis to detect changes in canopy foliage cover of mature eucalypts • High Resolution Multi-Spectral Imagery analysis to detect changes in tree foliage.	• DCP analysis annually post wet season (Q1/Q2) • High Resolution Multi-Spectral Imagery analysis as required.	HSEC Operational Delivery – PMO (Environment Operations Team)	If the trigger and/or threshold criteria was exceeded during the reporting period, the ACAR will include review of early response actions, if relevant to the exceedance.
Trigger Criteria					
25% decrease in mean foliage cover at potential impact sites relative to baseline[18], in excess of change in reference areas (Appendix E), attributable to the Amended Proposal	As for Early Response Criteria, with the addition of the following: • If causal environmental factors for foliage cover decline other than dewatering discharge cannot be identified then; during next regional flyover, capture High Resolution Multi-Spectral Imagery of the potential impact and reference areas • Review High Resolution Multi-Spectral Imagery to investigate extent of trees with foliage cover decline, within the impact and reference areas • Analysis of temporal and seasonal trends utilising Landsat and Sentinel Imagery Depending on outcomes of the investigations of High Resolution Multi-Spectral Imagery, take some or all of the following actions as warranted: • If review indicates widespread foliage cover decline, undertake expanded on-ground assessment of tree condition within the impact and reference areas	Monitoring of riparian vegetation; tree health (overstorey): • DCP analysis to detect changes in canopy foliage cover of mature eucalypts • High Resolution Multi-Spectral Imagery analysis to detect changes in tree foliage.	• DCP analysis annually post wet season (Q1/Q2) • High Resolution Multi-Spectral Imagery analysis as required.	HSEC Operational Delivery – PMO (Environment Operations Team)	• The environmental outcome will be reported against the trigger criteria for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions

[18] Baseline values are the mean % canopy foliage cover of all measurements in the predicted dewatering discharge footprint prior to discharge

Indicators	Management Actions	Monitoring	Timing/Frequency	Responsible	Reporting
	• Procurement and assessment of additional High Resolution Multi-Spectral imagery and LiDAR to assess broad scale overstorey canopy extent across the system • If preliminary assessment indicates it is warranted, undertake investigations of water levels/waterlogging in the rooting zone of impacted trees • If investigations indicate it is appropriate, expand the extent and frequency of tree condition monitoring within the impact and reference areas • Review potential remediation actions/strategy Consultation with DWER and external stakeholders may be considered appropriate.				
Threshold Criteria					
40% decrease in mean foliage cover at potential impact sites relative to baseline[18], in excess of change in reference areas (Appendix E), attributable to the Amended Proposal	As for Early Response and Trigger Criteria, with the addition of the following: • Within 21 days of confirmation of this threshold level being exceeded, provide a report to DWER • If threshold level exceedance is considered likely to be due to dewatering discharge, report to include proposed remediation actions, to prevent the 'no irreversible impact threshold' (Table 2-5) being reached.	Monitoring of riparian vegetation; tree health (overstorey): • DCP analysis to detect changes in canopy foliage cover of mature eucalypts • High Resolution Multi-Spectral Imagery analysis to detect changes in tree foliage.	• DCP analysis annually post wet season (Q1/Q2) • High Resolution Multi-Spectral Imagery analysis as required.	HSEC Operational Delivery – PMO (Environment Operations Team)	• In the event that monitoring, tests, surveys, or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days of the exceedance being reported • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact

Table 2-2: EMP Provisions – Inland Waters: Boolgeeda Creek Riparian Vegetation (Understorey) Health and Abundance

Rationale: Discharge of surplus water to Boolgeeda Creek has the potential to result in impacts to health and abundance of the riparian vegetation of Boolgeeda Creek. The Amended Proposal will be managed to avoid long term impacts. Management actions consistent with those currently being implemented under approved management plans.

EPA Factor: Inland Waters, Flora and Vegetation
EPA objective: To protect flora and vegetation so that biological diversity and ecological integrity are maintained **Key environmental values:** Riparian vegetation (understorey) health and abundance **Key impacts and risks:** Decrease in health and/or death of riparian vegetation as a result of the impacts of dewatering discharge on Boolgeeda Creek
Outcome-based provisions
Outcome: Surface discharge of surplus dewatering water to Boolgeeda Creek will not cause long term impacts to the environmental and conservation values of the Boolgeeda Creek system.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Reference and Monitoring Sites (Figure 2-1 and Figure 2-2)					
Early Response Criteria					
15% decline in number[19] of common[20] native perennial riparian understorey and groundcover species at potential impact sites, in excess of declines in reference areas (Appendix E), attributable to the Amended Proposal	Investigate potential cause of exceedance by review of: • Degree of exposure to dewatering discharge of transect quadrats where declines have occurred, via review of site-specific surface inundation extent and duration, discharge volumes and extent, and hydrological model Reference monitoring sites data to ascertain if declines have also occurred at control sites Impact and reference site data to ascertain if existing weed populations, or populations of other native species are expanding at the same transect quadrats where declines in number of common native species have occurred Site and vegetation condition information from impact and reference monitoring sites to determine if other environmental factors may have caused declines (i.e., fire, storm damage, insect activity, grazing disturbance etc.).	Riparian vegetation; understorey health and abundance: Vegetation monitoring transects for: • Species present • Number of individuals and/or percentage foliar cover • Vegetation condition.	Annually post wet season (Q1/Q2).	HSEC Operational Delivery – PMO (Environment Operations Team)	If the trigger and/or threshold criteria was exceeded during the reporting period, the ACAR will include review of early response actions, if relevant to the exceedance.
Trigger Criteria					

20% decline in the number[19] of common[20] native perennial riparian understorey and groundcover species at potential impact sites, in excess of declines in reference areas (Appendix E), attributable to the Amended Proposal	As for Early Response Criteria, with the addition of the following:
	If causal environmental factors other than dewatering discharge cannot be identified, and on-ground observations indicate appropriate, then during next annual regional flyover, capture High Resolution Multi-Spectral Imagery of the potential impact area.
	• Investigate the extent of decline within the impact and reference areas, via:
	  ○ Review of High Resolution Multi-Spectral Imagery from latest capture date, if on-ground observations and imagery assessment indicate observed changes in understorey can be distinguished
	  ○ Expanded on-ground assessment within the impact and reference areas.
	Depending on outcomes of the investigation of High Resolution Multi-Spectral Imagery, take some or all of the following actions as warranted:
	  ○ If investigations indicate it is appropriate, expand the extent and frequency of understorey monitoring within the impact and reference areas
		Riparian vegetation; understorey health and abundance:
		Vegetation monitoring transects for:
		• Species present
		• Number of individuals and/or percentage foliar cover
		• Vegetation condition.
			Annually post wet season (Q1/Q2).	HSEC Operational Delivery – PMO (Environment Operations Team)	• The environmental outcome will be reported against the trigger criteria for each calendar year in the ACAR.
					• If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions

[19] Number of species present relative to baseline

[20] Species that were present at ≥50% of potential impact monitoring transects on Boolgeeda Creek during baseline

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting

	• Review potential management actions/strategy, including:
	  ○ If investigations indicate disturbance to vegetation by feral herbivores has increased from baseline and is in excess of that observed at reference sites, implement control measures to reduce herbivore abundance in the discharge footprint and adjacent areas, in consultation with pastoral managers
	  ○ If investigations indicate that existing weed species have increased in abundance and are negatively impacting on native understorey vegetation, management of weeds will be undertaken at the level appropriate to the weed risk and priority identified for each species (in accordance with the Weed Prioritisation Process (dPaW 2013))
	  ○ Other remediation strategies in consultation with stakeholders.
	Consultation with DWER and external stakeholders may be considered appropriate, particularly in investigations indicate Threshold Criteria likely to be exceeded.				

Threshold Criteria					

25% decline in number[19] of common[20] native perennial riparian understorey and groundcover species at potential impact sites, in excess of declines in reference areas (Appendix E), attributable to the Amended Proposal	As for Early Response and Trigger Criteria, with addition of the following:
	• Within 21 days of confirmation of this threshold level being exceeded, provide a report to DWER
	• If threshold level exceedance is considered likely to be due to dewatering discharge, report to include proposed remediation actions, to prevent the 'no irreversible impact threshold' (Table 2-5) being reached.
		Riparian vegetation; understorey health and abundance:
		• Vegetation monitoring transects for:
		  ○ Species present
		  ○ Number of individuals and/or percentage foliar cover
		  ○ Vegetation condition.
			Annually post wet season (Q1/Q2).	HSEC Operational Delivery – PMO (Environment Operations Team)	• In the event that monitoring, tests, surveys, or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified.
					• The Proponent will provide a report to the CEO within twenty-one (21) days of the exceedance being reported
					• The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR
					• If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact

Table 2-3: EMP Provisions – Inland Waters: Boolgeeda Creek Establishment of New Weed Species in Riparian Vegetation

Rationale: Increasing water availability can increase the prevalence of weeds in the surplus discharge wetting front. Management actions consistent with those currently being implemented under approved management plans.

EPA Factor: Inland Waters, Flora and Vegetation
EPA objective: To protect flora and vegetation so that biological diversity and ecological integrity are maintained **Key environmental values:** Establishment of new weed species in riparian vegetation **Key impacts and risks:** Decrease in health, abundance and/or death of riparian vegetation as a result of establishment of new weed species
Outcome-based provisions
Outcome: Surface discharge of surplus dewatering water to Boolgeeda Creek will not cause long term impacts to the environmental and conservation values of the Boolgeeda Creek system.

Indicators	Management Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Reference and Monitoring Sites (Figure 2-1 and Figure 2-2)					
Trigger Criteria					
Weed species recorded at a potential impact site, which has not previously been recorded within the vegetation survey area of Boolgeeda Creek, attributable to the Amended Proposal.	Investigate potential cause of exceedance by review of: • Reference site data to ascertain if weed species have also established at reference sites • If causal environmental factors for establishment of new weed species other than dewatering discharge cannot be identified then: ○ Undertake expanded on-ground assessment within the dewatering impact area for other occurrences of the species ○ Implement control or eradication measures for these species within the dewatering impact area according to the weed risk identified (in accordance with the Weed Prioritisation Process (DPaW 2013)).	Vegetation monitoring transects for: • Weed species present • Number of individuals and/or percentage foliar cover (weeds) • Vegetation condition.	Annually post wet season (Q1/Q2).	HSEC Operational Delivery – PMO (Environment Operations Team)	• The environmental outcome will be reported against the trigger criteria for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions.
Threshold Criteria					
Weed species recorded at a potential impact site, which has not previously been recorded within the vegetation survey area of Boolgeeda Creek, and classified by DPaW (2013) as having High Ecological Impact, Low Feasibility of Control, and exceeds 60% of total understorey cover at impact sites attributable to the Amended Proposal.	• Within 21 days of confirmation of this threshold level being exceeded, provide a report to DWER • If threshold level exceedance is considered likely to be due to dewatering discharge associated with the Amended Proposal, report to include proposed remediation actions to prevent the 'no irreversible impact threshold' (Table 2-5) being reached.	Vegetation monitoring transects for: • Weed species present • Number of individuals and/or percentage foliar cover (weeds) • Vegetation condition	Annually post wet season (Q1/Q2).	HSEC Operational Delivery – PMO (Environment Operations Team)	• In the event that monitoring, tests, surveys, or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days of the exceedance being reported • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact

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Figure 2-1
Boolgeeda Creek Riparian Vegetation Monitoring Potential Impact and Upstream Sites

Drawn: L.Fuentes
Plan: RTIO-0213504v1
Date: October 2022

Proj: GDA 1994 MGA Zone 50
Scale: 1:180,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Tree Health Potential Impact
- Vegetation Transect Potential Impact
- Boolgeeda Creek Discharge Extent
- Discharge Pipeline
- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Minor Road
- Site Access Road
- Major Creek

N

0 2 4 6 8 10
Kilometres

Map units in metres

500,000 520,000 540,000
7,540,000 7,520,000 7,500,000

Robe River
Caves Creek
Duck Creek
Pinarra Creek
Boolgeeda Creek
Beasley River

Silvergrass
Nammuldi
Brockman 2
Brockman 4

B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14

RioTinto

Figure 2-2
Boolgeeda Creek Riparian Vegetation Monitoring Potential Impact and Reference Sites

Drawn: L.Fuentes
Plan: RTIO-0213505v1
Date: October 2022

Proj: GDA 1994 MGA Zone 50
Scale: 1:180,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Tree Health Potential Impact
- Vegetation Transect Potential Impact
- Tree Health Potential Reference
- Vegetation Transect Reference
- Discharge Pipeline
- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Minor Road
- Site Access Road
- Major Creek

N

0 2 4 6 8 10
Kilometres

Map units in metres

500,000 520,000 540,000
7,540,000 7,520,000 7,500,000

C1 C2 C3 C4 C5 C6 C06 C09 C11 C12 C05
E01 E02
T01 D6
B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14
Silvergrass
Nammuldi
Brockman 2
Brockman 4
Robe River
Caves Creek
Duck Creek
Boolgeeda Creek
Pinarra Creek
Beasley River

2.1.2. Duck and Caves Creek

Table 2-4: EMP Provisions – Inland Waters: Hydrology of Duck Creek and Aquatic Fauna Values of Duck and Caves Creek

Rationale: Surplus water discharge may affect vegetation health and/or surface water quality within the discharge extent. Ensuring that there are no long term to riparian vegetation health and water quality will also maintain fauna habitat values and ecosystem function. Management actions consistent with those currently being implemented under approved management plans.

EPA Factor: Inland Waters, Flora and Vegetation
EPA objective: To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected **Key environmental values:** Hydrology and Aquatic Fauna values associated with Duck Creek **Key impacts and risks:** Potential adverse impacts on hydrology and aquatic fauna community of Duck Creek from surplus water discharge quality
Outcome-based provisions
Outcome: Discharge of surplus water as a result of mining does not cause long term impacts on the environmental and conservation values of the Duck Creek system; Ensure water discharged to Duck Creek meets specified agreed water quality requirements developed in accordance with the ANZG (2018) framework or its updates.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Monitoring Locations (Figure 2-3)					
Trigger Criteria					
1. Toxicant – Rolling annual median concentration is statistically higher than the SSTV OR a single value is above the 95th percentile of baseline or ANZG (2018) or its updates DGV 90% species protection level; and resampling confirms the value still exceeds the SSTV (Appendix C), local baseline and reference sites, attributable to the Amended Proposal. OR Stressor – Rolling annual median concentration is statistically higher than the SSTV and resampling confirms the value still exceeds the TV, local baseline and reference sites, attributable to the Amended Proposal. OR **2.** Fauna assemblage patterns are outside variation measured during baseline and statistically significant differences are observed between potential impact and	**1.** Investigate potential cause of exceedance by review of: • Investigate potential cause of water quality change; review water quality at the discharge point, compare data to seasonal baselines and reference sites, review discharge volumes, review rainfall and flood events. • If other sources are identified as a result of Amended Proposal operations, then remove/eliminate source from the most likely pathway and resample • If necessary, review groundwater monitoring data from production borefield and investigate potential contamination from geology of orebody being dewatered. • If investigations warrant, increase frequency of monitoring at selected downstream and reference sites to determine geographic extent of potential contamination. • If necessary, seek expert advice on the potential risk to the environment and assess bioavailability of toxicants if warranted. • Review field ecological monitoring at potential impact and compare baseline to reference sites; if no observable impact on biota, review SSTVs in consultation with stakeholders and experts OR **2.** Review changes in relation to: ○ Water quality data ○ Hydrological data ○ Meteorological and other natural events ○ Habitat characteristics between potential impact and reference sites	**1.** Water Quality Monitoring at Site 1: Main channel of Duck Creek nearest to western boundary of Development Envelope (water quality monitoring point). Parameters indicated for monthly monitoring compared to site specific trigger values (SSTVs) (Appendix C). **2.** Aquatic fauna monitoring[21] at representative downstream and reference sites in Duck and Caves Creek[22]. Fish species richness, composition and abundance indices; fish size and age class distribution; macroinvertebrate species richness, composition and abundance indices; habitat characteristics	**1.** Monthly (while flowing water or pools persist and site is accessible) **2.** Annually (post wet season where pools occur)	HSEC Operational Delivery – PMO (Environment Operations Team)	• The environmental outcome will be reported against the trigger criteria for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions

[21] The low number of semi-permanent or permanent pools observed on Boolgeeda Creek indicate that impacts on aquatic faunal communities are likely to be low, therefore the focus of the monitoring is on Duck and Caves Creek. One site on Boolgeeda Creek, downstream of the maximum predicted B4 discharge footprint, near the confluence with Duck Creek, has been monitored annually since 2010 (and will continue to be so) as part of baseline creek monitoring for Duck Creek.

[22] The Proponent will monitor representative sites from established monitoring sites based on factors such as outcomes from annual surveys and/or discharge extent and volume. Locations may not always be available due to accessibility, weather or safety considerations.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
reference sites, attributable to the Amended Proposal.	If necessary, review monitoring at regional sampling locations to determine if changes are evident at a regional level • Seek expert advice on probable cause and environmental risk of changes observed				
1. Threshold Criteria Toxicant - The bioavailable concentration also exceeds the SSTV (Appendix C), discharge water is likely to be the cause of the exceedance and expert advice indicates an increased risk to biota, attributable to the Amended Proposal. Stressor - A statistically significant23 upward trend is apparent; discharge water is likely to be the cause of the exceedance and expert advice indicates an increased risk to biota, attributable to the Amended Proposal. OR **2.** Changes in aquatic fauna assemblages are localised to the potential impact areas, are increasing in severity or downstream extent for successive monitoring events and a relationship is established with altered water quality, flow regime or habitat characteristic attributable to Amended Proposal operations, attributable to the Amended Proposal.	**1.** Implement previously determined threshold contingency actions, as applicable: • Investigate probable causes and risk to the environment in consultation with external experts • If warranted, instigate additional field surveys and/or ecotoxicity studies to determine level of impact on aquatic biota • Consult with relevant stakeholders • If impacts on fauna indicate it is necessary, undertake remedial actions as required and permitted on advice from relevant stakeholders • If field ecological monitoring or ecotoxicity studies indicate exceedance has no acute or chronic effect on biota, revise SSTVs in consultation with stakeholders and experts OR **2.** • Consult with relevant stakeholders • If investigations indicate it is warranted ○ Investigate additional dry season survey • If necessary, implement remedial actions as required and permitted on advice from relevant stakeholders • Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that is has been demonstrated that the threshold criteria are being met. • Monitor threshold contingency actions to validate success of mitigation strategy.	1. Water Quality Monitoring at Site 1: Main channel of Duck Creek nearest to western boundary of Development Envelope (water quality monitoring point; Figure 2-3). Parameters indicated for monthly monitoring compared to site specific trigger values (SSTVs) (Appendix C) **2.** -Aquatic fauna monitoring at representative downstream and reference sites in Duck and Caves Creek (Figure 23). Fish species richness, composition and abundance indices; fish size and age class distribution; macroinvertebrate species richness, composition and abundance indices; habitat characteristics	1. Monthly (while flowing water of pools persist and site is accessible) 2. Annually (post wet season where pools occur)	HSEC Operational Delivery – PMO (Environment Operations Team)	• In the event that monitoring, tests, surveys, or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days of the exceedance being reported • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact

[23] Statistical analysis is significant if its p-value is ≤0.05.

RioTinto

Figure 2-3
Duck Creek Water Quality and Duck and Caves Creek Aquatic Fauna Monitoring Locations

Drawn: L.Fuentes
Plan: RTIO-0213546v1
Date: October 2022

Proj: GDA 1994 MGA Zone 50
Scale: 1:350,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Water Quality Monitoring Location
- Aquatic Fauna Sampling Point
- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Minor Road
- Site Access Road
- Major Creek

N

0 5 10 15 20

Kilometres

Map units in metres

440,000 460,000 480,000 500,000 520,000 540,000

7,560,000 7,540,000 7,520,000 7,500,000 7,480,000

Kumina Creek
Robe River
Caliwingina Creek
Serpentine Creek
Caves Creek
Duck Creek
Pinarra Creek
Boolgeeda Creek
Beasley River West
Metawandy Creek
Nanutarra - Munjina Road

CAVES CREEK HOMESTEAD
LOWER CAVES CREEK
UPPER DUCK CREEK
LOWER DUCK CREEK

HS1 HS2 HS3 HS4 HS5 HS6
PS1 PS2 PS3 PS4 PS5 PS6
CGU1 CGU2 CGU3 CGU4 CGU5 CGU6
DGU1 DGU2 DGU3 DGU4 DGU5 DGU6 DGU7 DGU8 DGU10 DGU11 DGU11B DGU12
DGUT1 DGUT2
DCD1 DCD2 DCD3 DCD4 DCD5 DCD6 DCD7 DCD8 DCD9 DCD10 DCD11 DCD12 DCD13 DCD14 DCD15

Silvergrass
Site 1
Nammuldi
Brockman 2
Brockman 4

Table 2-5: EMP Provisions – Inland Waters: Groundwater Dependent Vegetation of Duck and Caves Creek

Rationale: Amended Proposal activities have the potential to affect groundwater dependent vegetation in Duck and Caves Creek. The Amended Proposal will be managed to prevent long term impact on the health and abundance of GDV communities and Duck Creek and Caves Creek. Management actions consistent with those currently being implemented under approved management plans.

EPA Factor: Inland Waters, Flora and Vegetation
EPA objective: To protect flora and vegetation so that biological diversity and ecological integrity are maintained **Key environmental values:** GDV communities of Duck Creek and Caves Creek **Key impacts and risks:** Potential adverse impacts on groundwater dependent vegetation of Duck Creek from surplus water discharge and of Caves Creek from groundwater drawdown
Outcome-based provisions
Outcome: Prevent long term impact on the health and abundance of GDV communities in Caves Creek from groundwater drawdown; Prevent long term impact of the health and abundance of GDV communities in Duck Creek from surplus water discharge.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Monitoring Sites (Figure 2-4 and Figure 2-5)					
Early Response Criteria					
Duck or Caves Creek 1. ≥ 15% decrease in indicator tree species mean foliage cover from baseline mean cover at any monitoring site (Appendix D), attributable to the Amended Proposal. OR **Caves Creek Only** 2. Groundwater level in bore MB11SILV023 falls below 536 mAHD (Figure 2-5), attributable to the Amended Proposal.	1. • Context decline in foliage cover with reference and regional site results • Review other environmental factors such as climate, storm damage, fire and insect activity • If necessary, review exposure of impacted trees to ○ Rate and extent of groundwater drawdown or ○ Extent and duration of inundation with dewatering discharge OR **2.** • Review groundwater levels and gradients with orebody aquifer relative to climatic and regional trends • Review abstraction rates, intensity and water bore network sequencing • Review of conceptual groundwater model and revise if necessary • Investigate Managed Aquifer Recharge (MAR).	1. Eucalyptus tree health monitoring Foliage cover as an indicator of tree health (DCP) at representative potential impact and references sites on Duck and Caves Creek 2. Groundwater level will be monitored using a logger and/or manual dips in representative bores	1. Bi-annually 2. Monthly	HSEC Operational Delivery – PMO (Environment Operations Team)	If the trigger and/or threshold criteria was exceeded during the reporting period, the ACAR will include review of early response actions, if relevant to the exceedance.
Trigger criteria					
Duck or Caves Creek 1. ≥ 25% decrease in indicator tree species foliage cover from baseline (Appendix D) at two or more monitoring sites within a creek reach, decline is not part of regional climatic trend or due to other perturbation, attributable to the Amended Proposal. OR 2. Shift in composition, declines in abundance, cover or condition of native vegetation outside the variation measured during baseline and significantly different to	**1.** Investigate potential cause of exceedance by review of: • Review other environmental factors such as climate, fire, grazing intensity, insect activity • Review remotely sensed imagery to determine extent of canopy decline • Compare extent of decline to areas of groundwater drawdown, discharge extent and assess against predicted areas of impact • Review historical remotely sensed imagery to compare to seasonal and longer-term trends • Assess if decline is occurring in vegetation previously augmented from discharge • Review monitoring (transect survey) data • If investigations indicate it is warranted, initiate more frequent and/or extensive qualitative assessment of local riparian vegetation in impacted areas • Review and revise current trigger criterion levels according to results of above investigations, if required OR	1. Eucalyptus tree health monitoring. Foliage cover as an indicator of tree health (DCP) at representative potential impact and reference sites on Duck and Caves Creek. 2. Riparian vegetation monitoring transects: species present (includes introduced taxa); percentage foliar cover; number of individuals-perennial trees and shrubs; vegetation condition; disturbance (cattle activity, fire, other perturbations) at representative impact and reference sites on Duck and Caves Creek 3. Groundwater level will be monitored using a logger and/or	1. Bi-annually 2. Annually (post wet season) 3. Monthly	HSEC Operational Delivery – PMO (Environment Operations Team)	• The environmental outcome will be reported against the trigger criterion for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
reference areas, attributable to the Amended Proposal. OR **Caves Creek Only** 3. Groundwater level in bore MB11SILV019 falls below 527.3 mAHD (Figure 2-5)	**2.** • Context change with reference and regional site results • Review other environmental factors such as climate, fire, grazing intensity, insect activity • Review exposure of impacted sites to i) changed creek flow conditions or ii) extent and duration of inundation with dewatering discharge and iii) the extent of groundwater drawdown, in comparison to predicted areas of impact • Review impact and reference site data to ascertain if existing weed populations are expanding where the number of native species has declined • Review the extent of decline • If investigations indicate it is warranted, increase the extent or frequency of vegetation surveys and/or initiate qualitative assessments • If investigations indicate decline coincides with areas where introduced species have increased in extent, manage weeds at the level appropriate the weed risk and priority identified for each species (in accordance with the Weed Prioritisation Process (DPAW 2013)). **OR** **3.** • Review groundwater levels and gradients with orebody aquifer relative to climatic and regional trends • Review abstraction rates, intensity and water bore network sequencing • Review of conceptual groundwater model and revise if necessary • Review and revise current trigger criterion levels according to results of above investigations, if required. **If investigations indicate that trigger exceedance is due to the Amended Proposal and greater than predicted level of impact, implement trigger level response actions, for example:** **Caves Creek** • Reduce dewatering volumes and rates – and subsequently review groundwater levels and gradients If warranted, initiate Managed Aquifer Recharge (MAR) • Review groundwater levels against conceptual understanding and model predictions. **Duck Creek** • Potential modification to surplus water management and discharge regime • Review response of groundwater dependent vegetation in Duck and Caves Creek for indication of recovery following Trigger contingency actions. **If investigations indicate that trigger exceedance may continue to be exceeded with no indication of recovery, is outside of historical baseline variation and is attributable to the Project, investigate and consult with DWER on Threshold contingency actions.**	manual dips in representative bores.			
Threshold Criterion					
Duck or Caves Creek 1. ≥ 40% decrease in indicator tree species foliage cover from baseline within more than one creek reach for successive monitoring events, decline is not part of regional climatic trend	Threshold contingency action: • Notify relevant stakeholders • Instigate external reporting within 7 days. **Implement as appropriate, previously determined threshold contingency actions, for example:** **Caves Creek** • Increase MAR reinjection volume	1. Eucalyptus tree health monitoring. Foliage cover as an indicator of tree health (DCP). At representative potential impact and reference sites on Duck and Caves Creek 2. Riparian vegetation monitoring transects: species present (includes introduced taxa),	1. Bi-annually 2. Annually (post wet season).	HSEC Operational Delivery – PMO (Environment Operations Team)	• In the event that monitoring, tests, surveys, or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
or due to other perturbation and no evidence of seasonal recovery, attributable to the Amended Proposal. OR 2. Shift in composition, declines in abundance, cover or condition of native vegetation outside variation measured during baseline and increasing in severity and downstream extent for successive monitoring events, reasonably, attributable to the Amended Proposal..	• Consider ceasing dewatering **Duck Creek** • Change of surplus water discharge regime (timing, duration and/or location) • If threshold exceedance is due to increased cover of weeds or other species augmented due to discharge, undertake additional control measures as warranted. Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that the impact is below the threshold and trigger criteria. Monitor to validate success of threshold contingency actions.	percentage foliar cover; number of individuals-perennial trees and shrubs; vegetation condition; disturbance (cattle activity, fire, other perturbations) at representative impact and reference sites on Duck and Caves Creek.			• The Proponent will provide a report to the CEO within twenty-one (21) days of the exceedance being reported • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact.
Supporting/Complementary monitoring parameters for the trigger and threshold criteria					
Remote sensing - No criteria indicator. Data used to help interpret cause of any localised changes within a regional context and/or determine extent of any impacts to vegetation	Actions not applicable.	• Remotely sensed imagery of Duck and Caves Creek and other regional Pilbara creeks • Groundwater level/s at existing monitoring bores.	As required.	HSEC Operational Delivery – PMO (Environment Operations Team)	• If the trigger or threshold criterion was exceeded during the reporting period, the ACAR will include relevant supporting monitoring results, if relevant to the exceedance.

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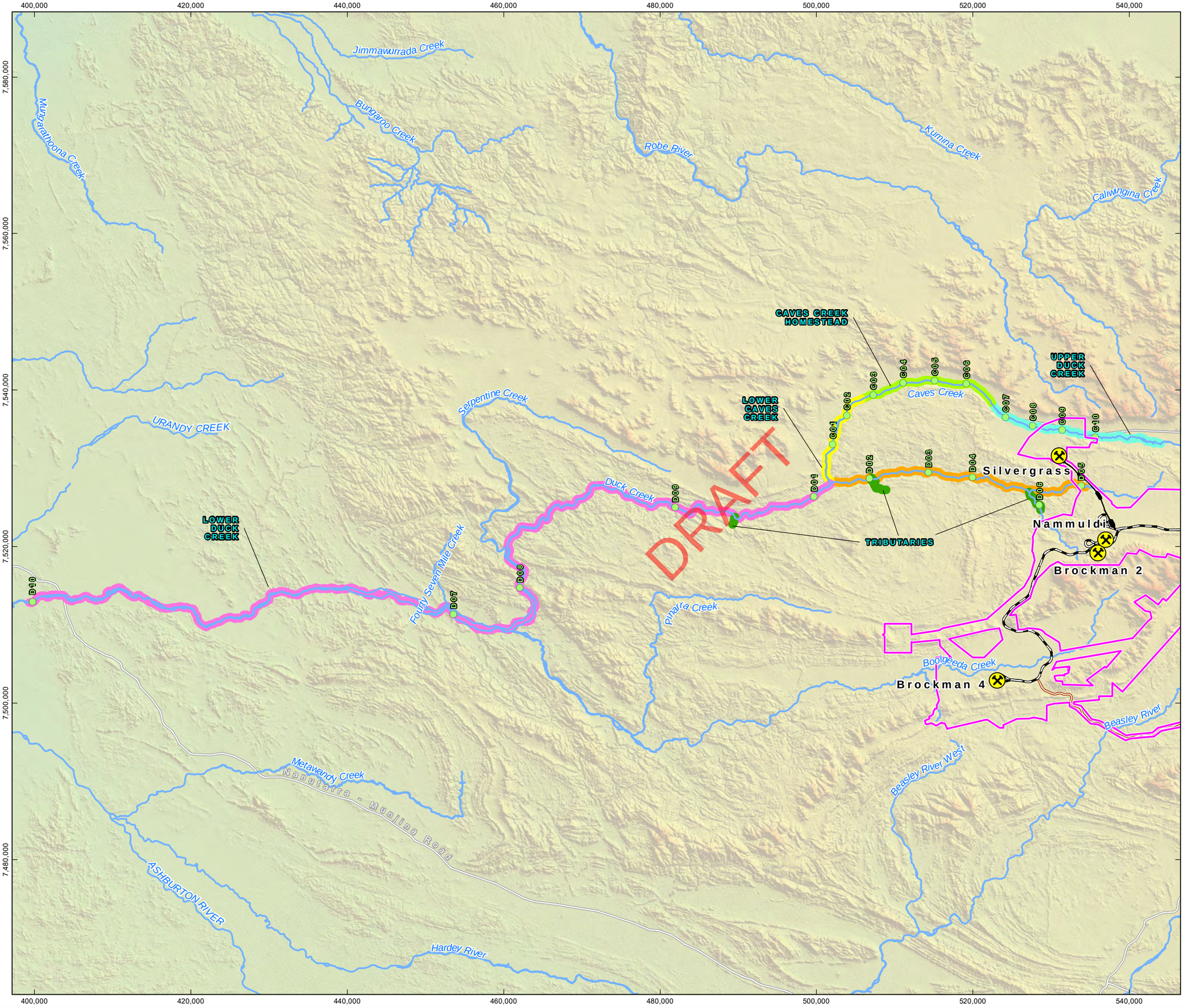
Figure 2-4
Duck and Caves Creek Vegetation Monitoring Digital Canopy Photography

Drawn: L.Fuentes
Plan: RTIO-0213478v1
Date: October 2022
Proj: GDA 1994 MGA Zone 50
Scale: 1:450,000 @A3
GIS.Team@riotinto.com



Legend

- Development Envelope
- Digital Canopy Photography (DCP)

Management Zones

- Beasley River and Tributaries
- Caves Creek Homestead
- Lower Caves Creek
- Lower Duck Creek
- Upper Caves Creek
- Upper Duck Creek

- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Minor Road
- Site Access Road
- Major Creek

N

0 5 10 15 20
Kilometres

Map units in metres

RioTinto

Figure 2-5
Duck and Caves Creek Groundwater Dependent Vegetation and Groundwater Monitoring Locations

Drawn: L.Fuentes
Plan: RTIO-0213479v1
Date: October 2022
Proj: GDA 1994 MGA Zone 50
Scale: 1:450,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Monitoring Bore
- Groundwater Dependent Vegetation Transect

Management Zones

- Beasley River and Tributaries
- Caves Creek Homestead
- Lower Caves Creek
- Lower Duck Creek
- Upper Caves Creek
- Upper Duck Creek

- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Minor Road
- Site Access Road
- Major Creek

N

0 5 10 15 20
Kilometres

Map units in metres

400,000 420,000 440,000 460,000 480,000 500,000 520,000 540,000

7,580,000 7,560,000 7,540,000 7,520,000 7,500,000 7,480,000

Jimmawurrada Creek
Mugarathoona Creek
Burgaroo Creek
Robe River
Kumina Creek
Caliwingina Creek
Serpentine Creek
URANDY CREEK
Duck Creek
Caves Creek
Pinarra Creek
Booligeeda Creek
Beasley River
Beasley River West
Metawandy Creek
Nanutarra - Munjina Road
ASHBURTON RIVER
Hardey River

CAVES CREEK HOMESTEAD
LOWER CAVES CREEK
UPPER DUCK CREEK
LOWER DUCK CREEK
TRIBUTARIES

MB11SILV019
MB11SILV023
G01 G03 G04 G06 G07 G08 G09 G10 G11 G12 G13
A01 A02
D01 D02 D03 D04 D05 D06 D07 D08 D09
E01 E02
T01

Silvergrass
Nammuldi
Brockman 2
Brockman 4

2.1.3. Plunge Pool

Table 2-6: EMP Provisions – Inland Waters: Plunge Pool

Rationale: Management of the groundwater levels and hydrological regimes of Plunge Pool will ensure its environmental value is maintained.

EPA Factor: Inland Waters
EPA objective: To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. **Key environmental values:** Plunge Pool **Key impacts and risks:** Groundwater abstraction may result in changes to the groundwater level of Plunge Pool.
Outcome-based provisions
Outcomes: No measurable drawdown of groundwater levels at Plunge Pool as a result of mine dewatering attributable to the Amended Proposal. Minimise changes to the hydrological regime of Plunge Pool catchment to ensure environmental and cultural heritage values are supported. Avoid, where possible, and otherwise minimise, impacts to water quality and sedimentation in Plunge Pool as a result of mining. (see Supporting and Complementary Monitoring). No direct disturbance to Plunge Pool MEZ

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Plunge Pool Monitoring Sites (Figure 2-6)					
Early Response Criteria					
Groundwater level at Bore MB19BS3X0001 (5.2 km from Plunge Pool) falls below 583.92 mAHD[24] attributable to the Amended Proposal.	If two[25] consecutive monthly exceedances are observed breaching the "early response" level, RTIO will: • Conduct a review and revision (if necessary) of the conceptual hydrogeological model, including planning for additional monitoring bores if determined appropriate for improving conceptualisation. • Determine if water level declines can be attributed to approved activities (i.e., dewatering) and are consistent with expected trends. • Review whether any changes in trends can be attributed to other environmental factors (i.e. land use changes or climate driven changes). • Review abstraction rates to determine whether additional dewatering optimisation can be undertaken. • Install (if required) or review additional monitoring bores[26] and incorporate into conceptual model. • Investigate whether Managed Aquifer Recharge (MAR) is an appropriate mitigation action, and if so, initiate a project to develop and commission a MAR scheme. • Review existing trigger & threshold criteria and update as appropriate.	Groundwater level in monitoring bores.	Monthly	Water Resource Evaluation team	N/A
Direct disturbance within 30 m of the boundary of the Plunge Pool MEZ attributable to the Amended Proposal.	Investigate potential cause of exceedance by review of: • Mine plan • Visual census of aerial image capture to confirm areas of exceedance. If relevant, undertake additional on-ground or aerial investigations (as triggered) to determine extent of change.	**Aerial Image Capture** UAV or satellite imagery of surrounding habitat in the 30 m area around the MEZ **Land Clearing Boundaries** Utilising GIS layers to ensure the MEZ is not cleared or otherwise disturbed.	Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team) supported by Pilbara Environment and Cultural Knowledge team	N/A

[24] 2 m less than lowest level observed in baseline data – 586.17 to 585.92 mAHD

[25] Data can be subject to errors, as well as genuine fluctuations in response to recharge events. To remove the chance of data outliers that do not fit with the expected baseline trends and patterns, it is proposed that a trend of outliers (a minimum of two samples) is first recorded before triggering response actions

[26] A number of additional bores are located across the Plunge Pool catchment (see Appendix F); the most appropriate bores have been selected for compliances purposes.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Plunge Pool Monitoring Sites (Figure 2-6)					
Trigger Criteria					
Groundwater level at Bore MB19BS30010 (2.9 km from Plunge Pool) falls below 573.24 mAHD[27], attributable to the Amended Proposal.	If two consecutive monthly exceedances are observed breaching the "trigger" level, RTIO will carry out all actions listed given under an "early response" exceedance, plus: • Implement MAR scheme (if deemed appropriate) • Consider ceasing dewatering (if deemed appropriate) • Develop and calibrate a transient numerical model If findings from the above actions indicate that successive exceedances will likely occur, RTIO will consult with DWER to ensure the Threshold actions remain appropriate.	Groundwater level in monitoring bores	Monthly	Water Resource Evaluation team	• The environmental outcome will be reported against the trigger criteria for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions
Effective catchment area of Plunge Pool is reduced to less than 7.5 km^2, attributable to the Amended Proposal	Review mine planning within the Plunge Pool catchment and ensure that surface water flows from at least 7 km^2 will be able to reach Plunge Pool at all times during operation and closure.	Calculate the remaining contributing catchment to Plunge Pool using up to date high resolution topography data (LiDAR)	Annual	Water Resource Evaluation team Mine Technical Services	
Direct disturbance within 15 m of the boundary of the Plunge Pool MEZ attributable to the Amended Proposal.	**Investigate potential cause of exceedance by review of:** • Mine plan • Visual census of aerial image capture to confirm areas of exceedance, if relevant, undertake additional on-ground or aerial investigations (as triggered) to determine the extent of change. If investigations and on-ground survey (if applicable) indicate that trigger exceedance is due to the Amended Proposal, implement trigger level response actions, for example: • Update any clearing procedures • Ensure that any further disturbance within 30 m of the MEZ is planned and checked against clearing boundaries at least daily. • Flag boundary of the MEZ on-ground if further clearing is planned within 30 m of the MEZ	**Aerial Image Capture** UAV or satellite imagery of surrounding habitat in the 15 m area around the MEZ **Land Clearing Boundaries** Utilising GIS layers to ensure the MEZ is not cleared or otherwise disturbed.	Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team)	
Threshold Criteria					
Groundwater level at Bore MB19BS30007 (1.7 km from Plunge Pool) falls below 567.80 mAHD[28], attributable to the Amended Proposal.	If two consecutive monthly exceedances are observed breaching the "threshold" level, RTIO will carry out all actions listed given under an "early response" and "trigger" exceedance, plus: • Review MAR operating strategy (if deemed appropriate) • Cease dewatering (if deemed appropriate) • In the event that monitoring, tests, surveys, or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days of the exceedance being reported	Groundwater level in monitoring bores	Monthly	Water Resource Evaluation team	• In the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days and to the DCCEEW within seven (7) business days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days and to the

[27] 2 m less than lowest level observed in baseline data – 576.21 to 575.24 mAHD

[28] 2 m less than lowest level observed in baseline data – 569.80 to 570.15 mAHD

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Plunge Pool Monitoring Sites (Figure 2-6)					
Effective catchment area of Plunge Pool is reduced to less than 7 km^2, attributable to the Amended Proposal	• Within 7 days of confirmation of this threshold level being exceeded, cease mining in the Plunge Pool catchment, if applicable. • Within 21 days of confirmation of this threshold level being exceeded, provide a report to DWER detailing the planned response, including timing. Actions are likely to include, but not limited to, earthworks and diversions to reinstate catchment area as well as additional flow monitoring.	Calculate the remaining contributing catchment to Plunge Pool using up to date high resolution topography data (LiDAR) Visual inspections of diversion structures within 1 week after rainfall to ensure they are functioning as intended/as designed.	Annual Opportunistic following rainfall (>20 mm)	Water Resource Evaluation team	• DCCEEW within twenty-one (21) business days of the exceedance being reported. • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact.
Direct disturbance within the boundary of the Plunge Pool MEZ, attributable to the Amended Proposal.	If exceedance of the threshold criteria is considered likely to be attributable to the Amended Proposal, implement action/s as agreed during prior consultation with DWER, for example: • Implement revised pit development method • Rehabilitation • Measures as agreed by relevant stakeholders. Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that the impact is below the threshold and trigger criteria. • Monitor to validate success of threshold contingency actions.	**Field Monitoring** On-ground assessment of presence and condition of vegetation and fauna habitat (specifically habitat that would support MNES species). **Aerial Image Capture** UAV or satellite imagery of the habitat in the MEZ	Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	
Supporting and Complementary Monitoring to Support Knowledge and Criteria for Management of Plunge Pool					
Plunge Pool water level and water quality (EC, pH and TSS). Supporting parameter to increase knowledge of Plunge Pool water balance	Not applicable	• Prior to culturally safe mining occurring within the Plunge Pool catchment undertake at least two years[29] of water quality (including sediment) monitoring and bathymetry to establish site specific background water quality and sediment levels to inform the implementation of water quality and sedimentation trigger and threshold criteria. This information will be captured through an update to the approved EMP.	• Quarterly (water Quality) • Bi-annual (Bathymetry)	Water Resource Evaluation team	N/A

[29] Access for monitoring may not always be possible due to accessibility, weather or safety considerations. It is noted that Plunge Pool is of significant value to Traditional Owners; any monitoring or access to Plunge Pool and surrounds will be subject to Traditional Owner consent.

RioTinto

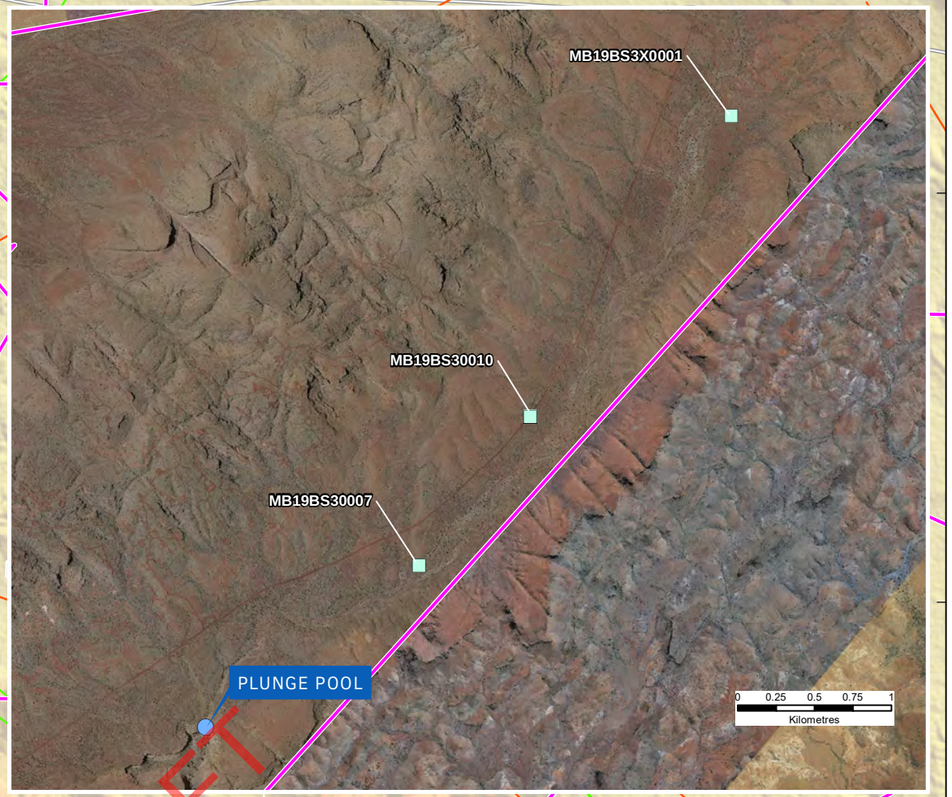
Figure 2-6
Plunge Pool Monitoring Sites

Drawn: L.Fuentes
Plan: RTIO0213125v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:150,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Monitoring Site
- Plunge Pool
- Hydraulic Barrier
- Hydraulic Barrier - Potential
- Rio Tinto Mine
- Minor Road
- Site Access Road



Silvergrass

Brockman 4

White Quartz Road

510,000
520,000
530,000
540,000
550,000

7,530,000
7,520,000
7,510,000
7,500,000

N

0 2 4 6 8
Kilometres

Map units in metres

2.1.4. Ridge Pool

As Ridge Pool is outside of the Development Envelope, this section relates to that part of the surface water catchment that is within the Development Envelope.

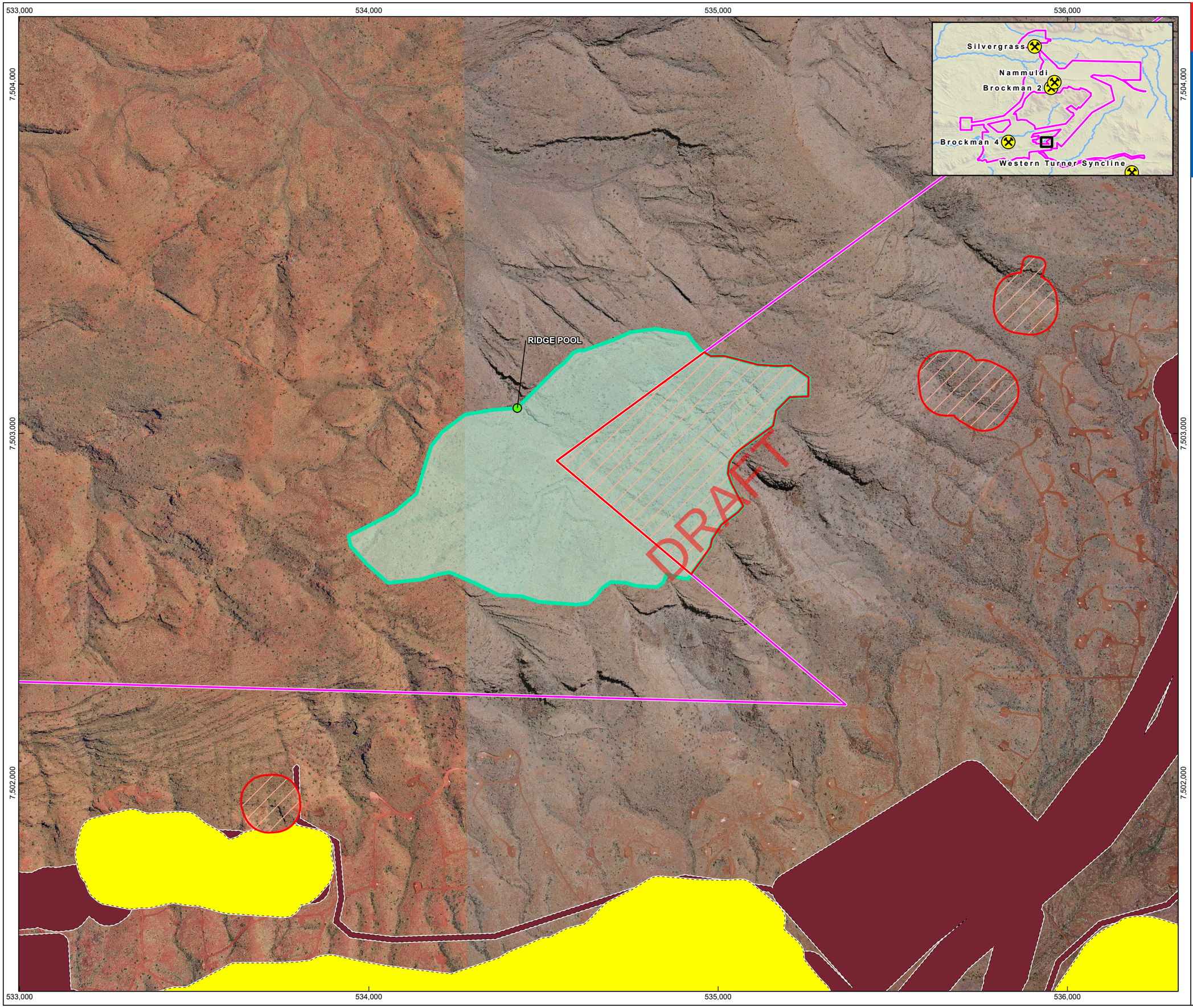
Table 2-7: EMP Provisions – Inland Waters: Ridge Pool surface water catchment within the Development Envelope

Rationale: Management of the Ridge Pool surface water catchment within the Development Envelope will ensure its environmental value is maintained.

EPA Factor: Inland Waters
EPA objective: To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. **Key environmental values:** Ridge Pool surface water catchment. **Key impacts and risks:** Changes to the surface water catchment may impact water quality and sedimentation in Ridge Pool.
Outcome-based provisions
Outcomes: No direct disturbance to Ridge Pool surface water catchment MEZ within the Development Envelope.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Ridge Pool Surface Water Catchment Mining Exclusion Zone (Figure 2-7)					
Early Response Criteria					
Direct disturbance within 30 m of the boundary of the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.	Investigate potential cause of exceedance by review of: • Mine plan • Visual census of aerial image capture to confirm areas of exceedance. If relevant, undertake additional on-ground or aerial investigations (as triggered) to determine extent of change.	**Aerial Image Capture** UAV or satellite imagery of surrounding habitat in the 30 m area around the MEZ **Land Clearing Boundaries** Utilising GIS layers to ensure the MEZ is not cleared or otherwise disturbed.	Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team) supported by Pilbara Environment and Cultural Knowledge team	N/A
Trigger Criteria					
Direct disturbance within 15 m of the boundary of the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.	**Investigate potential cause of exceedance by review of:** • Mine plan • Visual census of aerial image capture to confirm areas of exceedance, if relevant, undertake additional on-ground or aerial investigations (as triggered) to determine the extent of change. If investigations and on-ground survey (if applicable) indicate that trigger exceedance is due to the Amended Proposal, implement trigger level response actions, for example: • Update any clearing procedures. • Ensure that any further disturbance within 30 m of the MEZ is planned and checked against clearing boundaries at least daily. • Flag boundary of the MEZ on-ground if further clearing is planned within 30 m of the MEZ.	**Aerial Image Capture** UAV or satellite imagery of surrounding habitat in the 15 m area around the MEZ **Land Clearing Boundaries** Utilising GIS layers to ensure the MEZ is not cleared or otherwise disturbed.	Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team)	• The environmental outcome will be reported against the trigger criteria for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions.
Threshold Criteria					
Direct disturbance to the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.	If exceedance of the threshold criteria is considered likely to be attributable to the Amended Proposal, implement action/s as agreed during prior consultation with DWER, for example: • Implement revised mining development method • Rehabilitation • Measures as agreed by relevant stakeholders. Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met.	**Field Monitoring** On-ground assessment of presence and condition of vegetation and fauna habitat (specifically habitat that would support MNES species). **Aerial Image Capture** UAV or satellite imagery the habitat in the MEZ	• Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	• In the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days and to the DCCEEW within seven (7)

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Ridge Pool Surface Water Catchment Mining Exclusion Zone (Figure 2-7)					
	Monitor threshold contingency actions to validate success of mitigation strategy. Monitor to validate success of threshold contingency actions.				business days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days and to the DCCEEW within twenty-one (21) business days of the exceedance being reported. • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact



RioTinto

Figure 2-7
Ridge Pool
Surface Water Catchment - MEZ

Drawn: L.Fuentes
Plan: PDE0182259v1
Date: April 2024

Proj: GDA 1994 MGA Zone 50
Scale: 1:10,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Seasonal Pool (Intermitent or Episodic)
- Ridge Pool Catchment MEZ
- Mine Exclusion Zone (MEZ)

Conceptual Footprint

- Pit
- Infrastructure

N

0 100 200 300 400 500

metres

Map units in metres

2.1.5. Tetratheca butcheriana

Table 2-8: EMP Provisions – Flora and Vegetation: Direct Impacts to Priority 1 Species (*Tetratheca butcheriana*)

Rationale: Protection of individuals within the MEZ will ensure a viable population of *Tetratheca butcheriana* within the Development Envelope.

EPA Factor: Flora and Vegetation
EPA objective: To protect flora and vegetation so that biological diversity and ecological integrity are maintained **Key environmental values:** Priority Flora, *Tetratheca butcheriana* **Key impacts and risks:** Inadvertent clearing of individuals and potential degradation of the remaining population as a result of the implementation of the Amended Proposal.
Outcome-based provisions
Outcome: No direct impacts associated with the Amended Proposal to known individuals of *Tetratheca butcheriana*.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Mining Exclusion Zones (Figure 1-3)					
Early Response Criteria					
Direct disturbance within 30 m of the boundary of the *Tetratheca butcheriana* MEZ attributable to the Amended Proposal.	Investigate potential cause of exceedance by review of: • Mine plan • Visual census of aerial image capture to confirm areas of exceedance. If relevant, undertake additional on-ground or aerial investigations (as triggered) to determine extent of change. If investigations and on-ground survey (if applicable) indicate that early response exceedance is due to the Amended Proposal, implement early response actions including: • Monitoring for presence of new weed species within the MEZ of *Tetratheca butcheriana* • Dust monitoring within the MEZ of *Tetratheca butcheriana*	**Aerial Image Capture** UAV or satellite imagery of *Tetratheca butcheriana* and surrounding habitat in the 30 m area around the MEZ. **Land Clearing Boundaries** • Reviewing aerial imagery to ensure the MEZ is not cleared or otherwise disturbed.	Annual, or as triggered Annual	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	N/A
Trigger Criteria					
Direct disturbance within 15 m of the boundary of the *Tetratheca butcheriana* MEZ attributable to the Amended Proposal.	**Investigate potential cause of exceedance by review of:** • Mine plan • Visual census of aerial image capture to confirm areas of exceedance, if relevant, undertake additional on-ground or aerial investigations (as triggered) to determine the extent of change. If investigations and on-ground survey (if applicable) indicate that trigger exceedance is due to the Amended Proposal, implement trigger level response actions, for example: • Review and update clearing procedures • Ensure that any further disturbance within 30 m of the MEZ is planned and checked against clearing boundaries at least daily. • Flag boundary of the MEZ on-ground if further clearing is planned within 30 m of the MEZ	**Aerial Image Capture** UAV or satellite imagery of *Tetratheca butcheriana* and surrounding habitat in the 15 m area around the MEZ. **Land Clearing Boundaries** • Reviewing aerial imagery to ensure the MEZ is not cleared or otherwise disturbed.	Annual, or as triggered Annual	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	• The environmental outcome will be reported on against the trigger criterion for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Mining Exclusion Zones (Figure 1-3)					
Threshold Criteria					
Direct disturbance to the *Tetratheca butcheriana* MEZ, attributable to the Amended Proposal.	If exceedance of the threshold criteria is considered likely to be attributable to the Amended Proposal, implement action/s as agreed during prior consultation with DWER, for example: • Implement revised pit development method • Rehabilitation • Measures as agreed by relevant stakeholders. Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that that the threshold criteria are being met. Monitor to validate success of threshold contingency actions.	**Field Monitoring** **2024-2026 DBCA ecophysiology study** • On-ground measurements for gas exchange (i.e., photosynthesis, stomatal conductance, transpiration) and chlorophyll performance (i.e., chlorophyll fluorescence and content) • On-ground measures on plant growth (e.g., volume, phyllode lengths), survival and phenology (e.g., flower, fruit and seed production). **2027+** • A *Tetratheca butcheriana* annual monitoring program will be implemented considering the outcomes and recommendations of the DBCA ecophysiology study. **Aerial Image Capture** UAV or satellite imagery of *Tetratheca butcheriana* and surrounding habitat within the MEZ.	Annual, or as triggered	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	• In the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified. • The Proponent will report to the CEO within twenty-one (21) days of the exceedance being reported. • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR. • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact.
Supporting and Complementary Monitoring to Support Knowledge and Criteria for Management of *Tetratheca butcheriana*					
Field Monitoring **2024-2026 DBCA ecophysiology study** • On-ground measurements for gas exchange (i.e., photosynthesis, stomatal conductance, transpiration) and chlorophyll performance (i.e., chlorophyll fluorescence and content) • On-ground measures on plant growth (e.g., volume, phyllode lengths), survival and phenology (e.g., flower, fruit and seed production).	Not applicable	Conduct research programs as required to increase knowledge of *Tetratheca butcheriana* involving ecophysiology, niche modelling and Genetic relationships between populations	Two/three-year ongoing research project/s	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	N/A
Climatic conditions. Weather data to support *Tetratheca butcheriana* criteria monitoring parameters	Not applicable	Climatic data to support local weather conditions.	Ongoing climatic data capture		
Weed management within the approved Development Envelope (transects and opportunistic).	Not applicable	Weed monitoring program to identify weed species (and priority) weed control methods, incorporated into GIS system.	Annual		

2.1.6. Ghost Bat and Pilbara Leaf-nosed Bat

Table 2-9: EMP Provisions – Terrestrial Fauna: Ghost Bat (*Macroderma gigas)* and Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)

Rationale: To maintain the ecological function and viability of high value habitat through the implementation of monitoring protocols/procedures and mitigation measures to minimise direct and indirect impacts which have the potential to diminish environmental quality of high value critical and supporting habitat for the Ghost Bat and Pilbara Leaf-nosed Bats.

EPA Factor: Terrestrial Fauna
EPA objective: To protect terrestrial fauna so that biological diversity and ecological integrity are maintained **Key environmental values:** Habitat of conservation significant fauna species – Ghost Bat and Pilbara Leaf-nosed Bat. **Key impacts and risks:** Potential loss or degradation of high value critical and supporting habitat as a result of the implementation of the Proposal.
Outcome-based provisions
Outcome: No direct or significant indirect impacts to Ghost Bat and Pilbara Leaf-nosed Bat[30] roosts retained within MRZs and MEZs, attributable to the Proposal.

Indicators	Response Actions	Monitoring[31]	Timing/Frequency	Responsible	Reporting
MRZs and MEZs (Figure 1-4)					
Early Response Criteria					
Mining activities[32] attributable to the Proposal approach within 20 m of a MRZ boundary as per Table 1-4.	Investigate by review of: • In-field inspections (UAV or visual), including signage and fencing (where in place) • Site specific observations e.g., clearing extent Review of mine plan.	• Land clearing reconciliation (against GIS exclusion and disturbance layers) to ensure the restriction zones are not impacted or entered without authorisation • Aerial image capture (satellite or Remotely Piloted Aircraft). • Annual review of internal incident reporting and internal approval request process.	• Annual, or as triggered by clearing reconciliation • Bi-annual imagery captures and analysis	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	N/A
Trigger Criteria					
Mining activities attributable to the Proposal (other than existing and approved low impact activities[33]), intersect a MRZ boundary.	Investigate by review of: • In-field inspections (UAV or visual), including signage and fencing (where in place) • Site specific observations e.g., clearing extent Review of mine plan. If investigations and on-ground survey (if applicable) indicate that trigger exceedance is due to the Proposal, implement trigger level response actions, for example: • Review clearing procedures • Review mine plan • Re-assess work practices and training needs • Review and/or update MEZ • Undertake any practical corrective rehabilitation	• Land clearing reconciliation (against GIS exclusion and disturbance layers) to ensure the restriction zones are not impacted or entered without authorisation • Aerial image capture (satellite or Remotely Piloted Aircraft). • Annual review of internal incident reporting and internal approval request process.	• Annual, or as triggered by clearing reconciliation • Bi-annual imagery captures and analysis	• HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	• The environmental outcome will be reported on against the trigger criterion for each calendar year in the ACAR • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness

[30] The Upper Beasley River Roost (UBRR) Pilbara Leaf-nosed Bat roost is located 670m outside of the Development Envelope. This is the only significant Pilbara Leaf-nosed Bat roost is proximity to the Proposal.

[31] Physical access for monitoring may not always be possible due to accessibility, weather or safety considerations. Access may also be subject to Traditional Owner consent

[32] Not inclusive of any monitoring activities required as per this EMP.

[33] No mining excavation is permitted within a MRZ. Only low impact activities such as access tracks may be implemented. No more than 5% of the MRZ can be cleared for low impact activities.

Indicators	Response Actions	Monitoring[31]	Timing/Frequency	Responsible	Reporting
MRZs and MEZs (Figure 1-4)					
<u>Identified Apartment Block Caves <350 m from active mining / blasting</u> Vibration levels at caves as listed in Table 2-9[34] exceed: • Category 2 cave/s – 10 mm/s peak particle velocity (PPV) during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months attributable to the Proposal • Category 3 cave/s – 50 mm/s PPV attributable to the Proposal OR • Decline in visual structural integrity[35] at retained Apartment Block cave/s as listed in Table 2-9 supported by a significant step change in microclimate (temperature and humidity)attributable to the Proposal.	Investigate potential cause of exceedance by review of: • In-field inspections (UAV or visual) • Site specific observations e.g., blast vibration predictions • Blast vibration monitoring data • Temperature and humidity monitoring data to determine if the roost cave microclimate has been compromised, where available • Other monitoring and supporting data e.g., seasonal, climatic data, mine plan. If investigations and on-ground survey (if applicable) indicate that trigger exceedance is due to the Proposal, implement trigger level response actions, for example: • Cease disturbance within 150, 75 or 20 m of caves (dependent on cave category) • Conduct structural assessment of cave entrance • Conduct geotechnical assessment • Review clearing procedures • Review mine plan • Review blasting model and blast management procedures • Re-assess work practices and training needs • Analyse call activity data from same period for evidence of impact from noise and vibration • Review and/or update MEZ • Undertake any practical corrective rehabilitation (e.g., removal of significant rockfall or sealing of significant fractures) • If causal factors for disturbance cannot be identified, consider expanded on-ground assessment (if appropriate, expand the frequency of monitoring).	**<u>Blast Vibration Modelling</u>** • Blast vibration monitoring for all active mining/blasts within 350 m of caves • Modelling of PPV prior to blast • Modelling of actual PPV • Analysis of modelled versus actual PPV. **<u>Visual Inspection</u>** • On-ground or by UAV for assessment of structural damage to cave entrance or opening **<u>Temperature and Humidity Monitoring</u>** • Cave temperature and humidity logging and data analysis correlated against ambient temperature; and timing of mine pit development / blasting data in adjacent pits, to identify potential changes in internal cave structure	• Event based, all active mining/blasts within 350 m of cave/s. • Quarterly (or as triggered), for Ghost Bat caves within 350 m of proposed pits. • Ongoing (device dependant) monitoring, with quarterly analysis at Ghost Bat roosts within 350 m of activities and other significant roosts.	• HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team • Drill and Blast team	
<u>Identified Isolated Category 2 and Category 3 Caves <350 m from active mining / blasting</u> Vibration levels at isolated Category 2 or Category 3 caves as listed in Table 2-9 exceed: • Isolated Category 2 cave/s – 10 mm/s peak particle velocity (PPV) during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months attributable to the Proposal • Isolated Category 3 cave/s – 50 mm/s PPV, attributable to the Proposal. • OR • Decline in visual structural integrity[35] at any Isolated Category 2 or Category 3 cave/s, supported by a significant step change in microclimate (temperature and humidity) attributable to the Proposal.		**<u>Visual Inspections</u>** • Apartment Block and Isolated Category 2 cave/s (or if above trigger levels for Category 3 cave/s) on-ground or by UAV visual inspections for structural damage to the entrance of caves. **<u>Temperature and Humidity Monitoring</u>** • Cave temperature and humidity logging and data analysis correlated against ambient temperature; and timing of mine pit development / blasting data in adjacent pits, to identify potential changes in internal cave structure			

[34] Bob Bullen (Bat Call WA) conducted a review of the Brockman Syncline caves and provided cave classifications (following Bat Call WA 2021 A review of ghost bat ecology, threats and survey requirements, DAWE), vibration limits (PPV) and any season specifications. Vibration levels have been set at the most conservative peak particle velocity levels as precautionary measures. Trigger criteria will be updated according to results from geotechnical assessments conducted prior to blasting.

[35] Decline in visual sttructural integrity is defined as a negative change to the integrity of the cave. The trigger will be exceeded where changes are observed after a blast event for which a vibration level criteria is exceeded, including significant rockfalls (in comparison to baseline data).

Indicators	Response Actions	Monitoring[31]	Timing/Frequency	Responsible	Reporting
MRZs and MEZs (Figure 1-4)					
Threshold Criteria					
<u>Identified Apartment Block Cave/s <350 m from active mining / blasting</u> • Significant compromise in the structural integrity[36] supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal	Implement previously determined threshold contingency actions, for example: • Cease all disturbance within 350 m of cave/s • Cease blasting activities within 350 m of cave/s • Rehabilitation or roost re-construction • Measures as agreed by relevant stakeholders. Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met. Monitor threshold contingency actions to validate success of mitigation strategy.	Land Clearing Reconciliation • Land clearing reconciliation (against GIS exclusion and disturbance layers) to ensure the restriction zones are not impacted or entered without authorisation • Review of internal incidents of unauthorised access to the identified exclusion and disturbance zones • Aerial image capture (satellite or Remotely Piloted Aircraft). Blast Vibration Monitoring • Blast vibration monitoring for all blasts within 350 m of caves • Modelling of PPV prior to blast • Modelling of actual PPV • Analysis of modelled versus actual PPV. Temperature and Humidity Monitoring • Cave temperature and humidity logging and data analysis correlated against ambient temperature; and timing of mine pit development / blasting data in adjacent pits, to identify potential changes in internal cave structure Visual Inspections • Apartment Block and Isolated Category 2 cave/s (or if above trigger levels for Category 3 cave/s) on-ground or by UAV visual inspections for structural damage to the entrance of caves. Proposed monitoring for all caves retained within the Development Envelope is outlined in Table 2-10.	• Event based, all active mining/blasts within 350 m of cave/s. • Quarterly (or as triggered), for Ghost Bat caves within 350 m of proposed pits. • Ongoing (device dependant) monitoring, with quarterly analysis at Ghost Bat roosts within 350 m of activities and other significant roosts. • Annual.	• HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team • Drill and Blast team	• In the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria attributable to the Proposal, the exceedance will be reported in writing to the CEO within seven (7) days and to the DCCEE within seven (7) business days of the exceedance being identified. • The Proponent will provide a report to the CEO within twenty-one (21) days and to the DCCEEW within twenty-one (21) business days of the exceedance being reported. • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR • If any of the threshold criterion have been exceeded during the reporting period, the ACAR will include a description of the effectiveness of the threshold contingency actions that have been implemented to manage the impact.
<u>Identified Isolated Category 2 or Category 3 Caves <350 m from active mining / blasting</u> • Significant compromise in the structural integrity[36] of identified Isolated Category 2 or Category 3 cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal					
Supporting/Complementary Provisions for Threatened Fauna Management					
Demonstrate ongoing presence of Ghost Bat within the Development Envelope	If non-achievement is attributable to the Proposal, implement the following: • Review of Proposal activities and mine plan • Review of blast data and management plan • Re-assess work practices and procedures • Re-assess training needs • Re-assess management of feral animals on site.	• Undertake ongoing monitoring (acoustic recording) during operational phase for Ghost Bats use of caves as per Figure 2-7 and detailed in Table 2-9. • Annual review of Ghost Bat populations persistence within the Development Envelope. This data informs cave categorisation on site, which will subsequently inform the monitoring program.	• Bi-annual analysis (device dependant)	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	N/A
Demonstrate noise levels do not exceed continual 70 dB(Z) at significant roosts (isolated category 2 roosts and apartment block roosts), attributable to the Proposal.		• Undertake ongoing monitoring (sound noise level, device dependent) during operational phase at retained caves as detailed in Table 29. Microphones will be placed inside/as close to the roosting chamber (where possible and without causing detrimental impact/restricting species access).	• Bi-annual analysis (device dependant)		

[36] Significant compromise in the structural integrity of a cave is defined as damage that negatively impacts the structural integrity and microclimate of the cave such that future Ghost Bat use of the site is prevented.

Indicators	Response Actions	Monitoring[31]	Timing/Frequency	Responsible	Reporting
MRZs and MEZs (Figure 1-4)					
Demonstrate ongoing presence of Pilbara Leaf-nosed Bats within the Development Envelope		• Undertake ongoing monitoring (acoustic monitoring) during operational phase for Pilbara Leaf-nosed Bats use of Plunge Pool[37] and Upper Beasley River Roost as detailed in Table 2-9 • Annual review of Pilbara Leaf-nosed Bat populations persistence (acoustic data) within the Development	• Bi-annual analysis (device dependant)		
Collection of local climatic data at Brockman	Supporting parameter, review will inform assessment of targets and actions.	• Weather station at Brockman, including rainfall data and wind direction, to determine local climatic conditions.	Continuous.	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	
Management of lighting on site	Installed lighting managed on site, including: • Installing permanent lighting only where required, mainly in-pit and operational areas • Permanent and temporary lighting will be shielded to minimise light spill. Permanent lighting will be directed away from sensitive areas (e.g., MEZ, MRZ and roosts). Temporary lighting (e.g., trailer mounted units) may be required to provide safe working environments for short periods of time, where practicable and while still providing a safe work environment, these will be positioned to minimise direct light spill to sensitive areas.	• Inspections of lighting within the Development Envelope.	Continuous.	HSEC Operational Delivery – PMO (Environment Operations Team)	
Management of feral animals on site	Feral animal presence managed on site including: • Feral animal control undertaken • Prohibiting feeding animals • Prohibiting keeping pets • Appropriate waste disposal for food scraps and other wastes as per the Rio Tinto waste management guidelines.	• Record opportunistic observations within the Development Envelope and/or at significant environmental features • Record number of animals removed through control programs • Inspection of waste disposal areas within the Development Envelope.	Continuous	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	
Management of fauna interactions on site	Fauna interactions managed on site including: • Personnel are to be informed of EPBC Act listed threatened species (Ghost Bat, Pilbara Leaf-nosed Bat, Northern Quoll and Pilbara Olive Python) that may occur on site • EPBC Act listed threatened species encountered on site are to be recorded and records maintained for the Proposal. This will include locations and animal status (alive or dead).	• Review of inductions, training and awareness material • Inspection of records, related to sightings, recordings, encounters and fauna removal • Inspection to assess whether any unauthorised barbed wire is being utilised on site associated with the Proposal. If barb wwire is required for statutory purposes, inspection as to whether bat reflectors have been installed.	Continuous.	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	

[37] Access for monitoring may not always be possible due to accessibility, weather or safety considerations. It is noted that Plunge Pool is of significant value to Traditional Owners; any monitoring or access to Plunge Pool and surrounds will be subject to Traditional Owner consent.

Table 2-10: Retained bat caves and proposed monitoring/limits

Cave Name	Ghost Bat Cave Category			Ghost Bat cave within an Apartment Block	Isolated Cave (or Apartment Block Complex) >350 m from active mining / blasting				Isolated Cave (or Apartment Block Complex) <350 m from active mining / blasting						Notes
	Category 2	Category 3	Category 4		Temperature and Humidity Monitoring	Noise (supporting)		Acoustic Recording	Temperature and Humidity Monitoring	Vibration		Noise (supporting)		Acoustic Recording	
						Noise Limit	Noise Monitoring			PPV limit	Vibration Monitoring	Noise Limit	Noise Monitoring		
Inside Development Envelope															
B4jul16-26-27			X	No											
B4jun16-09				No											
B4jun16-36		X		No					X	50 mm/s PPV	X				
B4June16-26			X	No											
BS4MM-Aug16-03			X	No											
BS4MM-Aug16-04		X		No					X	50 mm/s PPV	X				
BS4MM-Aug16-15		X		No					X	50 mm/s PPV	X				
BS4MM-Aug16-18		X		No					X	50 mm/s PPV	X				
BS4MM-Aug16-19		X		No					X	50 mm/s PPV	X				
BS4MMJul16-11		X		No					X	50 mm/s PPV	X				
BS4MMJul16-13		X		No					X	50 mm/s PPV	X				
BS4MMJul16-14		X		No					X	50 mm/s PPV	X				
BS4MMJul16-15		X		No					X	50 mm/s PPV	X				
BS4MMJul16-17		X		No					X	50 mm/s PPV	X				
BS4MMJul16-30		X		No					X	50 mm/s PPV	X				
C8		X		No					X	50 mm/s PPV	X				
CBRK-000		X		No				X (supporting)	X	50 mm/s PPV	X			X (supporting)	BS1 Utilising one of the better Ghost Bat caves within the BS1 deposit - no Cat 2 caves present in deposit.
CBRK-006			X	No											
CBRK-045		X		No					X	50 mm/s PPV	X				
CBRK-052		X		No					X	50 mm/s PPV	X				
CBRK-055			X	No											
CBRK-057			X	No											
CBRK-059		X		No					X	50 mm/s PPV	X				
CBRK-061		X		AB-BS-7					X	50 mm/s PPV	Min one vibration meter per apartment complex (location on advice of SME) – used to calc vib limits for all other Cat 2 and 3 caves				
CBRK-063		X						X (Secondary)	X	50 mm/s PPV				X (Secondary)	
CBRK-065		X							X	50 mm/s PPV					
CBRK-067	X				X	Continual >70 dB(z)	X (Inside and outside)	X (Primary)	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.		Continual >70 dB(z)	X (Inside and outside)	X (Primary)	Lens G Utilising a Cat 2 Cave, in an apartment Block, within the Lens G deposit. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)

Cave Name	Ghost Bat Cave Category			Ghost Bat cave within an Apartment Block	Isolated Cave (or Apartment Block Complex) >350 m from active mining / blasting				Isolated Cave (or Apartment Block Complex) <350 m from active mining / blasting						Notes
	Category 2	Category 3	Category 4		Temperature and Humidity Monitoring	Noise (supporting)		Acoustic Recording	Temperature and Humidity Monitoring	Vibration		Noise (supporting)		Acoustic Recording	
						Noise Limit	Noise Monitoring			PPV limit	Vibration Monitoring	Noise Limit	Noise Monitoring		
Inside Development Envelope															
CBRK-069	X			AB-BS-8	X	Continual >70 dB(z)	X (Inside and outside)	X	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.	Min one vibration meter per apartment complex (location on advice of SME) – used to calc vib limits for all other Cat 2 and 3 caves	Continual >70 dB(z)	X (Inside and outside)	X	BS3 Best Ghost Bat cave within the BS3 deposit. Cat 2 Cave, in an apartment Block. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)
CBRK-071			X					x	X (supporting)					x	
CBRK-073		X		No					X	50 mm/s PPV	X				
CBRK-074		X		No				X (supporting)	X	50 mm/s PPV	X			X (supporting)	Nammuldi Utilising one of the better Ghost Bat caves within the deposit - no Cat 2 caves present in deposit.
CBRK-075			X	No											
CBRK-076	X			AB-BS-9	X	Continual >70 dB(z)	X (Inside and outside)	X (Primary)	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.	Min one vibration meter per apartment complex (location on advice of SME) – used to calc vib limits for all other Cat 2 and 3 caves	Continual >70 dB(z)	X (Inside and outside)	X	Lens G Utilising a Cat 2 Cave, in an apartment Block, within the Lens G deposit. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)
CBRK-079		X							X	50 mm/s PPV					
CBRK-081			X						X (supporting)						
CBRK-083		X							X	50 mm/s PPV					
CBRK-085	X				X	Continual >70 dB(z)		X (Secondary)	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.		Continual >70 dB(z)		X	Lens G Utilising a Cat 2 Cave, in an apartment Block, within the Lens G deposit. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)
CBRK-077			X	No											
CBRK-078	X			AB-SGE-2	X	Continual >70 dB(z)	X (Inside and outside)	X	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.	Min one vibration meter per apartment complex (location on advice of SME) – used to calc vib limits for all other Cat 2 and 3 caves	Continual >70 dB(z)	X (Inside and outside)	X	Silvergrass East Utilising a Cat 2 Cave, in an apartment Block, within the Silvergrass East area. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)
CBRK-080			X						X (supporting)						

Cave Name	Ghost Bat Cave Category			Ghost Bat cave within an Apartment Block	Isolated Cave (or Apartment Block Complex) >350 m from active mining / blasting				Isolated Cave (or Apartment Block Complex) <350 m from active mining / blasting						Notes
	Category 2	Category 3	Category 4		Temperature and Humidity Monitoring	Noise (supporting)		Acoustic Recording	Temperature and Humidity Monitoring	Vibration		Noise (supporting)		Acoustic Recording	
						Noise Limit	Noise Monitoring			PPV limit	Vibration Monitoring	Noise Limit	Noise Monitoring		
Inside Development Envelope															
CBRK-082	X			No	X	Continual >70 dB(z)	X (Inside and outside)	X	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.	X	Continual >70 dB(z)	X (Inside and outside)	X	Silvergrass East Utilising a Cat 2 Cave, in an apartment Block, within the Silvergrass East area. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)
CBRK-087			X	No											
CBRK-089		X		No					X	50 mm/s PPV	X				
CBRK-090			X	No											
CBRK-091			X	No											
CBRK-092			X	No											
CBRK-093	X			AB-BS-10	X	Continual >70 dB(z)	X (Inside and outside)	X	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.	X	Continual >70 dB(z)	X (Inside and outside)	X	
CBRK-095			X	No											
CBRK-097			X	No											
CBRK-099		X		No					X	50 mm/s PPV	X				
CBRK-100		X		No					X	50 mm/s PPV	X				
CBRK-101			X	No											
CBRK-105			X	No											
CBRK-106		X		No					X	50 mm/s PPV	X				
CBRK-109		X		No				X (supporting)	X	50 mm/s PPV	X			X (supporting)	BS4 Utilising one of the better Ghost Bat caves within the BS3 deposit.
CBRK-110		X		No					X	50 mm/s PPV	X				
CBRK-111		X		No					X	50 mm/s PPV	X				
CBRK-113			X	No											
CBRK-116		X		No					X	50 mm/s PPV	X				
CBRK-119		X		No					X	50 mm/s PPV	X				
CBRK-120			X	No											
CBRK-121		X		No					X	50 mm/s PPV	X				
CBRK-122			X	No											
CBRK-123			X	No											
CBRK-125		X		No					X	50 mm/s PPV	X				
CBRK-126			X	No											
CBRK-136			X	No											
CBRK-137		X		No				X (supporting)	X	50 mm/s PPV	X			X (supporting)	BS1 Utilising one of the better Ghost Bat caves within the BS1 deposit - no Cat 2 caves present in deposit.

Cave Name	Ghost Bat Cave Category			Ghost Bat cave within an Apartment Block	Isolated Cave (or Apartment Block Complex) >350 m from active mining / blasting				Isolated Cave (or Apartment Block Complex) <350 m from active mining / blasting						Notes
	Category 2	Category 3	Category 4		Temperature and Humidity Monitoring	Noise (supporting)		Acoustic Recording	Temperature and Humidity Monitoring	Vibration		Noise (supporting)		Acoustic Recording	
						Noise Limit	Noise Monitoring			PPV limit	Vibration Monitoring	Noise Limit	Noise Monitoring		
Inside Development Envelope															
CBRK-139		X		No					X	50 mm/s PPV	X				
CBRK-140		X		No					X	50 mm/s PPV	X				
CBRK-141		X		No					X	50 mm/s PPV	X				
CBRK-142			X	No											
CBRK-143			X	No											
CBRK-147			X	No											
CBRK-148			X	No											
CBRK-149			X	No											
CBRK-150		X		No					X	50 mm/s PPV	X				
CBRK-152			X	No											
CBRK-153		X		No					X	50 mm/s PPV	X				
CBRK-154		X		No					X	50 mm/s PPV	X				
CBRK-173		X		No					X	50 mm/s PPV	X				
CBRK-174		X		No				X (supporting)	X	50 mm/s PPV	X			X (supporting)	BS3 Utilising one of the better Ghost Bat caves within the BS3 deposit.
CBRK-199			X	No											
GBS_CA_03		X		No					X	50 mm/s PPV	X				
GBS_CA_05		X		No					X	50 mm/s PPV	X				
GBS_CA_08		X		AB-BS-11					X	50 mm/s PPV	Min one vibration meter per apartment complex (location on advice of SME) – used to calc vib limits for all other Cat 2 and 3 caves				
GBS_CA_09		X						X (Secondary)	X	50 mm/s PPV				X (Secondary)	
GBS_CA_10		X							X	50 mm/s PPV					
GBS_CA_11		X							X	50 mm/s PPV					
GBS_CA_12		X							X	50 mm/s PPV					
GBS_CA_14		X				Continual >70 dB(z)	X (Inside and outside)	X (Primary)	X	50 mm/s PPV		Continual >70 dB(z)	X (Inside and outside)	X (Primary)	
GBS_CA_15		X		No					X	50 mm/s PPV	X				
GBS_CA_16			X	No											
GBS_CA_17	X			No	X	Continual >70 dB(z)	X (Inside and outside)	X	X	10 mm/s PPV 1 October to 31 December (maternity period), 25 mm/s PPV all other times.	X	Continual >70 dB(z)	X (Inside and outside)	X	
GBS_CA_18		X		No					X	50 mm/s PPV	X				
GBS_CA_20		X		No					X	50 mm/s PPV	X				
GBS_CA_21		X		No					X	50 mm/s PPV	X				
GBS_CA_22		X		No					X	50 mm/s PPV	X				

Cave Name	Ghost Bat Cave Category			Ghost Bat cave within an Apartment Block	Isolated Cave (or Apartment Block Complex) >350 m from active mining / blasting				Isolated Cave (or Apartment Block Complex) <350 m from active mining / blasting						Notes
	Category 2	Category 3	Category 4		Temperature and Humidity Monitoring	Noise (supporting)		Acoustic Recording	Temperature and Humidity Monitoring	Vibration		Noise (supporting)		Acoustic Recording	
						Noise Limit	Noise Monitoring			PPV limit	Vibration Monitoring	Noise Limit	Noise Monitoring		
Inside Development Envelope															
MAMBAT81-01		X		No					X	50 mm/s PPV	X				
MAMBAT93-01		X		No					X	50 mm/s PPV	X				
MMBAT01		X		No					X	50 mm/s PPV	X				
MMBAT02		X		No					X	50 mm/s PPV	X				
MMBAT03		X		No					X	50 mm/s PPV	X				
MMBAT04		X		No					X	50 mm/s PPV	X				
MME05		X		No					X	50 mm/s PPV	X				
MME06		X		No					X	50 mm/s PPV	X				
NWTBAT01		X		No					X	50 mm/s PPV	X				
NWTBAT02		X		No					X	50 mm/s PPV	X				
Plunge Pool	NA	NA	NA	NA	NA	NA	NA	X (PLNB)	NA	NA	NA		NA	X (PLNB)	
Outside Development Envelope															
CBRK-005	X			AB-BS-2	X	NA (cave 7.5km outside DE)		X (supporting)	NA (cave 7.5km outside DE)						Comparison site - utilising a Cat 2 Cave, in an apartment Block, within the Silvergrass West area. Maternity usage over the project likely (and hence the need for a seasonal PPV over this period)
CBRK-038	X			No	X	NA (cave 9.0km outside DE)		X (supporting)	NA (cave 9.0km outside DE)						Comparison site - Utilising a Cat 2 Cave, within the Vivash area.
CBRK-047		X		No		NA (cave 1.4km outside DE)		X (supporting)	NA (cave 1.4km outside DE)						Comparison site - utilising one of the better Ghost Bat caves within the area
CBRK-060	X			AB-BS-6	X	NA (cave 1.6km outside DE)		X (supporting)	NA (cave 1.6km outside DE)						Comparison site - Utilising a Cat 2 Cave, in an apartment Block, within the Atlantis area.
Upper Beasley River Roost	Pilbara Leaf-nosed Bat Category 2			No	Cave size does not allow	NA (cave 670m outside DE)		X (PLNB)	NA (cave 670m outside DE)						

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Figure 2-8
Caves to be Monitored for Ongoing Ghost Bat Usage

Drawn: L Fuentes
Plan: RTIO-0213272v1
Date: September 2022

Proj: GDA 1994 MGA Zone 50
Scale: 1:185,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Caves

Approved Mine Layout

- Pit
- Waste Rock Landform
- Infrastructure

Conceptual Footprint

- Pit
- Waste Rock Landform
- Infrastructure

- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Minor Road
- Site Access Road
- Major Creek

N

0 2 4 6 8
Kilometres

Map units in metres

520,000 540,000 560,000

7,540,000 7,520,000 7,500,000

Robe River
Callawinnina Creek
Caves Creek
Mount Brockman Road
Wacklinna Creek
Duck Creek
Boolgeeda Creek
Beasley River
Nanutarra - Munjina Road

CBRK-005
CBRK-082
CBRK-078
CBRK-074 (NEBBAT01)
CBRK-085
CBRK-076
CBRK-067 (LGBAT03)
CBRK-069 (LGBAT08)
CBRK-047
CBRK-000
CBRK-137
CBRK-060
CBRK-174
CBRK-109
CBRK-038

Silvergrass
Nammuldi
Brockman 2
Brockman 4
Western Turner Syncline

2.1.7. Stygofauna

Table 2-11: EMP Provisions – Stygofauna – groundwater monitoring program

Rationale: Monitoring the groundwater levels as a proxy for availability of below water table habitat for restricted stygofauna species will ensure that the Amended Proposal will not have a greater impact than predicted on the availability of below water table habitat for restricted stygofauna within the Development Envelo**pe .**

EPA Factor: Subterranean Fauna
EPA objective: To protect Subterranean fauna so that biological diversity and ecological integrity are maintained. **Key environmental values:** Below water table habitat **Key impacts and risks**: Groundwater drawdown as a result of the implementation of the Amended Proposal is greater than predicted, leading to reduced availability of below water table habitat for restricted stygofauna.
Outcome-based provisions
Outcome: Retain suitable below water table habitat to support potentially restricted stygofauna species.

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Early Response Criteria					
Groundwater levels in any of the bores listed in the Table 2-11 decrease below respective early response criteria water levels, attributable to the Amended Proposal.	Investigate potential cause of exceedance by review of: • Groundwater abstraction rate, number of bores and bore location(s), and pumping biases in relation to extent of the cone of depression. • Monitoring frequency. • Groundwater model. • Mine and dewatering plan. • Boundary bores and consideration as to whether drawdown is associated with other Proponent's dewatering/abstraction activities. If investigations indicate that early response exceedance is likely to be attributable to the Amended Proposal, implement early response actions, for example: • Review rate of dewatering and trends. • Review and recalibrate groundwater model as required. • Re-assess risk of impact. • Investigate potential remediation options (e.g. trial managed aquifer recharge (MAR), barriers etc.).	**oundwater levels** • Bore network monitored using a logger and/or manually. • Location of monitoring bores is presented in Figure 2-8.	• Ongoing (device dependent)	Water Resource Evaluation team	N/A

Indicators	Response Actions	Monitoring	Timing/Frequency	Responsible	Reporting
Trigger Criteria					
Groundwater levels in any of the bores listed in the Table 2-11 decrease below respective trigger criteria water levels, attributable to the Amended Proposal.	Investigate potential cause of exceedance by review of: • Groundwater abstraction rate, number of bores and bore location(s), and pumping biases in relation to extent of the cone of depression. • Monitoring frequency. • Groundwater model, including potential to exceed threshold values. • Mine and dewatering plan. • Boundary bores and consideration as to whether drawdown is associated with other Proponent's dewatering/abstraction activities. If investigations indicate that trigger exceedance is due to the Amended Proposal, implement trigger level response actions, for example: Review and recalibrate groundwater model as required. • Change rate of dewatering. • Temporarily change dewatering regimes, including turning-off individual (targeted) dewatering bores in areas of exceedance, as appropriate. • Discuss progression of identified suitable remediation options (e.g. managed aquifer recharge (MAR), barriers etc.) with relevant stakeholders.	Monitoring as per early response level monitoring.	Monitoring frequency as per early response monitoring	Water Resource Evaluation team	• The environmental outcome will be reported on against the trigger criterion for each calendar year in the ACAR. • If any trigger criterion was exceeded during the reporting period, the ACAR will discuss potential reasons for exceedance of the trigger criterion and include a description of the effectiveness of trigger level actions.
Threshold Criteria					
Groundwater levels in any of the bores listed in the Table 2-11 decrease below respective threshold criteria water levels (maximum drawdown presented in the ERD), attributable to the Amended Proposal.	If exceedance of the threshold criteria is considered likely to be attributable to the Amended Proposal, implement action/s as agreed during prior consultation with DWER, for example: • Turn-off individual (targeted) dewatering bores in areas of exceedance, as appropriate. • Implement suitable remediation options (e.g. managed aquifer recharge (MAR), barriers etc.) as agreed by relevant stakeholders. • Other measures as agreed by relevant stakeholders. Continue to implement threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that the impact is below the threshold and trigger criteria. Monitor to validate success of threshold contingency actions.	Monitoring as per early response level monitoring.	Monitoring frequency as per early response monitoring	Water Resource Evaluation team	• In the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria attributable to the Amended Proposal, the exceedance will be reported in writing to the CEO within seven (7) days of the exceedance being identified. • The Proponent will report to the CEO within twenty-one (21) days of the exceedance being reported. • The environmental outcome will be reported against the threshold criterion for each calendar year in the ACAR. • If the threshold criterion was exceeded during the reporting period, the ACAR will include a description of the effectiveness of threshold contingency action/s that have been implemented to manage the potential impact.
Supporting/Complementary Provisions for Stygofauna					
Collection of local and regional reference data with regards to groundwater levels, groundwater chemistry and climatic information.	Supporting parameter; review will inform assessment of targets and actions.	• Proponent greater bore network monitored using a logger and/or manually.	Ad hoc / as required	Water Resource Evaluation team	• If the trigger and threshold criterion was exceeded during the reporting period, the ACAR will include relevant complementary/supporting results, if available and if relevant to the exceedance.

Table 2-12: Groundwater bores proposed to be monitored for groundwater drawdown (note, bores monitored may be subject to change as part of adaptive management)

Amended Proposal Area	Monitoring Bore / TP	Easting	Northing	Early Warning (mRL)	Trigger level (mRL)	Threshold (mRL)
Nammuldi	MB18BS20001	548924	7518096	541	511	504.391
	BRPB10	548657	7520020	541	516	513.864
	MB20NAM0001	550633	7518115	543	515.3	511.58
	MB11NAM001	551316	7517600	525	498	494.1
	MB20NAM0004	550063	7515419	543.5	528.3	499.3
	MB12NAM017	549340	7515103	522.7	502.7	492.7
	MB19BS3X0010	547781	7514104	520.4	500.4	490.4
	MB15BFH002	528000	7516664	571.3	569.3	567.3
	MB11NAM004	528903	7517517	564.3	560.3	556.3
BS3 EXT	MB19BS3X0001	543620	7507476	554	549	544
	MB19BS3X0002	544054	7508176	551.9	546.9	541.9
	MB19BS3X0003	543800	7509595	538.6	533.6	528.6
	MB19BS3X0005	544710	7510952	538.9	533.9	528.9
	MB19BS3X0007	546622	7513003	556.9	551.9	546.9
BS1 East	MB19BS1E0007	523302	7510268	510	500	485.5
	MB20BS1E0004	520372	7509304	510	500	485
	MB19BS1E0021	519765	7509642	510	500	482
BS1 West	RC17BS1W0116	515220	7508488	480	470	460
	MB17BS10004	511154	7508350	460	450	421
	MB20BS1W0018	510501	7509000	460	450	450
BS4	MB16BS4M0011	535898	7501288	503	498	478.9
Boolgeeda Valley	PZ04BS4B004	528107	7505109	529	526	524
	MB15BS4B014	528915	7506971	542	540	538

RioTinto

Figure 2-9
Groundwater Level Monitoring Locations – Stygofauna

Drawn: L.Fuentes
Plan: PDE0182259v2
Date: May 2024

Proj: GDA 1994 MGA Zone 50
Scale: 1:185,000 @A3
GIS.Team@riotinto.com

Legend

- Development Envelope
- Part IV Indicative Approved Footprint
- Major Creek
- Monitoring Bore

Conceptual Footprint

- Pit
- Waste Rock Landform
- Infrastructure
- Rio Tinto Mine
- Rio Tinto Railway
- Conveyor
- Major Road
- Minor Road
- Site Access Road

N

0 2 4 6 8 10
Kilometres

Map units in metres

520,000 540,000 560,000

7,540,000 7,520,000 7,500,000

Gaves Creek
Mount Brockman Road
Duck Creek
Boolgeeda Creek

Silvergrass
Nammuldi
Brockman 2
Brockman 4
Western Turner Syncline

BRPB10
MB20NAM0001
MB11NAM001
MB18BS20001
MB12NAM017
MB19BS3X0010
MB20NAM0004
MB19BS3X0007
MB19BS3X0005
MB19BS3X0003
MB19BS3X0002
MB19BS3X0001
MB11NAM004
MB19BS1E0007
MB20BS1E0004
MB19BS1E0021
MB17BS10004
RC17BS1W0116
MB17BS10004
MB16BS4M0011

2.2. Objective-based Provisions

2.2.1. *Tetratheca butcheriana*

Table 2-13: EMP Provisions – Flora and Vegetation: *Tetratheca butcheriana*

Rationale: All known individuals of *Tetratheca butcheriana* are protected within MEZs with a buffer between the records and mining. No indirect impacts are expected, so this objective based provision is set up to monitor and ensure that objective is met.

EPA Factor: Terrestrial Fauna
EPA objective: To protect flora and vegetation so that biological diversity and ecological integrity are maintained **Key environmental values:** Priority 1 *Tetratheca butcheriana* **Key impacts and risks:** There is potential for indirect impacts on *Tetratheca butcheriana*
Objective-based provisions
Objective: No measurable change in the presence or condition of known *Tetratheca butcheriana* individuals, attributable to the Amended Proposal

Management Target	Management Actions	Monitoring	Timing/Frequency	Responsible	Reporting
***Tetratheca butcheriana* condition**					
No significant indirect impacts to known *Tetratheca butcheriana* individuals within the MEZ, attributable to the Amended Proposal.	The MEZ has been established with a 300 m buffer around the locations of the *Tetratheca butcheriana* records. This is the primary management measure to minimise the risk of indirect impacts to this species. If monitoring indicates the presence of new weed species within the MEZ, or dust parameters (based on the outcomes and recommendations of the DBCA ecophysiology study) within the MEZ are exceeded, then the following will be undertaken: • Review potential sources of dust and increase dust control • Review vehicle hygiene procedures • Implement weed management activities to prevent weed cover increasing in the MEZ If monitoring indicates a change in the presence or condition of *Tetratheca butcheriana:* • Investigate cause of change • Review mine plane within 300 m of the MEZ • Review drill and blast procedures, if relevant • Review clearing procedures • Reassess work practices and training needs • Rehabilitation (if applicable).	**Field Monitoring** **2024-2026 DBCA ecophysiology study** (supporting monitoring in Table 2-7) • On-ground measurements for gas exchange (i.e., photosynthesis, stomatal conductance, transpiration) and chlorophyll performance (i.e., chlorophyll fluorescence and content) • On-ground measures on plant growth (e.g., volume, phyllode lengths), survival and phenology (e.g., flower, fruit and seed production). **2027+** • A *Tetratheca butcheriana* annual monitoring program will be implemented considering the outcomes and recommendations of the DBCA ecophysiology study. **Weed Monitoring** • Monitoring for presence of new weed species within a 30 m radius of *Tetratheca butcheriana* individuals within the MEZ once Early Response Criteria (direct disturbance within 30 m of the MEZ boundary) is triggered.	• Annual on-ground survey, or as triggered • Quarterly visual inspection when disturbance is occurring within 30 m of the MEZs.	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team.	• The environmental objective will be reported against the management target for each calendar year in the ACAR. • If the management target was not met during the reporting period, the annual report will include discussion of the effectiveness of the management actions or target and whether revision of the management actions or target is required.

Management Target	Management Actions	Monitoring	Timing/Frequency	Responsible	Reporting
***Tetratheca butcheriana* condition**					
		Dust Monitoring **2024-2026** • Investigation of the susceptibility of *Tetratheca butcheriana* to dust impacts currently investigated by DBCA as part of the ecophysiology study to inform future monitoring requirements. • Plant health measurements are being undertaken as part of the overarching ecophysiology study. **2027+** • Dust monitoring within the MEZ of *Tetratheca butcheriana* once Early Response Criteria (direct disturbance within 30 m of the MEZ boundary) is triggered. Dust monitoring requirements and parameters will be considered based on the outcomes and recommendations of the DBCA ecophysiology study.			

2.2.3. Northern Quoll and Pilbara Olive Python

Table 2-14: EMP Provisions – Terrestrial Fauna: Northern Quoll *(Dasyurus hallucatus)* and Pilbara Olive Python (*Liasis olivaceus barroni*)

Rationale: Management of direct and indirect impacts to Northern Quoll and Pilbara Olive Python associated with the Proposal will ensure that the species continue to persist within the Development Envelope.

EPA Factor: Terrestrial Fauna
EPA objective: To protect terrestrial fauna so that biological diversity and ecological integrity are maintained **Key environmental values:** Northern Quoll (*Dasyurus hallucatus*) and Pilbara Olive Python (*Liasis olivaceus barroni*) critical (denning/breeding) and moderate significance critical (foraging and dispersal) habitat when within a species home range **Key impacts and risks:** Potential loss of Northern Quoll or Pilbara Olive Python population.
Objective-based provisions
Objective: To ensure the Proposal is carried out in a manner that minimise direct and indirect impacts to the Northern Quoll and Pilbara Olive Python.

Management Target	Management Actions	Monitoring	Timing/Frequency		Reporting
Supporting/Complementary Provisions for Threatened Fauna Management					
Collection of local climatic data at Brockman	Supporting parameter, review will inform assessment of targets and actions.	Weather station at Brockman, including rainfall data and wind direction, to determine local climatic conditions.	Continuous	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	N/A
Management of feral animals on site	Feral animal presence managed on site including: • Feral animal control • Prohibiting feeding animals • Prohibiting keeping pets • Appropriate waste disposal for food scraps and other wastes as per the Rio Tinto waste management guidelines.	• Record opportunistic observation within the Development Envelope • Record opportunist observations from camera monitoring being undertaken within the Development Envelope • Record number of animals removed through control programs • Inspection of waste disposal areas within the Development Envelope. Additional monitoring as per Table 2-12.	Continuous	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	
Management of fauna interactions on site	Fauna interactions managed on site including: • Personnel are to be informed of EPBC Act listed threatened species (Ghost Bat, Pilbara Leaf-nosed Bat, Northern Quoll and Pilbara Olive Python) that may occur on site • EPBC Act listed threated species encountered on site are to be recorded and records maintained for the Proposal. This will include locations, and animal status (alive or dead).	• Review of inductions, training and awareness material • Inspection of records, related to sightings, recordings, encounters and fauna removal • Inspection to assess whether any unauthorised barbed wire is being utilised on site associated with the Proposal.	As triggered	HSEC Operational Delivery – PMO (Environment Operations Team) with technical support by Pilbara Environment and Cultural Knowledge team	

2.2.4. General Provisions for EPBC Act Listed Species

Table 2-15: EMP Provisions – General Provisions for EPBC Act Listed Species

EPBC Act listed threatened species (Ghost Bat, Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python)
Key environmental values: EPBC Act listed threatened species - Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat and Pilbara Olive Python **Key impacts and risks:** Potential loss or degradation of high value habitat, or injury to MNES fauna, as a result of implementation of the Action **Outcome:** Minimise impacts to EPBC Act listed threatened species (Ghost Bat, Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python) associated with implementation of the Action
Management-based provisions
Objective: Manage threatening processes associated with implementation of the Action, where relevant to minimising impacts to EPBC Act listed threatened species (Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat and Pilbara Olive Python)

Management Target	**Management Actions**	**Monitoring**			
		Method	Location	Frequency/Timing	Responsibility
Threatening Process - Fire					
1. Provision and maintenance of firefighting equipment in accordance with the relevant fire safety standards 2. Firefighting emergency response procedures are in place.	1. Appropriate firefighting equipment is to be available to control localised outbreaks of fire. Regular inspection and maintenance of firefighting equipment will be implemented to comply with relevant fire safety standards. 2. Emergency response (firefighting) procedures are to be implemented to control fires arising as a result of implementation of the Project. 3. Hot work permit system required to authorise all work scopes that are likely to produce a source of ignition (e.g., cutting, grinding, welding etc.).	• Inspection of firefighting equipment to ensure availability and compliance with fire safety standards • Inspection of hazard/incident records • Inspection of permit to work system records.	Development Envelope	Annual, or as appropriate, during the operational mine life	1. Safety Representatives 2. Emergency Services team
Threatening Process – Vehicle and Machinery Movement					
1. No incidents of vehicles being used off designated roads outside operational areas unless in the case of emergency or for necessary activities, that result in significant impacts to high value MNES habitat. 2. Implementation of speed limits in areas identified as having high value for MNES fauna.	1. Vehicles and machinery to remain on designated roads unless in the case of emergency or for undertaking necessary activities. 2. Implement speed limits within the Development Envelope based on a risk assessment that considers environmental values (in addition to safety/other required legislation). 3. Speed limits on unsealed roads to not exceed 60km/h. 4. Roads and tracks signposted with speed limits and warnings of fauna in areas identified as having high value for MNES fauna. 5. Prior to commencing clearing in critical value habitats, consideration is given to planning/staging progressive clearing to allow fauna to safely leave the vicinity of clearing.	• Inspection of incident records • Inspection of risk assessment	Development Envelope	Annual, or as appropriate, during the operational mine life	Mine Operations team

Management Target	Management Actions	Monitoring			
		Method	Location	Frequency/Timing	Responsibility
Threatening Process – Fauna Encounters/Interactions					
1. Induction material contains information relating to Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat and Pilbara Olive Python. 2. Records of all EPBC Act listed threatened species observed are appropriately maintained. 3. Fauna handling is undertaken in accordance with Rio Tinto's Wildlife Interaction Guidelines and the requirements of the BC Act. 4. No incidents of native fauna feeding, hunting or keeping of firearms or pets on site. 5. Access to the MEZs/MRZs (which potentially contain significant roosts or caves) is restricted to authorised personnel and there are no incidents of unauthorised access. 6. No new use of barbed wire on site, except in the case of statutory requirements. 7. Where barbed wire is used in accordance with statutory requirements, reflectors are installed.	1. All site personnel to be informed during their site induction of EPBC Act listed threatened species (Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat and Pilbara Olive Python) that may occur on site, associated high value habitats and measures to be taken to minimise impacts to these values. 2. Any EPBC Act listed threatened species encountered on site are to be recorded and records maintained for the Project. This will include locations, and animal status (alive/dead). EPBC Act listed threatened species' injury or fatality to be documented as an incident. 3. If EPBC Act listed threatened fauna species are required to be moved, fauna are to be handled and transported in accordance with Rio Tinto's Wildlife Interaction Guidelines and the requirements of the BC Act. 4. Feeding of native fauna, hunting, keeping of firearms[38] or pets on site is prohibited. 5. Each MEZ/MRZs is to be demarcated on online systems. Consideration will be given to on ground demarcation where in operational areas and where demarcation does not introduce potential risk to MNES species (and subject to Traditional Owner engagement) and access restricted to authorised personnel. 6. Barbed wire use is to be avoided in the Development Envelope associated with the Proposal, except where there is a legislative requirement to do so. Where barbed wire is existing or required by legislation, reflectors are to be installed on the barbed wire. 7. Establish egress points in artificial water sources (e.g. turkeys' nests and sediment ponds).	• Inspection of records, related to sightings, records, encounters and fauna removal • Inspection of MEZ/MRZs demarcation and procedures restricting access to the MEZs/MRZs (where applicable) • Inspections to assess whether any unauthorised barbed wire is being utilised on site. • Inspection of barbed wire installation to ensure reflectors are in place.	Development Envelope	Annual, or as appropriate, during the operational mine life	1. Training Department 2. HSEC Operational Delivery – PMO (Environment Operations Team)

[38] Excluding firearms for use in pastoral management activities or by licensed and authorised personnel (e.g., feral animal control contractors etc.)

Management Target	Management Actions	Monitoring			
		Method	Location	Frequency/Timing	Responsibility
Threatening Process - Weeds					
1. Compliance with equipment hygiene procedures. 2. Weed control is informed and targeted. 3. Induction material contains information relating weed management and control.	1. Weed management measures, including equipment hygiene procedures, are to be implemented to ensure weeds are recorded and controlled and equipment is cleaned to minimise the spread of weeds. • Equipment hygiene and inspection certificate required for all earth moving vehicles, heavy machinery and drill rig equipment entering and leaving the Development Envelope or moving between identified weed infestation areas to areas that are not infested. • No transfer or relocation of material potentially harbouring weeds/weed seeds is permitted from identified weed infested areas to areas with no/low weed infestation (e.g., transfer of topsoil from identified weed infested areas to areas with no/low weed infestation). • Infested or potentially infested material will be quarantined to areas with existing infestations. 2. A consultant will be engaged to assist in the development of a survey and control program to ensure a robust approach to identifying and managing introduced species within the Development Envelope. • A baseline weed and introduced species survey will be commissioned to inform the survey and control program. • The survey and control program will include a review to identify and target high risk areas (e.g., environmental value, existing weed presence, status of weeds that are present, and potential for further transfer/dispersal e.g., waterways and high trafficable areas). • Implement the targeted survey and control program at target high risk areas. • Use the results of the survey and control program to inform targeted management. • The results of the survey and outcomes of weed management will be reported annually in the Annual Compliance Assessment Report (including to DCCEEW). 3. All site personnel to be informed during their site induction of risk of weeds and requirements for weed management to ensure risk of introduction and weed spread are minimised.	• Inspection of earth moving equipment and hygiene certificates. • Inspections to assess material storage. • Targeted monitoring and management in high-risk areas (as identified by consultant). • Inspection of induction material and records.	High risk areas (as identified by consultant)	Inspection of earth moving equipment and hygiene certificates will be undertaken for the life of the Proposal. Monitoring and management frequency as determined by development of a survey and control program	1. HSEC Operational Delivery – PMO (Environment Operations Team) 2. Mine Operations team and HSEC Operational Delivery – PMO (Environment Operations Team) 3. Training Department

Management Target	Management Actions	Monitoring			
		Method	Location	Frequency/Timing	Responsibility
Threatening Process – Feral Animals					
1. Feral animal control is informed and targeted. 2. Feral animal control actions are implemented. 3. Feral animal presence is discouraged. 4. Induction material contains information relating feral animals.	1. A consultant will be engaged to assist in the development of a survey and control program to ensure a robust approach to identifying and managing feral animals, including feral cats, cane toads and European Red Fox within the Development Envelope. • The survey and control program will include a review to identify and target high risk areas (e.g., environmental value, and potential for further transfer/dispersal). • The survey and control program will consider opportunities to utilise automated feral cat control technology (e.g., Felixers), or other technologies on the advice of consultants and regulators, in high value areas (subject to regulatory approval). • Survey results and incidental sightings will inform further targeted management. • Traditional trapping utilised as required in readily accessible areas (e.g., accommodation and waste storage facilities). • Survey results and incidental sightings will be reported in the Annual Compliance Assessment Reports to regulators (including to DCCEEW). • Cane toads are not currently known within the nearby area; if cane toads are identified within the Development Envelope in the future, they will be reported to the appropriate Western Australian authorities including DBCA., and monitoring techniques and control technology at the time will be reviewed, in consult with consultants and regulators, to consider the most effective way to manage cane toads. 2. Feral animal presence will be discouraged on site by: • Prohibiting feeding animals. • Prohibiting keeping pets. • Appropriate waste disposal for food scraps and other wastes as per the Rio Tinto waste management guidelines. • Fencing of attractant areas (e.g. waste disposal/landfill) and regularly covering putrescible waste 3. All site personnel to be informed during their site induction of potential feral animal species (including feral cats, European Red Fox and cane toad) that may occur on site, and requirement to report sites immediately to site environmental representative.	• Targeted monitoring and management in high-risk areas (as identified by consultant). • Inspection of records, related to sightings, records, encounters and fauna removal. • Inspection of induction material and records.	High risk areas (as identified by consultant). Construction village, plant and administration areas	Frequency as determined by development of a survey and control program	1. HSEC Operational Delivery – PMO (Environment Operations Team) 2. Training Department
Threatening Process – Noise and Vibrations					
1. No disturbance, other than existing and authorised clearing, in the MEZ or MRZ. 2. Implementation of blast management controls for Ghost Bat caves within 350 m of active mining / blasting. 3. No blasting undertaken outside of daylight hours.	1. Implement Mining Exclusion Zones and Mining Restriction Zones to ensure retention of potential high value MNES habitat. 2. Implement blast management where relevant to minimise potential impacts to Category 2 and Category 3 (within an apartment block) Ghost Bat caves from noise and vibration associated with mining activities. 3. All site personnel to be informed during their site induction of requirements for no blasting to be undertaken outside of daylight hours.	• Annual land clearing reconciliation against relevant MEZ and MRZ • Noise and blast vibration monitoring for all active mining/blasts within 350 m of Category 2 and Category 3 (within an apartment block) Ghost Bat caves.	Proposal Development Envelope	Annual land clearing reconciliation Noise and blast vibration monitoring – as required by distance from Category 2 and Category 3 (within an appartement block) Ghost Bat caves	1. HSEC Operational Delivery – PMO (Environment Operations Team) 2. Mine Operations team 3. Drill and Blast team

Management Target	Management Actions	Monitoring			
		Method	Location	Frequency/Timing	Responsibility
Threatening Process – Dust and Light					
1. No disturbance, other than existing and authorised clearing, in the MEZ or MRZ. 2. Lighting and dust management actions are implemented.	1. Delineate MEZ and MRZ in online systems to ensure potential high value MNES habitat is retained. Consideration will be given to on ground demarcation where in operational areas and where demarcation does not introduce potential risk to MNES species (and subject to Traditional Owner engagement) and access restricted to authorised personnel. 2. Install permanent lighting only where required, that is, mainly in-pit and operational areas. 3. Permanent and temporary lighting will be shielded to minimise light spill. Permanent lighting will be directed away from sensitive areas (e.g., MEZ and MRZ, ghost bat caves etc). Temporary lighting (e.g., trailer mounted units) may be required to provide safe working environments for short periods of time; where practicable and while still providing a safe work environment, these will be positioned to minimise direct light spill to sensitive areas. 4. Manage dust emissions through: • Application of dust suppression methods including water sprays, where applicable; and • Implementing blast management protocols where relevant to minimise potential impacts of dust to bat caves.	• Annual land clearing reconciliation against relevant MEZ and MRZ • Monitoring of wind direction for all active mining/blasts within 350 m of Category 2 and Category 3 (within an apartment block)	Proposal Development Envelope	• Land clearing reconciliation – annual • Wind direction monitoring – as required by distance from Category 2 and Category 3 (within an appartement block)	1. HSEC Operational Delivery – PMO (Environment Operations Team) 2. Mine Operations team

2.3. Reporting

For each calendar year, the environmental objectives and outcome will be reported against their associated trigger, threshold criteria, management targets and supporting/complementary reporting where relevant in the Annual Compliance Assessment Report (ACAR) for the Amended Proposal (Table 4-2). A separate ACAR (reporting on MNES values) will be provided to the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

In the event that trigger and threshold criteria are exceeded or management targets are not met during the reporting period, the ACAR will include a description of the effectiveness of any management contingency actions that have been implemented to manage the impact.

In the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria, the exceedance will be reported in writing to the CEO within seven (7) days and to the DCCEEW (where appropriate) within seven (7) business days of the exceedance being identified.

A stand-alone report will be produced for DWER within 21 days and to the DCCEEW (where appropriate) within 21 business days of any reporting against exceeding the threshold criteria or non-achievement of a management target. A follow-up report detailing the adequacy of the response actions will also be submitted to the DWER within 12 months of the initial notification.

3. ADAPTIVE MANAGEMENT AND REVIEW OF THIS EMP

The conceptual framework for the development of Rio Tinto's EMPs provides details of the review and adaptive management process (Appendix B). The approach will include evaluation of:

- Monitoring data and comparison to baseline and reference site data on a regular basis to verify responses to potential impacts.
- The effectiveness and relevance of trigger and threshold contingency actions against environmental objectives, on an annual basis, to determine if any changes to the criteria, monitoring or response actions are required.
- The effectiveness and relevance of management actions and targets against environmental objectives, on an annual basis, to determine if any changes to actions, targets or monitoring are required.

Based on the review process results, the Proponent will update and adjust the management measures and strategies in consultation with DWER (Table 4-2).

4. STAKEHOLDER CONSULTATION

Consistent with the DCCEEW and DWER expectations for this EMP to align with the principles of EIA, the Proponent will consult with stakeholders, including but not limited to the Department of Biodiversity, Conservation and Attraction - Park and Wildlife Service and the DWER EPA Services and Compliance and Reporting during the environmental impact assessment of the Amended Proposal.

The Proposal is subject to Public Environmental Review level of assessment. Proposal documentation including the ERD and Draft EMP will be released for public review. During the drafting of the ERD, the Proponent has consulted on the project with reference to the EMP (see Table 4-1). In addition, the Proponent has received comments specifically on the Draft EMP from DCCEEW and comments have been addressed and incorporated into this Revision of the EMP.

Table 4-1: Brockman Syncline Proposal Stakeholder Consultation related to the EMP

Stakeholder	Date	Topics discussed
DCCEEW	February 2022	Monthly update on projects. Discussed MNES and noted the EMP will describe the monitoring and management proposed for the protection of MNES.
	March 2022	Monthly update on projects. Discussed the EMP, noting it will be submitted with draft ERD but will take into consideration advice/comments received from DCCEEW on the Greater Paraburdoo assessment
	July 2022	Meeting focussed primarily on the development and submission of s156A but informed that the EMP was being prepared for submission with the ERD.
	September 2022	Meeting focussed primarily on the development and submission of s156A but informed that the EMP was being prepared for submission with the ERD.
	October 2022	Rio Tinto provided an overview of the Brockman Syncline Proposal variation (s156A application) and the proposal in general (as assessed/presented in the draft ERD). Brief discussion included on monitoring actions in the EMP.
	December 2022	Briefing on approach to assessment of impacts to MNES including approaches for protection captured in the EMP.
	October 2023	Workshop held in Canberra to discuss the Proposal, including MNES related matters and associated proposed monitoring and management.
	December 2023	Receipt of DCCEEW comments on published ERD (including EMP). Amendments made to EMP to align with feedback received.
EPA Services (DWER)	August 2021	High level meeting discussing progress of assessment including progress of the development of the EMP.
	December 2022	Briefing on approach to assessment of impacts to MNES including approaches for protection captured in the EMP.
	October 2023	Workshop held in Canberra to discuss the Proposal, including proposed monitoring and management.
	December 2023	Receipt of EPAS comments on published ERD (including EMP). Amendments made to EMP to align with feedback received.

Table 4-2: Brockman Syncline Amended Proposal Environmental Management Plan Reporting Table

Key Environmental Factors: Flora and Vegetation, Terrestrial Fauna and Inland Waters	
Environmental Outcomes and Objectives with Associated Criteria and Management Targets.	**Reporting periods 1 January-31 December**
<u>Trigger Criteria</u>	**Status report:** Trigger criteria not exceeded Trigger criteria exceeded
1. **Boolgeeda Creek** 25% decrease in mean foliage cover at potential impact sites relative to baseline, in excess of change in reference areas (Appendix E), attributable to the Amended Proposal.	
2. **Boolgeeda Creek** 20% decline in the number of common native perennial riparian understorey and groundcover species at potential impact sites, in excess of declines in reference areas (Appendix E), attributable to the Amended Proposal.	
3. Weed species recorded at a potential impact site, which has not previously been recorded within the vegetation survey area of Boolgeeda Creek, attributable to the Amended Proposal.	
4. **Duck Creek** Toxicant - Rolling annual median concentration is statistically higher than the SSTV OR a single value is above the 95th percentile of baseline or ANZG (2018) DGV 90% species protection level; resampling confirms the value still exceeds the SSTV (Appendix C), local baseline and reference sites, attributable to the Amended Proposal. OR Stressor - Rolling annual median concentration is statistically higher than the SSTV and resampling confirms the value still exceeds the TV, local baseline and reference sites, attributable to the Amended Proposal.	
5. **Duck Creek** Aquatic fauna assemblage patterns are outside variation measured during the baseline and statistically significant differences are observed between potential impact and reference sites, attributable to the Amended Proposal.	
6. **Duck or Caves Creek** ≥ 25% decrease in indicator tree species foliage cover from baseline (Appendix D) at two or more monitoring sites within a creek reach, decline is not part of regional climatic trend or due to other perturbation, attributable to the Amended Proposal.	
7. **Duck or Caves Creek** Shift in composition, declines in abundance, cover or condition of native vegetation outside the variation measure during baseline and significantly different to reference areas, attributable to the Amended Proposal.	

Key Environmental Factors: Flora and Vegetation, Terrestrial Fauna and Inland Waters	
Environmental Outcomes and Objectives with Associated Criteria and Management Targets.	**Reporting periods 1 January-31 December**
8. **Caves Creek Only** Groundwater level in bore MB11SILV019 falls below 527.3 mAHD (Figure 2-5), attributable to the Amended Proposal.	
9. Groundwater level at Monitoring Bore MB19BS30010 (2,9 km from Plunge Pool) falls below 573.24 mAHD (2m less than lowest level observed in baseline data – 576.21 to 575.24 mAHD), attributable to the Amended Proposal.	
10. Effective catchment area of Plunge Pool is reduced to less than 7.5 km^2, attributable to the Amended Proposal.	
11. Direct disturbance within 15 m of the boundary of the Plunge Pool MEZ, attributable to the Amended Proposal.	
12. Direct disturbance within 15 m of the boundary of the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.	
13. Direct disturbance within 15 m of the boundary of the *Tetratheca butcheriana* MEZ, attributable to the Amended Proposal.	
14. Mining activities attributable to the Proposal (other than existing and approved low impact activities[39]), intersect a MRZ boundary.	
15. **Identified Apartment Block Caves <350 m from active mining / blasting** Vibration levels at caves as listed in Table 2-9 exceed[40]: • Category 2 cave/s – 10 mm/s peak particle velocity (PPV) during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months, attributable to the Proposal. • Category 3 cave/s – 50 mm/s PPV, attributable to the Proposal. OR • Decline in visual structural integrity[41] at retained Apartment Block cave/s as listed in Table 2-9), attributable to the Proposal.	

[39] No mining excavation is permitted within a MRZ. Only low impact activities such as access tracks may be implemented. No more than 5% of the MRZ can be cleared for low impact activities.

[40] Bob Bullen (Bat Call WA) conducted a review of the Brockman Syncline caves and provided cave classifications (following Bat Call WA 2021 A review of ghost bat ecology, threats and survey requirements, DAWE), vibration limits (PPV) and any seasonal specifications. Vibration levels have been set at the most conservative peak particle velocity levels as precautionary measures. Trigger criteria will be updated according to results from geotechnical assessments conducted prior to blasting.

[41] Decline in visual structural integrity is defined as a negative change to the integrity of the cave. The trigger will be exceeded where changes are observed after a blast event, including significant rockfalls (in comparison to baseline data).

Key Environmental Factors: Flora and Vegetation, Terrestrial Fauna and Inland Waters	
Environmental Outcomes and Objectives with Associated Criteria and Management Targets.	**Reporting periods 1 January-31 December**
16. **Identified Isolated Category 2 and Category 3 Caves <350 m from active mining / blasting** • Vibration levels at isolated Category 2 or Category 3 caves as listed in Table 2-9 exceed: • Isolated Category 2 cave/s – 10 mm/s PPV during breeding months (1 October to 31 December), or 25 mm/s PPV in non-breeding months attributable to the Proposal. • Isolated Category 3 cave/s – 50 mm/s PPV, attributable to the Proposal. OR • Decline in visual structural integrity[14] at any Isolated Category 2 or Category 3 cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal.	
17. Groundwater levels in any of the bores listed in the Table 2-11 decrease below respective trigger criteria water levels, attributable to the Amended Proposal.	
Threshold criteria:	**Status report:** Threshold criteria not exceeded Threshold criteria exceeded
1. **Boolgeeda Creek** 40% decrease in mean foliage over at potential impact sites relative to baseline, in excess of change in reference areas (Appendix E), attributable to the Amended Proposal.	
2. **Boolgeeda Creek** 25% decline in the number of common native perennial riparian understorey and groundcover species at potential impact sites, in excess of declines in reference areas (Appendix E), attributable to the Amended Proposal.	
3. Weed species recorded at a potential impact site, which has not previously been recorded within the vegetation survey area of Boolgeeda Creek, and classified by DPaW (2013) as having High Ecological Impact, Low Feasibility of Control, and exceeds 60% of total understorey cover at impact sites, attributable to the Amended Proposal.	
4. **Duck Creek** Toxicant - The bioavailable concentration also exceeds the SSTV (Appendix C), discharge water is likely to be the cause of the exceedance and expert advice indicates an increased risk to biota, attributable to the Amended Proposal. OR Stressor - A significant upward trend is apparent; discharge water is likely to be the cause of the exceedance and expert advice indicates an increased risk to biota, attributable to the Amended Proposal.	

Key Environmental Factors: Flora and Vegetation, Terrestrial Fauna and Inland Waters	
Environmental Outcomes and Objectives with Associated Criteria and Management Targets.	**Reporting periods 1 January-31 December**
5. **Duck Creek** Changes in aquatic fauna assemblages are localised to the potential impact areas, are increasing in severity or downstream extent for successive monitoring events and a relationship is established with altered water quality, flow regime or habitat characteristic reasonably, attributable to the Amended Proposal.	
6. **Duck or Caves Creek** ≥ 40% decrease in indicator tree species foliage cover from baseline within more than one creek reach for successive monitoring events, decline is not part of regional climatic trend or due to other perturbation and no evidence of seasonal recovery, attributable to the Amended Proposal. OR Shift in composition, declines in abundance, cover or condition of native vegetation outside variation measured during baseline and increasing in severity and downstream extent for successive monitoring events, attributable to the Amended Proposal.	
7. Groundwater level at Bore MB19BS30007 (1,740 m from Plunge Pool) falls below 567.80 mAHD (2m less than lowest level observed in baseline data – 569.80 to 570.15 mAHD)	
8. Effective catchment area of Plunge Pool is reduced to less than 7 km^2, attributable to the Amended Proposal.	
9. Direct disturbance within the boundary of the Plunge Pool MEZ attributable to the Amended Proposal	
10. Direct disturbance to the Ridge Pool surface water catchment MEZ within the Development Envelope, attributable to the Amended Proposal.	
11. Direct disturbance within the *Tetratheca butcheriana* MEZ, attributable to the Amended Proposal	
12. **Identified Apartment Block Caves <350 m from active mining / blasting** • Significant compromise in the structural integrity[42] of Apartment Block cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal	

[42] Significant compromise in the structural integrity of a cave is defined as damage that negatively impacts the structural integrity and microclimate of the cave such that future Ghost Bat use of the site is prevented.

Key Environmental Factors: Flora and Vegetation, Terrestrial Fauna and Inland Waters	
Environmental Outcomes and Objectives with Associated Criteria and Management Targets.	**Reporting periods 1 January-31 December**
13. **Identified Isolated Category 2, or Category 3 Caves <350 m from active mining / blasting** • Significant compromise in the structural integrity[15] of identified Isolated Category 2 or Category 3 cave/s, supported by a significant step change in microclimate (temperature and humidity), attributable to the Proposal .	
14. Groundwater levels in any of the bores listed in the Table 2-11 decrease below respective threshold criteria water levels (maximum drawdown presented in the ERD), attributable to the Amended Proposal.	
Management Targets	**Status report:** Management target achieved Management target not achieved
1. Demonstrate ongoing presence of Pilbara Leaf-nosed Bat and Ghost Bat within the Development Envelope, via camera, observation and/or secondary evidence.	
2. No significant indirect impacts to known *Tetratheca butcheriana* individuals within the MEZ, attributable to the Amended Proposal.	
3. Provision and maintenance of firefighting equipment in accordance with the relevant fire safety standards.	
4. Firefighting emergency response procedures are in place.	
5. No incidents of vehicles being used off designated roads outside operational areas unless in the case of emergency or for necessary activities, that result in significant impacts to high value MNES habitat.	
6. Implementation of speed limits in areas identified as having high value for MNES fauna.	
7. Induction material contains information relating to Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat and Pilbara Olive Python.	
8. Records of all EPBC Act listed threatened species observed are appropriately maintained.	
9. Fauna handling is undertaken in accordance with Rio Tinto's Wildlife Interaction Guidelines and the requirements of the BC Act.	
10. No incidents of native fauna feeding, hunting or keeping of firearms or pets on site.	
11. Access to the MEZs/MRZs (which potentially contain significant roosts or caves) is restricted to authorised personnel and there are no incidents of unauthorised access.	

Key Environmental Factors: Flora and Vegetation, Terrestrial Fauna and Inland Waters	
Environmental Outcomes and Objectives with Associated Criteria and Management Targets.	**Reporting periods 1 January-31 December**
12. No use of barbed wire on site, except in the case of statutory requirements.	
13. Where barbed wire is used in accordance with statutory requirements, reflectors are installed.	
14. Compliance with equipment hygiene procedures.	
15. Weed control is informed and targeted.	
16. Induction material contains information relating weed management and control.	
17. Feral animal control is informed and targeted.	
18. Feral animal control actions are implemented.	
19. Feral animal presence is discouraged.	
20. Induction material contains information relating feral animals.	
21. No disturbance, other than existing and authorised clearing, in the MEZ or MRZ.	
22. Implementation of blast management controls for Ghost Bat caves within 350 m of active pits / blasting.	
23. No blasting undertaken outside of daylight hours.	
24. Lighting and dust management actions are implemented.	

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WRM 2019a. *Brockman Syncline Proposal Aquatic Ecological Values Desktop Review*

WRM 2019b. *Greater Brockman 'Plunge Pool' Aquatic Biota Values Assessment Wet Season Sampling 2019*

WRM 2020a. *Brockman Syncline Expansion Baseline Aquatic Fauna and Water Quality Survey of Caves, Duck and Boolgeeda Creeks Dry Season 2019*

WRM 2020b. *Hazard Analysis and Risk Assessment for Dewatering* Discharge to Duck Creek and Boolgeeda Creek.

6. APPENDICES

Appendix A: Condition Requirements of Existing Ministerial Statements

Table 6-1: Condition Requirements of Existing Ministerial Statements

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
MS 1000: BROCKMAN SYNCLINE 4 IRON ORE – REVISED PROPOSAL – March 2015				
1-1	Proposal Implementation	When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Column 3 of Table in Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches and to include new limits relevant to the Amended Proposal.
2-1	Contact Details	The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-1	Compliance Reporting	The proponent shall prepare and maintain a Compliance Assessment Plan to the satisfaction of the CEO.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-2	Compliance Reporting	The proponent shall submit to the CEO the Compliance Assessment Plan required by condition 4-1 within six (6) months of the date of this statement. The Compliance Assessment Plan shall indicate: (1) the frequency of compliance reporting; (2) the approach and timing of compliance assessments; (3) the retention of compliance assessments; (4) the method of reporting of potential non-compliances and corrective actions taken; (5) the table of contents of Compliance Assessment Reports; and (6) public availability of Compliance Assessment Reports.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-3	Compliance Reporting	The proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
3-4	Compliance Reporting	The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-5	Compliance Reporting	The proponent shall advise the CEO of any potential non-compliance within seven days of that potential non-compliance being known.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-6	Compliance Reporting	The proponent shall submit to the CEO a Compliance Assessment Report by 30 April each year addressing compliance in the previous year, or otherwise agreed in writing by the CEO. The first Compliance Assessment Report shall be submitted by 30 April 2016 addressing the compliance for the period from the date of issue of this statement, notwithstanding that the first reporting period may be less than 12 months. The Compliance Assessment Report shall: (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf; (2) include a statement as to whether the proponent has complied with the conditions; (3) identify all potential non-compliances and describe corrective and preventative actions taken; (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
5-1	Public Availability of Data	Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g., maps)) relevant to the assessment of this proposal and implementation of this Statement.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
5-2	Public Availability of Data	If any data referred to in condition 5-1 contains particulars of: (1) a secret formula or process; or (2) confidential commercially sensitive information; the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
6-1	Discharge of surplus mine dewater to Boolgeeda Creek	The proponent shall manage the discharge of surplus mine dewater from the Brockman Syncline 4 Iron Ore - Revised Proposal in a manner that minimises impacts to the riparian vegetation along Boolgeeda Creek and the hydrologic regime of Boolgeeda Creek.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches of environmental outcomes: Discharge of surplus water to Boolgeeda Creek as a result of mining does not cause long term impacts on the environmental and conservation values of the Boolgeeda Creek system
6-2	Discharge of surplus mine dewater to Boolgeeda Creek	The proponent shall implement the Water Discharge Monitoring and Management Plan (Revision 2 dated 26 August 2014), or subsequent revisions approved by the CEO from the commencement of discharge of surplus mine dewater from the Brockman Syncline 4 Iron Ore - Revised Proposal site until advised otherwise by the CEO.	Retain and update	The latest version of the plan referred to in this condition was the Brockman Syncline 4 Revised Proposal Monitoring and Management Plan. All provisions relating to water discharge monitoring and management as well as riparian vegetation monitoring and management have been brought into the EMP.
6-3	Discharge of surplus mine dewater to Boolgeeda Creek	The proponent may review and revise the Water Discharge Monitoring and Management Plan (Revision 2 dated 26 August 2014), or any subsequently approved revisions, to the requirements of the CEO.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
6-4	Discharge of surplus mine dewater to Boolgeeda Creek	The proponent shall review and revise the Water Discharge Monitoring and Management Plan (Revision 2 dated 26 August 2014), or any subsequently approved revisions, as and when directed by the CEO.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
6-5	Discharge of surplus mine dewater to Boolgeeda Creek	The proponent shall continue to implement the management actions in accordance with the Water Discharge Monitoring and Management Plan until the CEO has confirmed by notice in writing that it has been demonstrated that the objective in condition 6-1 is being and will continue to be met and therefore the implementation of the management actions is no longer required.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
7-1	Rehabilitation and closure	The proponent shall ensure that the proposal is decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses,	Delete	Decommissioning and rehabilitation (Mine Closure) to be regulated by the DMIRS under the *Mining Act 1978* to

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
		and without unacceptable liability to the State of Western Australia, through the implementation of the Mine Closure Plan required by condition 7-2.		ensure that mining activities are rehabilitated and closed in a manner to make them physically safe to humans and fauna, geo-technically stable, geo-chemically non-polluting/non-contaminating and capable of sustaining an agreed post mining land use without unacceptable liability to the State. The EPA has provided advice on other recent projects that decommissioning, and rehabilitation can be adequately regulated through the Mine Closure Plan required by the *Mining Act 1978*, rather than a condition under part IV of the EP Act.
7-2	Rehabilitation and closure	The proponent shall prepare the Brockman Syncline 4 Mine Closure Plan in accordance with the Guidelines for Preparing Mine Closure Plans, June 2011 and any updates, to the requirements of the CEO on advice of the Department of Mines and Petroleum.	Delete	As above
7-3	Rehabilitation and closure	The proponent shall review and revise the Brockman Syncline 4 Mine Closure Plan required by condition 7-2 at intervals not exceeding three years, or as otherwise specified by the CEO.	Delete	As above
7-4	Rehabilitation and closure	The proponent shall implement the latest revision of the Brockman Syncline 4 Mine Closure Plan, which the CEO has confirmed by notice in writing, satisfies the requirements of condition 7-2.	Delete	As above
8-1	Residual Impacts and Risk Management Measures	In view of the significant residual impacts and risks as a result of implementation of the proposal, the proponent shall contribute funds to offset the clearing of 'good to excellent' condition native vegetation, including the loss of habitat for conservation significant species, in the Hamersley IBRA subregion, and calculated pursuant to condition 8-2. This funding shall be provided to a government-established conservation offset fund or an alternative offset arrangement providing an equivalent outcome as determined by the Minister.	Retain and update	This condition should be retained and updated to specify contributions to the Pilbara environmental Offsets Fund.
8-2	Residual Impacts and Risk Management Measures	The proponent's contribution to the initiative identified in condition 8-1 shall be paid biennially, the first payment due two years after commencement of the additional ground disturbance defined in Table 2 of Schedule 1. The amount of funding will be $750 AUD (excluding GST) per hectare of 'good to excellent' condition native	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
		vegetation cleared within the development envelope (delineated in Figure 1 and defined by the geographic coordinates in Schedule 2, Table 1, Development Envelope (Area 1)), within the Hamersley IBRA subregion.		
8-3	Residual Impacts and Risk Management Measures	The 2,610 ha of clearing of native vegetation previously approved under Ministerial Statement 717 is exempt from the requirement to offset under condition 8-2.	Retain	This condition should be retained in Draft Ministerial Statement Condition 9-5.
8-4	Residual Impacts and Risk Management Measures	The real value of contributions described in condition 8-2 will be maintained through indexation to the Perth Consumer Price Index (CPI), with the first adjustment to be applied to the first contribution.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
8-5	Residual Impacts and Risk Management Measures	The proponent shall prepare and submit an Impact Reconciliation Procedure to the satisfaction of the CEO.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
8-6	Residual Impacts and Risk Management Measures	The Impact Reconciliation Procedure required pursuant to condition 8-5 shall: (1) include a methodology to identify clearing of 'good to excellent' condition native vegetation in the Hamersley IBRA subregion; (2) require the proponent to submit spatial data identifying areas of 'good to excellent' condition native vegetation that has been cleared; (3) include a methodology for calculating the amount of clearing undertaken during each biennial time period; and (4) state dates for the commencement of the biennial time period and for the submission of results of the Impact Reconciliation Procedure, to the satisfaction of the CEO.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches to include the anticipated offset requirements of the Amended Proposal.
MS 925: NAMMULDI-SILVERGRASS EXPANSION				
1-1	Proposal Implementation	When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Column 3 of Table 2 in Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.	Retain but update	The Condition is still relevant and should be retained. However, it should be updated to reflect contemporary approaches and to include new limits relevant to the Amended Proposal.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
2-1	Contact Details	The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-1	Time Limit for Proposal Implementation	The proponent shall not commence implementation of the proposal after the expiration of five years from the date of this statement, and any commencement, within this five-year period, must be substantial.	Delete	Condition no longer required as the Amended Proposal has been substantially commenced and is being implemented.
3-2	Time Limit for Proposal Implementation	Any commencement of implementation of the proposal, within five years from the date of this statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five years from the date of this statement.	Delete	As above
4-1	Compliance Reporting	The proponent shall prepare and maintain a Compliance Assessment Plan to the satisfaction of the CEO.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-2	Compliance Reporting	The proponent shall submit to the CEO the Compliance Assessment Plan required by Condition 4-1 at least six (6) months prior to the first compliance assessment report required by Condition 4-6, or prior to implementation, whichever is sooner. The Compliance Assessment Plan shall indicate: (1) the frequency of compliance reporting; (2) the approach and timing of compliance assessments; (3) the retention of compliance assessments; (4) the method of reporting of potential non-compliances and corrective actions taken; (5) the table of contents of Compliance Assessment Reports; and (6) public availability of Compliance Assessment Reports.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-3	Compliance Reporting	The proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-4	Compliance Reporting	The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.	Retain but update	The Condition is still relevant and should be retained. However, should

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
				be updated to reflect contemporary approaches.
4-5	Compliance Reporting	The proponent shall advise the CEO of any potential non-compliance within seven days of that potential non-compliance being known.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-6	Compliance Reporting	The proponent shall submit to the CEO a Compliance Assessment Report by 30 April each year addressing compliance in the previous calendar year. The first Compliance Assessment Report shall be submitted by 30 April 2014 addressing the compliance for the period from the date of issue of this statement, notwithstanding that the first reporting period may be less than / more than 12 months. The Compliance Assessment Report shall: (1) be endorsed by the proponent's Managing Director / General Manager / Chief Executive Officer or a person delegated to sign on the Managing Director's / General Manager's / Chief Executive Officer's behalf; (2) include a statement as to whether the proponent has complied with the conditions; (3) identify all potential non-compliances and describe corrective and preventative actions taken; (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
5-1	Public Availability of Data	Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g., maps)) relevant to the assessment of this proposal and implementation of this Statement.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
5-2	Public Availability of Data	If any data referred to in condition 5-1 contains particulars of: (1) a secret formula or process; or (2) confidential commercially sensitive information; the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.	Retain but update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
6-1	Vegetation	The proponent shall ensure that dewatering and discharge do not cause long term impacts on the health and abundance of groundwater-dependent vegetation communities in Duck and Caves creeks beyond the approved clearing envelope as shown in Figure 3 and delineated by the coordinates specified in Schedule 2.	Retain and update	This condition should be converted to outcomes and addressed with triggers and thresholds in the EMP. The proponent shall implement the proposal to meet the following environmental outcomes: • Prevent long term impact on the health and abundance of groundwater dependent vegetation communities in Caves creeks from groundwater drawdown. • Prevent long term impact on the health and abundance of Groundwater Dependent Vegetation communities in Duck Creek from surplus water discharge.
6-2	Vegetation	To verify that Condition 6-1 is being met, the proponent shall develop a Groundwater Dependent Vegetation Monitoring and Management Plan to the satisfaction of the CEO. The Groundwater Dependent Vegetation Monitoring and Management Plan shall include: (1) identification of potential vegetation impact monitoring and control sites between the discharge points and the confluence of Duck Creek and the Ashburton River; (2) the design of a survey to acquire baseline data, including health and abundance parameters; (3) definition of health and abundance parameters; (4) definition of environmental parameters to be monitored, including groundwater drawdown along Caves Creek; (5) definition of monitoring frequency and timing; (6) identification of criteria to measure decline in health; (7) definition of trigger levels for 'no irreversible impact'; and (8) details of management actions and strategies to be implemented should the 'no irreversible impact' trigger levels be exceeded.	Retain and update	The latest version of the plan referred to in this condition was the Nammuldi-Silvergrass Monitoring and Management Plan. All provisions relating to water discharge monitoring and management as well as groundwater dependent vegetation monitoring and management have been brought into the EMP.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
6-3	Vegetation	The proponent shall implement the Groundwater Dependent Vegetation Monitoring and Management Plan required by Condition 6-2 prior to the start of dewatering until advised otherwise by the CEO.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
6-4	Vegetation	Prior to the commencement of dewatering, the proponent shall implement the baseline monitoring survey, required by Condition 6-2(2) for all sites identified in Condition 6-2(1) and submit the results to the CEO.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
6-5	Vegetation	In the event that monitoring required by Condition 6-3 indicates that a trigger level required by Condition 6-2(7) has been exceeded, the proponent shall provide a report to the CEO within 21 days of the exceedance being identified which: (1) describes the decline or change; (2) provides information which allows determination of the likely root cause of the decline or change; and (3) if considered likely to be the result of activities undertaken in implementing the proposal, describe which management actions will be implemented and the associated timelines to remediate the decline or change.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
6-6	Vegetation	The proponent shall implement the actions identified in Condition 6-5(3) until the CEO determines that the remedial actions may cease.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
7-1	Discharge of Water to Duck Creek	The proponent shall ensure that the discharge of surplus water from the Nammuldi or Silvergrass sites as a result of mining does not cause long term impacts on the environmental and conservation values of Duck Creek.	Retain and update	This condition has been converted to outcomes and addressed with triggers and thresholds in the EMP. The proponent shall implement the proposal to meet the following environmental outcome: Discharge of surplus water as a result of mining does not cause long term impacts on the environmental and conservation values of the Duck Creek system.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
7-2	Discharge of Water to Duck Creek	To verify that Condition 7-1 is being met, the proponent shall develop a high level environmental and conservation values statement for Duck Creek to the satisfaction of the CEO in consultation with the DEC and the DoW.	Complete	This condition has been demonstrated to be met through compliance reporting under MS 925
7-3	Discharge of Water to Duck Creek	The proponent shall ensure that any water discharged to Duck Creek does not exceed whichever is greater of the following: (1) the default trigger for the protection of marine and freshwater ecosystems as per the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates; (2) baseline levels of the receiving environment determined pursuant to Condition 7-4; or (3) other criteria agreed with the DEC and the DoW.	Retain and update	This condition should be converted to an outcomes and the detail of the monitoring, triggers and thresholds are included in the EMP. The proponent shall implement the proposal to meet the following environmental outcome: • Ensure water discharged to Duck Creek meets specified agreed water quality requirements developed in accordance with the ANZG framework or its revisions.
7-4	Discharge of Water to Duck Creek	Prior to discharging water from the Nammuldi or Silvergrass sites, the proponent shall develop a Water Discharge Monitoring and Management Plan in consultation with the DEC and the DoW to the satisfaction of the CEO to ensure that the environmental and conservation values associated with Duck Creek and any downstream ecosystems are maintained. This plan shall: (1) when implemented, identify the water quality baseline levels of the western boundary of the proposal, within Duck Creek and downstream of the water discharge points for the criteria measured under the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates; (2) describe the water discharge program; (3) when implemented, monitor to demonstrate whether Conditions 7-1 and 7-3 are being met; (4) when implemented, manage the implementation of the proposal to meet the requirements of Conditions 7-1 and 7-3; and (5) detail management actions and strategies to be implemented should the monitoring required by Condition 7-4(3) indicate that Condition 7-1 may not be met.	Retain and update	Discharge to Duck Creek is approved and being implemented; therefore, the constraint regarding discharging water from approved pits is no longer relevant. As water discharge is being continued rather than commenced, the requirement to describe the water discharge program in the EMP should be removed. The latest version of the plan referred to in this condition was the Nammuldi-Silvergrass Monitoring and Management Plan. All provisions relating to water discharge monitoring and management have been brought into the EMP, which addresses the outcomes and objectives.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
7-5	Discharge of Water to Duck Creek	The proponent shall implement the Water Discharge Monitoring and Management Plan from the commencement of discharge of excess water from the Nammuldi or Silvergrass sites.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
8-1	Water Quality and Quantity (Irrigated Agriculture Area)	The proponent shall ensure that any irrigation water runoff from the agricultural pivot cells does not exceed whichever is greater of the following: (1) the default trigger for the protection of marine and freshwater ecosystems as per the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates; or (2) baseline levels of the receiving environment for the criteria measured under the Australian and New Zealand Environmental and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ (2000)) *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates.	Retain	Retain
8-2	Water Quality and Quantity (Irrigated Agriculture Area)	The proponent shall ensure that changes to hydrological regime, specifically soil saturation, related to the establishment of irrigated pivot cells do not adversely affect the environment beyond a 30-metre buffer around the agricultural pivot cells.	Retain	Retain
8-3	Water Quality and Quantity (Irrigated Agriculture Area)	The proponent shall ensure that irrigation water quality is consistent with the requirements for irrigation water as per the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, *Australian Water Quality Guidelines for Fresh and Marine Waters* and its updates, or take such other in situ measures as approved by the CEO, to prevent the accumulation of toxicants within the soil profile, and to prevent the degradation of soil structure due to sodicity and excessive salinity.	Retain	Retain
8-4	Water Quality and Quantity (Irrigated Agriculture Area)	The proponent shall monitor the changes to the hydrological regime, specifically soil saturation, as well as the quality of any run-off from the agricultural pivot cells which enters surface water within the boundary of the proposal area to ensure that the requirements of Conditions 8-1 and 8-2 are met. This monitoring is to be carried out using methods detailed in the Nutrient and Irrigation Management Plan which forms part of the Agriculture Environmental Management Plan, June 2012, and any subsequent approved revisions, prepared for this proposal and to the satisfaction of the CEO.	Retain	Retain

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
8-5	Water Quality and Quantity (Irrigated Agriculture Area)	The proponent shall commence the water quality and soil saturation monitoring required by Condition 8-4 at least one month prior to the commencement of irrigation.	Retain	Retain
8-6	Water Quality and Quantity (Irrigated Agriculture Area)	In the event that monitoring required by Condition 8-4 indicates that the requirements of Conditions 8-1 and 8-2 are not being met: (1) the proponent shall report such findings to the CEO within 21 days of the decline in water quality being identified; (2) the proponent shall provide evidence to the CEO which allows determination of the cause of the decline in water quality; (3) if a decline in water quality is determined by the CEO to be a result of activities undertaken in implementing the proposal, the proponent shall submit to the CEO actions to be taken to remediate the decline in water quality within 21 days of the determination being made; and (4) the proponent shall implement the actions to remediate the decline in water quality required by Condition 8-6(3) upon approval of the CEO and shall continue to implement such actions until such time as the CEO determines that the remedial actions may cease.	Retain	Retain
9-1	Management of Introduced Crop Species	The proponent shall demonstrate that the selected crop species does not have the potential to become an invasive weed.	Retain	Retain
9-2	Management of Introduced Crop Species	To verify that the requirements of condition 9-1 are being met, prior to cultivation, the proponent shall prepare a report to the satisfaction of the CEO on advice of the DEC which: (1) identifies crop species considered for the Irrigated Agriculture Area shown in Figure 1. (2) provides evidence based on at least two surveys (one conducted during the wet season and one during the dry season), in a similar environment, that the selected crop species does not have the potential to become invasive; and (3) proposes the crop species to be cultivated.	Retain	Retain
9-3	Management of Introduced Crop Species	The proponent shall only plant the selected crop species following receipt of a notice in writing from the CEO that the crop species is acceptable.	Retain	Retain

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
9-4	Management of Introduced Crop Species	Prior to cultivation, the proponent shall develop a monitoring and management plan to the satisfaction of the CEO to ensure that the acceptable crop species approved in Condition 9-3 does not spread beyond a 30-metre buffer surrounding the agricultural pivot cells. The Plan shall include: (1) the location of monitoring sites, monitoring methodology and frequency of monitoring to demonstrate that the acceptable crop species approved in Condition 9-3 has not spread. (2) proposed management measures to prevent the propagation and spread of the acceptable crop species approved in Condition 9-3 beyond a 30-metre buffer surrounding the pivot cells. (3) identification of criteria to measure invasive spread of crop species; and (4) identification of trigger levels and management actions to be implemented should the criteria identified in Condition 9-4(3) be exceeded.	Retain	Retain
9-5	Management of Introduced Crop Species	The proponent shall implement the monitoring and management plan required by Condition 9-4 and any subsequent revisions approved by the CEO within the Irrigated Agriculture Area shown in Figure 1 prior to crop propagules arriving on site.	Retain	Retain
9-6	Management of Introduced Crop Species	In the event that the results of monitoring required by Condition 9-5 show that over five consecutive years there has been no spread of crop species beyond the indirect impact areas, the proponent may revise the frequency of monitoring required by Condition 9-5, as approved by the CEO.	Retain	Retain
9-7	Management of Introduced Crop Species	In the event that monitoring required by Condition 9-5 indicates that the requirements of Conditions 9-1 and 9-4 are not being met: (1) the proponent shall report such findings to the CEO within 21 days of the spread of crop species being identified; (2) the proponent shall provide evidence to the CEO which allows determination of the cause of the spread of crop species; (3) if determined by the CEO to be a result of activities undertaken in implementing the proposal, the proponent shall submit to the CEO within 21 days of the determination being made, actions to be taken to remediate the spread of crop species; and (4) the proponent shall implement the actions required by Condition 9-7(3) to control and eradicate the spread of crop species upon approval of the CEO and shall continue to implement such actions until such time as the CEO determines that the remedial actions may cease.	Retain	Retain

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
10-1	Closure, Decommissioning and Rehabilitation	Within six months following commissioning of the first Silvergrass pit or a new Nammuldi pit, whichever occurs first, the proponent shall prepare a Closure, Decommissioning and Rehabilitation Plan in accordance with the *Guidelines for Preparing Mine Closure Plans*, June 2011 and any updates, to the requirements of the CEO on advice of the Department of Mines and Petroleum.	Delete	Decommissioning and rehabilitation (Mine Closure) is proposed to be regulated by the DMIRS under the *Mining Act 1978* to ensure that mining activities are rehabilitated and closed in a manner to make them physically safe to humans and fauna, geo-technically stable, geo-chemically non-polluting/non-contaminating and capable of sustaining an agreed post mining land use without unacceptable liability to the State. The EPA has provided advice on other recent projects that decommissioning, and rehabilitation can be adequately regulated through the Mine Closure Plan required by the *Mining Act 1978*, rather than a condition under part IV of the EP Act.
10-2	Closure, Decommissioning and Rehabilitation	The Closure, Decommissioning and Rehabilitation Plan required by Condition 10-1 shall ensure that closure planning and rehabilitation are carried out in a coordinated, progressive manner and are integrated with development planning, consistent with current best practice, and the agreed land uses.	Delete	As above
10-3	Closure, Decommissioning and Rehabilitation	The Closure, Decommissioning and Rehabilitation Plan required by Condition 10-1 shall set out procedures to: (1) manage long-term hydrogeological impacts of mining the Marra Mamba and Bedded Brockman iron deposits; (2) model the long-term hydrological impacts, particularly the water levels and quality both in the pit void and downstream of waste material landforms; (3) identify pits to be backfilled; (4) manage over the long-term the surface water systems affected by the open pits; (5) progressively rehabilitate all disturbed areas to a standard suitable for the agreed end land use(s), with consideration and incorporation of: (a) the characteristics of the pre-mining ecosystems within the project area (through research and baseline surveys); (b) the performance of previously rehabilitated areas within the mining lease;	Delete	As above

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
		(c) the performance of rehabilitation areas at the proponent's other operations in the Pilbara; and (d) best practice rehabilitation techniques used elsewhere in the mining industry; (6) develop and identify completion (7) monitor rehabilitation to assess the performance of all rehabilitated areas against the completion criteria; (8) report on the rehabilitation and monitoring results; (9) develop management strategies and/or contingency measures in the event that operational experience and/or monitoring identify any significant environmental impact as a result of the proposal; (10) manage and monitor mineral waste including physical characteristics and acid or neutral metalliferous drainage using national and international standards and updates; and (11) close the mine in a manner which does not result in unacceptable liability to the State.		
10-4	Closure, Decommissioning and Rehabilitation	Within 12 months following commissioning of the first Silvergrass pit or a new Nammuldi pit, whichever occurs first, the proponent shall implement the Closure, Decommissioning and Rehabilitation Plan required by Condition 10-1 and any subsequent approved revisions until otherwise agreed by the CEO.	Delete	As above
11-1	Residual Impacts and Risk Management Measures	The proponent shall contribute funds for the clearing of "good to excellent" condition native vegetation, riparian vegetation within Area 1a (delineated in Figure 3) and Priority Ecological Communities within Area 1a (delineated in Figure 3) to fund the strategic regional conservation initiative for the Pilbara.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
11-2	Residual Impacts and Risk Management Measures	The proponent's contribution to the strategic regional conservation initiative identified in Condition 11-1 shall be paid biennially, the first payment due two years after ground disturbance. The amount of funding will be made on the following basis and in accordance with the approved Impact Reconciliation Procedure required by Condition 11-3: • $750 AUD (excluding GST) per hectare of "good to excellent" condition native vegetation cleared within the area delineated in Figure 2 as Area 1, up to a maximum of 6,308 ha; and • $1,500 AUD (excluding GST) per hectare of Priority Ecological Community and riparian vegetation cleared within the area delineated in Figure 3 as Area 1a.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
11-3	Residual Impacts and Risk	Prior to ground-disturbing activities, the proponent shall prepare an Impact Reconciliation Procedure to the satisfaction of the CEO.	Retain and update	Ground disturbance under MS 925 is approved and being implemented;

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
	Management Measures			therefore, the constraint regarding ground disturbance is no longer relevant. The requirement for an Impact Reconciliation Procedure should be retained and a draft Impact Reconciliation Procedure has been prepared for the Amended Proposal.
11-4	Residual Impacts and Risk Management Measures	The Impact Reconciliation Procedure required pursuant to Condition 11-3 shall: (1) include details of a methodology to identify clearing; (2) include a methodology for calculating the amount of clearing undertaken during each biennial time period; and (3) state dates for the commencement of the biennial time period and for the submission of results of the Impact Reconciliation Procedure, to the satisfaction of the CEO.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
11-5	Residual Impacts and Risk Management Measures	The real value of contributions described in condition 11-2 will be maintained through indexation to the Perth Consumer Price Index (CPI), with the first adjustment to be applied to the first contribution.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
MS 867: BROCKMAN 2 DETRITAL IRON ORE MINE EXTENSION PHASE 2B				
1-1	Proposal Implementation	The proponent shall implement the proposal as documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
2-1	Proponent Nomination and Contact Details	The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
2-2	Proponent Nomination and Contact Details	The proponent shall notify the Chief Executive Officer of the Office of the Environmental Protection Authority (CEO) of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3-1	Time Limit of Authorisation	The authorisation to implement the proposal provided for in this statement shall lapse and be void five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.	Delete	Condition no longer required as the Amended Proposal has been

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
				substantially commenced and is being implemented.
3-2	Time Limit of Authorisation	The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.	Delete	As above
4-1	Compliance Reporting	The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-2	Compliance Reporting	The proponent shall submit to the CEO the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance report required by condition 4-6, or prior to implementation, whichever is sooner. The compliance assessment plan shall indicate: 1. the frequency of compliance reporting; 2. the approach and timing of compliance assessments; 3. the retention of compliance assessments; 4. the method of reporting of potential non-compliances and corrective actions taken; 5. the table of contents of compliance assessment reports; and 6. public availability of compliance assessment reports.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-3	Compliance Reporting	The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-4	Compliance Reporting	The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the CEO.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-5	Compliance Reporting	The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
4-6	Compliance Reporting	The proponent shall submit to the CEO the first compliance assessment report fifteen months from the date of issue of this Statement addressing the twelve-month period	Retain and update	The Condition is still relevant and should be retained. However, should

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
		from the date of issue of this Statement and then annually from the date of submission of the first compliance assessment report. The compliance assessment report shall: 1. be endorsed by the proponent's Managing Director or a person delegated to sign on the Managing Director's behalf; 2. include a statement as to whether the proponent has complied with the conditions; 3. identify all potential non-compliances and describe corrective and preventative actions taken; 4. be made publicly available in accordance with the approved compliance assessment plan; and 5. indicate any proposed changes to the compliance assessment plan required by condition 4-1.		be updated to reflect contemporary approaches.
5-1	Public Availability of Data	Within three months of the issue of this Statement, and for the remainder of the life of the proposal, the proponent shall make all environmental data (including sampling design and sampling methodology) used in the assessment of this proposal publicly available in a manner approved by the CEO.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
6-1	Proposal Boundary	In implementing the proposal, the proponent shall not increase the mine pit footprint or the Material Waste Dump footprint beyond that delineated by MGA co-ordinates listed in Schedule 2 (attached).	Delete	
7-1	Groundwater	The proponent shall ensure that run-off and/or seepage from the mineral waste dump and waste material landforms does not impact the quality of groundwater and surface water within or adjacent to the proposal area to the extent that it exceeds the trigger values for a slightly to moderately disturbed ecosystem provided for in Table 3.4.2 of Chapter 3 of the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, Australian Water Quality Guidelines for Fresh and Marine Waters and its updates, taking into consideration natural background water quality.	Delete	The potential for run-off and seepage from mineral waste dumps and waste material landforms is being effectively regulated by DMIRS through the Mining Proposal and Mine Closure Plan documents under the *Mining Act 1978.* In accordance with the EPA Interim Guidance *Taking decision making processes into account in EIA,* the Proponent considers that the components of this condition can be adequately addressed through the Mining Proposal and Mine Closure Plan required by the *Mining Act 1978*, rather than a condition under part IV of the EP Act.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
7-2	Groundwater	The proponent shall monitor the quality of groundwater and surface water within the proposal area including around the edge of the BS2 pit and the waste material landform to ensure that the requirements of condition 7-1 are met. This monitoring is to be carried out using methods consistent with Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, Australian Guidelines for Water Quality Monitoring and Reporting (and its updates) and to the satisfaction of the CEO.	Delete	As above
7-3	Groundwater	The proponent shall commence the water quality monitoring required by 7-2 prior to ground disturbing activities in order to collect baseline data and submit the data to the CEO.	Delete	As above
7-4	Groundwater	Discharge water into Pit 5 is not to exceed the trigger values for a slightly to moderately disturbed ecosystem provided for in Table 3.4.2 of Chapter 3 of the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000 (ANZECC/ARMCANZ (2000)), Australian Water Quality Guidelines for Fresh and Marine Waters and its updates, taking into consideration natural background water quality.	Delete	As above
7-5	Groundwater	The proponent shall submit annually the results of monitoring required by condition 7-2 to the CEO. Discharge water is to meet ANZECC/ARMCANZ (2000) guidelines as required by condition 7-4.	Delete	As above
7-6	Groundwater	In the event that monitoring required by condition 7-2 indicates that the requirements of condition 7-1 are not being met, the proponent shall: 1. report such findings to the CEO within 21 days of the decline in water quality being identified; 2. provide evidence which allows determination of the root cause of the decline in water quality; and 3. if determined to be a result of activities undertaken in implementing the proposal, state the actions and associated timelines proposed to be taken to remediate the water quality.	Delete	As above
7-7	Groundwater	The proponent shall on approval of the CEO, implement the actions identified in 7-6(3) and continue to implement such actions until the CEO determines that the remedial actions may cease.	Delete	As above
7-8	Groundwater	The proponent shall make the monitoring reports required by condition 7-2 publicly available in a manner approved by the CEO.	Delete	As above

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
8-1	Acid and Metalliferous Drainage	Prior to ground-disturbing activities the proponent shall provide a report with a detailed risk assessment, using national and international standards, for any potential Acid Metalliferous Drainage as defined in Section 2.1 of the Page 5 of 24 Managing Acid and Metalliferous Drainage, February 2007 Department of Industry Tourism and Resources (and its updates) including selenium, within the area of the Proposal as defined in Figure 1 to identify: 1. The extent of the acidity and metal contamination hazard associated from related mining activities in the area of the proposal; and 2. The potential environmental receptors that could be impacted on exposure to this hazard. Note: The national and international standards referred to in condition 8.1 are the *Managing of Acid and Metalliferous Drainage*, February 2007 Department of Industry Tourism and Resources, and the *Global Acid and Metalliferous Drainage (GARD) Guide*, December 2008.	Completed, delete	This condition has been demonstrated to be met through compliance reporting under MS 867.
8-2	Acid and Metalliferous Drainage	Prior to the mining of any material with the potential to generate Acid Metalliferous Drainage including selenium, the proponent shall prepare and subsequently implement long-term prevention, monitoring, contingency and remediation strategies for the management of any potential Acid and Metalliferous Drainage including selenium, to the satisfaction of the CEO on advice of the Department of Environment and Conservation and the Department of Mines and Petroleum.	Completed, delete	As above
8-3	Acid and Metalliferous Drainage	The proponent shall undertake static and kinetic geochemical testing for potential Acid and Metalliferous Drainage including selenium on all disturbed rock types, as part of the long-term monitoring strategies required by condition 8-2 using national and international standards to the satisfaction of the CEO.	Delete	The management of any potential acid forming materials is managed under the Mining Proposal and Mine Closure Plans regulated by DMIRS under the *Mining Act 1978.*
8-4	Acid and Metalliferous Drainage	The proponent shall report the results and include an assessment of the efficacy of the long-term prevention, monitoring, contingency and remediation strategies required by condition 8-2 as part of the compliance assessment report required by condition 4-6 to the satisfaction of the CEO.	Delete	As above
8-5	Acid and Metalliferous Drainage	The proponent shall manage all material with the potential to generate Acid and Metalliferous Drainage including selenium so that the quality of surface water or groundwater does not exceed the trigger values for a slightly to moderately disturbed ecosystem provided for in Table 3.4.2 of Chapter 3 of the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, Australian Water Quality Guidelines for Fresh and Marine Waters and its updates.	Delete	As above

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
9-1	Rehabilitation and Mine Closure	The proponent shall undertake progressive rehabilitation of disturbed areas including the waste material landform over the life of the proposal to achieve the following outcomes: 1. The waste material landform facility shall be non-polluting and shall be constructed so that its stability, surface drainage, resistance to erosion and ability to support local native vegetation, are similar to undisturbed natural analogue landforms as demonstrated by Ecosystem Function Analysis or other methodology acceptable to the CEO; 2. Waste material landforms and other areas disturbed through implementation of the proposal (excluding mine pits), shall be progressively rehabilitated with vegetation composed of native plant species of local provenance; 3. The percentage cover and species diversity of living self-sustaining native vegetation in all rehabilitation areas shall be comparable to that of undisturbed natural analogue sites as demonstrated by Ecosystem Function Analysis or other methodology acceptable to the CEO; 4. No new species of weeds (including both declared weeds and environmental weeds) shall establish in the area as a result of the implementation of the proposal; and 5. The coverage of weeds (including both declared weeds and environmental weeds) within rehabilitated areas shall be no greater than the average of three reference sites on nearby land, with the reference sites to be chosen in consultation with the Department of Environment and Conservation and the Department of Mines and Petroleum.	Delete	Decommissioning and rehabilitation (Mine Closure) to be regulated by the DMIRS under the *Mining Act 1978* to ensure that mining activities are rehabilitated and closed in a manner to make them physically safe to humans and fauna, geo-technically stable, geo-chemically non-polluting/non-contaminating and capable of sustaining an agreed post mining land use without unacceptable liability to the State. The EPA has provided advice on other recent projects that decommissioning, and rehabilitation can be adequately regulated through the Mine Closure Plan required by the *Mining Act 1978*, rather than a condition under part IV of the EP Act.
9-2	Rehabilitation and Mine Closure	Rehabilitation activities shall continue until such time as the requirements of condition 9-1 are met, and are demonstrated by inspections, monitoring and reports to be met, for a minimum of five years following mine completion to the satisfaction of the CEO, on advice of the Department of Mines and Petroleum.	Delete	As above
9-3	Rehabilitation and Mine Closure	Within two years of the end of productive mining in the BS2 pit, the proponent shall backfill the BS2 pit with inert waste to sufficient depth to ensure that, following mine closure and backfilling, the groundwater water table would permanently remain at least 3 metres below the lowest point of the pit floor.	Delete	This requirement has been included as a proposal limit in Draft Condition 1.
9-4	Rehabilitation and Mine Closure	The proponent shall undertake monitoring to ensure that the requirements of condition 9-3 are adhered to until such time as the water table remains constant for 3 years after backfilling. Note: Watertable refers to the upper surface of groundwater below which soil is saturated with water that fills all voids and interstices, and where the pressure of water	Delete	Compliance with Draft Condition 1 will be reported annually. Detailed monitoring of groundwater quality will be included in the Mine Closure Plan regulated by DMIRS under the *Mining Act 1978*.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
		in the soil equates to atmospheric pressure. Constant refers to invariable or unchanging.		
9-5	Rehabilitation and Mine Closure Planning	Should the backfilling of the pit not ensure that the watertable remains at least 3 metres below the backfilled level of the BS2 and provide a sufficient capillary break to maintain groundwater quality and prevent the upward movement of salts; metals or other mobile elements (whichever is the greater); the proponent shall remediate and monitor to the satisfaction of the CEO.	Delete	This contingency is included in the Mine Closure Plan regulated by DMIRS under the *Mining Act 1978*
9-6	Rehabilitation and Mine Closure Planning	The proponent shall ensure that all waste material used for the encapsulation of potential acid forming (PAF) material and the construction of the store and release cover is of appropriate physical and chemical nature to the satisfaction of the CEO on advice from the Department of Mines and Petroleum.	Delete	Mine Closure, including progressive completion of waste landforms will be regulated by the DMIRS under the *Mining Act 1978* to ensure that mining activities are rehabilitated and closed in a manner to make them physically safe to humans and fauna, geo-technically stable, geo-chemically non-polluting/non-contaminating and capable of sustaining an agreed post mining land use without unacceptable liability to the State. The EPA has provided advice on other recent projects that mine closure can be adequately regulated through the Mine Closure Plan required by the *Mining Act 1978*, rather than a condition under part IV of the EP Act.
9-7	Rehabilitation and Mine Closure Planning	The proponent shall prevent the leaching of soluble constituents from pit walls at levels that may cause environmental harm as defined in Section 3A (2) of the Environmental Protection Act 1986.	Delete	As above
9-8	Rehabilitation and Mine Closure Planning	At the completion of mining of the BS2 pit the proponent shall encapsulate PAF material within a waste material landform consisting of: 1. an inert waste rock layer overlaid on the uppermost PAF layer of a minimum of 2 metres; 2. a thick store and release cover of a minimum of 4 metres constructed on top of the 2-metre layer of inert waste rock; and 3. topsoil spread of a minimum of 0.3 metres on top of the store and release cover.	Delete	As above

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
9-9	Rehabilitation and Mine Closure Planning	The proponent shall ensure that an adequate capillary break is installed under the waste dump as outlined in Figure 1 to prevent upward movement of groundwater coming into contact with material with potential to produce acid, metalliferous or seleniferous drainage.	Delete	As above
9-10	Rehabilitation and Mine Closure Planning	The proponent shall undertake monitoring to ensure that the requirements of condition 9-9 are met.	Delete	As above
9-11	Rehabilitation and Mine Closure Planning	In the event that monitoring required by condition 9-10 indicates that the requirements of condition 9-9 are not being met, the proponent shall: 1. report such findings to the CEO within 21 days; 2. prepare mitigation strategies on advice from the Department of Mines and Petroleum to the satisfaction of the CEO; and 3. implement the mitigation strategies.	Delete	As above
9-12	Rehabilitation and Mine Closure Planning	The proponent shall ensure that vegetation species for rehabilitation planting on the store and release cover are to be native to the proposal area with root penetration of less than 5 metres.	Delete	As above
9-13	Rehabilitation and Mine Closure Planning	The proponent shall monitor progressively the rehabilitation for the store and release cover against the criteria developed pursuant to condition 9-1 with appropriately timed surveys as agreed with the Department of Environment and Conservation, until the completion criteria are met. The surveys shall be conducted annually unless otherwise agreed by the CEO, on advice from the Department of Environment and Conservation and the Department of Mines and Petroleum.	Delete	As above
9-14	Rehabilitation and Mine Closure Planning	The proponent shall include the results of the rehabilitation monitoring required pursuant to condition 9-2 in the compliance assessment report referred to in condition 4-6 commencing no less than 15 months from the date rehabilitation was commenced. The report shall address the following: 1. The progress made towards meeting the completion criteria developed pursuant to condition 9-1(3); and 2. Contingency management measures in the event that the completion criteria required by condition 9-1(3) are unlikely to be met.	Delete	As above
9-15	Rehabilitation and Mine Closure Planning	The proponent shall make the monitoring reports required by condition 9-2 publicly available in a manner approved by the CEO.	Delete	As above

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
10-1	Mine Plan and Preliminary Closure Strategy	Within six months of the date of the Ministerial Statement being issued, the proponent shall submit to the Office of the Environmental Protection Authority a detailed and project-specific Mine Plan and Preliminary Closure Strategy to the requirements of the CEO on advice of the Department of Mines and Petroleum and Department of Environment and Conservation.	Delete	As above
10-2	Mine Plan and Preliminary Closure Strategy	The Mine Plan and Preliminary Closure Strategy shall include detailed results of geochemical and geophysical characterisation of materials, in particular the potential for acid drainage, metalliferous drainage, and of the occurrence of dispersive materials. Testing for materials with potential to cause acid and/or metalliferous drainage including selenium shall include static and kinetic testing carried out using techniques and timeframes consistent with national and international *standards (Leading Practice Sustainable Development Program for the Mining Industry – Managing Acid and Metalliferous Drainage 2009* – Department of Industry, Tourism and Resources; The Global Acid Rock Drainage Guide 2009 – International Network for Acid Prevention).	Delete	As above
10-3	Mine Plan and Preliminary Closure Strategy	The Mine Plan and Preliminary Closure Strategy shall provide detailed technical information on proposed management measures to prevent contamination, environmental harm or human health impacts during implementation of the proposal and after mine completion and closure.	Delete	As above
10-4	Mine Plan and Preliminary Closure Strategy	The Mine Plan and Preliminary Closure Strategy shall include maps and diagrams showing the proposed placement, dimensions, design and proposed methods of construction and closure of waste disposal facilities, mine pits and evaporation pond.	Delete	As above
10-5	Mine Plan and Preliminary Closure Strategy	The Mine Plan and Preliminary Closure Strategy shall demonstrate that waste disposal facilities will be located, designed and constructed to ensure that they are non-polluting and so that their final shape, height, stability and ability to support native vegetation are comparable to natural landforms in the area. The Mine Plan and Preliminary Closure Strategy shall describe remedial options available to deliver condition 7-1 if condition 7-6 is triggered.	Delete	As above
10-6	Mine Plan and Preliminary Closure Strategy	The proponent shall implement the Mine Plan and Preliminary Closure Strategy referred to in condition 10-1.	Delete	As above
10-7	Mine Plan and Preliminary Closure Strategy	The Mine Plan and Preliminary Closure Strategy shall be reviewed on a 3-year basis and incorporate new knowledge as the mine develops. The revised Mine Plan and Closure Strategy should be submitted in accordance with relevant Western Australian Government closure guidelines and updates.	Delete	As above
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No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
1	-	In implementing the proposal, the proponent shall fulfill the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review and in correspondence from the proponent, as consolidated on 21 March 1991.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
2	-	Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to charge those designs, specifications, plans or other technical material in any way that the Minister for the Environmental determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be affected.	Retain	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
3	-	Within 12 months of the commencement of production the proponent shall commission and subsequently report on further surveys of the flora and fauna of the Mt Brockman area, to the satisfaction of the Environmental Protection Authority, on the advice of the Department of Conservation and Land Management.	Completed, delete	Further flora and fauna surveys have been completed
4.	-	Within 12 months of the commencement of production, the proponent shall prepare and subsequently implement a rehabilitation plan which shall include, but not be limited to, the following: (1) details of topsoil conservation; (2) objectives for establishing self-sustaining indigenous vegetation following site rehabilitation; (3) initial development of completion criteria for rehabilitation success; (4) a monitoring programme for rehabilitated and control areas, and related studies; and (5) provision for annual review and modification in accordance with the results of the monitoring programme and related studies; in consultation with the Department of Mines, to the satisfaction of the Environmental Protection Authority. At least 12 months prior to the completion of mining, the proponent shall prepare final completion criteria to the satisfaction of the Environmental Protection Authority on advice of the Department of mines.	Delete	Mine Closure, including progressive completion of waste landforms will be regulated by the DMIRS under the *Mining Act 1978* to ensure that mining activities are rehabilitated and closed in a manner to make them physically safe to humans and fauna, geo-technically stable, geo-chemically non-polluting/non-contaminating and capable of sustaining an agreed post mining land use without unacceptable liability to the State. The EPA has provided advice on other recent projects that decommissioning, rehabilitation and mine closure can be adequately regulated through the Mine Closure Plan required by the *Mining Act 1978*, rather than a condition under part IV of the EP Act.

No	Aspect	Condition	Status	Proposed strategy for consolidation of conditions
5.	-	The proponent shall be responsible for final decommissioning and removal of the plant and installations and rehabilitating the site and its environs, to the satisfaction of the Environmental Protection Authority. At least six months prior to decommissioning, the proponent shall prepare and subsequently implement a final decommissioning and rehabilitation plan, to the satisfaction of the Environmental Protection Authority.	Delete	As above
6.	-	At least 12 months prior to the completion of mining, the proponent shall develop detailed plans for the retention or alternatively the decommissioning and rehabilitation of the rail spur, to the satisfaction of the Environmental Protection Authority.	Delete	As above
7.	-	No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.	Retain and update	The Condition is still relevant and should be retained. However, should be updated to reflect contemporary approaches.
8.	-	If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extent the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five-year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.	Delete	Condition no longer required as the Amended Proposal has been substantially commenced and is being implemented.

Appendix B: Conceptual Framework for the Development of Rio Tinto Environmental Management Plans

For the development of Environmental Management Plans (EMPs), a conceptual framework model has been applied (Figure A1). The framework ensures linkages between current understanding, potential impacts, outcomes, adaptive management, and consistent monitoring and management practices. The framework is a stepwise process that considers the environmental values as identified in the Proposal's Environmental Impact Assessment Documents, in order to implement appropriate management measures and actions to ensure the environmental objective can be achieved.

The first step of the framework examines in detail the current knowledge of the environmental value(s) associated with the Proposal. This is compiled from information provided in the EIA documents, any additional environmental surveys and examined with input from internal experts. Environmental values associated with the Proposal are evaluated based on their conservation status at local, state and regional levels.

The second step of the framework is to define relevant indicators, level of management and type of provisions (outcome based) and associated criteria.

A stressor-pressure-receptor (SPR) conceptual modelling approach is used to inform the selection of indicators, as recommended by national and international guidance (DIIS 2016). The SPR conceptual model sets out the collective knowledge, experience and perspective on the environmental value (system of interest) and illustrates assumptions about how the value (system) functions and what is believed to be the important or dominant processes and their linkages. This includes factors that are perceived to be driving changes in the value (system) and the consequences of changes in these factors. The conceptual model also includes factors such as spatial boundaries as well as temporal and seasonal variations.

The number and type of indicators selected to monitor and measure changes in individual environmental values will depend on several factors including the conservation status of the environmental value; the level of management required; the environmental outcome or objectives; location; and the types of pressures and stressors identified.

The required level of management (Low, Moderate or High) is determined using a matrix assessment with four factors relating to predicted impacts from the Proposal including: likelihood; consequence; spatial extent; and temporal duration (Table A 1). The higher the level of management, the more lines of evidence may be deemed necessary to meet the environmental outcome or objective (that is more indicators and / or more frequent monitoring schedules).

Draft (interim) trigger and threshold criteria be determined for each environmental value. Early response criteria (if appropriate) may be defined for indicators for the environmental value (e.g., groundwater depth) or the environmental value itself (e.g., vegetation status). Trigger and threshold criteria will directly relate to the environmental value and objective itself.

The number of trigger criteria, and the sensitivity of both trigger and threshold criteria, will be determined by the associated management level for the environmental value.

The third step of the framework is to undertake an evaluation of the baseline and/ or current data to assess against criteria and determine whether the environmental outcome are likely to be met with existing proposed indicators. This step should also occur as part of reporting requirements when criteria are exceeded. Where criteria are not being met the adaptive management process should be implemented.

The fourth step of the framework is to implement the EMP. To ensure successful implementation, relevant internal and external (regulatory) stakeholders are consulted to ensure the EMP meets management expectations and can be implemented for the associated Proposal.

The fifth, final step of the framework considers a revision of or alternatives of management objectives, indicators and/ or criteria. This step is considered where monitoring and assessment indicates objectives are not being met. Where data suggests that objectives cannot be met using current associated indicators and criteria, repeat the second to fifth step of the framework, with consideration of the additional information gained through monitoring.

Table A1: Management level assessment matrix

Factor	Level of required management (increasing to right)				
Likelihood	Rare	Unlikely	Possible	Likely	Almost Certain
Consequence	Environmental values (species, communities /ecosystems) with no formal recognition for conservation purposes	Environmental values (species, communities /ecosystems) with no formal recognition for conservation purposes but may hold local environmental significance	Environmental values (species, communities /ecosystems) recognised as being of conservation interest	Environmental values (species, communities /ecosystems) directly protected under State and Commonwealth legislation	Environmental values (species, communities /ecosystems) directly protected under State and Commonwealth legislation (with potential severe consequence).
Extent	Immediate	Surrounds	Local	Catchment	Sub-regional
Duration	Days	Months	Years	Decades	Centuries

- The factors act independently of one another, and an increased risk of one factor will not necessarily result in other factors with higher risk.
- Level/s of management gives an indication of potential importance, however important to note that regulatory focus, cumulative impact and heritage values may impact the way the environmental values are treated/ managed.

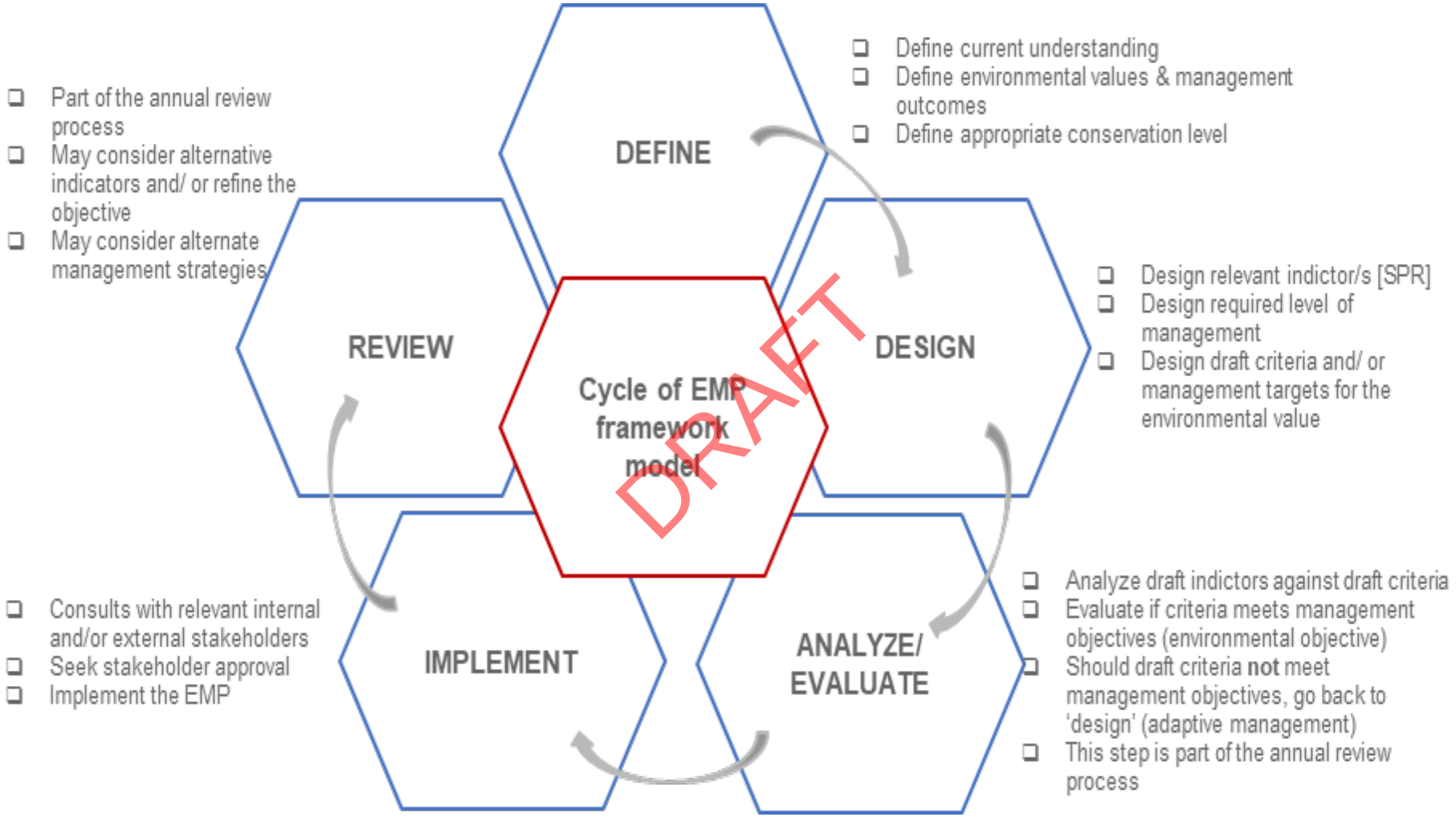


Figure A 1: Cycle of the conceptual Environmental Management Plan framework model

Appendix C: Site Specific Water Quality Trigger Values and Hazard Analysis

With respect to water quality triggers, the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANGZ) (2018) provide default guidelines values (DGVs) for a range of water and sediment quality analytes for the protection of aquatic ecosystems. The DGVs are to be applied as generic values where jurisdictional or site-specific values are not applicable, such as for systems for which there are no baseline data or where baseline data are insufficient to adequately describe the natural or existing seasonal or annual fluctuations in water quality. The DGVs provide the current 'best estimates' of toxicants concentrations that should ensure no significant adverse effects on aquatic ecosystems (ANGZ 2018). For the eutrophication parameters indicated in Table A 1, data for upland and lowland rivers from tables 3.3.4 and 3.3.5 in the National Water Quality Management Strategy (ANZECC & ARMCANZ 2000) were used.

Local conditions vary naturally between river systems as influenced by geology, hydrology, ecosystem process and historical land uses. For this reason, site specific trigger values (SSTVs) are preferable to the default guideline values contained in the ANGZ (2018). Baseline water quality data collected from the Duck and Caves Creek systems since 2009, and a regional Pilbara creek dataset have been used to develop interim operational SSTVs (WRM 2013, and later updated in WRM 2014a) consistent with the ANGZ (2018).

Baseline sampling of pools has been conducted over several seasons (three wet and three dry) between 2009-2013 (WRM 2014b). SSTVs were derived for all analytes for which ANGZ (2018) provide DGVs and for those analytes considered to be of potential risk to the local environment (based on preliminary hazard analysis of pre-discharge dewatering bore water quality data). The 80th (and 20th for pH and dissolved oxygen) percentile value for each analyte was calculated from the local baseline and Pilbara data set (WRM 2013). The locally derived trigger values (TVs) were then compared against ANGZ (2018) DGVs for 95% species protection (considered more appropriate than the 99% species protection DGVs, given that the area is already impacted by cattle). If the 95% DGV was greater than the 80th percentile value derived from the baseline data, then the DGV was proposed as the operational TV, whereas where the locally derived TV was greater than the 95% DGV, the locally derived TV was proposed as the operational TV. This approach was taken as the ANGZ (2018) DGVs are acknowledged as a conservative guideline based on world-wide ecotoxicity test data and with the caveat that biological effects data are collected from field ecological surveys to ascertain the actual impact of discharge on local biota. The exception to this approach was for metals that potentially bioaccumulate, for which the 99% species protection DGV has been adopted.

This approach was followed to derive interim operational SSTVs prior to discharge to Duck Creek commencing (WRM 2013). Application of these values was agreed with DWER (then DEC (ref. RTIO-HSE-0184254) and DoW (ref. RTIO-HSE-0184245)) in accordance with MS 925 Condition 7-3(3).

Water quality monitoring at Site 1 and the discharge point was undertaken fortnightly from the commencement of discharge and compared to the interim operational SSTVs. In the previous version of the NS MMP, fortnightly monitoring was specified for the first three months of discharge. As discharge commenced at the beginning of the wet season, fortnightly monitoring was extended for several months so that it continued into the dry season, i.e., to assess risk when there is less dilution with the receiving waters and concentrations of some analytes may be higher. After this time, a hazard analysis was performed to identify parameters posing greatest risk to aquatic ecosystems (WRM 2014c). Several analytes were identified as being of no, or negligible risk, with no apparent source to become elevated, and were recommended to be omitted from routine monitoring. It was also recommended that the fortnightly monitoring at Site 1 be reduced to monthly (WRM 2014c), with sampling to occur when water is flowing, or pools are present at Site 1.

The hazard analysis identified that carbonate precipitation in Duck Creek from dewatering discharge water potentially poses a moderate risk to aquatic fauna (WRM 2014c). To monitor this risk, geochemical advice was received that the following should be incorporated in routine monitoring field

parameters including; pH, electrical conductivity (EC) and water temperature and laboratory parameters including; pH, EC major ions, bicarbonate (HCO_3), carbonate (CO_3), total dissolved solids (TDS) and silicon (Si). These parameters are all included in the intended suite of analytes for monitoring at the discharge point and Site 1 (Table A3-1). In addition, the Langelier index will be calculated from pH, TDS and hardness (as $CaCO_3$ mg/L). The Langelier index provides an indication of whether water will precipitate or dissolve calcium carbonate.

During 2014 the SSTVs were updated, following collection and collation of further baseline and regional data (WRM 2014a). The SSTV for nitrate as a toxicant (NO_3) was updated, as the ANGZ (2018) does not currently provide a DGV, The ANZG (2018) refer to the guidelines values which were used to inform the nitrate toxicity attribute for New Zealand. The TV for NO_3 as a toxicant (95% species protection) is approximately11 mg/L (2.4 mg/L N_NO_3) based on the recent data from acute and chronic toxicity testing in New Zealand (Hickey 2013). Therefore, the TV for NO_3 of 11 mg/L was also proposed as the SSTV for the Amended Proposal (WRM 2014b). The lower SSTV for eutrophication impacts of N_NO_x (N_NO_3 and N_NO_2) still applies, derived from the 80th percentile of local and regional data (0.04 mg/L N_NO_x).

The updated SSTVs for Nammuldi discharge are shown in Table A 1, along with the ANGZ (2018) DGVs for 95% species protection and the 80th percentile of local and regional baseline data**.** A decision support framework for applying the interim operational SSTVs (WRM 2014a), shown in Figure A1, was incorporated into the environmental criteria described in this EMP.

Despite the recommendation to reduce the suite of analytes for monthly monitoring (WRM 2014c), the more extensive suite will continue to be monitored initially to ensure sufficient early data collection. However, the suite of analytes and the SSTVs will continue to be periodically reviewed as mining operations develop and understanding of the ecosystem and its response to dewatering discharge strengthens. If ecological risks are considered to have changed, monitoring may be revised in consultation with relevant government agencies and any revisions submitted to the CEO.

Table A 1: Site Specific Trigger Values (SSTVs) for Duck and Caves Creek Water Quality Monitoring Parameters

Note: ANZG (2018) 95% DGVs and 80th percentile value from local and regional baseline data (20th percentile values for DO and pH are shown in parentheses) also shown. All values are mg/L unless otherwise indicated. Table adapted from WRM 2014a and WRM 2014c.

Analyte	Footnote	ANZG (2018) (mg/L unless specified)	Duck and Caves Creeks (mg/L unless specified)	Interim Operational SSTVs (mg/L unless specified)	Frequency of monitoring at Site 1 and Discharge point[D]
		95% TV	80%ile		
Al pH>6.5)	T	0.055	0.015	0.055	Monthly
Alkalinity (as $CaCO_3$)		np	352	np	Monthly
As-total	T,A	np	<0.001	0.013	Monthly
As (III)	T,A	0.24	nr	nr	nr
As (V)	T,A	0.13	nr	nr	nr
B	T	0.94[#]	0.40	*0.4	Monthly
Ba	T	np	0.09	*0.09	Monthly
Ca	E	np	69	np	Monthly
Cd	T,H	0.0002	<0.0001	0.0002	Monthly
Cl (chloride)		np	326	np	Monthly
Co	T	np	0.0005	*0.0005	Monthly
CO_3		np	16	np	Monthly
Cr (III)	T	np	nr	np	Quarterly
Cr (VI)	T	0.001	nr	np	Quarterly

Analyte	Footnote	ANZG (2018) (mg/L unless specified)	Duck and Caves Creeks (mg/L unless specified)	Interim Operational SSTVs (mg/L unless specified)	Frequency of monitoring at Site 1 and Discharge point[D]
		95% TV	80%ile		
Cr-total	T,C	np	<0.0005	0.001	Monthly^
Cu	T	0.0014	0.0019	*0.0019	Monthly^
DO (% sat) (*in situ*)		85 - 120	(64) 108	*64 - 120	Monthly
EC (uS/cm)	E	20 - 900	1830	*1830	Monthly^
Fe	F	np	0.06	*0.3	Monthly^
Hardness (as $CaCO_3$)		np	590	np	Monthly^
HCO_3		np	404	np	Monthly
Hg-inorganic	T,B	0.0006	nr	**0.0001	Monthly
Hg-total	T,B	np	nr	0.00006	Monthly
K		np	11	np	Monthly
Mg	E	np	94	np	Monthly
Mn	T	1.9	0.06	1.9	Monthly
Mo	T,M	np	0.001	*0.001	Monthly
Na		np	187	np	Monthly
Ni	T,H	0.011	<0.001	0.011	Monthly
N-NH_3	T	0.9	0.01	0.90	Monthly
N-NH_4 (eutrophication)	U	0.01	nr	0.01	Monthly
N-NO_x (eutrophication)	U	0.03	0.04	*0.04	Monthly^
NO_3	T, N	np	0.6	11	Monthly^
N-total (eutrophication)	U	0.3	0.6	*0.6	Monthly
Pb	T,H	0.0034	0.0001	0.0034	Monthly
pH (*in situ - unitless*)		6 - 8	(7.6) 8.5	*7.6 - 8.5	Monthly^
P-FRP (eutrophication)	U	0.005	<0.01	**0.01	Monthly
P-total (eutrophication)	U	0.01	0.02	*0.02	Monthly^
S		np	66	--	Monthly
Se-total	T,B	0.011	<0.001	0.005	Monthly^
Si		np	12	np	Monthly
S-SO_4	E	np	170	np	Monthly
TDS-calc		np	1100	*1100	Monthly^
Temp (°C) (*in situ*)		np	29.2	*29.2	Monthly^
TSS		np	5	*5	Monthly^
Turbidity (NTU)	U	2 -15	3	15	Monthly
U	T	np	0.002	*0.002	Monthly
V	T	np	0.005	*0.005	Monthly
Zn	T,H	0.008	0.017	*0.017	Monthly^

Notes:

* Interim operational TV derived from 80%ile (and 20%ile for pH & DO) of reference data.

** Locally derived and default TV are greater than the laboratory limit of reporting (LOR), the LOR is proposed as the operational TV.

^ Analytes recommended for monitoring during hazard analysis of discharge water (WRM 2014c). Other analytes identified as being of negligible risk with no apparent source to become elevated; inclusion of these analytes will be reviewed for future monitoring

Default guideline value updated as per ANZG (2018)

np not provided

nr not recorded

A. Proposed TV for As-total is equivalent to ANZG (2018) default 95% TV for As(V). For monitoring, if As-total concentration is >0.013 mg/L, then re-sample and analyse for metal species (*i.e.,* AsV and AsIII) concentrations and compare against default ANGZ (2018) triggers. As (III) and As (V) values provided for reference to indicate selection of more conservative values for As (Total).

B. ANZG (2018) 99% species protection level TV recommended due to the ability of these metals to bioaccumulate. However, laboratory analysis of mercury for routine screening is only achievable to 0.0001 mg/L Hg-inorganic or 0.00005 mg/L Hg-total; the latter by persulphate digestion on low salinity samples.

C. Proposed TV for Cr-total equivalent to ANZG (2018) DGV for Cr(VI). For monitoring , if Cr-total concentration is >0.001, then re-sample and analyse for metal species (*i.e.,* Cr(VI) and Cr(III)) concentrations and compare against ANGZ (2018) DGVs.

D. Monitoring will occur monthly at Site 1 when water is present.

E. Conductivity (EC) and associated ions (*e.g.,* Ca, Mg, S-SO_4) will vary depending on flow; values higher than the operational TV may occur naturally during the dry season if water levels are reduced due to evapo-concentration.

F. ANZG (2018) state the DGV for Fe should be considered as interim only and recommend use of a site-specific TV where background levels are higher than the default TV.

H. TV should be modified for water hardness at the time of sampling using the default algorithms provided by ANGZ (2018). For annual compliance reporting, the median metal concentration and median annual hardness should be used in the algorithm. Note, worldwide literature now report default HMTV for Cu may not be sufficient to protect key sensitive species (see Markich et al. 2005, USEPA 2014), so an **HMTV for Cu is not recommended here**.

N. ANZG (2018) recommends referring to the guidelines used to inform the New Zealand nitrate toxicity attribute. However, due to an erroneous link, this value is not available. Consequently, the interim operational TV is based on the value 11 mg/L NO_3 value provided in the recent report (Hickey 2013). NO_3 will be analysed as N-NO_3, to convert nitrate-nitrogen (N-NO_3) to nitrate (NO_3), multiply by 4.43.

T. Toxicants.

U. Values for 'Upland and Lowland rivers' referenced from Tables 3.3.4 and 3.3.5, National Water Quality Management Strategy, ANZG (2018)

Appendix D: Baseline Foliage Cover of Overstorey Eucalypts on Duck Creek and Caves Creek by DCP Method

Table A 2: Baseline Foliage Cover of Overstory Eucalypts on Duck Creek and Caves Creek

		Baseline Mean		Mean – 15%	Mean -25%	Mean -40%
Caves Creek	CC1	0.44	(0.016)	0.38	0.33	0.26
	CC2	0.45	(0.018)	0.38	0.33	0.27
	CC3	0.43	(0.009)	0.37	0.32	0.26
	CC4	0.42	(0.013)	0.35	0.31	0.25
	CC5	0.40	(0.008)	0.34	0.30	0.24
	CC6	0.52	(0.008)	0.45	0.39	0.31
	CC7	0.56	(0.010)	0.48	0.42	0.34
	CC8	0.57	(0.008)	0.48	0.43	0.34
	CC9	0.52	(0.010)	0.44	0.39	0.31
	CC10	0.47	(0.013)	0.40	0.35	0.28
Duck Creek	DC1	0.51	(0.012)	0.44	0.38	0.31
	DC2	0.49	(0.012)	0.42	0.37	0.29
	DC3	0.46	(0.018)	0.39	0.35	0.28
	DC4	0.45	(0.010)	0.38	0.34	0.27
	DC5	0.52	(0.014)	0.44	0.39	0.31
	DC6	0.46	(0.018)	0.39	0.34	0.28
	DC7	0.51	(0.008)	0.43	0.38	0.30
	DC8	0.54	(0.012)	0.46	0.41	0.33
	DC9	0.55	(0.013)	0.47	0.41	0.33
	DC10	0.58	(0.012)	0.50	0.44	0.35

** Mean (± standard error) of ten trees at each site, measured on eight occasions between 2007 and 2013.*

Appendix E: Boolgeeda Creek Vegetation Monitoring

Vegetation Monitoring Transects

Vegetation mapping has been undertaken on Boolgeeda Creek for the extent of the maximum predicted discharge footprint (37 km downstream) and approximately 10 km upstream of the proposed discharge point (Biota 2005a, 2013a). Monitoring sites were selected to encompass the six creekline vegetation units that were mapped within the potential discharge impact area (C2 to C7). Although monitoring encompasses the banks of Boolgeeda Creek, floodplain vegetation units were not specifically targeted as discharge water is predicted to be contained within the low flow channel and therefore to predominantly impact creekline vegetation.

Two sites on Boolgeeda Creek within the predicted discharge footprint were monitored in 2010, as part of the baseline creek surveys for the Nammuldi-Silvergrass Expansion (Biota 2012). During 2014 these original sites were surveyed again, a further four monitoring sites were established within the predicted discharge footprint on Boolgeeda Creek, and two sites were selected upstream of the proposed discharge location (Figure 2-1). The discharge location is in the upper reach of Boolgeeda Creek; upstream of this location the creek becomes more braided and meandering, and the vegetation composition also changes (Biota 2005a, 2013a). Given the nature of the watercourse, it was not possible to select sites further upstream, that have vegetation representative of the potential impact area, to use as reference sites. Sites on the nearby Duck and Caves Creek, that are monitored as per Table 2-4 and Table 2-5 of the EMP will be used as reference sites for comparison with potential impact sites on Boolgeeda Creek (Figure 2-2). Reference sites were selected that are not potentially impacted by dewatering or surplus water discharge, and with similar vegetation composition to the potential impact sites on Boolgeeda Creek.

At each monitoring site, transects were established perpendicular to the watercourse, extending the width of vegetation considered to be associated with the watercourse and encompassing creek bed and banks[43] . Each transect comprised a belt of multiple 10 × 10 m quadrats. Within each quadrat the following parameters were recorded:

- Species present (including weeds)
- Percentage foliar cover for all species (including weeds)
- Number of individuals of perennial trees and shrubs that would usually grow >1 m in height (including weeds)
- Vegetation description based on the height and estimated cover of dominant species, utilising Aplin's (1979) modification of the vegetation classification system of Specht (1970)
- Vegetation condition ranked according to Trudgen (1988), with notation of disturbance such as grazing, other signs of cattle and feral activity, fire, weed invasions, presence of any defoliated/dead trees, other perturbations
- Diameter at breast height (DBH) for trees with DBH >3 cm
- Colour photographs from set photo points.

Baseline data was captured in May 2014. Potential impact monitoring has been implemented since 2014 and will continue for the duration of the Brockman Syncline Amended Proposal.

The presence of other feral animals is currently monitored opportunistically within the discharge wetting front in conjunction with other environmental monitoring and site visits. Control measures are implemented as deemed appropriate, in line with other site feral animal management practices.

[43] Methodology for transects aligned with transects established as part of the Nammuldi-Silvergrass Vegetation and Ground Water Dependent Ecosystems MMP, authorised by the EPA on 27 June 2013.

Weed species composition and abundance has been determined as part of vegetation surveys, and changes within the discharge wetting front are compared to baseline and upstream/reference sites. In addition to these systematic surveys, opportunistic surveillance of weeds is undertaken by qualified Rio Tinto personnel during other environmental monitoring and visits to the discharge point and wetting front. If new weed species, (not present during baseline surveys), are encountered within the wetting front, management will be undertaken as described in Table 2-3 this EMP. If declines in understorey vegetation are related to an increase in existing weed species populations, weeds in the discharge wetting front are managed as described in the EMP. Management priority is assigned depending on the weed risk of each species, according to the *Biosecurity and Agriculture Management Act 2007*, local and regional abundance and species characteristics described under the Weed Prioritisation Process (DPaW 2013). Depending on the priority determined, the appropriate management level may be to inspect, control or eradicate the weed from the management area.

Tree Health Monitoring

During 2014, ten tree health monitoring sites were established encompassing the maximum predicted discharge footprint on Boolgeeda Creek (Figure 2-1). At each monitoring location, ten eucalypt trees (comprised of *E. victrix* and *E. camldulensis*) across the creek bed and banks were selected for digital cover photography (DCP), to provide a quantitative measurement of the canopy foliage density (Macfarlane 2007). Canopy foliage density and/or leaf area index, is an established proxy for tree health, and severe defoliation can be a precursor of tree death (Kozlowski 1981), which is the parameter defining the irreversible impact threshold for overstorey vegetation.

The tree health monitoring sites coincide with the locations of vegetation monitoring transects where a significant eucalypt overstorey component was present. In the upper reach of Boolgeeda Creek, the overstorey is less abundant and eucalypts are not present at all sites. Upstream of the proposed discharge location eucalypts are particularly sparse and it was not possible to establish reference sites due to insufficient trees being present. As for the vegetation transect monitoring, sites on Duck and Caves Creek, that are not potentially impacted by dewatering or surplus water discharge, are used as a reference for tree health monitoring on Boolgeeda Creek (Figure 2-2).

Baseline measurements were made in May 2014. Potential impact monitoring has occurred on an ongoing basis in accordance with the Brockman Syncline 4 Monitoring and Management Plan (BS4 MMP) and will continue to be implemented in accordance with this EMP, which has superseded the BS4 MMP.

High Resolution Multi-Spectral Imagery

High resolution multispectral imagery has been collected at the end of the dry season for the full extent of Boolgeeda Creek and reference areas on Duck Caves Creek, since 2014 (excluding 2015). Imagery has been sourced from aerial digital multispectral imagery (2014 only) and WorldView satellite imagery (2016 onwards). A spectral vegetation index, such as the modified soil adjusted vegetation index (MSAVI), is calculated from the spectral characteristics of the images. Spectrally, healthy vegetation emits a strong reflectance in the near-infrared (NIR) band and absorption in the red band, while the ratio between the red and NIR band for unhealthy or dead vegetation is minimal. Hence, the imagery can be used to analyse temporal changes in vegetation health and cover and provide a broad, landscape level analysis of the system in comparison to on-ground surveys.

The high-resolution imagery collected, has been used as baseline data for comparison with measurements of management of the Existing Operations, and will be continue to be implemented in accordance with this EMP.

Appendix F: Plunge Pool groundwater level monitoring plan

Plunge Pool is the only permanent pool (groundwater) located within the Development Envelope. It occurs at the base of a small gorge within the BS3 assessment area adjacent to the BS3 deposit and supports significant environmental and cultural values. Extensive hydrogeological drilling has been

undertaken in areas adjacent to Plunge Pool to understand its relationship and connection to surrounding aquifers. The measured groundwater levels indicate the aquifers are all compartmentalised in this area by cross-cutting dolerite dykes (Figure A2). The water levels decrease in step changes from 593 mRL to 546 mRL over an approximate 5 km distance. No impacts associated with groundwater drawdown are predicted at Plunge Pool associated with the Amended Proposal.

Selection of monitoring bores:

A number of monitoring bores have been installed across the Plunge Pool catchment and informed the conceptualisation of the groundwater levels (see Figure A3). For monitoring purposes within the EMP the most appropriate bores have been chosen for compliance purposes, with the justification provided below.

Bore MB19BS3X0001 is the closest monitoring bore to the proposed BWT mining at MMJ (BS3). This is located on south side of dyke close to proposed BWT mining, but far enough away from Plunge Pool and is believed to be an isolated aquifer compartment bounded by dolerite dykes either side. Groundwater levels have been observed to range from 585.92 - 586.17 mAHD (0.25 m) between 23/05/2020 to 04/02/2023. The next suitable monitoring bore is MB19BS30010 which is 2.3km away with an 8m head difference, therefore, MB19BS3X0001 has been selected as the key monitoring bore for the Early Response Criteria.

Bore MB19BS30010 is located 2.9 km from Plunge Pool, in the downstream compartment of the early response bore based on current understanding. At MB19BS30010, groundwater levels range from 575.24 - 576.21 mAHD (0.94 m) observed to date since 29/09/2019. The concept of overtopping compartments is the basis for nominating this bore. If a reduction was observed in MB19BS0010 and not MB19BS3X001 (early warning) this would require further investigation as it would suggest the decline is not a result of proposed dewatering.

Bore MB19BS30007 is located 1.7 km from Plunge Pool in separate compartment isolated by dykes. Range is from 569.8 - 570.15 mAHD (0.35 m) since 17/05/2020 (samples since this date are daily). Plunge Pool is located in a downgradient compartment. If a reduction was observed in MB19BS30007 and not MB19BS30010 (Trigger) this would require further investigation as it would suggest the decline is not a result of proposed dewatering.

Water levels recorded in monitoring bores within the Plunge Pool compartment are at ~546 mRL and the pool water level ranges between 541 to 542.6 mRL (tipping point of pool).

Please refer to *Plunge Pool Groundwater Level Monitoring Approach* (Rio Tinto 2024) for further information regarding baseline groundwater level data collected in groundwater in the Plunge Pool catchment, the expected groundwater level observations that could occur due to groundwater abstraction and the rationale of assigning the groundwater level monitoring criteria to assure groundwater flows to Plunge Pool are not impacted.

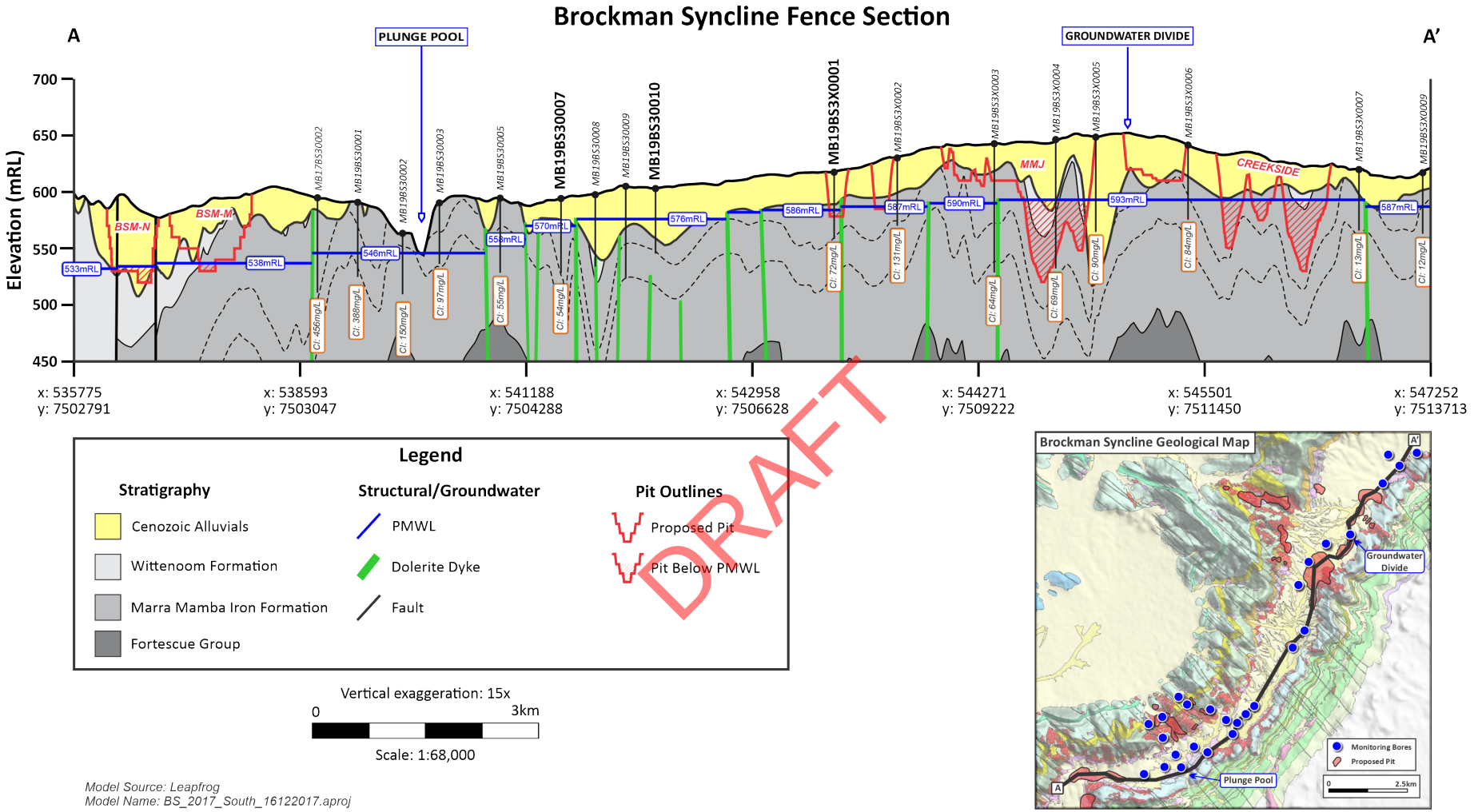
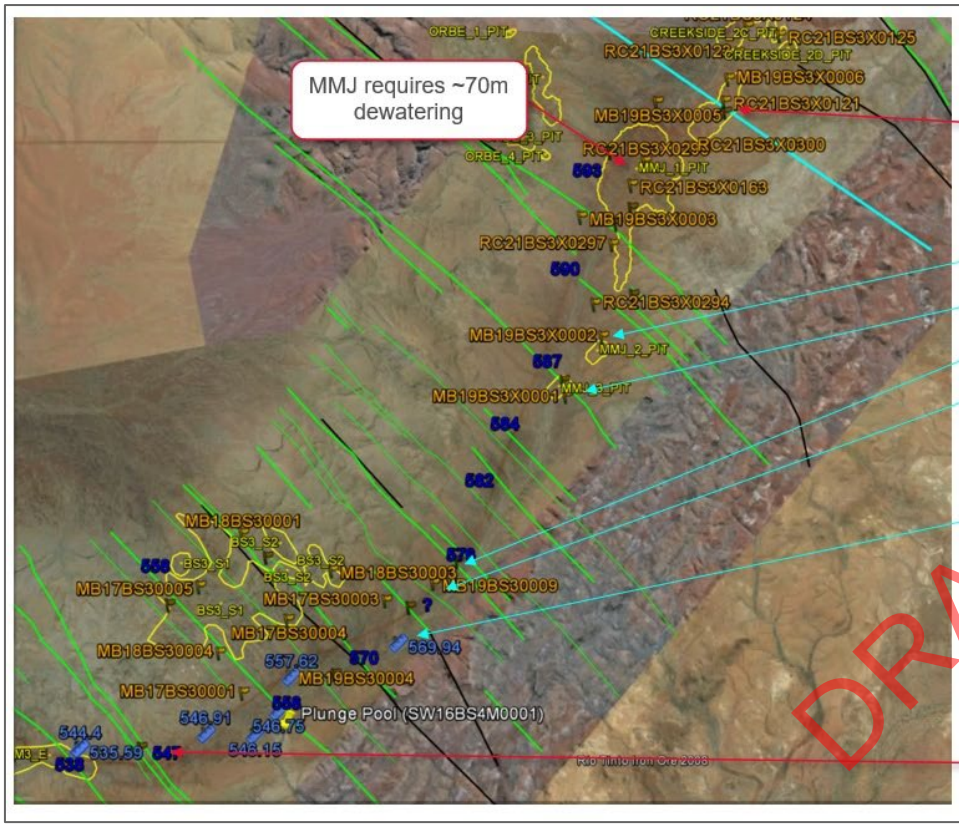


Figure A2: Conceptualisation of the Brockman Syncline Plunge Pool catchment



Bore	WL			Diff
	PMWL	Min	Max	
MB19BS3X0005	593.00	594.3	594.9	0.6
MB19BS3X0004	593.00	589.6	595.2	5.6
MB19BS3X0003	593.00	593.8	594.3	0.5
MB19BS3X0002	587.00	586.5	586.9	0.4
MB19BS3X0001	587.00	585.9	587.3	1.4
MB19BS30010	576.00	575.2	576.2	1.0
MB19BS30009	570.00	571.6	577.1	5.5
MB17BS30003	570.00	569.3	569.7	0.4
MB19BS30007	570.00	569.4	570.7	1.4
MB19BS30005	558.00	557.7	558.8	1.1
MB19BS30004	558.00	557.5	557.8	0.3
MB19BS30003	546.00	546.6	546.8	0.2
MB17BS30001	546.00	545.8	546.8	1.1
MB19BS30002	546.00	546.0	546.2	0.2
MB19BS30001	546.00	546.8	547.0	0.2
MB17BS30002	546.00	546.9	547.4	0.6

N

Plunge Pool

S

Figure A3 – Location of monitoring bores within the Plunge Pool Catchment