

Application form

Environmental Protection Act 1994

Submission of a progressive rehabilitation and closure plan

This is the approved form for a progressive rehabilitation and closure plan (PRC plan) under section 126C of the Environmental Protection Act 1994 for a site-specific application for a mining activity relating to a mining lease.

Only use this application form if you are required to submit a PRC plan, where:

- You are applying for a new site-specific environmental authority for a mining activity relating to a mining lease.
OR
- The administering authority has included the requirement to submit a proposed PRC plan in an information request for a new site-specific environmental authority for a mining activity relating to a mining lease.
OR
- You completed a PRC plan as part of an EIS process and are submitting the PRC plan in the approved form as required under section 126C.
OR
- You have an existing site-specific environmental authority for a mining activity relating to a mining lease and have received a transition notice from the administering authority¹ in accordance with section 754 of the *Environmental Protection Act 1994* (EP Act).
OR
- Where none of the above apply: you have an existing site-specific environmental authority for a mining activity, you do not otherwise have a PRCP schedule approved yet one is required, and any of the following applies:
 - You have failed to comply with a transition notice;
 - You did not receive a transition notice as required under the legislation;
 - The administering authority has refused your proposed PRCP schedule.

Before completing this application form it is recommended that you:

- Read the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964²), which explains the information you are required to provide with this application.
- Have a pre-lodgement meeting. To request a pre-lodgement meeting, please fill out and lodge the form Application for pre-lodgement services (ESR/2015/1664).

¹ The Department of Environment, Science and Innovation is the administering authority under the *Environmental Protection Act 1994*.

² This is the publication number. The publication number can be used as a search term to find the latest version of a publication at www.qld.gov.au.



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If you require assistance in answering any part of this form, or have any questions about your application, please contact the relevant business centre. Contact details are at the end of this form (Section 10).

Privacy statement

The administering authority is collecting the information on this approved form to process your application for a PRC plan. The collection of information is authorised under Chapter 3 and Chapter 5 of the EP Act. Some of the information may be disclosed to the Department of Resources and Queensland Treasury for the purpose of processing this application or the Rehabilitation Commissioner in accordance with s444J of the EP Act the if accessing the information is necessary or convenient to be done in the performance of the Commissioner's functions.

Please note that the administering authority is required to keep this application on a register of documents open for inspection by members of the public under section 541 of the EP Act, and must permit a person to take extracts from the register pursuant to section 542 of the EP Act.

Your personal information will not be otherwise disclosed to any other parties unless authorised or required by law. For queries about privacy matters please email privacy@des.qld.gov.au or telephone 13 74 68.

Definitions of terms used in this form	
<i>(Where there is inconsistency between the definition of terms used here and the terms used in the EP Act, the terms in the EP Act apply)</i>	
Available for improvement	In relation to land in an improvement area for a non-use management area, means land in the improvement area that is not being mined, other than land to which any of the following applies— a) the land is being used for operating infrastructure or machinery for mining, including, for example, a dam or water storage facility; b) the land is identified in the PRCP schedule or the application for an environmental authority relating to the schedule as containing a probable or proved ore reserve that is to be mined within 10 years after the land would otherwise have become available for improvement; c) the land is required for the mining of a probable or proved reserve mentioned in paragraph (b).
Available for rehabilitation	For a rehabilitation area, means land in the area is not being mined, unless— a) the land is being used for operating infrastructure or machinery for mining, including, for example, a dam or water storage facility; or b) the land is identified in the PRCP schedule or the application for an environmental authority relating to the schedule as containing a probable or proved ore reserve, under section 126D(6) of the EP Act, that is to be mined within 10 years after the land would otherwise have become available for rehabilitation; or - ba) the land is required for the mining of a probable or proved reserve mentioned in paragraph (b); or c) the land contains permanent infrastructure identified in the proposed PRCP schedule as remaining on the land for a post-mining land use.
Land outcome document	For land, means the following documents relating to the land— a) an environmental authority for a resource activity on the land; b) a document made under a condition of an environmental authority

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	mentioned in paragraph (a), if– i. the document relates to the management of a void within the meaning of section 126D of the EP Act on the land, or the rehabilitation of the land; and ii. the document was received by the administering authority before the assent date; and iii. the administering authority has not, within 20 business days after the assent date, given notice to the environmental authority holder that the document is insufficient in a material particular relevant to a matter mentioned in subparagraph (i); and iv. before the assent date, the document has not been superseded; c) a document made under a condition of an environmental authority mentioned in paragraph (a), if– i. the document relates to the management of a void within the meaning of section 126D of the EP Act on the land, or the rehabilitation of the land; and ii. the environmental authority requires the document to be given to the administering authority on a stated day that is on or after the assent date, or does not state a day when the document must be given; and iii. the document is received by the administering authority within three years after the assent date; and iv. the administering authority does not, within 20 business days after receiving the document, give the environmental authority holder a notice that the document is insufficient in a material particular relevant to a matter in subparagraph (i); d) a report evaluating an EIS under the <i>State Development and Public Works Organisation Act 1971</i>, section 34D; e) an EIS assessment report; f) a written agreement between the holder of an environmental authority mentioned in paragraph (a) and the State that is in force on the assent date.
Improvement area	For a non-use management area, means an area of land in the non-use management area to which a management milestone relates.
Management milestone	For a non-use management area, means each significant event or step necessary to– a) achieve best practice management of the area; and b) minimise risks to the environment.
Non-use management area	Means an area of land the subject of a PRC plan that cannot be rehabilitated to a stable condition after all relevant activities for the PRC plan carried out on the land have ended.
Post-mining land use	For land the subject of a PRC plan, means the purpose for which the land will be used after all relevant activities for the PRC plan carried out on the land have ended.
PRC plan	For land the subject of a mining lease, means a progressive rehabilitation and closure plan for the land that consists of – a) the rehabilitation planning part of the PRC plan; and

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	b) the PRCP schedule for the PRC plan, including any conditions imposed on the schedule.
PRCP schedule	For a PRC plan, means a schedule of the plan that – a) complies with section 126D of the EP Act; and b) is approved under chapter 5, part 5, division 2 of the EP Act, with or without conditions.
Proposed PRC plan	For an application, a proposed PRC plan means a PRC plan proposed for land the subject of a mining lease that: (a) complies with Chapter 5, part 2, division 3; and (b) either – accompanies the application; or is submitted for the application after the application is made
Rehabilitation area	For land the subject of a post-mining land use, means an area of the land to which a rehabilitation milestone for the post-mining land use relates.
Rehabilitation milestone	For the rehabilitation of land, means each significant event or step necessary to rehabilitate the land to a stable condition.

The fields marked with an asterisk * are mandatory. If they are not completed then your application may be considered not properly made under section 128 of the EP Act.

Section 1 – Environmental authority details		
Does this application relate to an <u>existing</u> environmental authority for a mining activity relating to a mining lease approved through a site-specific application?*	☐ No – Provide the reference number for your environmental authority application:	Insert.
	☒ Yes – Provide your environmental authority number:	EPML03337715

Section 2 – Applicant details	
Details of the applicant are to be provided in this section. If there is an agent acting on behalf of the applicant, details of the agent are to be provided. An agent could be a consultant or contractor for the environmental authority holder. The person nominated as the application contact will receive correspondence relating to this application.	
NAME / COMPANY NAME* BHP Mitsubishi Alliance (BMA)	TRADING NAME (*IF AN ORGANISATION) BMA
REGISTERED BUSINESS ADDRESS / RESIDENTIAL ADDRESS (NOT A POST OFFICE BOX) * Level 14, 480 Queen Street BRISBANE CITY Queensland 4000 Australia	POSTAL ADDRESS (*WHERE DIFFERENT) See registered business address
ABN / ACN (*IF AN ORGANISATION) ABN67096752	NAME OF APPLICATION CONTACT* Trudy Mazucco
EMAIL* trudy.mazucco@bhp.com	TELEPHONE* 0475 300 433

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- ☒ INDICATE IF YOU WANT TO RECEIVE CORRESPONDENCE VIA EMAIL
- ☐ INDICATE IF THIS FORM IS BEING COMPLETED BY AN AGENT FOR THE ENVIRONMENTAL AUTHORITY HOLDER*
- NOTE: If an agent is nominated, please provide evidence of appointment by the authority holder/s.**

Section 3 – Website address

If this application relates to an application for a new site-specific environmental authority for a mining activity, would you like to use the details on the environmental application form?	☒ No – Provide details below.	
	☐ Yes – Go to next section.	
Provide the website address for the application notice and application documents.	www.bhp.com	
Provide details of the contact person if technical assistance is required.	NAME Trudy Mazucco	TELEPHONE 0475 300 433
	EMAIL trudy.mazucco@bhp.com	

Section 4 – Non-use management areas (new environmental authority applications only)

Does this application for a proposed PRC plan include a NUMA justified under section 126D(2)(b) of the EP Act? *	☐ No – Go to next section.	
	☐ Yes	
Has a public interest evaluation been carried out by a qualified entity for the NUMA(s)? *	☐ No – Go to next section.	
	☐ Yes	
Has the proposed NUMA(s) changed since the public interest evaluation was carried out in the EIS? *	☐ No – Go to next section.	
	☐ Yes – Provide details below.	
How has the proposed NUMA(s) changed since the public interest evaluation was carried out?	Please provide details below. Insert.	

Section 5 – PRC plan structure

The PRC plan must be prepared in accordance with the structure/format shown in Appendix 1 of this application form.	
Requirement	Requirement met?
Include a cover page that complies with Appendix 1 of this application form.	☒ Yes
Include a table of contents that complies with Appendix 1 of this application form.	☒ Yes

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Section 6 – PRC plan Checklist *			
The PRC plan must meet the information requirements stated in section 3 of the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964), and sections 126C and 126D of the EP Act (note there is a limited exception for transitional PRC plans). All PRC plan requirements are mandatory. For each requirement, insert a reference to the section of the PRC plan which satisfies the requirement. Justification must be provided for any requirement for which the response is Not Applicable (NA). If more space is required, please attach a separate sheet.			
PRC plan Requirement	Requirement met? (Yes / NA)	PRC Plan Section No.	Justification
Rehabilitation planning part of the PRC plan The rehabilitation planning part of the PRC plan must include the information required under section 126C the EP Act, including information requirements described in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964) in accordance with section 126C(1)(j) of the EP Act.			
Project description <i>Note: For existing mines transitioning to the PRC plan framework, pre-disturbance information collected as part of an EIS process or original environmental authority application should be included. If this information is unable to be provided, or cannot be developed because of the mine's life stage, this should be clearly explained in this section of the rehabilitation planning part of the PRC plan.</i>			
Describe the following:			
each resource tenure, including the area of each tenure, to which the application relates;	Yes	Section 1.1.2	-
the relevant activities to which the application relates;	Yes	Section 1.4.1	-
the likely duration of the relevant activities	Yes	Section 1.4.1	-

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Include a detailed description, including maps, of how and where the relevant activities are to be carried out.	Yes	Section B: 10 PRCP Schedule	-
Consultation			
Include details of the consultation undertaken by the applicant in developing the proposed PRC plan.	Yes	Section 2	-
Include details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.	Yes	Section 2.3.3.2 & 2.5	-
Post-mining land use			
State the extent to which each proposed post-mining land use identified in the proposed PRCP schedule for the plan is consistent with the outcome of consultation with the community in developing the PRC plan.	Yes	Section 2.5 & 3.2	-
State the extent to which each proposed post-mining land use identified in the proposed PRCP schedule for the plan is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.	Yes	Section 3.3	-
Non-use management area			
<i>Note for Transitional PRC plans: The holder is not required to comply with a requirements under section 126C(1)(g) or (h) or 126D(2) or (3) for the proposed PRCP schedule for the plan in relation to land if a land outcome document identifies the outcome for the land as the same, or substantially similar to, the outcome for the land if it were a non-use management area.</i>			
State the extent to which each proposed non-use management area identified in the PRCP schedule for the plan is consistent with the	NA	-	-

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outcome of consultation with the community in developing the PRC plan.			
State the extent to which each non-use management area identified in the PRCP schedule for the plan is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.	NA	-	-
For each proposed non-use management area, state the reasons the applicant considers the area cannot be rehabilitated to a stable condition because of a matter mentioned in section 126D(2).	NA	-	-
For each matter mentioned in the requirement above, include copies of reports or other evidence relied on by the proponent for each proposed non-use management area.	NA	-	-
Rehabilitation and management methodology <i>Note: Section 3.5 of the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964) outlines the range of information that must be included as appendices to the rehabilitation planning part of the PRC plan.</i>			
For each post-mining land use, state the applicant's proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP schedule.	Yes	Section 6	-
For each non-use management area, state the applicant's proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP schedule for the area.	NA	-	-
Risk assessment			

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Identify the risks of a stable condition for land described as a post-mining land use not being achieved, and how the applicant intends to manage or minimise the risks.	Yes	Section 7	-
PRCP Guideline			
Include any other information prescribed by the administering authority in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964).	Yes	Section 8	Monitoring and Maintenance
Include the spatial information required in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964). See Attachment 1 of this form for details on how spatial information must be submitted.	Yes	Section B: 10 PRCP Schedule	Spatial Data submitted as per requirements
Other information			
Include the other information the administering authority reasonably considers necessary to decide whether to approve the PRCP schedule.	Yes	Section C: Appendices	Supporting studies and information included in Section C: Appendices
PRCP Schedule The proposed PRCP schedule must comply with section 126D of the EP Act, and be written in accordance with the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964). The administering authority will assess the proposed PRCP schedule in conjunction with the rehabilitation planning part of the PRC plan and other application documents, and decide whether to approve the proposed PRCP schedule, with or without conditions, or refuse the proposed PRCP schedule.			
Include a PRCP schedule prepared using the PRCP schedule template (ESR/2019/5103 ³).	Yes	Section B: 10 PRCP Schedule	Included in Section B: 10 PRCP Schedule, but also submitted separately in the PRCP schedule template

³ This is the publication number. The publication number can be used as a search term to find the latest version of a publication at www.qld.gov.au.

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Include maps showing all of the land mentioned in the PRCP schedule, as it relates to being progressively rehabilitated.	Yes	Section B: 10 PRCP Schedule	Maps included in Section B: 10 PRCP Schedule, but also submitted separately in the PRCP schedule template
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Section 7 – Non-use management areas (transitional applications only) ⁴	
Does this application for a proposed PRC plan include a NUMA? *	☒ No – Go to next section.
	☐ Yes
Does the relevant environmental authority or any other land outcome document identify an outcome for the land that is the same, or substantially similar, to the outcome for the land if it were a NUMA under a PRCP schedule?	☐ No – Go to next section.
	☐ Yes
Does the environmental authority or any other land outcome document state sufficient detail to identify either the location or the area of the land to which the outcome relates?	☐ No – Provide details below.
	☐ Yes – Provide the document name(s) in Section 8.
If the area is not identified – how will the total area of the land to which the outcome relates be minimised? *	Insert.
If the location is not identified – how will the environmental authority holder ensure the location of the land to which the outcome relates minimises risks to the environment? *	Insert.

⁴ Transitional applications mean the holder of an existing EA for an ineligible mining activity relating to a mining lease that has been issued a transition notice and is transitioning into the new PRC plan framework.

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Section 8 – Transitional PRC plan requirements (transitional applications only) ⁴						
In accordance with transitional provisions in the EP Act, an applicant with an existing environmental authority is able to transition aspects of the PRCP schedule from existing land outcome documents. Indicate below any information that is being transitioned from a land outcome document.						
PMLU/NUMA	Rehabilitation /Improvement area	Milestone Reference	Identify which of the below is being transitioned from a land outcome document		Land outcome document	Page No.
			Land outcome	Milestone criteria		
EA Table F1 Cattle Grazing	RA3	RM1, RM2, RM3, RM4, RM7, RM10, RM13	☒	☒	EPML03337715	EA Page 16-18
EA Table F1 Dry Land Cropping	NA	NA	☒	☐	EPML03337715	EA Page 16-18
EA Table F1 Woodland Habitat	RA21	RM1, RM3, RM5, RM8, RM11, RM14	☒	☒	EPML03337715	EA Page 16-18
EA Table F1 Water Storage	NA	NA	☒	☐	EPML03337715	EA Page 16-18
EA Table F1 Watercourse	RA11	RM1, RM3, RM6, RM9, RM12, RM15	☒	☒	EPML03337715	EA Page 16-18
Each land outcome document must be submitted with this approved form						
☒ All land outcome documents identified above have been attached to this approved form.						
Is the land outcome in the PRCP considered the same or substantially similar to the land outcome provided in the LOD?						

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☒ **Yes**

☐ **No**

If no, please identify the land outcome:

As per section 755B of the EP Act, the notification stage under chapter 5, part 4 applies for the assessment process because the outcome for land under a land outcome document is different to the outcome for the land under the proposed PRCP schedule.

Section 9 – Declaration*		
Note: If you have not told the truth in this application you may be prosecuted.		
I declare that: - I am the holder of the environmental authority, or authorised signatory for the holder of the environmental authority. - The information I have provided is true and correct to the best of my knowledge. - I understand that it is an offence under section 480 of the <i>Environmental Protection Act 1994</i> to give to the administering authority or an authorised person a document containing information that I know, or ought reasonably to know, is false or misleading in a material particular. - I understand that under section 480A of the <i>Environmental Protection Act 1994</i> that, if I am required to give a document to the administering authority or an authorised person, it is an offence to give a document that I know or ought reasonably to know, contains incomplete information in a material particular. - I understand that failure to provide sufficient information may result in the application being refused. I understand that an incomplete application may be invalid. Invalid applications will be returned without processing and will only be processed if resubmitted with all invalidating issues addressed. - I understand that all information supplied on or with this application form may be disclosed publicly in accordance with the <i>Right to Information Act 2009</i> and the <i>Evidence Act 1977</i>. - I will comply with all conditions and milestones of my approved PRCP schedule as well as any relevant provisions in the <i>Environmental Protection Act 1994</i>. - I understand that I am responsible for managing the environmental impacts of these activities, and that approval of this application is not an endorsement by the administering authority of the effectiveness of management practices proposed or implemented.		
Where an agreement is in place between all holders of the environmental authority, one holder can sign on behalf of the other joint holders. Please tick the checkbox below.		
☒ I HAVE AUTHORITY TO SIGN THIS FORM ON BEHALF OF ALL THE JOINT HOLDERS OF THE ENVIRONMENTAL AUTHORITY.		
Applicant's signature		
APPLICANT'S NAME BHP Mitsubishi Alliance (BMA)	POSITION -	COMPANY / ORGANISATION BMA
APPLICANT'S SIGNATURE		DATE Select.
Joint holder(s) signature if applicable		
NAME, POSITION AND COMPANY NAME Insert.	SIGNATURE	DATE Select.
NAME, POSITION AND COMPANY NAME Insert.	SIGNATURE	DATE Select.

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OR ☐ I HAVE ATTACHED A DOCUMENT THAT PROVIDES THE REQUIRED INFORMATION FOR ALL JOINT HOLDERS.

Where the environmental authority holder is a company, this form must be signed by an authorised person for that company. Where there is more than one holder of the environmental authority, this declaration is to be signed by all holders, unless there is an agreement between all holders that one can sign on behalf of the other(s).

If you are signing on behalf of the environmental authority holder(s) you must provide a letter of authorisation.

Section 10 - Submission

Please submit your completed application form and supporting material to the Department of Environment, Science and Innovation office that services the industry applicable to your environmental authority.

A list of business centres can be found at www.des.qld.gov.au using the words 'business centres' as a search term.

Enquiries: Minerals Business Centre
PO Box 7230
Cairns QLD 4870
Phone: 07 4222 5352
Fax: 07 4222 5070
Email: ESCairns@des.qld.gov.au

Coal Business Centre
PO Box 3028
Emerald QLD 4720
Phone: 07 4987 9320
Email: CRMining@des.qld.gov.au

The latest version of this publication and other publications referenced in this document can be found at www.qld.gov.au using the relevant publication number (ESR/2019/4957 for this form) or title as a search term.

Appendix 1–PRC plan structure

Appendix 1 describes the formatting/structural requirements for a completed PRC plan. This includes the information required in a PRC plan cover page and table of contents, and the structure of a PRC plan.

A PRC plan must include the following sections in the order listed:

1. **Cover page:** This section must include the following information:
 - Title of the project
 - Document title
 - Version number
 - Document ID number
 - Date of submission
 - Tenure number(s)
 - Environmental authority holder name
 - Environmental authority holder contact details.
2. **Table of contents:** This section must include the following information:
 - Sections of PRC plan
 - Sub-sections of PRC plan
 - Figures, tables and maps (as applicable).
3. **Rehabilitation planning part**
 - 3.1. **Project planning:** This section will include baseline information, site location details, a description of the project and information on rehabilitation/improvement planning.
 - 3.2. **Community consultation:** This section will include information on stakeholder consultation including a community consultation register and community consultation plan. The community consultation register must include consultation dates, identification of each community member, description of consultation type (workshop, quarterly meetings, etc.), information provided to the community, issues raised/discussed by the community, how issues have been considered, decisions/outcomes of engagement, and commitments made by the applicant. The community consultation plan must include the objectives for community consultation, how the community will be engaged, proposed consultation frequency, what information will be released for community consultation, and how feedback/comments will be considered.
 - 3.3. **Post-mining land use:** This section will include the assessment of PMLU options, methodology for determining PMLU options, and details of each nominated PMLU. It must be consistent with the outcome of consultation with the community in developing the plan, and any strategies or plans for the land of a local government, the State or the Commonwealth.
 - 3.4. **Non-use management areas (if applicable):** This section will include the justification for the NUMA and details of each nominated NUMA. In providing justification for the NUMA, it must:
 - state the reasons the applicant considers the area cannot be rehabilitated to a stable condition
 - include copies of reports or other evidence relied on by the applicant for each proposed non-use management area
 - state the extent to which the proposed non-use management area is consistent with the outcome of consultation with the community in developing the plan, and
 - state the extent to which the non-use management area is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.
 - The detail of each nominated NUMA must include information demonstrating that the proposed footprint of each NUMA is as small as practicable, an assessment of the NUMA location options, a description of the proposed location of each NUMA and the environmental values of the

surrounding environment, and evidence showing how the proposed location will prevent or minimise environmental harm.

3.5. Rehabilitation management methodology: This section will include information describing how the proposed rehabilitation and management methodology have been developed and will be implemented. For each proposed post-mining land use for land, state the proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP schedule. This should include details of the general rehabilitation practices, tailings storage facilities, voids, underground mining and built infrastructure. For each proposed NUMA, state the proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP schedule for the area.

3.6. Risk assessment: This section will include a risk assessment that identifies the risk of a stable condition for land not being achieved and a risk treatment plan outlining how the applicant will manage or minimise the risk. All proposed NUMAs should also have a completed risk assessment. If rehabilitation trials are planned, this is also where relevant details must be given.

3.7. Monitoring and maintenance: This section will include a monitoring and maintenance program that identifies and describes the monitoring systems that will be undertaken to demonstrate a milestone and milestone criteria have been achieved. It must include timing of when each rehabilitation or management milestone is to be achieved and be accompanied by maps outlining the relevant land.

4. **Appendices and attachments:** The completed PRCP schedule and any relevant required reports/plans are to be included in this section. The Progressive Rehabilitation and Closure Plan Schedule template (ESR/2019/5103) should be included.

Attachment 1—Spatial data requirements for PRC plan

Attachment 1 provides guidance on the required content of spatial information (shapefiles) for the submission of a PRC plan. This attachment should be read in conjunction with the department's guideline: Spatial Information Submission (ESR/2018/4337). To obtain a copy of the guideline, the spreadsheet containing the schema (in Table 2) and a shapefile template for PCR plans are available on the Queensland Government's website at www.qld.gov.au, using the search term "submission of spatial information". The following sections provide information about the required fields and attributes for datasets.

Required files—Table 1

The applicant must submit shapefiles detailing the following:

- the location and maximum extent of disturbance footprint for the mine life
- the PMLU and NUMAs for the area within the resource tenure(s)
- the rehabilitation and improvement areas within the resource tenure(s)
- any sensitive receptors
- extent of a floodplain
- existing rehabilitation (if the PRC plan is for an existing environmental authority).

A minimum of one (1) shapefile must be submitted for a PRC plan, detailing the above-listed information, as outlined within Table 1. Each file must be named in accordance with the requirements outlined within the department's guideline: Spatial Information Submission (ESR/2018/4337).

Where the PRC plan relates to a site where a NUMA or floodplain are not present, this should be stated in the spatial information submission email to which the relevant spatial files are attached.

Table 1: Shapefile checklist

File	Spatial information requirement	Schema	Example file name (e.g. using submission date of 30 June 2020)
1	PRC plan – polygon	Table 2	EPPR00372556_PRC_PY_30062020

Where:

- PRCP = PRC plan
- PY = polygon (geometry)

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Table 2: Schema for PRC plan

Field Name	Type	Length	Definition	Domain Values ⁵	Domain Value Description	Mandatory/ Optional
PERMIT_REF	TEXT	50	The alpha-numeric environmental authority number relevant to the spatial information (if this PRC plan does not relate to an existing EA, please provide the relevant application number instead).			Mandatory
PROCESS	TEXT	4	The relevant process spatial data is being submitted for	PRCP	Progressive rehabilitation and closure plan	Mandatory
SITE_NAME	TEXT	254	Site name relating to the environmental authority.			Mandatory
SITE_ID	TEXT	20	This field contains a unique identifier for the spatial feature, which has been generated by the applicant.			Mandatory
FEATURE	TEXT	10	This field contains the land use feature on site which this polygon or point is describing. Select the relevant option of either post-mining land use, rehabilitation area, non-use management area, improvement area, maximum disturbance footprint, sensitive receptor, existing rehabilitation or floodplain using the codes specified.	PMLU	Post-mining land use	Mandatory
				REHAB_AREA	Rehabilitation area	Mandatory
				NUMA	Non-use management area	Mandatory if the PRC plan schedule proposes or changes a non-use management area
				IMPRV_AREA	Improvement area	Mandatory if the PRC plan schedule proposes or changes a non-use management area

⁵ If blank, populate based on Attribute type & definition

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				FOOTPRINT	Maximum disturbance footprint over mine life	Mandatory
				SR	Sensitive receptor	Mandatory
				EX_REH	Existing rehabilitation	Mandatory if the application is for an existing EA and there is existing rehabilitation undertaken
				FLDP	Floodplain	Mandatory if there is a floodplain located within the EA boundary
FEAT_DESC	TEXT	254	Feature description		This field provides a description of the feature identified in 'FEATURE'.	Mandatory
PMLU_TYPE	TEXT	10	This field provides a description of the post mining land use type. If PMLU_TYPE is 'Other' additional information in the comments field is required.	GRAZ	Grazing	Mandatory for each PMLU.
				NAT_ECO	Native ecosystem	
				WTR_ST	Water storage	
				REC	Recreation	
				HB_ECS	Habitat and ecosystem services	
				AGRI	Agriculture	
				FOR	Forestry	
				CROP	Cropping	
				PERM_INFRA	Permanent infrastructure	
				IND	Industrial	
				LNDFL	Landfill	
				Oth	Other	
DATE_SUBMT	DATE	dd/mm/yyyy	Date of submission. This field identifies the date the spatial information was submitted.		Date of submission	Mandatory
SOURCE	TEXT	5	This field identifies the source of the spatial information and the capture	DIG	Digitising (Tracing over Ortho Imagery)	Mandatory

Application form

Submission of a progressive rehabilitation and closure plan

			methodology for the spatial information provided.	GPSD	GPS Differential Survey	
				GPSND	GPS Non Differential Survey	
				RTK	Real-Time Kinematic (RTK) Survey	
				UK	Unknown	
AREA_HA	DOUBLE	N/A	This field indicates the area in Hectares. (Polygon only)			Mandatory if GEOMETRY = polygon.
COMMENTS	TEXT	254	A free text field has been provided to include any additional information the proponent wishes to provide in relation to the data.			Mandatory if PMLU_TYPE = Oth



BHP Mitsubishi Alliance

Progressive Rehabilitation and Closure Plan

Red Hill Mine

Status: DRAFT

Version: 1.0 (13 December 2024)

Business Owner: Red Hill Mine

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Tenure Number(s)

ML1763 (part) and ML70421 (part)

EA holder name

BHP Coal Pty Ltd, Mitsubishi Development Pty Ltd, QCT MINING PTY. LTD., Umal Consolidated Pty Ltd, QCT INVESTMENT PTY. LTD., BHP Queensland Coal Investment Pty Ltd and QCT Resources Pty Limited

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Glossary of terms and abbreviations

Key terms and abbreviations, and associated definitions used in this report are listed below.

Term / Abbreviation	Description
3P grasses	Perennial, productive and palatable (3P) grasses
Administering authority	Department of Environment, Tourism, Science and Innovation (Queensland)
AEP	Annual exceedance probability
AHD	Australian height datum
AQP	Appropriately qualified person
ASC	Australian Soil Classification
BBAC	Barada Barna Aboriginal Corporation
BMA	BHP Mitsubishi Alliance
BOM	Bureau of Meteorology
BRM	Broadmeadow Mine
CEC	Cation exchange capacity
CHPP	Coal handling and preparation plant
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DES	Department of Environment and Science (Queensland)
DESI	Department of Environment, Science and Innovation (Queensland)
DETSI	Department of the Environment, Tourism, Science and Innovation (Queensland) (the administering authority) (previously referred to as the Department of Environment, Science and Innovation and the Department of Environment and Science)
DM	Dry matter (with reference to vegetation)
DoR	Department of Resources (Queensland) (currently referred to as the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development)
EA	Environmental Authority (<i>Environmental Protection Act 1994</i> , Queensland)
EC	Electrical conductivity
EIS	Environmental Impact Statement
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)

Term / Abbreviation	Description
EPP (Water and Wetland Biodiversity)	<i>Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (Queensland)</i>
ESP	Exchangeable sodium percentage
FCCM	Fort Cooper Coal Measures
GDE	Groundwater dependent ecosystem
GLS	Goonyella lower seam
GMS	Goonyella middle seam
GRM	Goonyella Riverside Mine
GUS	Goonyella upper seam
IA	Improvement area “...for a NUMA, means an area of land in the NUMA to which a management milestone for the NUMA relates” (PRCP Guideline, 2024)
IDC	Index of diversion condition
Interburden	Mineral (mining) waste located between mined coal seams
IRC	Isaac Regional Council
LOD	Land outcome document
LSA	Land suitability assessment
MCM	Moranbah Coal Measures
MERFP Act	<i>Mineral and Energy Resources (Financial Provisioning) Act 2018 (Queensland)</i>
MIA	Mine industrial area
Milestone criteria	“...for a management milestone or a rehabilitation milestone, means a requirement that must be met to achieve the milestone” (PRCP Guideline, 2024)
Mineral waste	Material comprising spoil, ± rejects, ± waste coal. Sometimes called ‘mine waste’ or ‘mining waste’
ML	Mining lease
NC Act	<i>Nature Conservation Act 1992 (Queensland)</i>
NUMA	Non-use management area
Overburden	Mineral (mining) waste located above the top coal seams
PMF	Probable maximum flood

Term / Abbreviation	Description
PMLU	Post-mining land use <i>"...for land, means the purpose for which the land will be used after all environmentally relevant activities carried out on the land have ended"</i> (section 112 of the Environmental Protection Act 1994) (PRCP Guideline, 2024)
PRCP	Progressive rehabilitation and closure plan
PRCP Guideline	Progressive rehabilitation and closure plan Guideline (September 2024) (DESI, Queensland)
QA/QC	Quality assurance and quality control
RA	Rehabilitation area <i>"... for a post-mine land use, means an area of land in the post-mine land use to which rehabilitation milestone for the post-mining use relates"</i> (PRCP Guideline, 2023)
RCM	Rangal Coal Measures
RE	Regional ecosystem
RHM	Red Hill Mine
Rejects	Waste material produced during coal processing
Residual void	An open pit resulting from the removal of ore and/or waste rock that will remain following the cessation of all mining activities and completion of rehabilitation processes
RM	Rehabilitation milestone <i>"...for the rehabilitated land, means each significant event or step necessary to rehabilitate the land to a stable condition (section 112 of the EP Act)"</i> (PRCP Guideline, 2024)
RRR	Residual risk rating (with reference to the risk assessment)
Spoil	Rock material overlying and between 'target' coal seams, which is mined and placed in the spoil dumps (i.e. overburden and interburden)
SQP	Suitably qualified person (for performing a regulatory function)
STAC	Smart Transformation Advisory Council
Transitional PRCP	<i>"...the holder of an existing EA for an ineligible mining activity relating to a mining lease that is transitioning into the new PRCP framework"</i> (PRCP Guideline, 2024)
Underburden	Mineral (mining) waste located beneath the GLS
VM Act	<i>Vegetation Management Act 1999</i> (Queensland)
WBNM	Watershed Bounded Network Model

INTRODUCTION

Red Hill Mine (RHM), owned by BHP Mitsubishi Alliance (BMA), is an approved underground metallurgical coal mine located in the Bowen Basin, Queensland.

This transitional Progressive Rehabilitation and Closure Plan (PRCP) has been prepared for RHM in accordance with the requirements of the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act). This PRCP has been developed to meet the requirements of the *Environmental Protection Act 1994* (EP Act) and the Progressive Rehabilitation and Closure Plan Guideline (PRCP Guideline) (DESI, 2024a).

Environmentally relevant activities at RHM include mining black coal, resource recovery and transfer facility operation, chemical storage and sewage treatment. These are undertaken under the conditions of the site's Environment Authority (EA) EPML03337715, provided in Appendix A.

Environmental Authority Holder: Umal Consolidated Pty Ltd, BHP COAL PTY LTD, QCT INVESTMENT PTY. LTD., MITSUBISHI DEVELOPMENT PTY LTD, QCT MINING PTY. LTD., QCT RESOURCES PTY LIMITED, BHP Queensland Coal Investments Pty Ltd

Environmental Authority Number: EPML03337715 (14 April 2021)

Tenements: ML1763 (part) and ML70421 (part)

This PRCP comprises two parts:

- Section A: Rehabilitation planning part - provides information about the site, details the rehabilitation methodologies and techniques, and includes evidence and justification to support the development of the proposed PRCP schedule; and
- Section B: PRCP schedule - includes maps of rehabilitation and closure outcomes for the site, and tables of time-based rehabilitation milestones.

This PRCP also includes Section C: Appendices, providing specialist studies and technical assessments used to support the development of the PRCP.

TRANSITIONAL PROVISIONS

Part 27, Chapter 13 of the EP Act sets out the transitional provisions following the commencement of the MERFP Act. In particular, BMA is a 'mining EA holder' for the purposes of the transitional provisions on the basis that, on commencement of the MERFP Act, BMA was "*the holder of an environmental authority (EPML03337715) for a mining activity relating to a mining lease authorising operations*" at RHM (section 750, EP Act).

The transitional provisions provide how an EA holder was to 'transition' into the PRCP regime. This was summarised, and additional guidance provided, within Section 6 of the PRCP Guideline, which states it applies to "*existing EA holders who must transition into the new PRC Plan framework*".

In accordance with the transitional provisions and requirements of Section 6 of the PRCP Guideline, BMA adhered to the following process to transition rehabilitation and closure outcomes from the RHM EA into the draft PRCP schedule:

1. Identifying rehabilitation and closure outcomes in the land outcome document (LOD) (EPML03337715)
2. Identifying post-mining land uses (PMLUs)
3. Identifying non-use management areas (NUMAs)
4. Defining rehabilitation areas (RAs) within the PMLU, or improvement areas (IAs) within the NUMA
5. Identifying milestones
6. Identifying milestone criteria

7. Identifying when the first rehabilitation milestone must commence and completion dates for the milestones.

Additional background to this PRCP includes:

- In accordance with transitional provisions (section 750, EP Act), the RHM EA (EPML03337715) is an approved LOD.
- A Transition Notice for RHM was issued to BMA by the administering authority (Department of the Environment, Tourism, Science and Innovation (DETSI), previously known as Department of Environment, Science and Innovation (DESI), and Department of Environment and Science (DES)), dated 13 December 2021 (Appendix B). This Transition Notice required submission of the RHM PRCP by 13 December 2024.
- The Transition Notice was issued following a pre-notification meeting held between the administering authority and BMA, on 29 November 2021. This PRCP is based on the key aspects agreed on by the administering authority during this meeting, as documented in the memorandum *Progressive Rehabilitation and Closure Plan - Red Hill Mine (v2)*, provided in Appendix C.
- Prior to the PRCP submission, a pre-lodgement meeting between the administering authority and BMA was held on 25 November 2024. This was arranged to discuss the key content of the site's draft PRCP, aimed at identifying any notable gaps or refinements needing to be addressed prior to the final submission.
- The PRCP was submitted to the administering authority on 13 December 2024.

Similar conditions in relation to rehabilitation acceptance criteria were included consistently across the EAs for all BMA sites in 2018. Per BMA's understanding of the legislation, it intended to transition the EA rehabilitation acceptance criteria to the PRCP schedules for all BMA sites. During the assessment of the Saraji Mine (SRM) PRCP (Notice of Decision received 4 September 2024):

- The administering authority:
 - Adopted a position, that despite BMA's conditions being transitional under the legislation, that these criteria were insufficient to achieve rehabilitation and management outcomes
 - Refused criteria proposed by BMA, instead imposing new and significantly revised criteria
 - Acknowledged BMA's intention to develop site-specific criteria for SRM
- BMA:
 - Agreed to the imposed criteria as revised, except in respect of erosion management
 - Sought inclusion of PRCP schedule conditions that facilitated the development of site-specific criteria

Noting the above, BMA has not attempted to transition the EA rehabilitation acceptance criteria to the RHM PRCP schedule. Instead, the SRM PRCP schedule conditions and milestone criteria that are imposed and are relevant to RHM, have been included in the RHM PRCP schedule. Similarly, BMA has included and makes reference to PRCP schedule conditions, including those that facilitate the development of site-specific criteria for RHM.

KNOWLEDGE BASE REFINEMENT

Compilation of this PRCP has been supported by the rehabilitation and closure-related knowledge base for RHM at the time of submission of this PRCP (13 December 2024). Relevant studies contributing to this knowledge base have been referenced throughout this PRCP, with key resources provided in Section C: Appendices.

As highlighted by the International Council of Mining and Metals in the Integrated Mine Closure Good Practice Guide, 2nd Edition (ICMM, 2019), *"the collection, updating, use and review of the knowledge base is considered an ongoing and iterative process over the mine life, and will be used to inform iterative refinement and improvement of the rehabilitation and closure planning process over time"*. As the rehabilitation and closure knowledge base for RHM develops over the life of the operation, it will be used to inform ongoing refinement of the plans for rehabilitation and closure, as well as this PRCP as required.

A: REHABILITATION PLANNING

1 PROJECT PLANNING

Legislative Requirement

In accordance with Section 126C(1)(b) and (c)(ii) of the EP Act, the rehabilitation planning part of the PRC Plan must include a description of:

- *each resource tenure, including the area of each tenure*
- *the relevant activities to which the application relates*
- *the likely duration of the relevant activities*
- *how and where the relevant activities are to be carried out, including maps.*

PRCP Guideline

- *The following spatial information must be submitted as part of the PRC Plan:*
- *the location and maximum extent of disturbance footprint for the mine life*
- *the PMLUs and NUMAs for the area within the resource tenures*

any sensitive receptors.

In addition to the list above, the PRC Plan must include spatial information outlining the rehabilitation and improvement areas that correspond to the proposed PRCP Schedule. The spatial information must show the locations of the rehabilitation and improvement areas for a 10-year period (minimum).

All spatial information must be prepared and submitted in accordance with the guideline 'Spatial Information Submission' (ESR/2018/4337).

1.1 Project description

1.1.1 Geographic location

RHM is located approximately 20km north of the town of Moranbah in the Bowen Basin and approximately 135km south-west of Mackay (Queensland) (Figure 1). RHM is located adjacent and to the east of the existing open cut Goonyella Riverside Mine (GRM) and north of the underground Broadmeadow Mine (BRM).

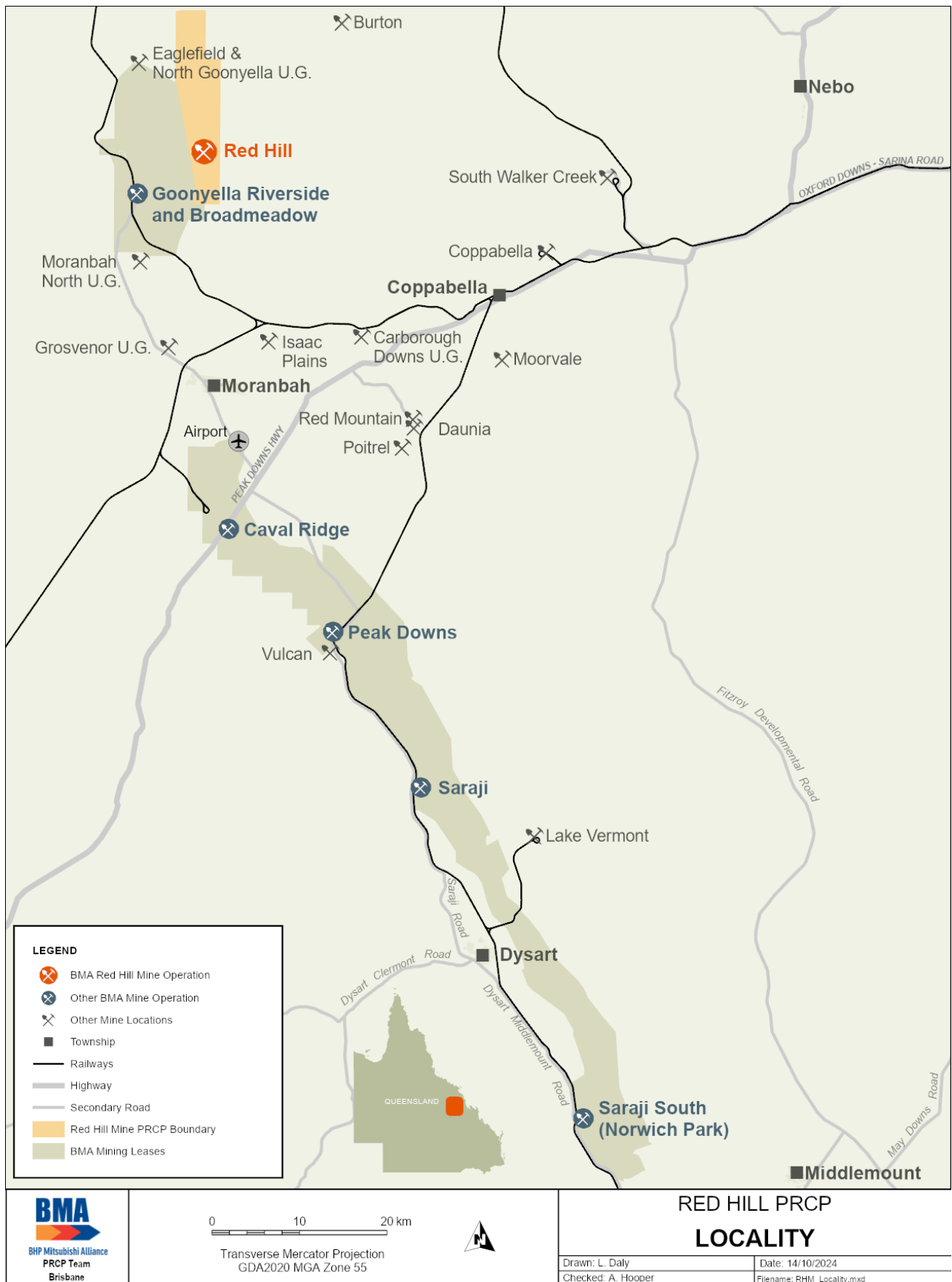


Figure 1: RHM location map

1.1.2 Mining tenements

RHM EA includes the mining leases (MLs) listed in Table 1 and illustrated in Figure 2. The mining tenements associated with the RHM EA area cover 9,701 hectares (ha).

Table 1: RHM mining tenements

Lease number	Name	Date granted
ML1763 (part)	Goonyella	30 September 1971
ML70421 (part)	Red Hill	22 September 2016

The RHM EA area overlaps with the GRM and BRM EA area. The EA overlap areas are detailed in the Red Hill Mining Lease environmental impact statement (EIS) (BMA, 2013a).

BMA is authorised to carry out activities under the RHM EA, including underground mining on both ML70421 and part of ML1763. Additional infrastructure to service RHM will be constructed on GRM and BRM. An extension to the BRM underground operation was also approved within the Red Hill EIS.

In respect of the correlation between the two PRCPs to prevent any overlap:

- The RHM PRCP covers the rehabilitation and closure of the area outlined as the 'Red Hill Mine PRCP Boundary', in Figure 3
- The GRM and BRM PRCP (submitted 29 November 2024) covers the rehabilitation and closure of the area outlined as the 'Goonyella Riverside and Broadmeadow Mine PRCP Boundary', in Figure 3

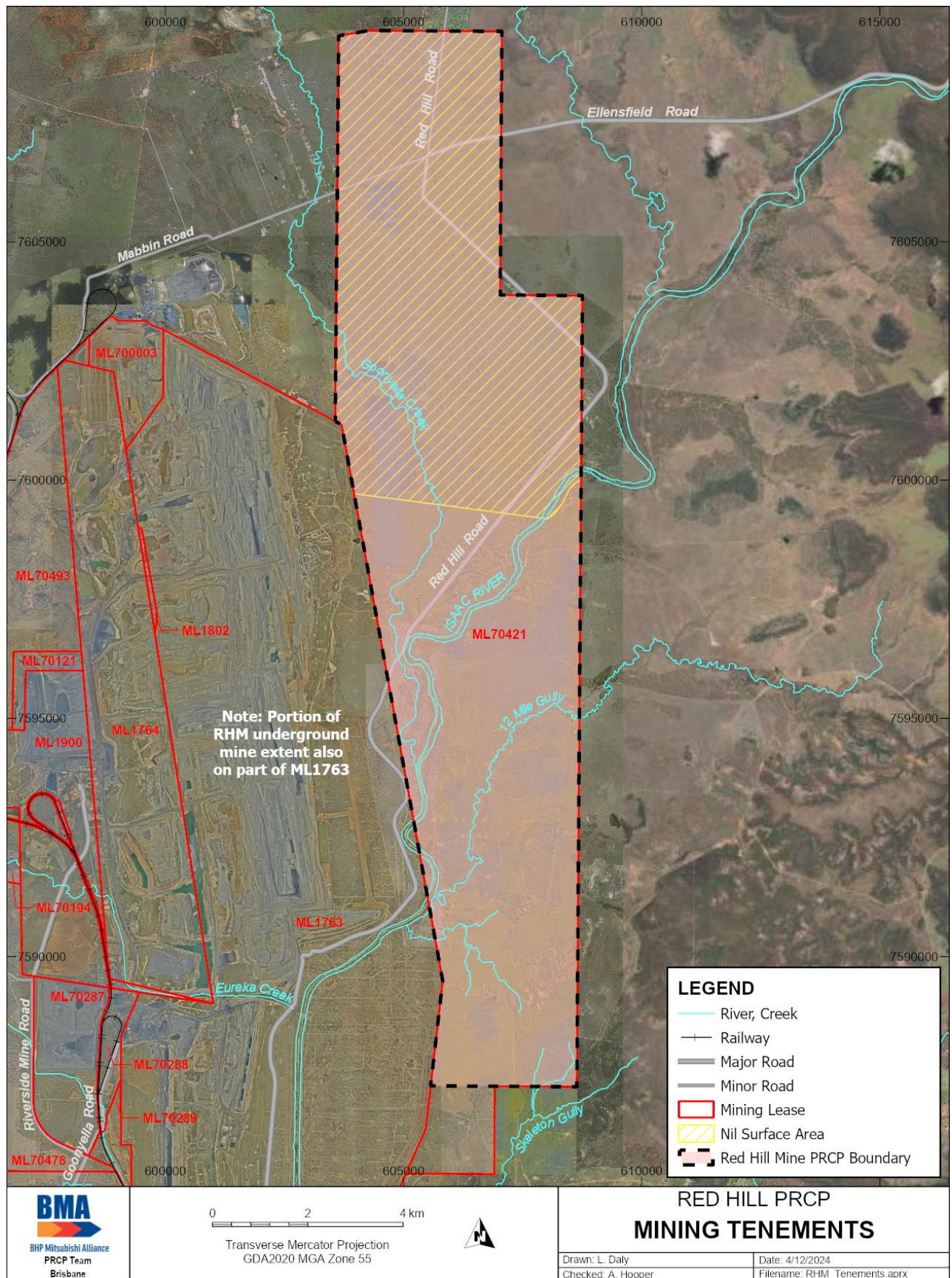


Figure 2: RHM mining tenements

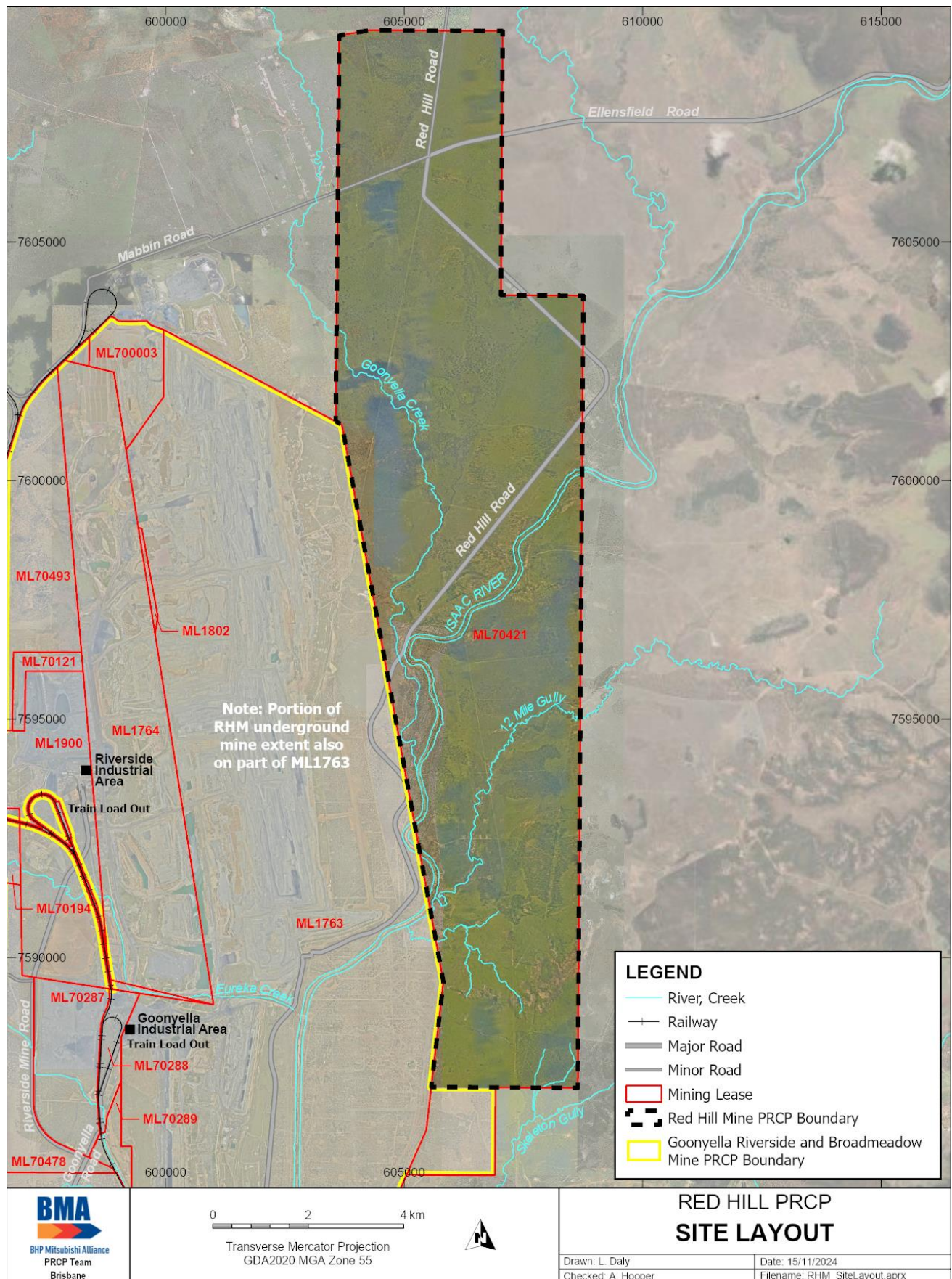


Figure 3: RHM site map

1.1.3 Primary mine features and infrastructure on-site

RHM has not yet commenced development or operation. As detailed in the RHM EIS (BMA, 2013a), approved operations at RHM include:

- Underground longwall mining to the east of GRM
- An expansion of GRM to provide key infrastructure for RHM
- An extension of the adjacent BRM underground longwall panels

RHM will utilise existing infrastructure at GRM and BRM plus additional infrastructure will be installed on the GRM and BRM MLs to service RHM, including an additional coal handling and preparation plant (CHPP) and other associated processing infrastructure, conveyors, mine industrial area (MIA) and coal stockpiles. All water and waste will be transferred to GRM and BRM for management and tailings and rejects will be disposed of at GRM and BRM.

The RHM underground operation shown in the PRCP within ML1763, is reduced from the proposed layout in the EIS due to the GRM open cut operation extending further down dip than planned at the time of the EIS. If the mine plan for the GRM open cut operation changes from the landform presented in the GRM and BRM PRCP, up to the full extent of the EIS approved footprint of the RHM underground operation may be mined. It is acknowledged that an amendment to either or both the RHM PRCP and GRM and BRM PRCP may be required to facilitate change in respect of planned operations.

The primary mine features and infrastructure approved within the RHM PRCP area are summarised in Table 2.

Table 2: Primary mine features and infrastructure at RHM

Mine domain	Description
Underground mining and infrastructure	• Subsidence areas • Ventilation shafts • Gas drainage bores and associated infrastructure • Longwall mining equipment • Service infrastructure
Surface infrastructure	• Bridge across Isaac River • Accommodation village • MIA: - Various buildings - Workshops - Fuel, oil, chemical, explosive and water storage - Fuel and wash bays - Sewage treatment plant • Conveyors and transfer stations • Pipes and pumps • Power lines • Communications towers and lighting towers • Fences
Stockpiles	• Coal stockpiles

Mine domain	Description
	Topsoil stockpiles
Dams	Mine dams
General disturbance	- Laydown areas - Roads - Drains and culverts - Exploration
Regional infrastructure (to remain at closure)	- Red Hill Road - Mabbin Road - Ellensfield Road - Stock route U831 - Eungella water pipeline - Middlemount water pipeline - Third party powerlines and substations

1.1.4 Type of mining operation

RHM is planned as an underground longwall mine using a thick seam mining technique, the same as BRM. The longwall panels will be accessed from the existing GRM voids or via drift access.

Prior to mining the longwall panels at RHM, a network of bores and associated surface infrastructure will be progressively installed over the underground mine footprint as mining advances for mine gas pre-drainage and management to enable the safe extraction of coal.

The longwall panels are accessed from the mine access via the main headings, which run roughly west-east. The main headings are a series of roadway tunnels for access, ventilation, machinery, electrical supply, communication systems, water, and compressed air lines. The longwall panels are orientated roughly north-south off the main headings. The EIS indicated further optimisation of the mine layout may occur (BMA, 2013a).

Mining of each longwall panel commences from the far extent of the longwall block, working back towards the main headings. The roof of the mined-out area collapses as mining progresses, which may result in subsidence on the surface.

The longwall continuous mining equipment includes:

- Self-advancing hydraulic powered roof supports which move with the shearer to support the roof
- Mechanised shearers to cut and remove the coal at the coal face
- Armoured face conveyors to remove the coal from the face and transfer it to the roadway to the surface

As the coal seam is up to 10m thick, it is too thick to be extracted using conventional longwall mining. The thick seam mining technique is therefore proposed for RHM to enable more coal to be extracted. The hydraulic roof support system can be raised and lowered, allowing coal above the area cut by the shearers to fracture and cave in behind the mining face as the hydraulic support is lowered, falling onto a rear armoured face conveyor to be extracted from the mine.

The coal is conveyed from the longwall face along the headings and then to the surface utilising a system of conveyors to raw coal stockpiles and then to the CHPP. RHM coal will predominately be processed at the proposed Red Hill CHPP located on GRM and BRM, but may also be processed at the existing GRM and BRM CHPPs.

Vertical shafts connect the mine workings to the surface to provide ventilation and emergency access to the surface if required.

1.1.5 Proposed duration of the operation

Current life-of-mine planning commences development of the RHM underground access in 2060, once open cut mining at GRM is complete. Mining of coal is planned to commence in 2063 and continues until 2091.

Changes to GRM mine plans may bring forward the start of RHM. Variations to the planned mining rates due to business or market conditions, changes to technology, or refined resource information may also change the proposed duration or footprint of the operation. It is acknowledged that an amendment to either or both the RHM PRCP and GRM and BRM PRCP may be required to facilitate change in respect of planned operations.

1.2 Baseline information

PRCP Guideline (Section 3.1)

In addition to the legislative requirements, the following information about the site, where relevant, is considered necessary by the administering authority (as per section 126C(1)(j) of the EP Act) to decide whether to approve the PRCP Schedule:

- site topography (locally and regionally)
- climate (general and specific (rain, evaporation, temperatures)) including long-term projections
- geological setting
- site hydrology and fluvial networks
- groundwater levels and properties
- soil types, properties, and productivity
- land stability (pre-existing land degradation/erosion and predisposition to ongoing stability issues)
- vegetation communities and ecological data (including existing regional ecosystem mapping)
- fauna presence and populations
- pre-mining land use
- identification of underlying landholders

Transitional PRC Plans must include any baseline information collected as part of an EIS process or original EA application. If this information is unavailable, the reasons should be explained in this section of the rehabilitation planning part. Transitional PRC Plans are not required to demonstrate how aspects of the mine site have been designed for closure for existing or approved disturbance. However, any expansion to an existing site must demonstrate how it has been designed for closure. The rehabilitation/improvement planning must include data from when mining first commenced up until planned surrender. The transitional provisions of the EP Act include an exceptional circumstance for when land is available for rehabilitation.

1.2.1 Site topography

The topography at RHM is relatively flat. The mine is located within a broad valley through which the Isaac River flows. The valley is defined to the west by the Denham Range and to the east by the Carborough Range. The southern end of the valley broadens out on to a wide flood plain. A low broad ridge to the north defines the northern part of the Isaac River catchment.

The topography of the Isaac River valley near RHM area varies from approximately 250m Australian Height Datum (AHD) along the Isaac River to the east to approximately 450m AHD elevation along portions of the Denham Range that define the western edge of the valley. The relatively steep slopes associated with the Denham Range contrast with the extensive flat areas across the base of the river corridor, where gradients are generally less than 1:100.

1.2.2 Climate

RHM is located in a semi-arid climatic zone, which is characterised by high summer temperatures, warm dry winters and a distinct wet and dry season. Weather data was collected at the Moranbah Water Treatment Plant (Station No. 034038) between 1972 and 2012; and since 2012 it has been collected at the Moranbah Airport (Station No. 034035) (BOM, 2024).

1.2.2.1 Temperature

Maximum average temperatures range from 24°C in June/July to 35°C in December/January, with minimum average temperatures ranging from 9°C in July to 21°C in January.

1.2.2.2 Rainfall

Although rainfall occurs throughout the year, it is more prevalent in the summer months (Table 3).

Table 3: Moranbah monthly average rainfall for station no. 034038 and station no. 034035

Month	Station no. 034038 (mm)	Station no. 034035 (mm)
January	103.8	103.1
February	100.7	82.6
March	55.4	76.8
April	36.4	25.7
May	34.5	30.6
June	22.1	23.1
July	18.0	35.9
August	25.0	13.9
September	9.1	13.3
October	35.7	22.8
November	69.3	66.3
December	103.9	64.3
Annual	614.2	560.8

1.2.2.3 Evaporation

The evaporation rate is highest in the summer months - mean daily rate of 8.5mm in December; and lowest in the cooler months - mean daily rate of 3.5mm in June. The annual average rate of potential evaporation is approximately 2,300mm, which greatly exceeds the annual rainfall, a characteristic of semi-arid environments.

1.2.2.4 Wind

Wind records for Moranbah for January - April show an easterly predominance of moderate strength (1 - 20km/h), with easterlies dominating in May - July with some south-easterly influence. Easterly winds predominate for August - December which tends north to north-easterly from October to December.

1.2.2.5 Long-term climate projections

To account for potential future climate uncertainties within hydrologic designs and mine water planning, this PRCP and supporting technical studies have utilised the *BMA Climate Change Adaptation in Mine Water Planning and Hydrologic Assessments Guideline* (BMA, 2023). This guideline was developed specifically for the locations of the BMA assets to provide a consistent approach to the adoption of future climate variables. The approach and baseline data, on which the guideline was based, has been derived from Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology (BOM), DETSI and other published sources and is aligned with the published projection database and methods including Consistent Climate Scenarios Projection Data and High-Resolution Projection Data.

1.2.3 Geological setting

RHM is situated on the north-western margin of the Bowen Basin, on the Collinsville Shelf. The Bowen Basin in the area is characterised by a relatively thin accumulation of sediments, gentle easterly dips and minor deformation.

Locally, the Permo-Triassic sequence comprises, in ascending stratigraphic order: the upper part of the late Permian German Creek Formation of the marine influenced Back Creek Group; and the Moranbah Coal Measures (MCM), Fort Cooper Coal Measures (FCCM) and Rangal Coal Measures (RCM) of the late Permian Blackwater Group. All units of the Permo-Triassic sequence dip from west to east at between three and five degrees.

The RCM outcrop in the far eastern corner of ML70421. The FCCM contain thick, stone banded, poor quality coal seams which are not considered economic under current circumstances. These in turn overlie the MCM which include the target coal seam for mining at RHM. The MCM were deposited in a predominantly fluvial flood plain environment.

The lithology of the MCM is generally characterised by interbedded fine-grained lithic sandstone, siltstone, mudstone, claystone, and coal, which is uniform across the site. The MCM show regular grading of lithological sequences from sandstone to siltstone and mudstone to coal, then tending back to sandstone, typical of depositional flood plain/river systems.

The MCM are characterised by several laterally persistent thick coal seams interspersed with several thin minor seams, which split and coalesce along strike and down dip.

Coal occurs in four distinct horizons within RHM as shown in Figure 4:

- Goonyella upper seam (GUS);
- Goonyella P seam (GP1 and GP2 plies);
- Goonyella middle seam (GMS); and
- Goonyella lower seam (GLS).

The GUS, GMS and GLS are mined at GRM to the west of RHM and BRM mines the GMS and GLS to the south. RHM will only target the GMS which yields high quality coking coal. The GMS is between 5 and 10.5m thick within the target mining.

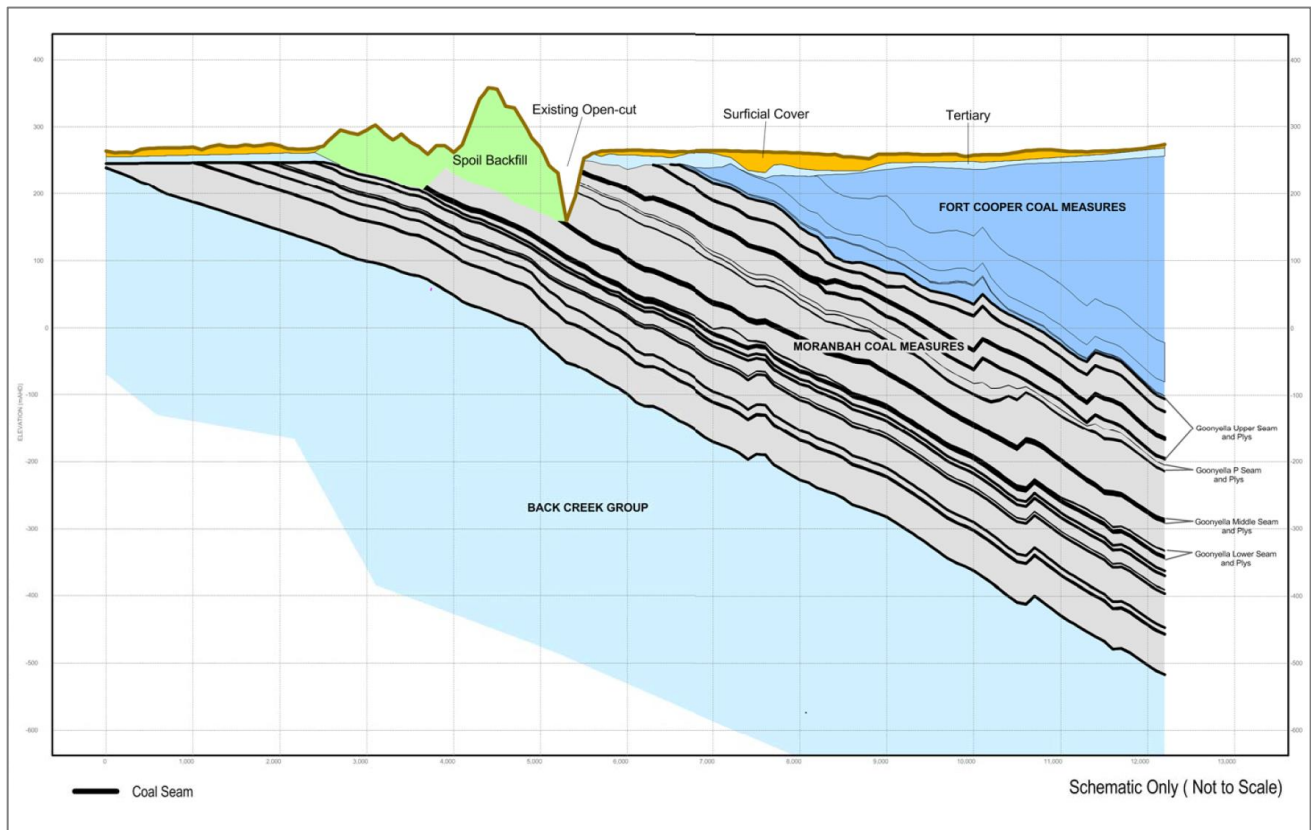


Figure 4: Geological cross section (BMA, 2013b)

1.2.4 Site hydrology and fluvial networks

RHM is located within the Isaac Connors Sub-basin which forms part of the Fitzroy Basin. The RHM EA area, lies across the Isaac Western Uplands Tributaries, Isaac and Lower Connors River Main Channel and Isaac Northern Tributaries Sub-catchments within the Upper Isaac River Catchment. The surface water environmental values for these sub-catchments are detailed in the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP (Water and Wetland Biodiversity)) Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all water of the Isaac River Sub-basin (including Connors River) (DEHP, 2011) and summarised in Table 4.

Table 4: Surface water environmental values

Sub-catchment	Aquatic ecosystems	Irrigation	Farm supply/ use	Stock water	Aquaculture	Human consumer	Primary recreation	Visual recreation	Drinking water	Industrial use	Cultural and
Isaac Western Upland Tributaries	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Isaac and Lower Connors River Main Channel	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓

Sub-catchment	Aquatic ecosystems	Irrigation	Farm supply/ use	Stock water	Aquaculture	Human consumer	Primary recreation	Visual recreation	Drinking water	Industrial use	Cultural and
Isaac Northern Tributaries	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓

Several ephemeral watercourses, including Isaac River, Goonyella Creek and Twelve Mile Gully, and some minor unnamed surface water drainage lines are located within RHM. Minor agricultural type dams associated with the use of the property for grazing, not constructed by BMA, are located within the EA boundary. The watercourses within RHM are summarised in Table 5 and are shown in Figure 5.

There are currently no water licences within RHM for the taking of surface waters or diversion of watercourses.

Table 5: Watercourses and key drainage lines within and immediately surrounding RHM

Watercourse	Perennially	Hierarchy	Strahler stream order	Comment
Isaac River	Intermittent	Major	6	The Isaac River is the dominant major watercourse in the catchment. The Isaac River flows through the site in a southerly direction and has its confluence with the Mackenzie River approximately 250km to the south of the mine.
Goonyella Creek and tributaries	Intermittent	Minor	1 - 2	The Goonyella Creek catchment includes the areas to the north and west of RHM, which includes disturbances from other mining operations. Confluence with the Isaac River is in the proximity of the planned underground workings.
Twelve Mile Gully	Intermittent	Minor	1 – 3	Twelve Mile Gully runs in a south westerly direction across RHM draining into the Isaac River in the southern portion of ML70421.

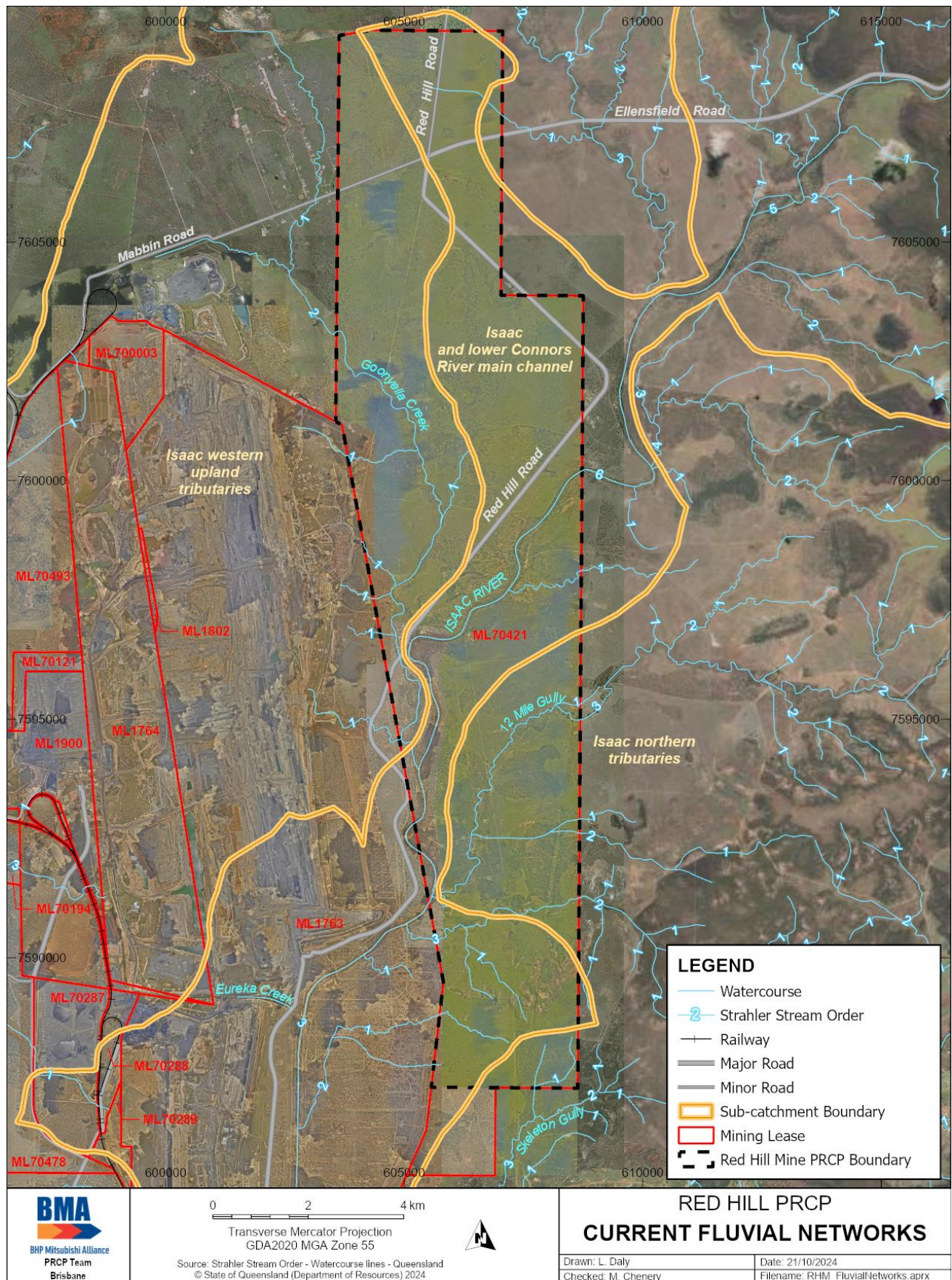


Figure 5: RHM fluvial network

1.2.4.1 Fluvial Water Quality

As operations at RHM have yet to commence, surface water monitoring data assessing upstream water quality specific to RHM is not available and the DETSI administered WaTERS database (August 2024) does not hold water quality data specific to RHM. Table 6 summaries the available water quality results for the sampling undertaken upstream of RHM for the EIS (URS, 2013).

Table 6: Summary of upstream water quality results

Parameter	Number of Samples	Average	Median	Q1 - 25th Percentile	Q3 - 75th Percentile	Minimum	Maximum
Aluminium (µg/L)	45	11,334	8,500	3,900	15,000	100	46,000
Ammonia as N (µg/L)	44	55	20	5	30	5	1,460
Arsenic (µg/L)	45	29.0	2.5	2.0	2.5	0.5	1200.0
Beryllium (µg/L)	1	2.5	2.5	2.5	2.5	2.5	2.5
Boron (µg/L)	45	54	50	30	60	25	125
Cadmium (µg/L)	45	1.8	0.3	0.3	0.3	0.1	69.0
Chromium (µg/L)	45	165	15.0	11.0	24.0	0.3	6,600.0
Copper (µg/L)	38	156	11	7	13	3	5,500
Fluoride (µg/L)	45	92	100	50	100	10	400
Iron (µg/L)	45	13,358	11,000	6,500	16,000	90	59,000
Lead (µg/L)	45	539.7	6.0	2.5	8.0	2.5	24,000
Magnesium (µg/L)	1	407	407	407	407	407	407
Manganese (µg/L)	44	1,678	261	183	359	72	60,000
Mercury (µg/L)	45	0.1	0.1	0.1	0.1	0.1	0.2
Molybdenum (µg/L)	45	7.4	2.5	2.5	2.5	2.5	210.0
Nickel (µg/L)	45	199	15	10	26	3	8,100
Nitrate as NO ₃ (µg/L)	45	46	20	10	40	5	590
Nitrite as NO ₂ ⁻ (µg/L)	4	18	8	5	20	5	50
pH (units)	45	-	-	-	-	5.4	9.1
Selenium (µg/L)	45	2.6	2.5	1.0	2.5	0.5	8.0
Sulfate (mg/L)	45	3,091	2	1	4	1	55,000

Parameter	Number of Samples	Average	Median	Q1 - 25th Percentile	Q3 - 75th Percentile	Minimum	Maximum
Zinc (µg/L)	45	472	24	18	35	3	20,000
Filterable Reactive Phosphate (FRP) (µg/L)	7	306.7	294.0	206.0	395.5	185.0	465.0
Electrical Conductivity (µS/cm)	38	195	170	146	210	110	510
Total Dissolved Solids (mg/L)	45	203	200	120	260	18	411
Total Suspended Solids (mg/L)	45	446	340	250	480	31	1,800
Turbidity (NTU)	45	660	450	300	770	120	2,400
Cobalt (µg/L)	45	45	6	3	8	3	1,700
Dissolved Aluminium (µg/L)	38	1,714	405	163	3,075	20	9,300
Dissolved Arsenic (µg/L)	38	0.6	0.5	0.5	0.5	0.5	1.0
Dissolved Beryllium (µg/L)	1	2.5	2.5	2.5	2.5	2.5	2.5
Dissolved Boron (µg/L)	45	44	40	30	50	25	100
Dissolved Cadmium (µg/L)	38	0.1	0.1	0.1	0.1	0.1	0.1
Dissolved Chromium (µg/L)	45	1.2	0.5	0.5	1.0	0.5	8.0
Dissolved Copper (µg/L)	45	2.9	2.0	2.0	3.0	1.0	8.0
Dissolved Iron (µg/L)	45	788	260	100	800	25	5,300
Dissolved Lead (µg/L)	45	0.5	0.5	0.5	0.5	0.5	2.0
Dissolved Manganese (µg/L)	45	3.0	2.5	1.0	5.0	0.5	12.0
Dissolved Mercury (µg/L)	45	0.1	0.1	0.1	0.1	0.1	0.1
Dissolved Molybdenum (µg/L)	45	1.4	0.5	0.5	2.5	0.5	7.0
Dissolved Nickel (µg/L)	45	2.2	2.0	2.0	2.0	0.5	7.0
Dissolved Selenium (µg/L)	45	2.0	2.5	1.0	2.5	0.5	5.0
Dissolved Zinc (µg/L)	45	3.3	2.5	2.5	5.0	0.5	6.0
Chemical Oxygen Demand (mg/L)	38	34	32	26	35	3	100
C6-C9 (µg/L)	38	23	25	25	25	10	25

Parameter	Number of Samples	Average	Median	Q1 - 25th Percentile	Q3 - 75th Percentile	Minimum	Maximum
C10-C14 (µg/L)	38	109	25	25	25	25	3,200
C15-C28 (µg/L)	38	315	100	100	100	50	5,800
C29-C36 (µg/L)	38	202	25	25	60	25	6,100
BOD (lab) (mg/L)	38	2	1	1	2	1	3
C10 - C36 Fraction (sum) (µg/L)	31	656	100	70	100	50	15,000
NO ₂ + NO ₃ (µg/L)	2	85	85	68	103	50	120
Dissolved Cobalt (ug/L)	38	0.5	0.5	0.5	0.5	0.5	0.5
Total Silver (ug/L)	38	3.4	0.3	0.3	2.5	0.3	75.0
Dissolved Silver (ug/L)	37	0.8	0.1	0.1	2.5	0.1	2.5
Dissolved Uranium (ug/L)	38	1.5	0.2	0.1	0.2	0.1	50.0
Total Uranium (ug/L)	38	2.0	0.5	0.3	0.7	0.3	50.0
Dissolved Vanadium (ug/L)	38	3.7	2.5	2.5	2.5	2.5	12.0
Total Vanadium (ug/L)	38	294	27	19	40	5	10,000

The data collected to date has been collected as part of the RHM EIS and is summarised in the EIS's supporting technical documentation. Additional work is required to collect data that would support the development of site-specific values in line with the *Assessing and managing water quality in temporary waters - Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Smith, et al., 2020).

1.2.5 Hydrogeology

A hydrogeological assessment, including conceptual and numerical modelling, has been undertaken to support the development of this PRCP. The detailed report – *Transitional PRCP – Red Hill Mine - Hydrogeology Assessment* (AECOM, 2024) is provided in Appendix D. The groundwater numerical model domain for RHM includes the MLs forming RHM, GRM and BRM, in addition to surrounding areas where the operations could influence groundwater conditions. As the operations at GRM and BRM have an influence on groundwater conditions at RHM, the interpretation of the hydrogeological conditions presented within this PRCP collectively considers these neighbouring mining operations.

1.2.5.1 Groundwater environmental values

RHM is located within the Isaac Connors groundwater management area Zone 34 of the Fitzroy Basin. Within the groundwater management area, alluvial groundwater is managed as Groundwater Unit 1 and water within the hard rock aquifers as Groundwater Unit 2 (sub-artesian aquifers). The site is in the groundwater chemistry zone of 'sodic sequence', which is saline, sodium and chloride dominated (DEHP, 2011). Volumetric limits apply to extraction of groundwater within the groundwater management area for non-stock and domestic purposes.

Groundwater resources are also scheduled under the EPP (Water and Wetland Biodiversity) as Isaac Groundwaters of the Isaac River Sub-basin of the Fitzroy Basin water plan (WQ1310). Table 7 summarises the groundwater environmental values.

Table 7: RHM groundwater environmental values

Groundwater zone	Aquatic ecosystems	Irrigation	Farm supply/use	Stock water	Aquaculture	Human consumer	Primary recreation	Secondary Recreation	Visual recreation	Drinking water	Industrial use	Cultural and spiritual value
Isaac Groundwaters	✓	✓	✓	✓	-	-	✓	-	-	✓	-	✓

1.2.5.2 Hydrogeological units

Groundwater at RHM comprises the following key hydrogeological units:

- Quaternary alluvium – unconfined aquifer (sporadic discontinuous water-bearing strata of permeable unconsolidated irregular sequences of clay, silt, sand and/or gravel) localised along Eureka Creek, Goonyella Creek and regionally along the Isaac River where it is well developed
- Tertiary – including the Suttor Formation, Basalt and Duaringa Formation, which form an unconfined aquifer overlying Triassic and Permian units regionally
- Late Permian age coal measures – including the RCM, FCCM and MCM (Blackwater Group) consisting of:
 - Low permeability interburden units with aquitard properties
 - Coal seams that exhibit water bearing properties primarily associated with secondary porosity through cleats and fracturing
- Mid Permian – consisting of the Back Creek Group, which outcrops to the west of the site and underlies the Blackwater Group

The coal seams within the MCM are the primary aquifer at RHM. The coal seams can be characterised as semi-confined aquifers, with the upper, middle and lower coal seams forming the main hydrostratigraphic units locally. The MCM overburden and interburden act as aquitards and are typically dry, or very low yielding.

Quaternary alluvium

The Quaternary alluvial deposits unconformably overlie the Suttor Formation, Tertiary Basalt, and Rewan Formation. In the proximity of GRM and BRM the alluvial deposits predominantly occur in close proximity of the Isaac River (typically between 1 and 3km total width) and immediately surrounding floodplains. Along the Isaac River these deposits consist of clay, sandy clay, and sands and gravels with varying proportions of clay, to depths of up to 37m and typically between 15 and 35m. Investigations in the Isaac River alluvial deposits immediately to the south of the site indicated the thickness of bed sands in the Isaac River was 2 to 3m.

Hydrogeological investigations within the region indicated the permeability of the Isaac River alluvium ranged from 8.9 to 45.4m/day. The Quaternary flood deposits (riverbank sediments) are generally finer grained than the bed sands, with permeability values between 0.01 and 10m/day.

The Isaac River alluvium has limited effective storage, provides only limited volumes of baseflow, and does not contain permanent groundwater. More permanent groundwater resources may however occur in the deeper and relatively narrow parts of the Isaac River channel.

Due to the generally shallow saturated thickness and the lack of continuity of the more permeable gravel and sand sections, the Quaternary alluvium is not considered a significant aquifer in the proximity of RHM as it has limited sustainable yield. However, during periods of creek or river flow, the alluvium may become fully saturated and discharge to sub-cropping coal seams or other underlying aquifers. Drilling and monitoring on-site indicates

that, where groundwater does occur, depth to groundwater in the Quaternary alluvium is approximately 3 to 13m below ground level. There is a marked separation between the measured alluvium groundwater levels and the piezometric levels associated with the deeper coal seam aquifers and thus it is unlikely that changes in groundwater levels in the coal would significantly impact on the alluvium hosted groundwater.

Regionally, groundwater flow within the alluvial aquifer is expected to follow topography and local drainage patterns.

Recharge of the alluvial aquifer, which is a porous media aquifer, is from surface water flow or flooding (losing streams), surface infiltration of direct rainfall and overland flow, where no substantial clay barriers occur in the shallow sub-surface. Available hydrologic data suggests that water infiltrates/drains to the base of the alluvium relatively quickly after rainfall events. This saturation is generally sporadic, producing semi-permanent, localised, relatively thin aquifers.

Groundwater discharge from the alluvium occurs through evapotranspiration from vegetation, short duration baseflow, and infiltration and recharge to the underlying older formations.

Tertiary Sutor Formation and Tertiary sediments

The undifferentiated Tertiary sediments and Sutor Formation occurs extensively throughout the area, though outcrop is not always continuous; it is eroded in areas to expose the underlying Permian rocks, with parts of the Tertiary sequence concealed by younger alluvium and colluvium. The Tertiary sediments generally consist of lenses of paleochannel gravels and sands separated by sandy silts, sandy clays and clays. A review of the borehole logs showed the Tertiary sediments vary in thickness up to approximately 80m with a typical thickness of 15m.

Groundwater level in the Tertiary deposits has been found to be between 4 and 17m below ground level and exists within the more permeable sand and gravel Tertiary sediments. Depending on the location, the Tertiary aquifer is either unconfined to confined, with the degree of confinement determined by weathering, overlying alluvium and clay content. There is a distinction between the Tertiary and the coal measure groundwater levels, indicating a separation between the hydrostratigraphic units.

Recharge of the Tertiary aquifers primarily occurs through direct infiltration of rainfall and overland flow and through overlying Quaternary alluvial aquifers. Primary discharge mechanisms in the Tertiary sediment aquifers are through flow into adjacent or underlying aquifers; evapotranspiration; and groundwater extraction.

A review of bore logs within the RHM, GRM and BRM footprint showed that the Tertiary sediments are dominated by low permeability clays and sandy clays with isolated areas of loose more permeable sand. Within the proximity of the GRM Airstrip Pit, a hydraulic conductivity of 6.6×10^{-4} m/day was identified within the Tertiary sediments, indicating a predominantly clay lithology. Hydraulic conductivity within the sandstone/siltstone, sands and clays of the Tertiary Formation range between 2×10^{-7} to 24.6m/day (noting that 24.6m/day was significantly higher than other results for the unit).

Groundwater flow within the Tertiary sediments is limited due to the compartmentalisation associated with the variable clay contents and the discontinuous nature of the formation. Where groundwater flows occur, they are expected to be a subdued reflection of topography.

Permian Coal Measures

Groundwater occurrence within the Permian coal measures is largely restricted to the low to moderately permeable coal seams that exhibit both primary porosity and the more dominant secondary porosity through fractures and cleats. The GLS, GMS and GUS coal seams represent the most extensive Permian aquifers at RHM.

Permian overburden and interburden are characterised by low vertical hydraulic conductivity and confine the coal seam aquifers both above and below. The confining units also have very low (leakance), limiting water flows into the aquifer (recharge). Other sediments in the overburden and interburden are relatively impermeable (either due to high clay content or significant cementing) and form aquitards. The overburden and interburden is hydrogeologically 'tight' and hence very low yielding to essentially dry claystone, mudstone, sandstone, siltstone and shale.

Evidence from piezometric observations for the coal seam aquifers suggests the groundwater levels were slightly different for each seam, with the GUS seam being 1 to 2m higher than the GMS seam, and the GLS seam being up to 14m lower than the GMS seam at the same location. This variation in hydraulic heads between coal seams confirms the aquitard nature of the interburden and the limited potential for induced flow.

As operations at the neighbouring GRM have a significant influence on groundwater levels at RHM and mining at GRM commenced prior to the earliest available groundwater data, a data derived piezometric surface cannot be produced. Prior to development of the mining operations, groundwater flow direction in the coal seam aquifers is expected to have been from the north and west to the south and east across the site. This flow direction is consistent with recharge to the coal seams occurring at the subcrops to the west. The current groundwater flow pattern has been altered locally with groundwater flow towards the existing mine pits and underground workings at GRM, BRM and other surrounding mining operations, which are dewatered and depressurised.

The occurrence of groundwater in the interburden is limited. Aquifers in the interburden are discontinuous with heterogeneous hydraulic properties creating isolated, lens-like aquifers. Due to the heterogeneity and discontinuity of the interburden aquifers within the Permian strata, the groundwater flow direction cannot be determined on a regional scale for these units.

Groundwater recharge in the Permian-Triassic strata aquifers occurs from:

- Infiltration of rainfall and overland flow in outcrop and sub-crop areas
- Downward seepage or through flow from overlying or adjacent alluvial or tertiary aquifers where no significant clay barriers exist
- Leakage between aquifers by faulting and other structural discontinuities in overburden and interburden sediments
- Water storage/placement within mining voids or other workings

Primary discharge mechanisms in the Permian-Triassic strata aquifers include:

- Dewatering for mine progression
- Downgradient Permian-Triassic strata outcrop areas
- Through flow into adjacent (outcropping or sub-cropping coal seams) or seepage into underlying aquifers (via structural discontinuities)

Interpreted hydraulic conductivity values for the MCM indicate that the cleats and joints in the coal are less open with depth, with a corresponding decrease in permeability. The following ranges of hydraulic conductivity at the site have been identified:

- GUS: 0.02m/day (limited data, no range available)
- GMS: 0.009 to 0.1m/day
- GLS: 7×10^{-7} to 3m/day
- Interburden: 9×10^{-7} to 9×10^{-5} m/day
- Overburden: 6×10^{-4} to 5×10^{-2} m/day

1.2.5.3 Groundwater quality

An assessment of groundwater quality for each of the hydrogeological units, based on the existing data held, was undertaken as part of the Hydrogeological Assessment (Appendix D). A summary of the currently known groundwater quality characteristics within each of the aquifers is provided below.

The groundwater data collection for RHM historically has been sporadic and undertaken for specific projects with different sampling methodologies and data quality objectives applied. Recent bore installation (2020) and monitoring programs have commenced, however the data is considered insufficient to provide statistical interpretations suitable to allow the development of site-specific milestone criteria.

Quaternary alluvium

The groundwater from the Quaternary alluvium is dominated by sodium and bicarbonate ions. Available data, which is also limited by the temporal nature of saturation, and sporadic lateral extent of the aquifer, also indicates the aquifer has variable salinity relating to depth of the aquifer and distance/time from recharge. Monitoring results from 2020 to 2024 indicate the alluvium hosted groundwater ranges from fresh to highly saline. Generally, the alluvial groundwater has lower salinity than the Tertiary and Permian formations.

Alluvium major ions and nutrient results from the 1998 to 2011 monitoring data indicated variability over time and between locations. The EPP (Water and Wetland Biodiversity) 50th percentile water quality objectives for shallow (<30m depth) groundwater were exceeded by the median results for: sodium and chloride, and by the maximum results for: sodium; calcium; chloride; bicarbonate; sulphate; and fluoride.

Tertiary and Permian

The Tertiary and Permian age formations have variable salinity, ranging from brackish to saline. The MCM and Back Creek Group has moderate to high salinity principally due to elevated levels of sodium and chloride ions. The Back Creek Group groundwater contains a relatively higher proportion of sulphate due to marine influence during deposition compared to the MCM.

Permian major ions and nutrients results from the available monitoring data indicated variability over time and between locations. The EPP (Water and Wetland Biodiversity) 50th percentile water quality objectives for deep groundwater (>30m depth) are exceeded by the median and maximum results for: sodium; calcium; magnesium, chloride; bicarbonate; sulphate; and fluoride.

1.2.5.4 Groundwater use

Groundwater use in the area within and surrounding RHM is limited with land users predominantly utilising surface water dams and water supplied through reticulated infrastructure. Groundwater use is generally limited by groundwater quality restricting its beneficial use without prior treatment.

A search of the Department of Regional Development, Manufacturing and Water Groundwater Bore Database was carried out for registered bores around the RHM area with a 5km buffer around the MLs. The search indicated there are 224 registered bores for the following uses:

- Groundwater monitoring – 190 bores
- Exploration – 20 bores
- Water supply – 8 bores
- Unknown – 6 bores

The Queensland Water Entitlement Database did not list any of the registered bores as having a water licence. BMA holds a water licence covering the EA area for the taking of underground water from the MCM for the purpose of dewatering (water licence authorisation #: 621847, expiry: 30/9/2037).

The BOM National Atlas of groundwater dependent ecosystems (GDEs) (GDE Atlas) (BOM, 2017) indicates moderate potential and high potential aquatic GDEs and moderate potential and low potential terrestrial GDEs being present within the RHM ML. A review of the mapping indicates the mapped potential aquatic GDEs in the areas surrounding RHM, other than the Isaac River, Goonyella Creek and Twelve Mile Creek, are dominated by anthropogenic infrastructure within the MLs including the TSFs, mine dams, in pit water storages, constructed drains and diversions, and not natural ecosystems. The groundwater monitoring in the proximity of the site indicates the alluvial groundwaters are temporal in nature and therefore likely to only support aquatic ecosystems after recharge resulting from periods of flooding. Terrestrial ecosystems within the riparian zones of the Isaac River and its tributaries are potentially facultative GDEs with deeper rooted species accessing the temporal groundwaters within the alluvial and colluvial deposits.

1.2.5.5 Conceptual site model – extent of mining

A hydrogeological conceptual site model representing the PRCP extent of mining, at the last day of mining at RHM, is illustrated in Figure 6. This conceptual site model indicates the mining operations result in the following:

- Groundwater drawdown within the MCM, associated with dewatering/depressurisation of the RHM underground workings and on-going passive dewatering into the GRM residual voids
- Inwards hydraulic flow gradients towards the underground workings prior to flooding
- Flooding of the underground workings contributes to the recovery of groundwater in the proximity of the RHM underground workings and development of hydraulic gradients towards the Goonyella residual void located immediately to the west

- Drawdown in the MCM at the end of mining is at, or close to, the maximum expected to occur as a result of RHM
- Little to no impact on surficial aquifers/GDEs, which are intermittently saturated, including the Isaac River alluvium
- Little to no impact on environmental receptors
- No impact on anthropogenic receptors, i.e. the water supply bores

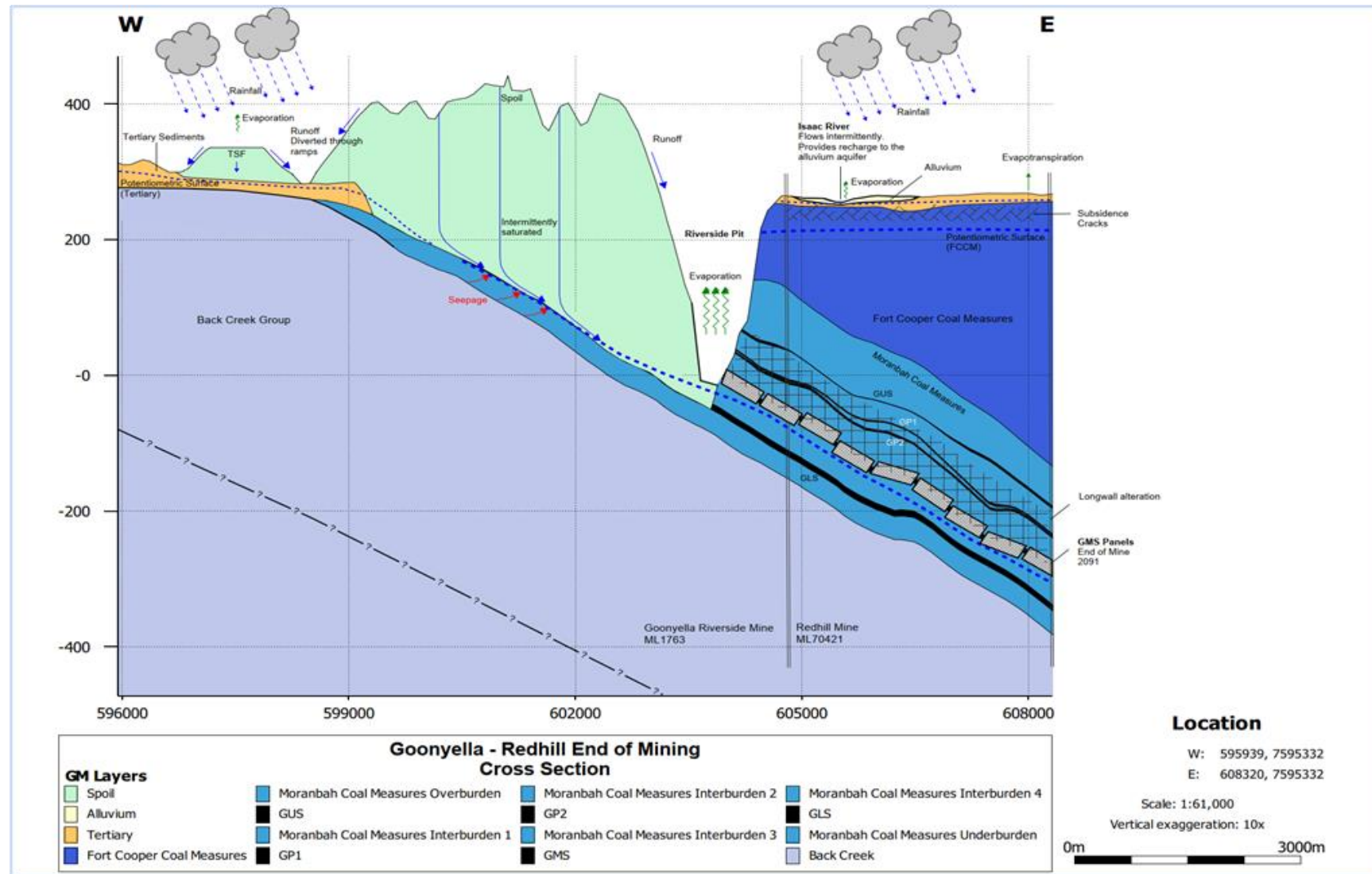


Figure 6: Conceptual site model of RHM at last day of mining (extent of mining) (AECOM, 2024)

1.2.6 Soil types, properties and productivity

A baseline soils assessment was completed by GSS Environmental as part of the RHM EIS. The detailed report - *Soil and Land Suitability Assessment, Red Hill Mining Lease, Environmental Impact Statement* (GSS Environmental, 2013) is provided in Appendix E. The key soils information from the report is summarised in this section.

A summary of the Australian Soil Classification (ASC), soil management group, description and grazing land suitability class for the soil types is provided in Table 8. The soil mapping according to the ASC is shown in Figure 7.

The pre-mining grazing land suitability class of the soil types was assessed in the EIS. The assessment was in accordance with the *Guidelines for Agricultural Land Evaluation in Queensland* (DPI, 1990) classification system. This system allows for land to be allocated into five possible classes (with land suitability decreasing progressively from Class 1 to Class 5) which are derived from limitations that include soil type.

Table 8: RHM baseline soil types

Soil Type #	ASC	Soil management group	Description	Land suitability class
1	Lithic Rudosol	Clay topsoil	Shallow rocky (skeletal) soils with a clay loam or clayey soil matrix associated with or underlain by shallow bedrock. Structurally stable with low potential for dispersion, and is generally of moderate salinity, strongly acidic	3
2	Tenosol	Sand/loam topsoil	Poor structure and loose sandy texture comprising deep (>1m) sand or silty sand grading to loamy or light clayey sand subsoils. Generally nondispersive, and has low levels of salinity, with a neutral pH	4
3a	Red Kandosol	Sand/loam topsoil	Sandy loam to loamy surface and medium to heavy clay subsoils. The topsoil is non-dispersive to moderately dispersive, mainly non-saline to slightly saline and varies from slightly acidic to mildly alkaline	2
3b	Brown Kandosol	Sand/loam topsoil	Sandy loam to light clayey surface soils grading to light to medium or heavy clay subsoils. Slightly to moderately dispersive, non-saline and mainly neutral to slightly acidic	2
5	Brown Chromosol	Sand/loam topsoil	Sandy and loamy surface duplex soils, non-sodic to marginally sodic, non-saline sandy clay or medium to heavy clay subsoils. The topsoil is structurally stable with a low potential for dispersion. Most topsoil is non-saline although can be slightly saline and is slightly acidic to moderately alkaline	2
6	Brown Sodosol	Sand/loam topsoil	Medium to deep hard-set thin loamy surface duplex soils, light medium to heavy clay deep subsoils. The topsoil is non-dispersive to moderately dispersive, is generally moderately	3

Soil Type #	ASC	Soil management group	Description	Land suitability class
			saline, and the topsoil was generally neutral, or in some instances moderately acidic	
7	Brown Dermosol	Clay topsoil	Hard-set or thin weak self-mulching clay loam to medium clay surface horizon. Non-dispersive to moderately dispersive, is non-saline and varied from slightly acidic to moderately alkaline, with occasionally high gravel content	3
8a	Shallow Vertosol	Clay topsoil	Cracking clay soils with a thin weak self-mulching surface soil over dark brown or brownish black sodic moderately saline heavy clay subsoils underlain by weathered rock. The topsoil is typically nondispersive, although occasionally has moderate dispersion ratings, is non-saline to slightly saline, and neutral to slightly alkaline	3
8b	Deep Vertosol	Clay topsoil	Cracking clay soils with a thin weak self-mulching surface soil over dark brown or brown strongly structured mostly sodic heavy clay subsoils. The topsoil is mainly non-dispersive, occasionally moderately dispersive, varying from non-saline to moderately saline and is slightly acidic to slightly alkaline	3
8c	Deep Salic Vertosol	Clay topsoil	Cracking clay soils mostly with self-mulching surface soils, mainly non-dispersive, varies from non-saline to high saline and is moderately acidic to moderately alkaline. The subsoil is mainly non-dispersive	3

Table 9 summarises the chemical and physical parameters of the undisturbed soil management groups at RHM. Clay topsoils can be moderately alkaline in pH, have electrical conductivity (EC) which is non-saline and moderate cation exchange capacity (CEC). Sand/loam topsoils are slightly acidic to neutral in pH, have EC which is non-saline and a very low to low CEC.

Due to RHM being an underground mine there is minimal planned disturbance to soil. Topsoil stripping is only expected in the infrastructure areas, or where required for exploration drilling, subsidence crack repairs and drainage works.

Table 9: Summary of chemical properties of undisturbed RHM soils

Analysis (unit)	Soil management group and ASC			
	Clay soils	Sand/loam soils		
	Brown dermosol (0 - 10cm)	Red kandosol (0 - 20cm)	Brown chromosol (0 - 15cm)	Brown sodosol (0 - 25cm)
Soil pH	8.3	6.3	6.4	7.0
Soil ECe (%)	0.8	0.3	0.5	0.9
CEC (meq/100g)	20.6	4.5	1.8	8.5
Exchangeable sodium percentage (ESP) (%)	2	4	0	0
Emerson Aggregate Test #	2(3)	3(2)	5	5

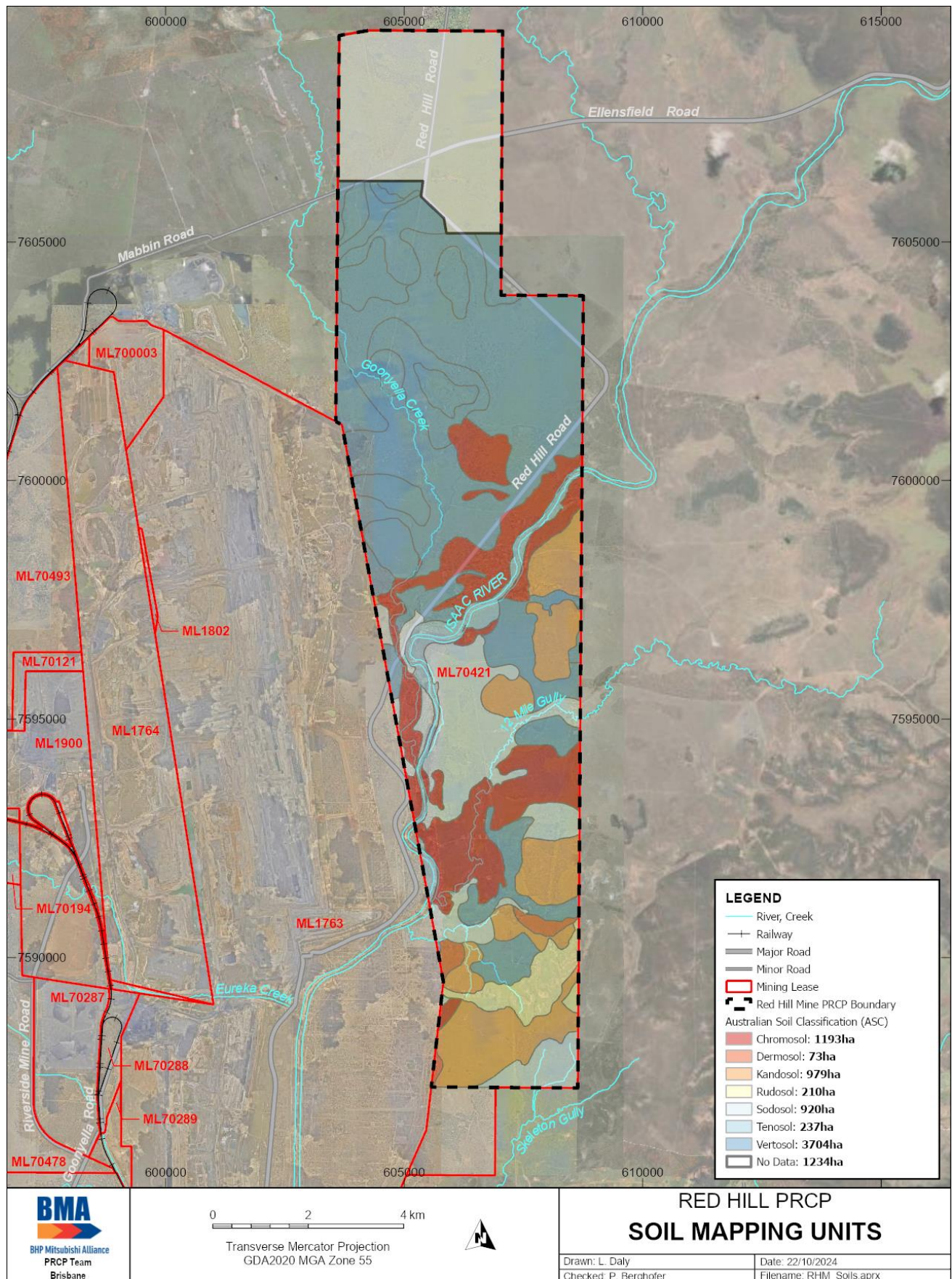


Figure 7: RHM Soil Mapping Unit – ASC

1.2.7 Land stability

The pre-mining topography at RHM is generally flat to undulating and is consistent with the regional landscape. RHM and non-mined land adjacent to GRM and BRM and within the Bowen Basin indicates surface erosion is common upon disturbance of soils and vegetation from cattle grazing and other land uses.

1.2.8 Vegetation communities and ecological data

Two main terrestrial ecological studies relating to vegetation communities and ecological values have been undertaken within the RHM site including:

- *Red Hill Mining Lease Environmental Impact Statement – Section 09 Terrestrial Ecology* (BMA, 2013e)
- *Goonyella Riverside Mine, Broadmeadow Mine and Red Hill Mine Ecology Assessment* (ELA, 2023)

The results of the ecological assessments and desktop searches of the following ecological databases have been used to determine the vegetation communities and ecological values of the RHM site, as well as the fauna presence and habitats as discussed in Section 1.2.9:

- Wildlife Online Database (DESI, 2024c)
- Regional ecosystem mapping (DESI, 2024d)
- Matters of State Environmental Significance mapping (MSES) (DESI, 2024e)
- Maps of environmentally sensitive areas (DESI, 2024f)

It is important to note that vegetation clearing and disturbance activities approved within the RHM site may have occurred since the ecological assessments.

1.2.8.1 Regional ecosystems

Baseline regional ecosystem (RE) mapping for RHM is based on the results of ground-truthed vegetation surveys and mapping undertaken as part of the RHM EIS (BMA, 2013e), and results from the more recent ecology survey in the most northern part of RHM (ELA, 2023). Ground-truthed RE mapping for the site is shown in Figure 8 and listed in Table 10, along with their associated *Vegetation Management Act 1999* (VM Act) class and biodiversity status.

The majority of vegetation communities and REs within the RHM site have been disturbed or modified by grazing practices to some degree (BMA, 2013e). Despite historic clearing for cattle grazing, several remaining patches of remnant vegetation have been mapped across the RHM site.

Table 10: Ground-truthed regional ecosystems within RHM

RE descriptions	RE Code	VM Act class	Biodiversity status
<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	11.3.1	Endangered	Endangered
<i>Eucalyptus populnea</i> woodland on alluvial plains	11.3.2	Of concern	Of concern
<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	11.3.25	Least concern	Of concern
<i>Eucalyptus coolabah</i> woodland on alluvial plains	11.3.3	Of concern	Of concern
<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	11.3.4	Of concern	Of concern
<i>Corymbia tessellaris</i> woodland	11.3.4a	Of concern	Of concern

RE descriptions	RE Code	VM Act class	Biodiversity status
<i>Acacia cambagei</i> low woodland on alluvial plains	11.3.5	Least concern	Of concern
<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. grassy or shrubby woodland on Cainozoic clay plains	11.4.2	Of concern	Of concern
<i>Eucalyptus populnea</i> with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on Cainozoic clay plains	11.4.7	Endangered	Endangered
<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	11.4.8	Endangered	Endangered
<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	11.4.9	Endangered	Endangered
<i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces	11.5.3	Least concern	No concern at present
<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces	11.5.9	Least concern	No concern at present
<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest in depressions on Cainozoic sand plains and remnant surfaces	11.5.16	Endangered	Endangered
<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	11.7.2	Least concern	No concern at present
<i>Eucalyptus melanophloia</i> woodland to open woodland on Cainozoic igneous rocks	11.8.4	Least concern	No concern at present
<i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks	11.8.5	Least concern	No concern at present
<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	11.8.11	Of concern	Of concern
<i>Acacia harpophylla</i> - <i>Eucalyptus cambageana</i> woodland to open forest on fine-grained sedimentary rocks	11.9.1	Endangered	Endangered

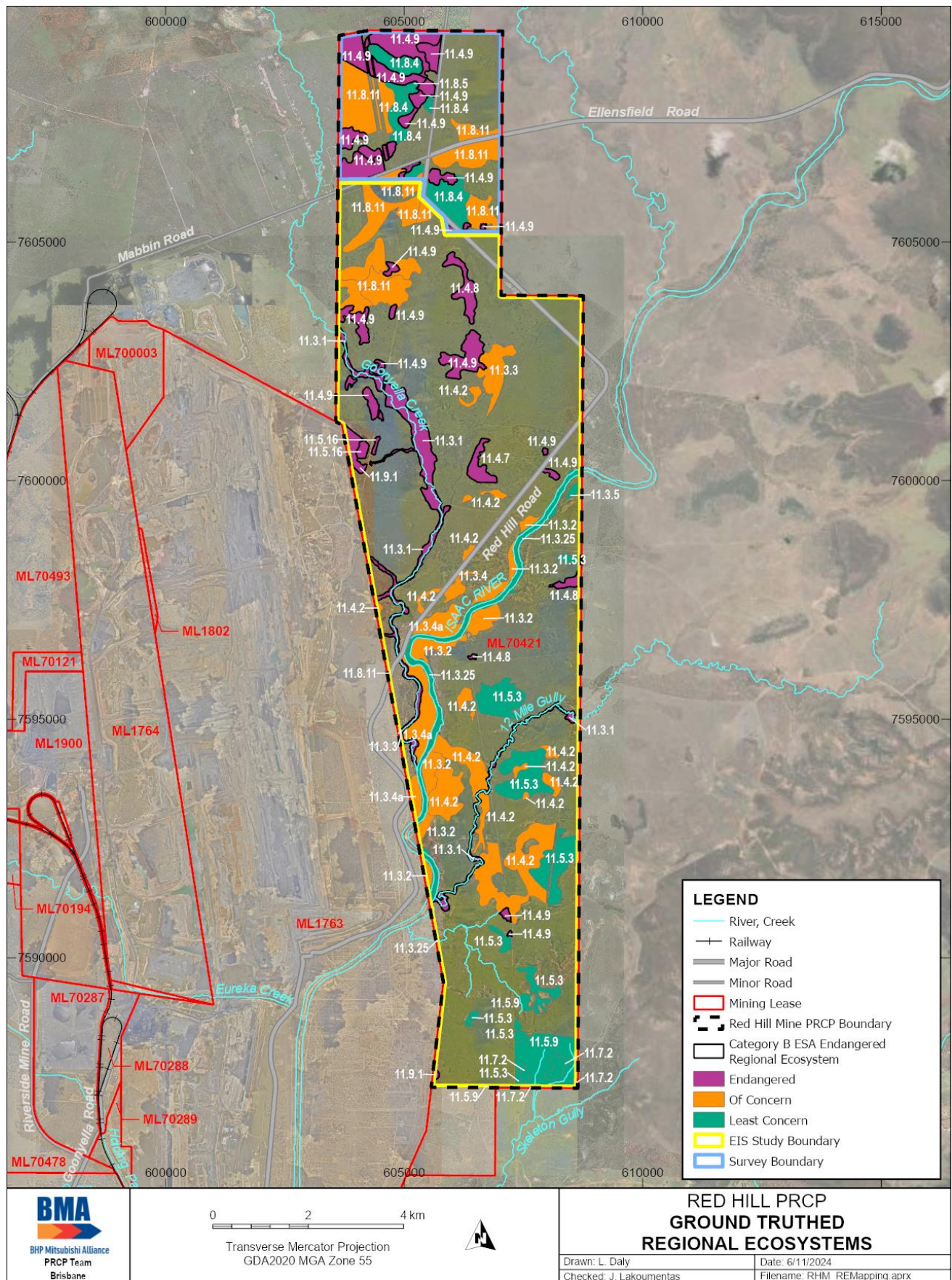


Figure 8: RHM ground-truthed regional ecosystems

1.2.8.2 Environmentally sensitive areas

Category B environmentally sensitive areas (ESAs) are defined under Schedule 19 of the *Environmental Protection Regulation 2019* to include Endangered REs based on the biodiversity status in the 'Regional ecosystem description database' (Queensland Herbarium, 2024).

The following REs with a current Endangered biodiversity status were ground-truthed on RHM site in association with Category B ESAs (BMA, 2013e; ELA, 2023) (Figure 8):

- RE 11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains
- RE 11.4.7 *Eucalyptus populnea* with *Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on Cainozoic clay plains
- RE 11.4.8 *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains
- RE 11.4.9 *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains
- RE 11.5.16 *Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains and remnant surfaces
- RE 11.9.1 *Acacia harpophylla*-*Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks.

1.2.8.3 State significant flora species

Two state significant flora species under the *Nature Conservation Act 1992* (NC Act) have been recorded and are known to occur on RHM based on the results of previous ecological surveys:

- *Cerbera dumicola* (Near threatened NC Act) (BMA, 2013e)
- King blue grass (*Dichanthium queenslandicum*) (Vulnerable NC Act) (BMA, 2013e; ELA, 2023)

Cerbera dumicola was recorded at a single location in the east of the RHM site during the EIS, where it was identified within non-remnant vegetation (BMA, 2013e). King blue grass was recorded in the natural grassland vegetation community in north of the RHM site within RE 11.8.11 (BMA, 2013e; ELA, 2023) (Figure 8.)

1.2.9 Fauna presence and populations

1.2.9.1 State significant fauna species

The following threatened fauna species under the NC Act are known to occur on RHM based on the results of the previous ecological surveys:

- Koala (*Phascolarctos cinereus*) (Endangered NC Act) (BMA, 2013e; ELA, 2023)
- Ornamental snake (*Denisonia maculata*) (Vulnerable NC Act) (BMA, 2013e; ELA, 2023)
- Squatter pigeon (*Geophaps scripta scripta*) (Vulnerable NC Act) (BMA, 2013e; ELA, 2023)
- Greater glider (*Petauroides volans*) (Endangered NC Act) (ELA, 2023)
- Australian painted snipe (*Rostratula australis*) (Endangered NC Act) (ELA, 2023)
- Short-beaked echidna (*Tachyglossus aculeatus*) (Special least concern NC Act) (BMA, 2013e; ELA, 2023)

Fauna habitat mapping of koala, ornamental snake (Figure 9) and squatter pigeon (Figure 10) is based on the RHM EIS data (where available) (BMA, 2013e), to align with the EA authorised impacts, and the ELA (2023) survey in the northern part of RHM. Habitat mapping of central greater glider and Australian painted snipe (Figure 11) is based on the ELA (2023) survey results.

The koala was recorded within poplar box (*Eucalyptus populnea*) woodland in the mid-west of the RHM site (BMA, 2013e). Suitable habitat associated with poplar box woodlands and red gum (*E. camaldulensis*) riparian woodlands exists for this species (BMA, 2013e). The Isaac River contains large tracts of eucalypt woodlands

(RE 11.3.25) providing habitat connectivity values for the koala. Habitat for the koala on RHM has been mapped in Figure 9.

The ornamental snake was recorded on the east of the RHM site during the EIS (BMA, 2013e). Habitat for the ornamental snake has been mapped in Figure 9 in association with areas with gilgai depressions and cracking clays (typically RE 11.4.8 and RE 11.4.9), as well as creek lines which provide habitat connectivity and species mobility between a highly fragmented landscape (BMA, 2013e).

Multiple squatter pigeon have been observed on the RHM site during ecological surveys (BMA, 2013e; ELA, 2023). Squatter pigeon are ground-dwelling birds, predominantly foraging on seeds from grasses and tend to inhabit the grassy understorey of eucalypt woodlands and open grass areas including regrowth and modified areas, such as paddocks (ELA, 2023). The squatter pigeon requires access to permanent waterbodies for drinking, either natural or man-made, as long as there is bare ground at the water's edge. Squatter pigeon habitat has been mapped on RHM in association with remnant and regrowth eucalypt dominated REs within 1km of suitable water sources, including larger watercourses and waterbodies that hold pools of water for extended periods (ELA, 2023) (Figure 10).

The greater glider has been recorded within *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines associated with RE 11.3.25 (ELA, 2023). The greater glider habitat predominantly consists of *Eucalyptus* spp. forests and woodlands fringing riparian corridors and flood plains, with hollow bearing trees associated with the Isaac River (ELA, 2023) (Figure 11).

There have been no direct observations of the Australian painted snipe during surveys at RHM (ELA, 2023). However, the species was identified as known to occur as there have been several records within 50km of the site, including one undated historical record located within RHM on the floodplains of the Isaac River (ELA, 2023). This highly mobile species occurs within terrestrial shallow wetlands, ephemeral or permanent, with shallow muddy edges. This species may temporarily utilise habitat within the RHM site, which includes palustrine wetlands and flooded gulgais (under certain climatic conditions) (ELA, 2023) (Figure 11).

The short-beaked echidna has been recorded on RHM site during ecological surveys (BMA, 2013e; ELA, 2023). This species occurs in a wide range of habitats and is likely to occupy remnant and regrowth habitats within the site (BMA, 2013b) (Figure 8).

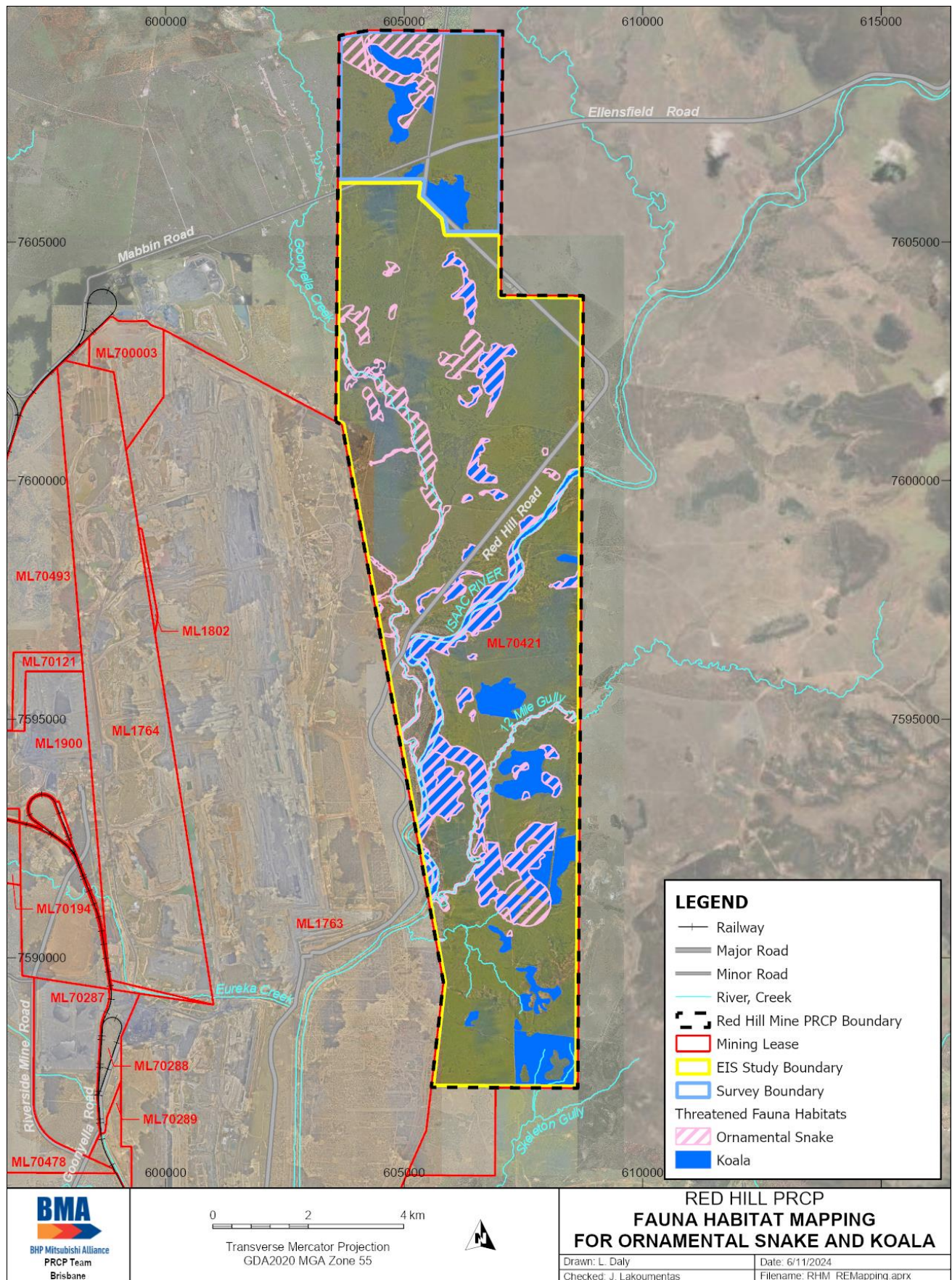


Figure 9: RHM fauna habitat mapping for koala and ornamental snake

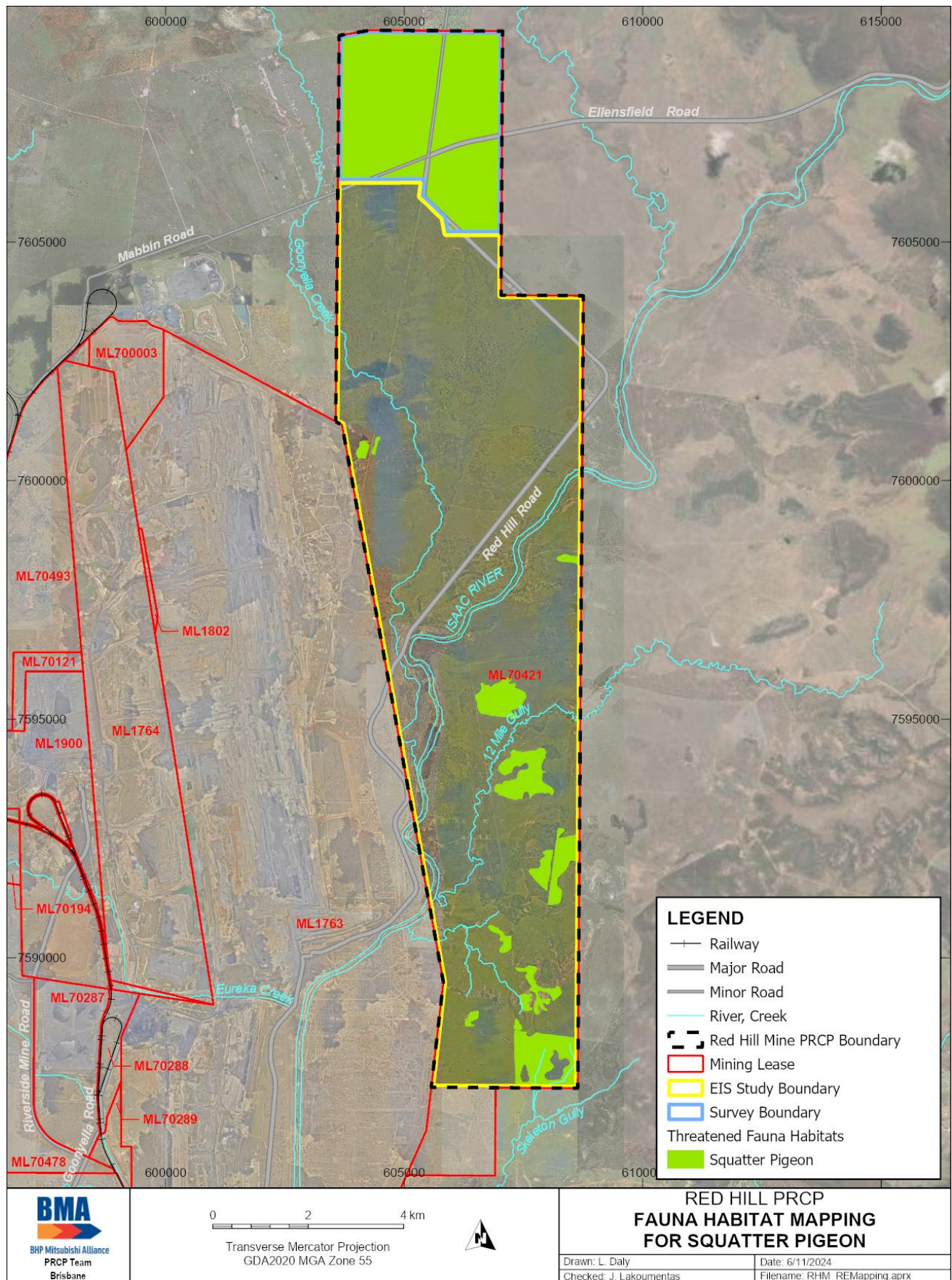


Figure 10: RHM fauna habitat mapping for squatter pigeon

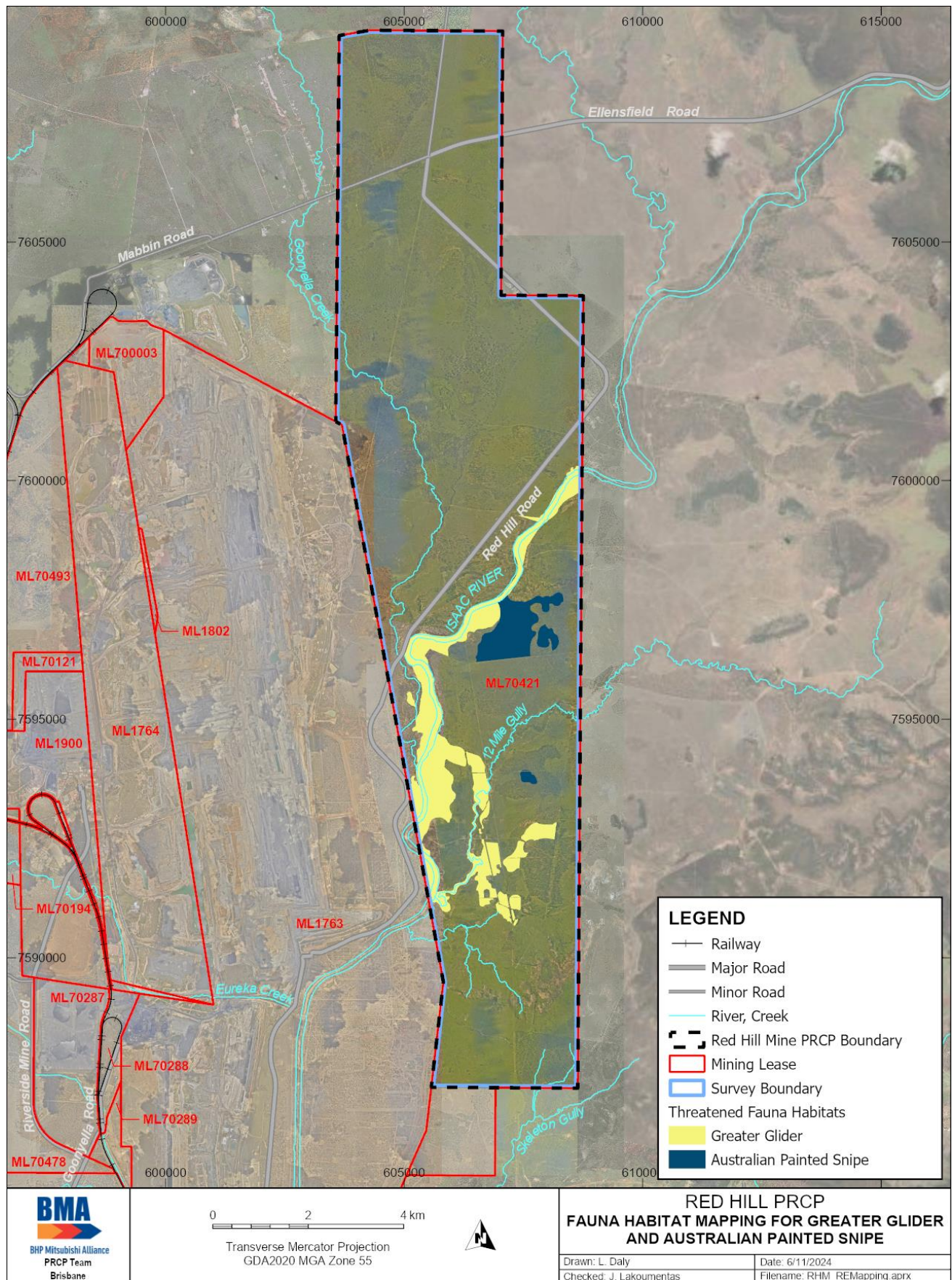


Figure 11: RHM fauna habitat mapping for greater glider and Australian painted snipe

1.2.10 Pre-mining land use

Prior to exploration and mining activities, the RHM site has been used for cattle grazing, resulting in extensive tree clearing over most of the area.

A small area of strategic cropping land, approximately 120ha (1.2% of the site), is mapped in the north of ML70421, however there is no evidence of previous cropping activity within RHM site (BMA, 2013b).

1.2.11 Contaminated land

The primary land uses within the RHM MLs have included:

- Rural cattle grazing
- Riverside Homestead, including cattle dip, hydrocarbon storage, workshops/storage sheds, septic systems, waste disposal/landfill areas, hardstand plant/material storage and other infrastructure associated with property maintenance
- Coal seam gas infrastructure including wells and pipelines
- Electrical transmission infrastructure including substations
- Red Hill Road

At the time of the contaminated land investigations, undertaken to support the RHM EIS, much of the area within RHM was contained on the Queensland Environmental Management Register. Underlying properties that have been utilised to undertake EP Act 'notifiable activities', have been listed on the Queensland Environmental Management Register. The Queensland Environmental Management Register listings are not associated with BMA RHM activities or infrastructure. None of the RHM underlying properties were listed on the Queensland Contaminated Land Register.

Planned BMA activities at RHM are predominantly associated with exploration, the extraction of coal through underground mining techniques and an accommodation village. Coal processing, heavy industrial support activities and waste disposal will be undertaken on the neighbouring GRM and BRM MLs. Therefore, the mining operations at RHM are unlikely to contribute to the existing Queensland Environmental Management Register listing or contribute further to the contamination of land.

1.2.12 Underlying landholders

The RHM site is a combination of freehold land owned by BMA (and/or related companies) and other freehold land holdings including:

- Private landowner
- Centurion Coal Mining Pty Ltd
- Red Hill Road and Mabbin Road reserves, owned by Isaac Regional Council (IRC)
- Q.E.C. Ltd

The underlying land ownership for RHM is shown in Figure 12. BMA has agreements with the underlying landholders in relation to the granted ML surface areas that enable mining activities to proceed within the RHM area.

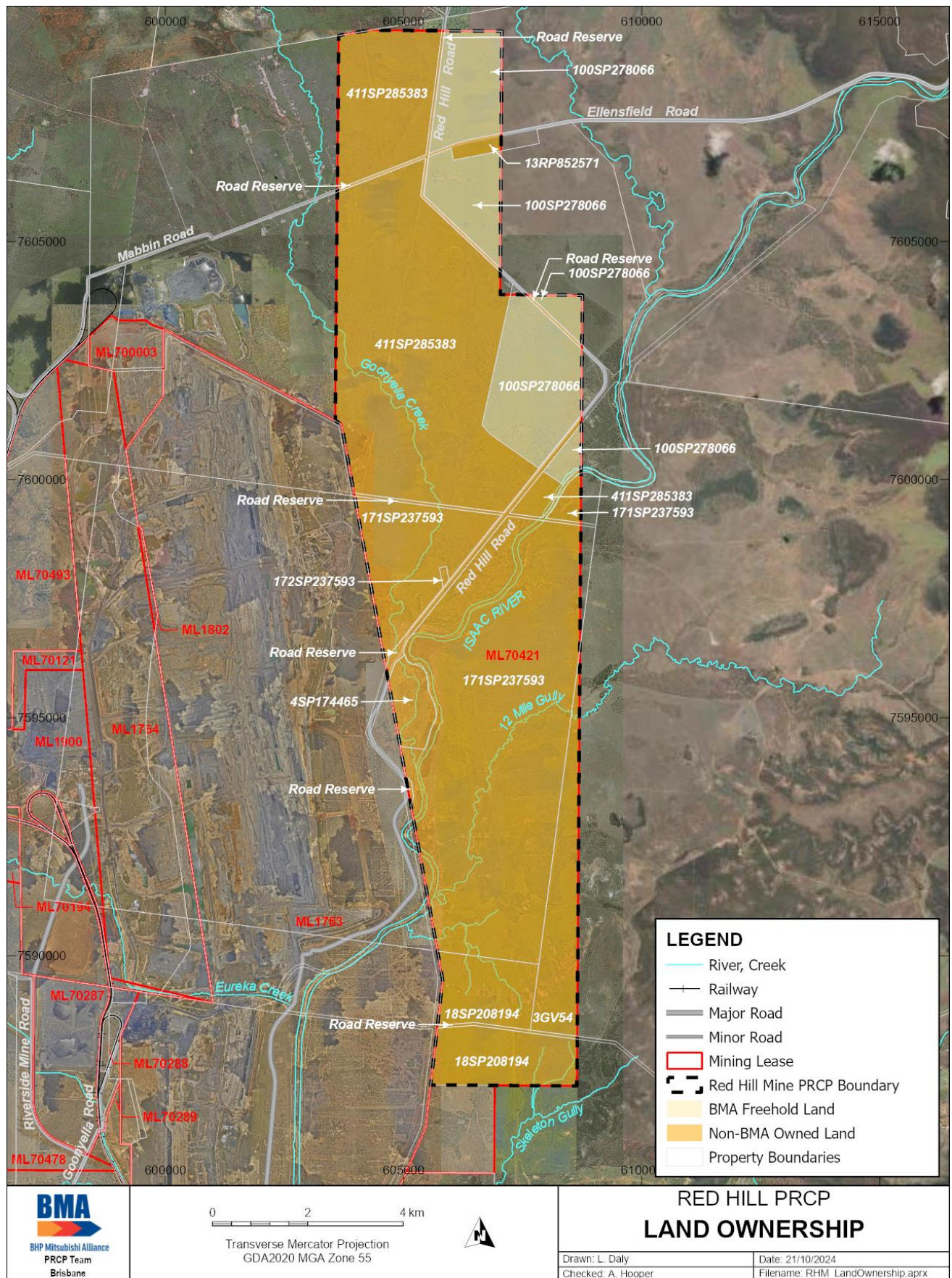


Figure 12: RHM land ownership

1.3 Design for closure

As this PRCP for RHM is subject to transitional PRCP arrangements, it is not required to demonstrate how aspects of the mine site have been designed for closure for existing or approved disturbance (PRCP Guideline, Section 3.1).

However, this PRCP has been developed to manage progressive rehabilitation of the RHM site, aiming to minimise long-term management requirements as well as associated closure costs. Importantly, a focused design for closure underpins all sections of this plan, including:

- Engagement with relevant stakeholders presenting transitional PMLUs
- Defining and implementing rehabilitation practices based on identified risks that could influence achievement of milestone criteria
- Demonstrating a successful rehabilitation trajectory towards achievement of these milestone criteria by ongoing site monitoring and maintenance

1.4 Rehabilitation and improvement planning

Legislative Requirement

In accordance with sections 126C(1)(b) and (c)(ii) of the EP Act, the rehabilitation planning part must include:

- *identification of all relevant activities on the mine site*
- *the predicted duration of each of the relevant activities proposed for the mine site*
- *the size/extent of the relevant activities*
- *whether the different relevant activities can be progressively rehabilitated.*

PRCP Guideline (Section 3.1)

Under section 126C(1)(j) of the EP Act, transitional PRC Plans must also include the following details about any existing rehabilitation already completed at the time of submission of the proposed PRC Plan:

- *a description of the rehabilitation works previously carried out*
- *when the rehabilitation works commenced and were completed*
- *whether the rehabilitation has been applied for or approved as progressively certified under the EP Act.*

1.4.1 Relevant activities requiring rehabilitation

The relevant activities at RHM that will require rehabilitation, the predicted duration and availability for progressive rehabilitation, are provided in Table 11. Any infrastructure that is beneficial to the PMLU may be retained if agreed with the landowner and will not be available for rehabilitation.

Table 11: Relevant activities requiring rehabilitation at RHM

Relevant Activity	Predicted duration	Availability for progressive rehabilitation
Underground mining subsidence	Final subsidence will be realised after flooding of the underground workings, which is scheduled to be complete within 5 years of final mining	• Available for initial operational repair of cracks and drainage works progressively during mining operations once the initial subsidence is complete • Final rehabilitation is scheduled once final subsidence is complete after flooding of underground workings at the end of mining

Relevant Activity	Predicted duration	Availability for progressive rehabilitation
Infrastructure – gas drainage	Varying: with the latest utilised until the end of mining	- Available for removal once no longer required to support underground mining operations, when mining in the associated longwall panel/s is complete - Final rehabilitation of the underlying area is scheduled once final subsidence is complete after flooding of underground workings at the end of mining
Infrastructure – mine access, ventilation, bridge, buildings, accommodation village, services	Varying: with the latest utilised until the end of rehabilitation activities	Dependent on the use and location, or unless deemed suitable to be retained for the PMLU: typically areas will be available for rehabilitation either at the end of mining or after the major rehabilitation activities are complete
Roads, laydown areas, stockpiles and general disturbance	Varying: with the latest utilised until the end of rehabilitation activities	Dependent on the use and location, or unless deemed suitable to be retained for the PMLU: typically areas will be available for rehabilitation either at the end of mining or after the major rehabilitation activities are complete
Mine dams	Varying: with the latest utilised until the end of rehabilitation activities	Available for rehabilitation when no longer required for water management
Exploration	Throughout the operational life	Available for initial rehabilitation once exploration activities are complete, within at least six months of the completion of works
Watercourse crossings	Varying: with the latest utilised until the end of rehabilitation activities	Dependent on the location in relation to mining and rehabilitation activities and after subsidence: typically crossings will be available for rehabilitation at the end of the major rehabilitation activities; some may be available earlier, such as at the end of mining

1.4.1.1 EA progressive rehabilitation conditions

The RHM EA includes the following condition regarding exploration activities and rehabilitation.

- L1: *“Exploration activities must be undertaken in accordance with the most recent version of the document Eligibility criteria and standard conditions for exploration and mineral development projects.”*

The *Eligibility criteria and standard conditions for exploration and mineral development projects* (DEHP, 2016) has rehabilitation conditions that require the holder of the environmental authority *“to complete the rehabilitation processes on all areas disturbed by mining activities, apart from those areas currently being utilised for mining activities, as soon as practical and at least within six months of the completion of works in those areas.”*

The RHM EA includes the following condition regarding the commencement of progressive rehabilitation:

- F3: *“Rehabilitation must commence progressively in accordance with the plan of operations.”*

All areas are included in the PRCP schedule for rehabilitation as soon as practicable after land becomes available. For infrastructure and general disturbance areas, rehabilitation is scheduled the year after the land becomes available to allow for final planning. Subsidence areas are scheduled within a year of becoming available for rehabilitation, once final subsidence is realised after flooding of the underground workings

(completed five years after final mining) to allow for final settlement and cracking. Operational compliance activities, including initial crack repairs and drainage works of subsidence areas, will be undertaken progressively during operations as panels are mined.

1.4.2 Rehabilitation areas and milestones

The rehabilitation areas (RA) and rehabilitation milestones (RM) included in the PRCP schedule for RHM are referred to throughout this PRCP.

A RA is defined in the PRCP Guideline as “an area of land in the post-mine land use to which a rehabilitation milestone for the post-mining use relates”, and a RM is “each significant event or step necessary to rehabilitate the land to a stable condition (section 112 of the EP Act)”.

The RHM RAs, as well as the relevant activities associated with each RA, are detailed in Table 12 and shown in Figure 23, and the RMs are detailed in Table 13. As required by the PRCP Guideline, only PMLU areas where disturbance has occurred or will occur, are mapped as a RA. The northern areas of ML70421 and undisturbed watercourse areas are expected to remain undisturbed through the mine life and are therefore not mapped as a RA.

To support ongoing operations, exploration and minor ancillary activities may be required in areas not mapped as a RA. Minor ancillary activities can occur without a PRCP amendment and may include roads, access tracks and culverts, fences, underground services, low-impact telecommunication facilities, electrical sub-stations and switch yards, transmission grid works and supply network works, storage depots, pipelines and pumps, groundwater bores, gas drainage bores, monitoring and investigation works and exploration activities (as agreed with the administering authority and included as a condition in the SRM PRCP schedule). Disturbance must be rehabilitated in accordance with the provisions detailed in the *Eligibility criteria and standard conditions for exploration and mineral development projects* (DEHP, 2016) or its successor, with the exception that land must be rehabilitated to a stable condition and achieve the proposed PMLU.

Table 12: Rehabilitation areas, associated PMLUs and relevant activities for RHM

RA*	PMLU	Relevant activity
RA3	Cattle grazing	- Accommodation village - Roads - General infrastructure and disturbance
RA11	Watercourse	- Watercourses impacted by underground mining/subsidence - Watercourse crossings/culverts
RA21	Woodland habitat	- Subsidence - Underground mining infrastructure - General infrastructure and disturbance within underground mining area

*BMA uses a consistent set of RAs across their assets, and as such some RA numbers are not relevant at RHM

Table 13: Rehabilitation milestones for RHM

RM	RM name
RM1	Infrastructure decommissioning and removal
RM2	Remediation and/or management of contaminated land

RM	RM name
RM3	Landform development and reshaping
RM4	Surface preparation (cattle grazing)
RM5	Surface preparation (woodland habitat)
RM6	Surface preparation (watercourse)
RM7	Revegetation (cattle grazing)
RM8	Revegetation (woodland habitat)
RM9	Revegetation (watercourse)
RM10	Achievement of surface requirements (cattle grazing)
RM11	Achievement of surface requirements (woodland habitat)
RM12	Achievement of surface requirements (watercourse)
RM13	Achievement of post-mining land use to a stable condition (cattle grazing – RA3)
RM14	Achievement of post-mining land use to a stable condition (woodland habitat – RA21)
RM15	Achievement of post-mining land use to a stable condition (watercourse – RA11)

1.4.3 Existing rehabilitation

Disturbance from exploration activities at RHM have been progressively rehabilitated (as per EA conditions F3 and L1). However, no existing rehabilitation has been included in the PRCP as rehabilitated exploration areas may be subject to further impacts from subsidence.

No progressive certification applications under the EP Act have been applied for RHM rehabilitation areas.

2 COMMUNITY CONSULTATION

Legislative Requirement

In accordance with section 126C(1)(c)(iii) and (iv) of the EP Act, the rehabilitation planning part of the PRC Plan must include:

- details of the consultation undertaken by the applicant in developing the proposed PRC Plan, and*
- details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.*

PRCP Guideline (Section 3.5)

In developing the proposed PRC Plan, the community should at least be engaged on the plan for the mine, PMLUs or NUMAs, areas of disturbance, rehabilitation and management methods, progressive rehabilitation, and closure timeframes. Ongoing community consultation should continue throughout the stages of the mine life so that progressive rehabilitation and the socio-economic and environmental impacts related to mine closure can be discussed with the community.

Community consultation carried out through different processes (such as an EIS) may be used to address the requirements in section 126C(1)(c) of the EP Act. The details of this consultation must be provided in the rehabilitation planning part of the proposed PRC Plan).

Transitional PRC Plans are still required to meet the legislative requirements in section 126C(1)(c) of the EP Act. All proposed PRC Plans must contain a community consultation plan regardless of whether the site has an existing EA.

To comply with section 126C(1)(c)(iii) of the EP Act, the PRCP must include details of the consultation undertaken by the applicant in developing the proposed PRCP (Section 2.4). This includes previous consultation undertaken as part of existing EA approvals or regular engagement processes (Section 2.2.1), and consultation undertaken as part of PRCP development (Section 2.2.2).

To comply with section 126C(1)(c)(iv) of the EP Act, and the PRCP Guideline, the PRCP must include a community consultation plan which details how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan (Section 2.3).

A community consultation register has been compiled to support the development of this PRCP – *Red Hill PRCP Community Consultation Register* is provided in Appendix F.

2.1 Stakeholders

The PRCP Guideline requires that the applicant must attempt to consult all relevant members of the community, noting that the community may include, but are not limited to:

- Affected landholders (such as underlying and adjoining land holders, and holders of land necessary for access to the land to which the proposed PRCP relates)
- Traditional Owners
- Local government
- Local community groups

The Queensland Government Information sheet *Community consultation for Progressive Rehabilitation and Closure Plan* (last revised on 16 February 2024) (DESI, 2024b), states that community members to be included in consultation must have a genuine, demonstrable and legitimate interest in:

- The land where the activity will occur
- The land adjacent to where the activity will occur
- The land/amenities surrounding where the activity will occur that are likely to be impacted by the activity (e.g. groundwater/drinking water users within the surrounding area or community located upstream or downstream of the activity)

Genuine interest may include direct impact interest (e.g. underlying and adjacent land holders), cultural interest (e.g. Traditional Owners), land use interest (e.g. overlapping tenure holders, or local government), or heritage, environmental, recreational or health interests (e.g. state or local government, or relevant community groups).

The stakeholders identified as having a genuine, demonstrable and legitimate interest in the ongoing rehabilitation and closure planning at RHM are listed in Table 14, along with BMA's existing relationship and the stakeholders potential areas of interest with respect to the RHM PRCP. Stakeholder details such as names of Queensland Government departments, companies and community groups, are correct for the point in time that the consultation was completed and may change over time.

2.2 Consultation to date

2.2.1 Pre-PRCP consultation

Initial consultation and engagement relating to RHM was undertaken between 2008 and 2012 as part of EIS consultation. EIS consultation included engagement on rehabilitation and land uses. Since then, the following rehabilitation and closure-related engagement has taken place for RHM prior to development of the RHM transitional PRCP:

- Engagement with Barada Barna Aboriginal Corporation (BBAC) has been ongoing since 2021 on PRCP development and rehabilitation execution, specifically on provision of seed for rehabilitation and contracting opportunities for rehabilitation execution
- Engagement with affected (underlying) landowners has been undertaken to develop compensation, leasing and agistment agreements, as BMA must rehabilitate in accordance with the requirements of the EP Act which are satisfied through the PRCP
- During 2018 and 2019, BMA engaged with the administering authority to implement the current EA conditions in relation to PMLUs and acceptance criteria, which were included in the EA Table F1: Rehabilitation Requirements
- BMA engaged with the administering authority in relation to how the PRCP Guideline elements (particularly regarding transitional arrangements) and the current EA conditions related to rehabilitation and closure would transition to PRCPs
- Since 2021, information about the PRCP process, the schedule for development of PRCPs for BMA assets and PRCP progress briefings has been provided to IRC at routine meetings, noting the RHM PRCP would be submitted in December 2024
- BMA has engaged with nearby landholders on land management and lease/license conditions, and on operational, environmental management and/or water matters, as required

2.2.2 Transitional PRCP consultation

Consultation as part of the development of the RHM transitional PRCP has included letters sent in 2024 via letter box drop, post or email to more than 6,500 premises in Moranbah and Dysart, including property owners, households, business and community groups. These stakeholders are listed in Table 14 and include:

- Barada Barna People, via BBAC
- Widi People of the Nebo Estate #1
- Widi People of the Nebo Estate #2
- Private owner of freehold land within and adjacent to the RHM EA area
- Other owners of land within the EA area including Q.E.C. Ltd (Powerlink) and Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)
- Moranbah residents, business owners and community organisations via a letter drop to all premises
- IRC
- Members of the Moranbah Smart Transformation Advisory Council (STAC)
- Isaac Business Chamber
- Owners and operators of utility assets within and adjacent to RHM
- Nearby mining tenement holders and petroleum (gas) tenement holders
- Queensland Government departments

In addition to the consultation letters, BMA distributed information about PRCPs to individuals, businesses and organisations via:

- BMA's Coal Connect, an online weekly newsletter to the BMA workforce and all internal coal personnel
- BMA's Community Connect, a bi-monthly newsletter distributed to more than 15,000 community members and BMA suppliers throughout the Bowen Basin

BMA's Community Hotline was also available during consultation for the community to request more information about PRCPs and continues to be available for any future queries.

2.3 Community consultation plan

The PRCP Guideline requires the community consultation plan to include:

- Objectives of the community consultation
- Consultation process, including proposed frequency of consultation
- Information to be released for community consultation
- How community feedback will be considered in the PRCP

Whilst many stakeholders in the Isaac region are well-educated about mining operations, there is less understanding of planning for life-of-mine, rehabilitation and closure planning. The community consultation plan recognises the following social context:

- Talk of closure planning will lead to community concerns, requiring careful and consistent communication
- PRCP consultations by a range of companies for a variety of assets will represent considerable cumulative demands on stakeholders, and a coordinated, strategic approach will be required to manage consultation fatigue
- Community members are becoming increasingly aware of climate change and the impacts of resource activities and energy policies on the environment

Accordingly, community and stakeholder expectations with regards to mine rehabilitation are expected to increase over time and need to be continuously assessed.

2.3.1 Objectives

The objectives of the community consultation include:

- To engage stakeholders in developing objectives and aspirations for PMLUs and landform, and social value opportunities to be considered in the PRCP
- To support transparent access to information about the RHM PRCP and implementation, enabling opportunities for the Moranbah and Dysart communities, BMA suppliers and government agencies and representatives to provide inputs and feedback on rehabilitation and closure outcomes
- To engage with utility owners and operators and adjacent mining and energy tenement holders, to provide information about RHM closure planning that supports them to manage their assets and interests

2.3.2 Consultation process

The consultation process to enable ongoing PRCP-related engagement is detailed in Table 15. The process includes the relevant stakeholders, engagement type and proposed consultation frequency to achieve the consultation objectives.

BMA continues to engage with neighbouring landholders on land management, lease/licence conditions, and operational matters, as required.

Stakeholder titles are correct as at the time consultation was undertaken. Some stakeholder titles (e.g. names of Queensland Government departments) may change over time and will be updated as necessary as part of future PRCP consultation and amendments.

2.3.3 Information to be provided

2.3.3.1 Consultation to date

The transitional PRCP consultation letters provided information about RHM and rehabilitation and closure planning and encouraged the stakeholders (Section 2.2.2) to contact BMA if they would like to discuss the PRCP. The information provided to stakeholders through the transitional PRCP consultation letters included:

- Introduction of Queensland Government requirements for mine rehabilitation and closure planning
- EP Act requirements for rehabilitation
- PRCP requirements
- PRCP submission date
- Location of RHM
- EA details
- Approved activities at RHM
- MLs within RHM EA area
- Estimated mine life of RHM
- BMA's commitment to progressive rehabilitation
- Rehabilitation objective and methods
- EA approved PMLU options
- Commitment to future engagement in PRCPs
- An invitation to seek information or discussion about PRCPs
- Contact details for further information or discussion

The information provided to the community as part of the transitional PRCP consultation via Coal Connect and Community Connect included:

- Progressive rehabilitation as a key focus for BMA
- PRCP requirements and purpose
- Timing for the development of the RHM PRCP
- Life of BMA assets that are subject to transitional PRCPs
- Commitment to ongoing engagement
- Contact details for further information or discussion

Consultation and engagement conducted by BMA to date was to transition the PMLUs within the EA to the PRCP. The BMA Community Hotline was also available during consultation for the community to request more information about PRCPs and continues to be available for any future queries.

2.3.3.2 Ongoing consultation

Information to be released for community consultation, as part of future RHM PRCP implementation will include:

- The rationale and scope for PRCPs
- Approved mining activities and PMLUs for RHM
- On-site activities and areas of disturbance
- Proposed rehabilitation methods, schedule and milestones
- Progress against rehabilitation milestones

- Alignment with long-term transformation planning occurring through governments
- Opportunities for community consultation as part of the PRCP's implementation

Communication tools could include:

- Frequently asked questions and answers and a PRCP fact sheet available to support consultation activities
- Face to face and virtual meetings, forums or workshops
- Updates and fact sheets about the RHM PRCP

Additional information to be shared with specific stakeholders is detailed in Table 15.

2.3.4 How feedback will be considered

The PRCP community consultation register (Appendix F) will be updated to include the consideration of issues raised and the outcomes of engagement as part of the community consultation activities outlined in Table 15. All stakeholder feedback recorded in the community consultation register will be considered in framing and detailing future PRCP amendments for RHM.

This may include feedback on, for example:

- Planned PMLUs
- Alternative PMLUs
- Vegetation species most suitable to the approved PMLUs
- Rehabilitation methods to protect cultural heritage and achieve optimal use for the PMLUs
- PRCP schedule
- Water management (e.g. availability for beneficial use as part of the PMLUs, or adjacent uses)
- Development of business capacity programs to equip local and Indigenous businesses for rehabilitation works.

The PRCP will be evaluated to ensure PMLUs are consistent with the outcomes of consultation with the community.

2.4 Community consultation register

The community consultation stakeholders, the consultation undertaken, and feedback received are documented in the community consultation register (Appendix F). The community consultation register is compliant with section 126C(1)(c)(iii) of the EP Act and includes:

- Identification of each community member/stakeholder
- Previous engagements with the community
- Consultation date(s)
- Description of consultation type
- Information provided to the community
- Issues raised/discussed by the community
- How issues have been considered
- Decisions/outcomes of engagement
- Commitments made by BMA

2.5 Feedback to date

All feedback received to date as part of the consultation for the PRCP, is documented in the community consultation register (Appendix F) and summarised in Table 14. There were no enquiries or feedback received following the transitional PRCP consultation letters apart from an acknowledgement of receipt of the letter. There were also no responses or enquiries to letters to Moranbah premises or to the information provided via Community Connect and Coal Connect.

Table 14: RHM identified stakeholders, current BMA relationships, potential PRCP areas of interest and consultation outcomes

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
Traditional Owners			
Barada Barna People (QCD380/08), represented by BBAC	- BMA has a constructive working relationship with Barada Barna People, who are the registered native title holders of land which includes RHM. - BBAC and BMA meets regularly as part of the BBAC-BMA Relationship Committee. - BMA holds a Native Title Project Agreement with BBAC on behalf of Barada Barna people. RHM falls within the Agreement area. The Agreement was signed on 31 July 2024. This Agreement sets a new way forward in the relationship between BMA and the Barada Barna people, providing intergenerational benefit. Under the Agreement, BMA will provide support towards priority community projects that enable Barada Barna people to live and work on-country, strengthening this important connection. - From a rehabilitation and closure perspective, BMA is working with BBAC specifically on provision of seed for	- Aspirations around rehabilitation and potential commercial opportunities as a PMLU - How operational management and/or rehabilitation could contribute to future use of the areas - Recognition and management of cultural heritage impacts - Native Title and land acquisition interests - PMLUs and landforms - Future access to and ownership of land - Environmental management/stewardship - Employment and business opportunities in rehabilitation, environmental management and monitoring	- Existing PMLUs were discussed with BBAC and they expressed their desire to be involved in the activities required to support execution of the rehabilitation and management milestones for PMLUs - The landform shown in the RHM PRCP reflects that approved under the EA. The PRC Plan and schedule shows this area mined and subsequently rehabilitated. It is however noted that there are a number of areas of cultural heritage significance within the ML boundary and further consultation with Barada Barna would be required before mining could take place in these areas.

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
	rehabilitation and contracting opportunities for rehabilitation execution.		
Widi People of the Nebo Estate #1	BMA has a constructive relationship with Widi People of the Nebo Estate #1, meeting as needed. There are no agreements with Widi People with respect to RHM.		No feedback was received in relation to PMLUs at RHM
Widi People of the Nebo Estate #2	BMA has a constructive relationship with Widi People of the Nebo Estate #2, meeting as needed. There are no agreements with Widi People with respect to RHM.		No feedback was received in relation to PMLUs at RHM
Underlying landowners			
Private landowner	- BMA has a longstanding relationship with the landowner of freehold land within and adjacent to the EA area. The landowner also holds an agistment licence within the EA area. - BMA engages with the landowner through letters, emails and regular meetings, including on an as-needs basis with regard to licenses and land management.	- Environmental management/stewardship - PMLUs and landforms - PRCP schedule - Future access to and ownership of land when it is no longer required for mining - Water usage, quality and access to groundwater and surface water (e.g. water allocations, water pipelines, etc.) - Potential impacts on roads and road reserves	No feedback was received in relation to PMLUs at RHM

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
		Potential impacts on land, water, property and future business value relating to PMLUs, and timing of impacts	
Q.E.C. Ltd. (Powerlink)	- Powerlink has an easement for energy transmission within the EA area and owns a parcel of land within the EA area for a substation. - Engagement with Powerlink is via routine correspondence on commercial and statutory issues, with meetings held as required on specific issues.	- PRCP schedule - Potential impacts on powerlines - Potential impacts on land and future business value relating to PMLUs, and timing of impacts	No feedback was received in relation to PMLUs at RHM
Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)	- Centurion Coal Mining Pty Ltd owns land within the EA area as well as the overlapping Middlemount Water Pipeline. - Centurion Coal Mining Pty Ltd also holds an adjacent Petroleum Lease. - Engagement with Centurion Coal Mining Pty Ltd is via routine correspondence on commercial and statutory issues.	- PMLUs and landforms - PRCP schedule - Future access to and ownership of land when it is no longer required for mining - Potential impacts on Middlemount Water Pipeline - Potential impacts on land, water, property and future business value relating to PMLUs, and timing of impacts	No feedback was received in relation to PMLUs at RHM
IRC	IRC owns land within the EA area for road reserves (Red Hill Road and Mabbin Road).	- PRCP schedule - Potential impacts on Council services, road infrastructure and traffic conditions	The PRCP landform proposes a realignment of Red Hill Road. To effect realignment, BMA acknowledge it would need to

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
	BMA and IRC engage in commercial discussions regarding use of IRC land within the EA area, as required.		apply for and obtain, a Works On Road Corridor Permit from IRC. Engineering studies will need to be completed before the permit is applied for. Concerns raised by IRC in relation to any realignment proposal for Red Hill Road will be considered during the permitting process. If changes are made to the proposed realignment as a result of future planning or permitting processes that impact the PRCP schedule, a PRCP amendment will be required.
Local Government			
IRC	- BMA has a long established and cooperative relationship with IRC. - BMA provides regular updates on PRCPs to IRC, as part of biannual IRC-BMA meetings which discuss a range of topics, and as part of additional issue-specific meetings from time to time.	- Local employment - Impacts on Council services and infrastructure - Stock routes - Rehabilitation progress and PRCP schedule - PMLUs and landforms	- Transitional provisions for the PRCP were discussed. IRC understand the PMLUs as per the EA are being transitioned into the PRCP. - IRC requested further information and engagement to understand how BMA and IRC could work together on potential innovative approaches to end of life mines

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
		• Management of closure impacts on employment and businesses • Alignment of rehabilitation plans with local and regional planning goals • Economic transformation (towards post-mining) and community sustainability • Potential impacts on environmental qualities, amenity and traffic conditions during closure or rehabilitation activities • Potential cumulative impacts of closure of multiple mining assets in a similar timeframe (e.g. job and population losses)	and long term futures of the local communities post mining. These innovative approaches would need to provide commercial viability as well as ecological and social functionality. IRC have been interested to understand the challenges to facilitate future changes. BMA has committed to engage with IRC on this going forward
Residents, businesses and community groups			
• Moranbah residents, businesses and community groups	• BMA engages with Moranbah residents, businesses and community organisations through stakeholder meetings, media and social media, and Community Connect, a regular BMA newsletter • Engagement activities with community members ranges from one-off responses to enquiries, to community events and forums, and ongoing engagement processes such as partnerships with	• Timing of closure • Rehabilitation obligations and progress • Environmental management/stewardship • Employment continuity • PMLUs and landforms • Management of closure impacts on employment and businesses • Economic and community sustainability	• No feedback was received in relation to PMLUs at RHM

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
	community organisations and industry bodies	Local employment and business opportunities in rehabilitation works	
Moranbah STAC	The Smart Transformation Project, including the Moranbah STAC was established by BMA in 2019. STAC members meet every two months to consider a range of issues and priorities related to the future and sustainability of the communities and economies of Moranbah.	As above, with a particular focus on community and economic development and transformation	No feedback was received in relation to PMLUs at RHM
Isaac Business Chamber	The Isaac Business Chamber was established in early 2024 and represents businesses across the IRC local government area. BMA has engaged with Isaac Business Chamber through community forums.	As above, with a particular focus on business and economic development opportunities associated with mining and/or rehabilitation works	No feedback was received in relation to PMLUs at RHM
Utility owners/easement holders with assets within the EA area			
- Q.E.C. Ltd. (Powerlink) - Ergon Energy - Centurion Coal Mining Pty Ltd (Middlemount Water Pipeline Pty Ltd) - Aurizon Network	- BMA has constructive working relationships and engages with utility owners as required (issue-specific or transactional engagement) with respect to: - Powerlines and powerline easements (Powerlink)	- Impact on assets/asset value - Remediation of impacts on assets - Any service disruptions and mitigations - Crossing/interface agreements - Timeframe for decommissioning utilities that service RHM	No feedback was received in relation to PMLUs at RHM

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
	- Powerlines overlapping the EA area (Ergon Energy) - Middlemount Water Pipeline - Rail lines (Aurizon)	• Cost of decommissioning utilities	
BMA operations			
• RHM workforce (including contractors)	• RHM is not yet operational so there is no workforce • Engagement with the future workforce will be through the relevant channels when operations commence, which may include 'toolbox' talks, email communications and Coal Connect	• Timing of closure • Rehabilitation obligations • Employment continuity • Management of closure impacts on employment and businesses • Economic and community sustainability • Local employment and business opportunities in rehabilitation works	• Not applicable
BMA suppliers			
• RHM suppliers	• RHM is not yet operational so there are no current suppliers • Engagement with the future suppliers will be via the relevant channels when operations commence, which may include the BMA community-related	• Loss of supply opportunities with closure • Opportunities to participate in supply chain for closure and/or rehabilitation works • Economic transformation (towards post-mining)	• Not applicable

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
	Local Buying Program portal, and via Community Connect.	Economic and community sustainability	
Overlapping/adjoining/nearby resource interests			
- Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.) - Anglo American Australia - Fitzroy (CQ) Pty. Ltd. - Stanmore SMC Pty Ltd Overlapping and nearby Authority to Prospect and Petroleum Commercial Area: - Arrow Bowen Pipeline Pty Ltd (Arrow Energy Pty. Ltd.) - QPM Energy Pty Ltd and QPM Energy (MGP Upstream) Pty Ltd	- BMA liaises with overlapping, adjoining and nearby mining and resource interests on an as-needed basis - BMA also engages with overlapping and nearby petroleum resource holders in accordance to <i>Mineral and Energy Resources (Common Provisions) Act 2014</i> (Qld) (MERC Act) requirements for petroleum overlap activities	- Train load-out access - Future land use and ownership - Collaboration on good industry rehabilitation and closure practices - Potential future use of land within the EA area for resource extraction purposes - Potential for any disruption of resource activities due to closure or rehabilitation works - Cumulative impacts and opportunities of mine closures	No feedback was received in relation to PMLUs at RHM

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
CH4 Pty Ltd (Arrow Energy Pty. Ltd.)			
Queensland Government			
Queensland Government departments: - Department of Resources (DoR) - DETSI	- BMA has constructive working relationships with DoR and DETSI - DoR's Deputy Director-General Georesources has asked to be kept informed on PRCP	- Legislative compliance - Resource development - Employment and growth opportunities - Public interest - Environmental management - Economic transformation (towards post-mining) - Financial assurance - Environmental risk management - Future PMLUs and landform - Company responses to stakeholder views - Industry best practice, and innovative future-looking approaches	No feedback was received in relation to PMLUs at RHM

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
Offices of the Ministers for: - Resources and Critical Minerals - Environment, Science and Innovation, and the Great Barrier Reef - Energy and Clean Economy Jobs - Agricultural Industry Development and Fisheries; and Rural Communities - Regional Development and Manufacturing, and Water Members of Parliament: - Member for Burdekin - Shadow Minister for Natural Resources and Mines - Shadow Minister for Environment and the Great Barrier Reef	BMA conducts regular engagement with Ministers and Members of Parliament. Employment growth and sustainable community and economic development are key priorities for Queensland Government stakeholders	- Legislative compliance - Resource development - Employment and growth opportunities - Public interest - Environmental management - Economic transformation (towards post-mining) - Financial assurance - Environmental risk management - Future PMLUs and landform - Company responses to stakeholder views - Industry best practice, and innovative future-looking approaches	No feedback was received in relation to PMLUs at RHM

Stakeholder	Existing BMA relationship	Potential areas of interest	Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes
- Shadow Minister for Science and Innovation - Shadow Minister for Energy and Cost of Living - Shadow Minister for Water and the Construction of Dams - Shadow Minister for Regional Development and Manufacturing			

Table 15: Process to be followed for ongoing community consultation for RHM PRCP

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP	
- Barada Barna People - Widi People of the Nebo Estate #1 - Widi People of the Nebo Estate #2	Meet with Traditional Owners and landowners to provide an update on the PRCP and progress with rehabilitation, and invite their inputs and feedback on: - PMLUs and post-mining landforms, including any particular values or opportunities in specific disturbed areas - Rehabilitation methods which would optimise future woodland habitat and/or grazing opportunities, and potential land management requirements	As required, to a schedule agreed with representatives

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP	
- Private landowner of underlying land within EA area and adjacent land - Other underlying landowners within EA area: Q.E.C. Ltd. (Powerlink), Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)	- Shared value initiatives, e.g. infrastructure retention, capacity building, environmental management, or research partnerships - Rehabilitation methods, schedule and progress towards milestones	
Landowners within EA area and adjacent land	Advise the landowners in writing regarding any proposed changes to the RHM PRCP that have potential to affect interests in freehold land within or adjacent to the EA area.	As required, as part of the PRCP amendment process
	Meet with landowners to discuss any proposed changes to the PRCP and progress with rehabilitation, and invite their inputs and feedback on: - Land use/management/rehabilitation issues as relevant to the private freehold land - Access to water resources - Shared value initiatives, e.g. infrastructure retention, capacity building, environmental management, or research	As required, as part of the PRCP amendment process
	Correspond and if requested meet with landholders during the pre-closure, closure/decommissioning and rehabilitation periods, to reduce the potential for works to impact on their amenity, land use, property access or access to water	Annually for at least five years prior to the forecast end of mining, or as agreed with the landowner

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP	
- Barada Barna People - Widi People of the Nebo Estate #1 - Widi People of the Nebo Estate #2	Meet with Traditional Owners to provide an update on the PRCP and progress with rehabilitation, and invite inputs and feedback on: - Involvement of businesses owned by Barada Barna People in rehabilitation works - Pipeline of opportunities relating to rehabilitation work and land management	As part of regular updates to a schedule agreed with Traditional Owners
IRC	Meet with IRC as part of consultation on proposed amendments to the PRCP, to invite their inputs and feedback on: - Impacts and opportunities pertaining to IRC assets within the EA area - IRC's strategic analysis and planning for the area - Challenges, opportunities and community aspirations of relevance to mine closure and rehabilitation - IRC's intended economic and social transition approaches - Shared value initiatives, e.g. infrastructure retention, capacity building, environmental management or research	As required, to a schedule agreed with IRC
	Provide progressive rehabilitation information as part of regular meetings with IRC	As required, to a schedule agreed with IRC
	Engage with IRC to seek inputs on: - Any impacts of RHM's closure and/or rehabilitation works on Council assets or services - Any impacts of RHM's closure and/or rehabilitation works on community amenity - Rehabilitation methods and potential land/water management requirements	Annually for at least five years prior to the forecast end of mining, or as agreed with representatives

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP	
RHM personnel (future)	Keep the RHM workforce updated via internal newsletters/emails or toolbox talks if there are substantive changes to the PRCP, e.g., significant changes in rehabilitation milestones or plans for the cessation of mining at RHM, and including a communication channel for personnel to ask questions or contribute to discussions about PRCPs and rehabilitation	Ongoing engagement process
	Commencing five years prior to the forecast cessation of mining, provide regular updates to RHM personnel on the implementation of closure, and seek personnel's feedback on rehabilitation progress	Annually for at least five years prior to the forecast end of mining
Moranbah residents, community members, business owners and community groups	Via workshops or focus groups, seek involvement in articulating community aspirations for rehabilitation, and economic transformation opportunities related to PMLUs	As required, or as agreed with representatives
	Provide community updates if there are any substantive changes and associated PRCP amendments required, via mail-out letters	As required, as part of the PRCP amendment process
	Provide updates and briefings on PRCPs to the Moranbah STAC	On request

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	2. To support transparent access to information about the RHM PRCP and implementation, enabling opportunities for the Moranbah community, RHM suppliers and government agencies and representatives to provide inputs and feedback on rehabilitation and closure outcomes	
Moranbah residents, community members, business owners, community groups	Using community forums such as interagency meetings, community meetings, supplier networks, partnership meetings and business network meetings, provide regular community updates on RHM PRCP and implementation	As required, or as agreed with representatives
	Invite input to final planning for closure, including management of closure impacts, via a workshop, community forum or other means	Three years prior to the forecast end of mining
RHM suppliers (future)	Provide regular updates about business supply opportunities resulting from progressive rehabilitation work packages, including through the Isaac Business Chamber	As required
	Participate in initiatives led by IRC, Isaac Business Chamber, industry or local communities which aim to harness social value from mine closure and rehabilitation planning, and/or work towards economic transformation	As required, or as agreed with representatives
	Provide information about the pending closure of RHM and potential future supply opportunities as part of closure and rehabilitation to local businesses, Traditional Owner businesses and RHM suppliers	Three years prior to the forecast end of mining, subsequent consultation to be agreed

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	2. To support transparent access to information about the RHM PRCP and implementation, enabling opportunities for the Moranbah community, RHM suppliers and government agencies and representatives to provide inputs and feedback on rehabilitation and closure outcomes	
Elected representatives and Queensland Government agencies	Provide updates via letters and/or meetings on PRCPs to: - DoR – Deputy Director-General, Georesources - DoR – Director, Native Title Services and Coal Hub - Offices of the Ministers for: - Resources and Critical Minerals - Environment and the Great Barrier Reef; and Science and Innovation - Energy and Clean Economy Jobs - Agricultural Industry Development and Fisheries; and Rural Communities - Regional Development and Manufacturing; and Water - Queensland Parliament Member for Burdekin - Shadow Minister for Natural Resources and Mines - Shadow Minister for Environment and the Great Barrier Reef - Shadow Minister for Science and Innovation - Shadow Minister for Energy and Cost of Living - Shadow Minister for Water and the Construction of Dams - Shadow Minister for Regional Development and Manufacturing	As required, or as agreed with representatives

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	3. To engage with utility owners and operators, and adjacent mining and energy tenement holders, to provide information about RHM closure planning that supports them to manage their assets and interests	
Utility owners and operators: • Powerlink • Ergon Energy • Middlemount Water Pipeline Pty Ltd Telstra	Engage with utility owners and easement holders that have interests in land or infrastructure within the EA area to: • Inform them of closure timelines and rehabilitation activities relevant to land or infrastructure in which they have an interest • Seek inputs about potential impacts on utility/transport assets and/or service capacity, and any specific management measures to avoid impacts on utility assets and services. • Develop agreements in relation to the use, rehabilitation and/or management of land owned by utility owner and operators within the EA	• Three years prior to the forecast end of mining
	Maintain engagement regarding progressive rehabilitation and undertake consultation regarding crossing/interface agreements, as required if rehabilitation will affect utilities	• Initiated three years prior to decommissioning

Stakeholders	Engagement type	Proposed consultation frequency
Consultation objective	3. To engage with utility owners and operators, and adjacent mining and energy tenement holders, to provide information about RHM closure planning that supports them to manage their assets and interests	
Nearby mining interests: - Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.) - Anglo American Australia - Fitzroy (CQ) Pty. Ltd. - Stanmore SMC Pty Ltd Overlapping and nearby Authority to Prospect and Petroleum Commercial Area: - Arrow Bowen Pipeline Pty Ltd (Arrow Energy Pty. Ltd.) - QPM Energy Pty Ltd and QPM Energy (MGP Upstream) Pty Ltd - CH4 Pty Ltd (Arrow Energy Pty. Ltd.)	Write to advise overlapping, adjacent and nearby resource interests if there are any substantive changes to the closure and rehabilitation schedule in future iterations of the RHM PRCP.	As required, as part of the PRCP amendment process

Relationship with PRCP schedule

RHM has transitional provisions and approved land outcomes identified in the EA. Specific community engagement on the proposed PMLUs within the EA being transitioned to the PRCP, and the proposed rehabilitation approach, has been undertaken prior to submission of the transitional RHM PRCP. Consultation will continue as per the process documented in the community consultation plan.

3 POST-MINING LAND USES

Legislative Requirement

In accordance with section 126C(1)(d) of the EP Act, the rehabilitation planning part of the PRC Plan must state the extent to which each post-mining land use for land identified in the PRC PLAN schedule for the plan is consistent with:

1. the outcome of consultation with the community in developing the plan, and
2. any strategies or plans for the land of a local government, the State or the Commonwealth.

PRCP Guideline (Section 3.2)

A PMLU is defined under section 112 of the EP Act as the purpose for which the land will be used after all relevant activities for the PRC Plan carried out on the land have ended. Relevant activity for a PRC Plan is defined in the EP Act as the relevant activities to be carried out on land the subject of the plan. It is not the intention of this definition to include third-party activities or assets that continue to exist once mining activities have ceased, such as third-party pipeline easements, power easements or overlapping tenures for other EAs.

The rehabilitation planning part of the PRC Plan must include a detailed description of the nominated PMLU(s) for the site. The description must include (where relevant), but is not limited to:

- a description of the use of the land
- if applicable, the specific vegetation types (e.g. RE 13.2.9) or land suitability classification (e.g. Class 4)
- identification of any permanent or essential management infrastructure to be included as part of the PMLU
- completion criteria for measuring whether the PMLU has been successfully achieved

Where a PMLU has been previously addressed in a land outcome document and is able to be transitioned into the PRCP Schedule, the holder is not required to complete the information requirements under section 126C(1)(j) of the EP Act in this section for those PMLUs.

However, the legislative requirements under section 126C(1)(d) of the EP Act still apply. All PMLUs transitioned into the PRCP Schedule must still meet the requirements of a PMLU explained in this section, particularly that the PMLU can be rehabilitated to a stable condition.

Where PMLUs have not been pre-approved, the applicant must include all of the requirements stated in this section.

3.1 Nominated PMLUs

A number of PMLUs are permitted for RHM under the EA (Table F1 in the RHM EA), of which the following three are proposed as PMLUs at RHM:

- Cattle grazing
- Woodland habitat
- Watercourse

The proposed PMLUs are illustrated in Figure 13 and have been recommended based on the closure landform, existing vegetation, ecological values, pre-mining land uses and the outcomes of the rehabilitation and closure studies supporting this PRCP.

There is minimal planned disturbance to soil and changes to the landform, and therefore the proposed PMLUs are expected to be substantially unchanged from pre-mining except for the effects of subsidence, which will

alter the topography and surface drainage patterns. The proposed PMLUs are consistent with the RHM EIS, which proposed grazing within a mosaic of bushland, native and non-native grassland and ponded areas (BMA, 2013b).

The PMLUs are underpinned by rehabilitation objectives that focus on achieving a safe, stable, non-polluting and sustainable post-mining landscape (as defined in the EA).

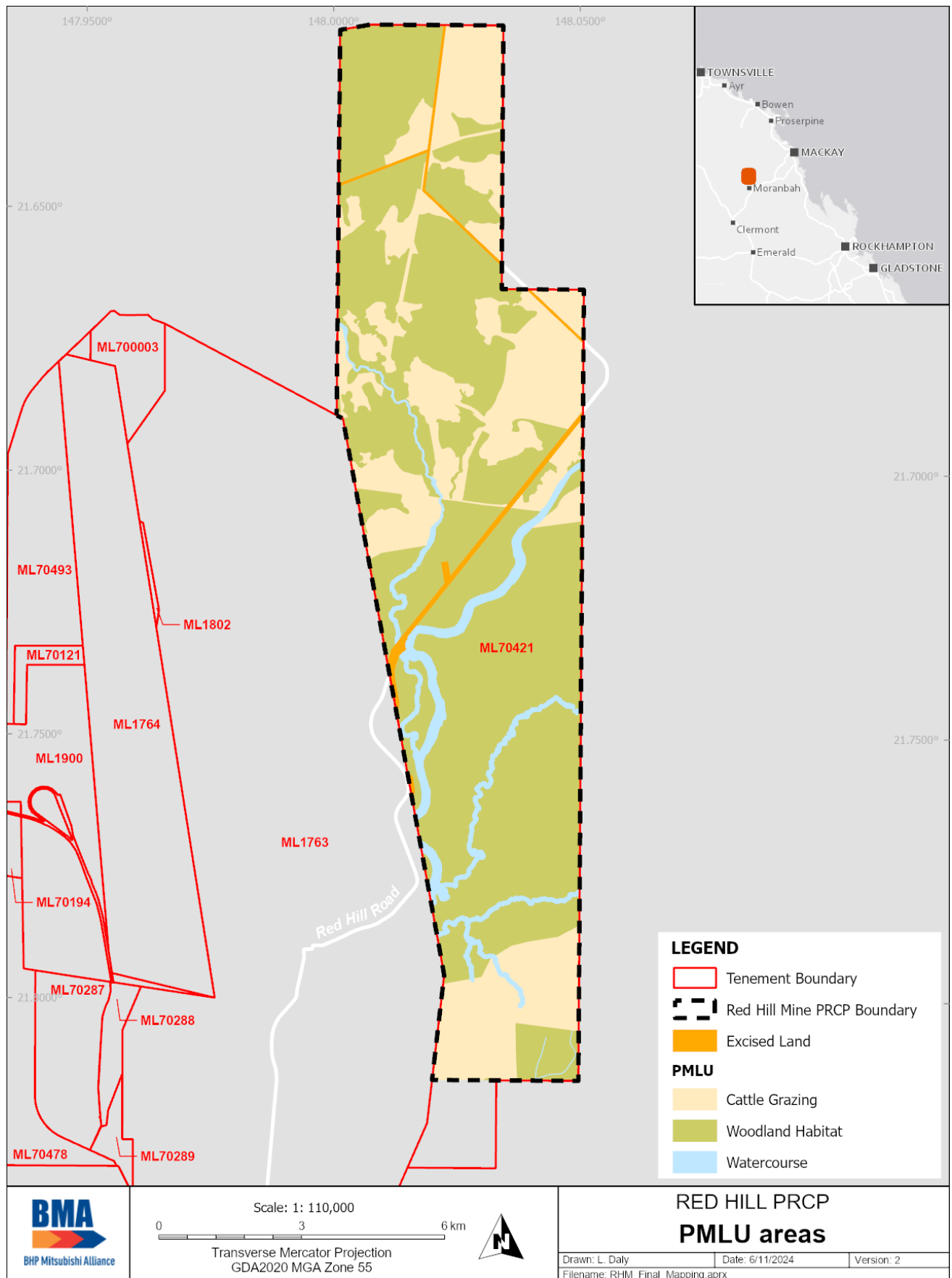


Figure 13: RHM PMLUs

3.1.1 Cattle grazing

The EA objectives, indicators and acceptance criteria for cattle grazing PMLU are listed in Table 16. As the RHM EA is an approved LOD, BMA understands the legislative intent was to transition the relevant EA acceptance criteria to the milestone criteria for the final milestone of achievement of the PMLU to a stable condition of cattle grazing (RM13). The final milestone criteria for RM13 (Section 10.4) accords with the relevant criteria imposed by the administering authority during assessment of the SRM PRCP (approved 4 September 2024). During that process, the administering authority modified and expanded the criteria originally proposed by BMA. Further context as to the inclusion of this criteria is outlined in the Transitional provisions section.

At RHM, cattle grazing PMLU is predominately planned for infrastructure areas where there was clearing for agricultural land uses prior to mining.

Table 16: RHM EA post-mine land use objectives, indicators and acceptance criteria: cattle grazing

Goal	Objective	Indicator	Acceptance criteria
Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
Stable	Rehabilitation is geotechnically stable	Factor of Safety	≥1.5
	Rehabilitation is erosionally stable	Extent, slope gradient and groundcover	1. Groundcover >50% 2. 70% of slopes ≤20%
Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
	Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater	EC	Not significantly different to: a) The <i>Environmental Protection (Water) Policy 2009</i> schedule documents water quality objectives for relevant groundwater chemistry zones; or b) Local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.
Able to sustain the agreed PMLU	Rehabilitation is suitable for sustainable cattle grazing	Land suitability assessment (LSA) for cattle grazing	Land suitability class ≤3 or not different from pre-mining class if ≥4. Assessment completed in accordance with <i>LSA Framework for Open-Cut Coal Mine Rehabilitation 2018</i> (A rule-set for LSA sustainable beef cattle grazing on land rehabilitated after open cut coal mining in the Bowen Basin Queensland) unless otherwise agreed in writing between the

Goal	Objective	Indicator	Acceptance criteria
			administering authority and the environmental authority holder.
		Leucaena stem density	<250 stems >2m height per ha (1 per 40m ²), mean total area

3.1.1.1 Pre-mining cattle grazing land suitability class

The EA acceptance criteria refers to the pre-mining land suitability class. The pre-mining land suitability for cattle grazing was assessed as part of the RHM EIS (BMA, 2013b; BMA, 2013a) in accordance with the *Guidelines for Agricultural Land Evaluation in Queensland* (DPI, 1990) and is detailed in Section 1.2.6.1. Land suitability decreases progressively from Class 1 (suitable land with negligible limitations) to Class 5 (unsuitable land with extreme limitations).

The RHM EIS assessment of land suitability pre- and post-mining indicated that land suitability class would change in some areas from suitable grazing land (Classes 2 and 3) to unsuitable for agricultural activities (Class 5) due to the modelled impact of ponding (BMA, 2013b). However, for areas impacted by subsidence, the proposed PMLU is woodland habitat.

3.1.1.2 Post-mining cattle grazing land suitability class

The post-mining cattle grazing land suitability assessment referred to in the EA acceptance criteria was *A rule-set for land suitability assessment of sustainable beef cattle grazing on land rehabilitated after open-cut coal mining in the Bowen Basin Queensland*, developed by Short (2018).

The PRCP milestone criteria for achieving the PMLU to a stable condition for cattle grazing (RM13) will be assessed according to the land suitability framework presented in the *Rehabilitated mined land suitability for beef cattle grazing in the Bowen Basin: Technical Paper 1* (Short, Rehabilitated mined land suitability for beef cattle grazing in the Bowen Basin: Technical Paper 1, 2023) from the Office of the Queensland Mine Rehabilitation Commissioner (Table 17). This land suitability framework has minor changes from the rule-set referred to in the EA (Table 16) and will be adopted for the PRCP to align with the leading practice paper.

Rehabilitation activities will aim to achieve a land suitability class of 3 or better. However, monitoring of cattle grazing reference sites has shown that land in the broader area often decreases to class 4 and class 5 due to the limitations of water availability, soil nutrient (nutrient deficiency – phosphorus or nutrient availability and toxicity – acidity/alkalinity) or sub-soil erosion. Therefore, cattle grazing rehabilitation at RHM can also be class 4 for these same limitations, however the rehabilitation must also be assessed for land condition (Section 3.1.1.3).

Reference sites (Section 8.4) will also be assessed according to the land suitability framework (Table 17) to enable a comparison between the performance of cattle grazing rehabilitation and the representative cattle grazing land suitability class of the broader area.

Table 17: Regional land suitability framework for beef cattle grazing PMLU rehabilitation in the Bowen Basin (Short, 2023)

Limitation	Indicator	Suitable			Unsuitable	
		Class 1	Class 2	Class 3	Class 4	Class 5
Water availability	Soil water storage (mm)	>75	75 - 60	<60 - 40	<40 - 30	<30
Nutrient deficiency	Available-P (mg/kg) in 0-0.1m depth increment	>20	20 - 14	<14 - 8	<8 - 4	<4
Nutrient availability and toxicity	pH in 0-0.1m depth increment	7.3 - 6.6	< 6.6 - 6.0 >7.3 - 7.9	<6.0 - 5.6 >7.9 - 8.4	<5.6 - 5.0 >8.4 - 9.0	<5.0 >9.0
Surface condition	Surface condition	Fine (peds <10mm)	Coarse (peds >10mm)	Surface crust	Very hard setting	Massive
Salinity	ECe (dS/m) in Effective rooting depth (0-0.6m depth increment)	<2	2 - 4	>4 - 10	>10 - 16	>16
Rockiness	Gravel, 20 - 60mm (%)	<20	20 - 50	>50 - 70	>70 - 85	>85
	Cobble, 60 - 200mm (%)	<10	10 - 20	>20 - 50	>50 - 75	>75
	Stone, 200 - 600mm (%)	<2	2 - 10	>10 - 20	>20 - 50	>50
	Boulders, >600mm (%)	0	<2	2 - 10	>10 - 20	>20
Slope gradient	Slope gradient (%)	<5	5 - 10	>10 - 15	>15 - 20	>20
Microrelief	Vertical (m)	0	<0.2	0.2 - 0.4	>0.4 - 0.6	>0.6
Water erosion	Slope (%), ESP <6 (%) in 0-0.1m soil depth increment	<5	5 - 8	>8 - 12	>12 - 18	>18
	Slope (%), ESP >6-14 (%) in 0-0.1m soil depth increment	<3	3 - 6	>6 - 10	>10 - 12	>12
	Slope (%), ESP >14 (%) in 0-0.1m soil depth increment	<1	1 - 2	>2 - 4	>4 - 6	>6
Sub-soil erosion	ESP (%) at 0.5m depth	<6	6 - 14	>14 - 23	>23 - 34	>34
Potentially acid forming materials	Strongly acid conditions (pH < 4.5) within (x) m depth	>3	3 - 2	<2 - 0.9	<0.9 - 0.6	<0.6

3.1.1.3 Land condition

Cattle grazing rehabilitation areas assessed as land suitability class 4 will also be assessed for land condition as described in the *Queensland Reef Protection Regulations Farming in Reef Catchments Grazing Guide* (DES, 2022a).

Land condition means “the capacity of grazing land to respond to rain and produce useful forage” (DES, 2022a). Indicators of land condition include “the proportion of organic ground cover, density of desirable perennial pasture species (i.e. grasses that are perennial, productive and palatable (3P) for cattle), extent of erosion and presence of weeds” (DES, 2022a).

Land condition is classified into four broad categories under the Grazing Land Management ABCD land condition framework based on indicators associated with pasture and soil condition (Table 18). For cattle grazing rehabilitation to achieve the PMLU to a stable condition, land condition must be assessed as Good (A) condition for non-grazed areas, or Good (A) or Fair (B) condition for grazed areas. When land is in a Poor (C) or Degraded (D) condition, maintenance measures are required to improve the land condition.

Table 18: Grazing Land Management ABCD Land Condition Framework (DES, 2022a)

Land Condition	Land Condition Features
Good – A	A condition land has all of the following features: - most land types in good condition will typically have at least 50% and often above 70% ground cover at the end of the dry season - good density of perennial grasses dominated by those species considered to be 3P grasses for that land type, little bare ground (less than 30 % in most years) - few weeds and no significant infestations - good soil condition: no erosion, good surface condition
Fair – B	B condition land has at least one or more of the following features, but otherwise is similar to A condition land: - land types will typically have at least 50% ground cover and less than 70% in most years at the end of the dry season - some decline of grasses that are 3P grasses, increase in other species (less favoured grasses, weeds) and/or bare ground (more than 30% but less than 50% in most years) - some decline in soil condition, some signs of previous erosion and current susceptibility to erosion
Poor – C	C condition land has one or more of the following features, but otherwise is similar to B condition land: - land with poor or degraded condition will typically have less than 50% ground cover at the end of the dry season - general decline of grasses that are 3P grasses, large amounts of less favoured species and/or bare ground (greater than 50% in most years) - obvious signs of past erosion and/or current susceptibility to erosion is high
Degraded – D	D condition land has one or more of the following features: - generally less than 20% ground cover - general lack of any perennial grasses or forbs - severe erosion or scalding, resulting in hostile environment for plant growth - often no long-term ability to carry stock

3.1.2 Woodland habitat

The EA objectives, indicators and acceptance criteria for a woodland habitat PMLU are listed in Table 19. As the RHM EA is an approved LOD, BMA understands the legislative intent was to transition the relevant EA acceptance criteria to the milestone criteria for the final milestone of achievement of the PMLU to a stable condition of woodland habitat (RM14). The final milestone criteria for RM14 (Section 10.4) accords with the relevant criteria imposed by the administering authority during assessment of the SRM PRCP (approved 4 September 2024). During that process, the administering authority modified and expanded the criteria originally proposed by BMA. Further context as to the inclusion of this criteria is outlined in the Transitional provisions section.

At RHM, woodland habitat PMLU is planned for areas related to underground mining or subsidence, including remnant vegetation and some cleared areas. For undisturbed areas, woodland habitat has been proposed where remnant or regrowth REs were mapped in the recent ecology survey (ELA, 2023). Consistent with the RHM EIS, the proposed PMLUs are a mosaic of grazing, bushland, native and non-native grassland and potentially ponded areas, however the inclusion of regrowth REs has contributed to an increased amount of woodland habitat PMLU.

Table 19: RHM EA PMLU, indicators and acceptance criteria: woodland habitat

Goal	Objective	Indicator	Acceptance criteria
Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
Stable	Rehabilitation is geotechnically stable	Factor of safety	≥1.5 unless an alternative is justified by an appropriately qualified person
	Rehabilitation is erosionally stable	Groundcover (steep slopes, >15%)	80%
		Groundcover (lesser slopes, ≤15%)	50%
Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
	Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater	EC	Not significantly different to: a) the <i>Environmental Protection (Water) Policy 2009</i> schedule documents water quality objectives for relevant groundwater chemistry zones; or b) local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.

Goal	Objective	Indicator	Acceptance criteria
Able to sustain an agreed post-mining land use	Native bushland characteristics	Species richness:	
		Trees	≥2
		Shrubs	≥3
		Grasses	≥4
		Tree canopy cover	≥16 %

3.1.3 Watercourse

The EA objectives, indicators and acceptance criteria for a watercourse PMLU are listed in Table 20. These criteria were developed specifically for diversions, although they can be applied to watercourse rehabilitation. As the RHM EA is an approved LOD, BMA understands that the legislative intent was to transition the relevant EA acceptance criteria to the milestone criteria for the final milestone of achievement of the PMLU to a stable condition of watercourse (RM15). The final milestone criteria for RM15 (Section 10.4) accords with the relevant criteria imposed by the administering authority during assessment of the SRM PRCP (approved 4 September 2024). During that process, the administering authority modified and expanded the criteria originally proposed by BMA. Further context as to the inclusion of this criteria is outlined in the Transitional provisions section.

The watercourses that transverse through RHM are assigned a watercourse PMLU. These include Isaac River, Goonyella Creek and Twelve Mile Gully, as well as small drainage lines (Section 1.2.4).

The lateral limits of the watercourse PMLU were defined based on the following considerations:

- Aerial imagery of the watercourses and associated riparian vegetation (Section 1.2.8)
- Strahler stream orders (Section 1.2.4)
- Flood modelling (Section 6.1.2)

The disturbed areas within the watercourse PMLU include the subsidence impacted areas and various creek crossings.

Table 20: RHM EA PMLU objectives, indicators and acceptance criteria: watercourse

Goal	Objective	Indicator	Acceptance criteria
Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
Stable	Rehabilitation is erosionally stable	Geomorphic index (Index of Diversion Condition (IDC) method)	Greater or equal to upstream or downstream values
Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
Able to sustain an agreed post-mining land use	Riparian vegetation	Riparian vegetation index (IDC method)	Greater or equal to upstream or downstream values

3.2 Community considerations

The PMLUs of cattle grazing, woodland habitat and watercourse as presented in the EA and this PRCP, is consistent with the outcomes of community consultation completed to date (Section 2). No concerns on the proposed PMLUs were raised during community consultation, including:

- Consultation with BBAC – the PMLUs have been discussed with the BBAC as part of ongoing consultation regarding the development of the PRCPs. This consultation included discussion on opportunity for BBAC's involvement in rehabilitation activities as it relates to the proposed PMLUs, specifically on the provision of seed and contracting opportunities for rehabilitation execution.
- Consultation with IRC – BMA has provided regular PRCP briefings to the IRC which have detailed that the proposed PMLUs as per the EA, are being transitioned into the PRCP. IRC and BMA have agreed to continue to engage on future opportunities, challenges and community aspirations, relevant to mine rehabilitation and closure as they develop.

3.3 Regional planning integration

The PMLUs at RHM consider pre-mining land uses, the final landform and already approved PMLUs in the RHM EA (Section 3.1).

Under the Isaac Regional Planning Scheme (Isaac Regional Council, 2021), RHM is located in a rural zone. This includes primary production uses (such as cropping, intensive horticulture, aquaculture, grazing, intensive animal industries, animal husbandry and animal keeping), renewable energy facilities and extractive industries, outdoor recreation and small-scale tourism facilities. The purpose of the rural zone includes providing *“for other uses and activities that are compatible with: (i) existing and future rural uses and activities; and (ii) the character and environmental features of the zone...”* (Isaac Regional Council, 2021).

Land use performance outcomes (PO11) for this rural zone include ensuring development:

- ‘(a) is consistent with the rural character of the locality;*
- (b) supports the primary rural function of the zone;*
- (c) protects rural, natural and scenic values of the locality; and*
- (d) includes boundary re-alignments where used to align with mining or petroleum tenements’.*

Concurrently, the Queensland Government, via its Mackay, Isaac and Whitsunday Regional Plan (DLGP, 2012), maps RHM in a regional landscape and rural production area, which includes land used for agriculture, natural economic resources (including extractive resources), water catchment, traditional uses, conservation areas and native forests.

The defined uses for both of these regional plans are consistent with the PMLUs proposed for RHM.

Relationship with PRCP schedule
The proposed PMLUs for RHM are consistent with pre-mining land uses, current adjacent land uses and PMLUs already approved as part of the RHM EA. These PMLUs can also be aligned to future land use development outcomes defined as part of State and regional plans. The PMLU extents consider the closure landform, growth media, pre-mining land uses, existing vegetation, ecological values, watercourses and surrounding public infrastructure.

4 NON-USE MANAGEMENT AREAS

Legislative Requirement

In accordance with sections 126C(1)(d), (g) and (h) of the EP Act, for each proposed non-use management area, the rehabilitation planning part of the PRC Plan must:

- state the reasons the applicant considers the area cannot be rehabilitated to a stable condition
- include copies of reports or other evidence relied on by the applicant for each proposed non-use management area
- state the extent to which the proposed non-use management area is consistent with the outcome of consultation with the community in developing the plan, and
- state the extent to which the non-use management area is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.

PRCP Guideline (Section 3.3)

A NUMA is defined in the EP Act as an area of land the subject of a PRC Plan that cannot be rehabilitated to a stable condition after all relevant activities for the PRC Plan carried out on the land have ended. Proposed NUMAs must be justified under the criteria set out in section 126D(2) of the EP Act.

The rehabilitation planning part of the PRC Plan must also include:

- a) information demonstrating that the proposed footprint of each NUMA is as small as practicable
- b) an assessment of the NUMA location options, having regard to the constraint of the resource location, with an analysis of the potential environmental harm and sensitivity of the surrounding environment of each option
- c) a description of the proposed location of each NUMA and the environmental values of the surrounding environment
- d) evidence showing how the proposed location will prevent or minimise environmental harm.

In accordance with section 126D(1)(c) of the EP Act, the applicant must develop and implement management milestones within the PRCP Schedule which achieve best practice management and minimise environmental harm for any NUMAs contained in the proposed PRC Plan. As part of the development of management milestones, the applicant must conduct a NUMA specific risk assessment to identify and quantify risks and associated controls. The risk assessment should have an overarching goal of identifying and controlling any significant risks to the community and the environment.

The proposed PRC Plan must include a detailed description of the nominated NUMA(s) for the site. The description must include, but is not limited to:

- description of the land at surrender
- any relevant safety features
- completion criteria for measuring whether the NUMA has achieved sufficient improvement.

Where a NUMA has already been identified in a land outcome document and is able to be transitioned into the PRCP Schedule, the applicant is not required to comply with sections 126C(1)(g) or (h) or 126D(2) or (3) of the EP Act. NUMAs transitioned into the PRCP Schedule are not required to complete the information requirements under section 126C(1)(j) of the EP Act in this section for those NUMAs. However, the legislative requirements under section 126C(1)(d) of the EP Act still apply.

Where a NUMA has not been pre-approved and is proposed as part of the transition into the PRC Plan, the applicant must include all of the requirements identified in this section.

No NUMA areas are proposed at RHM.

5 VOIDS IN FLOOD PLAINS

Legislative Requirement

In accordance with section 126D(3) of the EP Act, if land the subject of the proposed PRCP Schedule will contain a void situated wholly or partly in a flood plain, the schedule must provide for the rehabilitation of the land to a stable condition.

PRCP Guideline (Section 3.4)

Section 41C of the EP Regulation states the decision considerations for a void situated wholly or partly in a flood plain. A void is considered to be located in a flood plain if the flood plain modelling shows that, when all relevant activities carried out on the land have ended, the land is the same height as, or lower than, the level modelled as the peak water level 0.1% AEP for a relevant watercourse under the guideline Australian Rainfall and Runoff (2019)(ARR).

Where a land outcome document has a pre-approved land outcome for a void with a location specified, flood plain modelling is not required. If a void has been identified as a NUMA in a land outcome document but the location is not identified, the applicant is required to carry out flood plain modelling in accordance with this section of the guideline. While the provision in the EP Act relating to voids located within a floodplain having to rehabilitate to a stable condition does not apply, the PRC Plan must include how the proposed location of the void minimises risks to the environment. Therefore, the flood plain modelling is required to support the assessment of the proposed location of the void.

If there are no land outcomes identified in a land outcome document, the applicant is required to carry out flood plain modelling in accordance with this section of the guideline.

No voids are planned at RHM, therefore a void in flood plain assessment has not been undertaken.

6 REHABILITATION AND MANAGEMENT METHODOLOGY

Legislative Requirement

In accordance with section 126C(1)(e) and (i), the rehabilitation planning part of the PRC Plan must:

- For each proposed post-mining land use for land, state the proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP Schedule.
- For each proposed non-use management area, state the proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP Schedule for the area.

PRCP Guideline (Section 3.6)

The proposed rehabilitation or management methodologies will underpin the development of the milestone criteria and support how the proposed PMLU will be achieved or the NUMA will be managed. As per section 126C(1)(j) of the EP Act, the administering authority requires information describing how the proposed rehabilitation or management methodologies have been developed and will be implemented.

This section identifies a number of studies or reports that must be provided in the proposed PRC Plan. If any of the required information outlined below is not relevant to the specific operation, the applicant must provide justification in the PRC Plan outlining why the information is not required.

PRCP Guideline (Section 3.6.1)

This section outlines the range of information that the administering authority considers is necessary to underpin the development of the rehabilitation or management methodologies applicable to new and existing mines for most domains. The applicant must include the information as appendices to the rehabilitation planning part.

6.1 General rehabilitation practices

6.1.1 Hydrogeology

PRCP Guideline (Section 3.6.1)

Assess the hydrogeology of the site and all connected strata, and develop a conceptual model of the mine site's groundwater systems. This information must be integrated into the design of rehabilitation strategies and choice of PMLU or NUMA.

A hydrogeological assessment including conceptual and numerical modelling, has been undertaken to support the development of this PRCP. The detailed report – *Red Hill Mine Transitional PRC Plan Hydrogeology Assessment* (AECOM, 2024), is provided in Appendix D. The groundwater numerical model domain for RHM

includes the MLs forming RHM, GRM and BRM, in addition to surrounding areas where the operations could influence groundwater conditions. As the operations at GRM and BRM have an influence on groundwater conditions at RHM, the interpretation of the hydrogeological conditions presented within this PRCP collectively considers these neighbouring mining operations.

The key hydrogeological units present within and immediately surrounding RHM are detailed in Section 1.2.5 and include:

- Quaternary alluvial - unconfined aquifer (sporadic discontinuous water-bearing strata of permeable unconsolidated sand or gravel) localised at and near to the Isaac River, Eureka Creek, and Goonyella Creek, and more regionally along the Isaac River.
- Tertiary sediments - consisting of clay, silt, sand, gravel, colluvium, fluvial, and lacustrine deposits. Unconfined discontinuous aquifer with groundwater generally restricted to more porous media that overlies Permian units.
- Permian coal measures - low permeability interburden/overburden units with aquitard properties and coal seams that exhibit water bearing properties primarily associated with secondary porosity through cleats and fracturing.

6.1.1.1 Groundwater modelling

To support the assessment of potential groundwater impacts, numerical groundwater modelling was undertaken in accordance with the Australian Groundwater Modelling Guidelines (Barnett, et al., 2012), the Murray Darling Basin Commission Groundwater Flow Modelling Guideline (Aquaterra, 2001) and the Independent Expert Scientific Committee Explanatory Note for Uncertainty Analysis (IESC, 2018). The numerical groundwater model was adapted from the existing 2013 RHM groundwater model, which had been built using MODFLOW-SURFACT™ modelling package. The numerical groundwater model was updated to: reflect current available data; increase the model domain providing coverage for the area of interest; incorporate the PRCP closure landform/mining progression; and to achieve alignment with updates to the Australian Groundwater Modelling Guidelines.

The model update utilised MODHMS® (Hydrogeologic Inc., USA) that extends on the original MODFLOW-SURFACT™ modelling package to enhance the simulation capabilities and robustness. MODHMS® is based on the standard MODFLOW groundwater modelling code. The MODFLOW code was developed by the United States Geological Survey (McDonald and Harbaugh 1984) for three-dimensional, groundwater flow modelling. The MODFLOW code is the most widely used code for groundwater modelling and is considered an industry standard.

The objectives of the groundwater modelling, as required for input into the PRCP, were to:

- Assess the potential groundwater related impacts at completion of mining and until conditions stabilise post rehabilitation
- Assist in demonstrating the suitability of the closure landform for the PMLUs
- Demonstrate the closure landform is non-polluting with respect to potential poor-quality groundwater
- Demonstrate that groundwater receptors post-closure are not adversely impacted by the closure landform

The model layer elevations in the refined-grid area were generated based on the RHM, GRM and BRM geological model, and publicly available data outside of the BMA geological model domain. The groundwater numerical model layers utilised are summarised in Table 21.

Table 21: Numerical groundwater model layers

Layer	Unit
1	Tertiary, alluvium
2	FCCM
3	Overburden

Layer	Unit
4	GUS coal seam
5	Interburden
6	GP1 coal seam
7	Interburden
8	GP2 coal seam
9	Interburden
10	GMS coal seam
11	Interburden
12	GLS coal seam
13	Underburden
14	Back Creek Group

Due to the influence that the neighbouring GRM residual void lakes have on post-mining groundwater conditions at RHM, the groundwater model and the GRM void water balance models were aligned through an iterative modelling approach. The iterative alignment approach included the inclusion of the water balance model void lake outputs within the groundwater model, the groundwater model was re-run to refine the groundwater inflows to the voids, which were then used to re-run the water balance model. This process was repeated until the variance between the iterations in the model outputs indicated an appropriate level of alignment had been achieved.

Further details on the model build, calibration and design are contained in Appendix D.

6.1.1.2 Groundwater levels

As mining operations commenced at the neighbouring GRM in 1971, prior to available data on groundwater levels for the area, a pre-mining groundwater potentiometric surface cannot be determined based on groundwater monitoring data. However, groundwater within the alluvial and Tertiary sediments are expected to have been a subdued reflection of topography and the Permian aquifers are expected to have flowed in a south easterly direction in line with the coal seam dip and the sub-crops on the western extent.

Groundwater model simulations of groundwater recovery in the post-mining environment have been undertaken and are detailed in Appendix D.

Groundwater within the alluvium and Tertiary sediments at RHM are recharged predominantly from precipitation and losing streams and are relatively disconnected from the underlying Permian hosted aquifers due to the low hydraulic conductivity of the Permian overburden. As a result, the groundwater numerical model predictions indicate there is limited to no change in post-mining groundwater levels compared to the current conditions within the alluvium and associated potential GDE locations. Drawdown of groundwater in the Tertiary sediments in the proximity of the GRM residual voids is expected to be maintained post-mining.

Modelling of the GMS groundwater levels (Plate 40 of Appendix D) indicated the following:

- Groundwater is drawn down during the RHM operations in the GMS because of mine dewatering activities. Subsequent flooding of the RHM underground workings increases the rate of post-mining groundwater recovery and results in hydraulic gradients that direct groundwater flows to the immediately adjacent GRM Goonyella residual void

- The GMS groundwater levels are predicted to remain drawn down across RHM as a result of the GRM residual voids which maintain an inward hydraulic gradient centred on the Goonyella residual void
- The lower groundwater levels in the GMS are not predicted to induce flows from the Back Creek Group and Tertiary materials

Modelling of the GLS groundwater levels (Plate 41 of Appendix D) indicated the following:

- The underground mining operations at RHM influence GLS groundwater levels at the GRM and BRM site. The dewatering and depressurisation at RHM, lower GLS groundwater levels surrounding the underground workings. Post-mining flooding of the RHM underground workings increases the rate of groundwater recovery in the GLS and forms inward hydraulic gradients to the GRM Goonyella residual void
- The GRM Goonyella residual void located immediately to the west of RHM, maintains a drawdown in the GLS through the RHM tenure and an inward hydraulic gradient upon stabilisation of groundwater levels post-mining

Groundwater levels at the registered supply bores within 20km of the RHM mining area (Figure 64 of Appendix D), identified one bore that will be adversely impacted post-mining. Groundwater bore RN182313 (Cleanskin Gully bore), which was drilled to 25.34 m and intersects FCCM, is located adjacent to the Goonyella residual void high-wall in the proximity of the ML boundary between GRM and RHM. Groundwater at this location will be drawn down beyond the depth of the bore. Noting this bore is located within the BMA operational area and adjacent to the Goonyella high-wall, therefore the on-going use of this bore for supply purposes is considered implausible.

6.1.1.3 Flow path simulation

An assessment of the potential contaminant migration paths within groundwater were assessed through particle tracking simulation within the groundwater model, which is detailed in Section 15.6 of Appendix D.

The particle tracking simulation indicates that particles located to the east of the GRM Goonyella residual void and in the proximity of the RHM underground workings, migrate to the west towards the Goonyella residual void in the post-mining environment. This confirms the GRM Goonyella residual void maintains an inward hydraulic gradient and does not result in the migration of the water contained within the void's lake into the RHM area.

6.1.1.4 Post-mining conceptual site model

An evaluation of the source-pathway-receptor linkages based on the modelling results for the post-mining environment, where groundwater conditions have stabilised, has identified the following key features:

- The neighbouring GRM Goonyella residual void lake height remains below the surrounding groundwater elevations for all RHM impacted hydrostratigraphic units creating an inward hydraulic gradient towards to the residual void
- Little to no additional impact on surficial aquifers, including the Isaac River alluvium, caused by the closure landform
- Little to no impact on environmental (GDEs) receptors caused by the closure landform
- A single groundwater supply bore located in the proximity of the Goonyella residual void high-wall has been identified to become dry with time. No other anthropogenic receptors are identified to be impacted by the PRCP closure landform

A visual representation of the post-mining conceptual site model is provided in Figure 14.

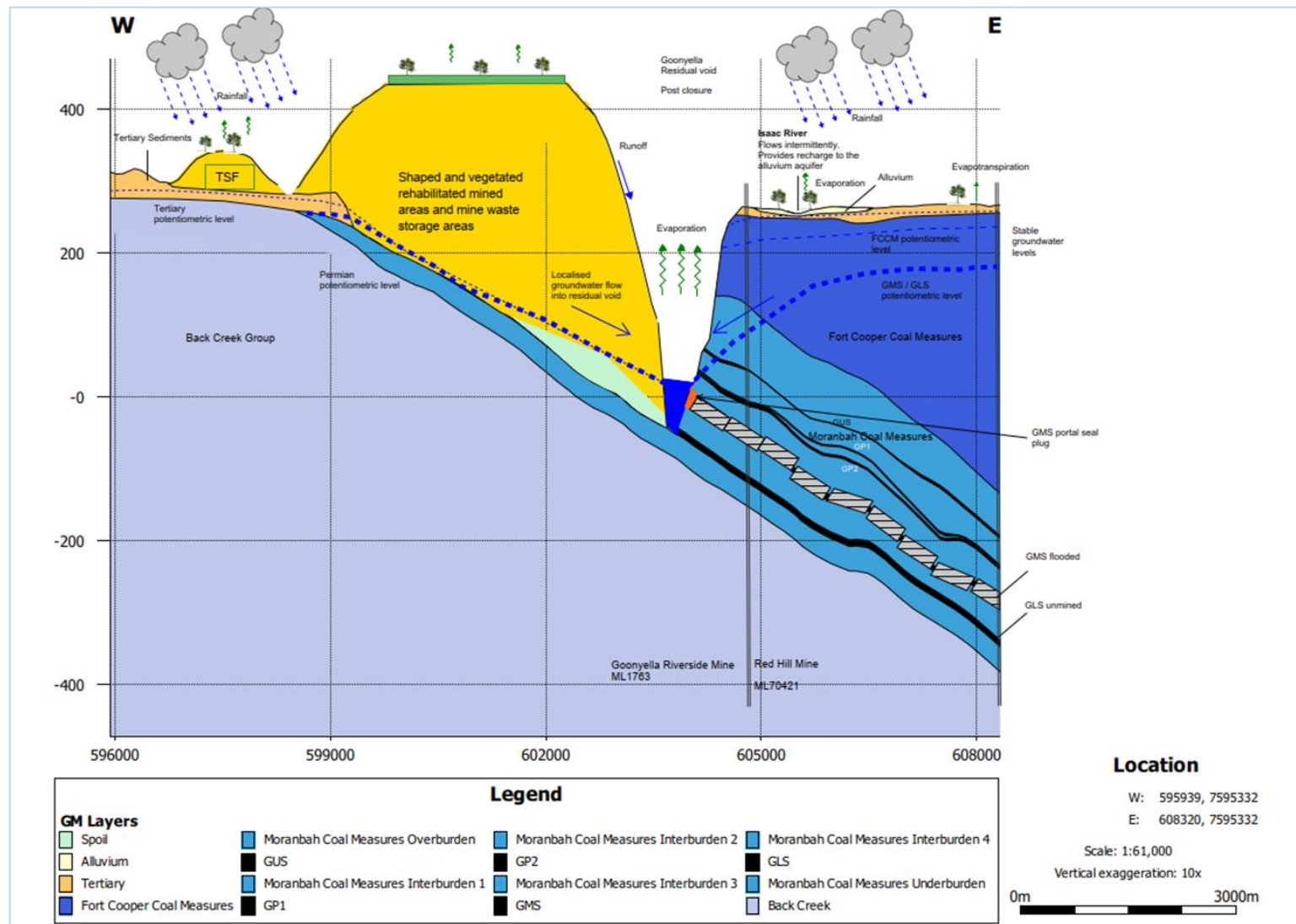


Figure 14: Post-mining conceptual site model (AECOM, 2024)

Relationship with PRCP schedule

Groundwater, once stabilised, will have an inward hydraulic gradient towards the immediately adjacent GRM Goonyella residual void. The closure landform will have little to no additional impact to environmental or anthropogenic receptors. Groundwater is not anticipated to require any active management post-mining.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following PRCP Conditions will contribute to achievement of PMLU to a stable condition:

PRCP11	With respect to groundwater: a) The monitoring bores listed in Table 43: RHM rehabilitation groundwater monitoring locations must be installed by 2080; and. b) Following monitoring bore installation, groundwater quality must be monitored six monthly at, but not limited to, bores specified in Table 43: RHM rehabilitation groundwater monitoring locations; and c) The holder must develop site-specific groundwater quality limits prior to the commencement of operations; and d) The groundwater model must be recalibrated and predictions rerun at least every five years commencing from 2080.
PRCP12	With respect to groundwater the following must be demonstrated prior to surrender: a) Groundwater quality results for compliance bores have not exceeded the site-specific groundwater quality limits, for 3 consecutive results within the five-year period immediately prior to surrender.

6.1.2 Flooding

PRCP Guideline (Section 3.6.1)

Section 3.4 of this guideline requires flood plain modelling for the purpose of voids located within a flood plain being rehabilitated to a stable condition. In addition to this, the applicant must also assess the flooding susceptibility and influence across the site. If flooding is a consideration, develop a hydrologic model of the catchment and a hydraulic model of the proposed mining area. Knowledge of flooding is integral to the rehabilitation planning process, including the placement and design of mine domains.

A rehabilitation flood assessment, including hydrologic and hydraulic modelling for a range of design storm events and development of a flooding risk profile, has been undertaken to support the development of this PRCP. The detailed report – *Red Hill Mine Progressive Rehabilitation and Closure Plan Rehabilitation Flood Assessment* (SLR, 2024), is provided in Appendix G.

The flood modelling was undertaken on an iterative approach with the closure landform design development. Information from the initial round of rehabilitation flood modelling was used to design conceptual drainage and backfill in subsidence areas to reduce potential adverse impacts associated with the final closure landform. Upon finalising the landform design, the flood modelling was re-run and the flood risk profile and other interpretations amended to reflect the final closure landform design.

6.1.2.1 Flood modelling

A review of the watercourses in the vicinity of RHM was undertaken using hydrologic streamline data sourced from DoR. The following watercourses were identified as potentially having flood extents that could interact with RHM:

- Isaac River
- Twelve Mile Gully
- Goonyella Creek

Hydrologic model

A hydrologic model was developed for the RHM catchments using Watershed Bounded Network Model (WBNM) Version 2017. The rainfall-runoff routing program, Storm Injector Version 1.3.9.0 was utilised to assist in setup and analysis of Australian Rainfall and Runoff design storm ensembles and to review model results.

The hydrologic model covers a total area of 1,240km². Catchment land use was adopted based on the final landform and aerial imagery, with a predominant land use assessed to be rural. Therefore, the majority of the catchment was modelled as fully pervious.

The WBNM model was simulated for the 39%, 2%, 1%, 0.1% Annual Exceedance Probability (AEP) and probable maximum flood (PMF) events with a range of storm durations between 1 hour to 48 hours and 10 temporal patterns for each duration in accordance with Australian Rainfall and Runoff.

Flood frequency analysis was undertaken for the gauge at Isaac River at Burton Gorge (130402A). Data for this gauge is available between 1964 and 1988 (24 years). A second gauging station was considered, Isaac River at Goonyella gauge (13414A), however due to the construction of the Burton Gorge Dam in 1992, the data from this stream gauging station was considered not suitable for flood frequency analysis.

Validation assessment of the WBNM model indicated the results were comparable to the peak flows from the flood frequency analysis, regional flood frequency estimation at the Burton Gorge and the previous WRM (2019) assessment, although the outcome suggests that the 0.1% AEP results may be conservative on the high side. It was therefore considered the WBNM model was suitable for the intended purpose.

Hydraulic model

2-dimensional hydraulic modelling was undertaken as part of the assessment, including:

- Fluvial model to quantify flooding conditions within the Isaac River, for a range of design storm events. The results of the model were utilised to assess the risk of inundation of the GRM residual voids as a result of the RHM landform and stability of the final landform.
- Pluvial model to simulate local catchment rainfall runoff behaviour over the areas of the final landform where subsidence will potentially occur. A direct rainfall (Rain-on-Grid) approach was applied. The model results were utilised to investigate potential ponding in subsidence areas.

The hydrodynamic modelling software TUFLOW (Build 2023-03-AE) was used for the hydraulic modelling.

The fluvial model set up utilised the closure landform and a model grid size of 10m. Two hydraulic structures were included in the model, which were associated with culverts under Goonyella Road and the Coppabella to North Goonyella section of the Goonyella System rail alignment. The fluvial model was used to simulate a range of design storm events including 39%, 2%, 1%, 0.1% AEP and PMF. Three climate change scenarios (6%, 11% and 20% increase in rainfall intensities) were also run for the 0.1% AEP.

Pluvial hydraulic modelling was undertaken for the area potentially subject to subsidence from underground mining as part of the RHM operations (Section 6.4.1). The pluvial modelling was used to identify inundation areas and inform changes to the landform to minimise the potential for impacts from inundation within the underground subsidence areas. The pluvial modelling set up utilised evaporation data from the State government SILO database Long Paddock (Queensland Government, 2024) (average evaporation rate 5.52mm/day, or 0.23mm/h) and RHM soil types (Landloch, 2024). Soil types were converted to the corresponding United States Department of Agriculture soil types which are used in the TUFLOW software.

Within the RHM subsidence area, a combination of conceptual drains and partial backfill have been incorporated to limit potential depths of inundation and residual ponding. Where reasonably practical and outside of the

watercourse alignments, the modelled depth of inundation was designed to target 1m or less in a 2% AEP event, which achieves a predominantly free draining landform. Free draining of the subsidence panels for the purpose of this assessment is where the landform sheds the majority of the surface water from the landform and towards the local drainage lines, and where any residual collection of water on the landform does not persist for more than one month under typical dry weather conditions.

Within the existing watercourse alignments, water depths may exceed 1m in a 2% AEP event and residual ponding was considered consistent with the PMLU of watercourse.

The conceptual design of the backfill and cutting of drains, where reasonably practical, limited surface disturbance, interference with endangered REs and limited disturbance of the banks of the Isaac River.

6.1.2.2 Fluvial food levels and rehabilitation domains

The fluvial TUFLOW model results are included in Appendix G (Figures 5-6 to 5-8 and B-1-1 to B-8-3). The results indicate the RHM subsidence areas are located within the Isaac River floodplain with the tributaries Twelve Mile Creek and Goonyella Creek breaking their banks from the 39% AEP event. Inundation post-mining will be reflective of the subsidence landform with greater depth and lateral extent within the subsided panels.

Outside of the watercourse channels, the velocities of the floodwaters are generally low (<1m/s). The water velocities within the watercourses are consistent with velocities identified upstream and downstream of RHM and are considered reflective of natural conditions.

It is noted the Burton Dam located upstream of RHM does provide some flood mitigation and reduces natural flood heights in the proximity of the site.

6.1.2.3 Pluvial pond in subsidence area

The pluvial model results, included in Appendix G (Figures 5-9 and C1-1-1 to C1-1-3), show the inundation depths in subsidence areas are equal to or less than 1m in the 2% AEP event, except for within the alignments of the watercourses and within one pre-existing farm dam. It is expected that natural sediment transport and deposition processes, that occur during flows within the watercourses, will result in the self-healing of subsidence areas within the watercourses over time. The presence of ponding within the watercourse alignments is considered consistent with the PMLU of watercourse.

Outside of the watercourse alignments and the existing farm dam, the limiting of inundation within the subsidence areas was achieved through the inclusion of conceptual backfill and installation of drains to allow for drainage overland to the watercourses (Figure 5-3 of Appendix G). The conceptual design of the partial backfill and cutting of drains has limited the number of disturbance locations on the banks of the Isaac River and the level of surface disturbance required to achieve a reduction in inundation depth. The incorporation of the conceptual backfill and drains achieves a peak inundation depth of 1m in a 2% AEP event and provides a landform that is predominantly free draining back to the watercourses.

The subsidence modelling results (Section 6.4.1.1) are a conservative estimate, and actual depths will vary to that presented in the subsidence model. Therefore, the proposed backfill and drains cut in the subsidence landform can be considered as a proof of concept only, and further refinement and design based on actual depths of subsidence will be required.

6.1.2.4 Alteration of flows

An assessment of the alteration of flows has been undertaken to gauge potential impacts of the closure landform to surrounding land users and environments. As the landform is predominantly free draining, the pre- and post-mining catchments are consistent and therefore there will not be a significant change to flows.

Upstream flows did not change between the pre- and post-mining landforms.

6.1.2.5 Flood risk profile

A flood risk profile was developed based on the rehabilitation flood modelling results. Details of the flood risk profile are contained in Appendix G and the RHM PRCP risk assessment summarised in Section 7.

Through the iterative closure landform design and modelling approach, the closure landform was developed to minimise the potential for environmental harm and to create a stable landform. As a result of this process, the flood risk profile identified low risk levels associated with flooding and the RHM closure landform. Therefore, no critical controls are required.

Relationship with PRCP schedule

The interaction between flooding and the proposed final closure landform presents low risk. Inundation depths within the subsidence areas are managed through drains and partial backfill to achieve 1m or less of inundation and a predominantly free draining landform.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM1	1.6 With the exception of 1.2, 1.3, 1.4 and 1.5 above, the following are complete: - All surface water drainage infrastructure removed - Mine water dams are decommissioned - Watercourse crossings and culverts removed.
RM2	3.2 Reshape watercourse crossings to a profile similar to the pre-disturbance condition (RA11). 3.3 Backfill and/or install drainage to limit subsidence inundation (RA21): - To maximum 1m depth in a 2% AEP rainfall event demonstrated by modelling completed by an AQP, or - Does not adversely impact achieving the PMLU as assessed by an AQP.
RM15	15.4 Geomorphic index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method). 15.6 Assessment by an AQP that the watercourse diversion has an Index of Diversion Condition score >10. 15.8 Watercourse bank stability is not adversely impacted by subsidence as assessed by an AQP.

6.1.3 Waste characterisation

PRCP Guideline (Section 3.6.1)

Characterise mine wastes in a report that describes the likely physical behaviour and chemical reactivity of the waste materials under the conditions in which they would be stored. The report must address the constituent elements present, and their likely future speciation and mobility.

All mined material should be classified on its propensity to be potentially acid or non-acid forming, to generate neutral metalliferous or saline drainage, and its susceptibility to weathering.

No mine waste material is planned to be dumped or disposed at RHM. Coal will be processed at the CHPPs located on GRM and BRM and the tailings and rejects disposed at GRM and BRM. Due to the underground mining method and access via GRM and BRM, no spoil will be dumped at RHM. Therefore, no mine waste materials will be stored on-site at RHM and a material characterisation assessment is not required for RHM.

6.1.4 Soil and capping material

PRCP Guideline (Section 3.6.1)

The rehabilitation and management methodology should include that soil assessment activities are supplemented by additional surveys conducted at appropriate intervals to assess soil resources in planned disturbance areas. In addition to the assessment of soils, the proposed rehabilitation methodologies in the rehabilitation planning part must also address topsoil management. Topsoil management must ensure sufficient topsoil quantity and quality is available in those instances that waste rock or tailings cannot support the proposed PMLU. Integrated soil and waste rock characterisation and mapping should form the foundation of the rehabilitation strategies. The available soil resources and capping material should be assessed prior to the commencement of operations.

A soil survey and assessment were undertaken as part of the RHM EIS (Section 1.2.6). The detailed report – *Soil and Land Suitability Assessment, Red Hill Mining Lease, Environmental Impact Statement* (GSS Environmental, 2013) is provided in Appendix E.

As detailed in Section 1.2.6, there is minimal planned disturbance to soil. Topsoil stripping will be required in some exploration and infrastructure areas. Topsoil is generally not planned to be stripped in subsidence areas unless larger crack repairs or drainage works are required (Section 6.4.4).

6.1.4.1 Quality of available resources

Underground mining and infrastructure activities occur on the southern area of RHM where soil types 1 – 7, as detailed in Section 1.2.6, are located (Table 22). The vertosols are concentrated at the north end of RHM (Figure 7) where minimal disturbance is expected.

6.1.4.2 Quantity of available resources

The recommended stripping depths for the soils within RHM are listed in Table 22, however only limited areas will require stripping.

Topsoil will be respread a minimum depth of 100mm (woodland habitat PMLU) or 150mm (cattle grazing or watercourse PMLU), therefore based on the stripping depths in Table 22, there will be sufficient quantity of topsoil available on-site for rehabilitation of disturbed areas within RHM.

Table 22: Recommended topsoil stripping depth

Soil type #	Australian Soil Classification	Topsoil stripping depth (mm)	Potential disturbance (stripping/subsidence)
1	Lithic Rudosol	0	Yes
2	Tenosol	400	Yes
3a	Red Kandosol	300	Yes
3b	Brown Kandosol	500	Yes
5	Brown Chromosol	400	Yes
6	Brown Sodosol	250	Yes
7	Brown Dermosol	200	Yes
8a	Shallow Vertosol	0	Minimal

Soil type #	Australian Soil Classification	Topsoil stripping depth (mm)	Potential disturbance (stripping/subsidence)
8b	Deep Vertosol	0	No
8c	Deep Salic Vertosol	0	Minimal

6.1.4.3 Resource management

During mining operations, topsoil will be stripped from the infrastructure areas, and where required in the exploration areas, subsidence areas for larger crack repairs and drainage works. Topsoil will be stripped according to the recommended depths from the pre-mining soil surveys. Topsoil will be stockpiled adjacent to the disturbance area and will be respread over the area during rehabilitation. Topsoil is stripped with caution to ensure as little contamination with subsoils occurs as possible. The spatial location of stockpiles will be recorded in a geographic information system and a volume inventory maintained.

An assessment of the growth media characteristics will be completed by an appropriately qualified person (AQP) prior to rehabilitation, to determine the amelioration requirements and surface treatments. The assessment will consider the topsoil qualities, landform and revegetation plan for the proposed PMLU (Section 6.1.8) and the land suitability framework (Section 3.1.1.3) when planning cattle grazing rehabilitation.

The recommended amelioration and surface treatments will be undertaken as part of the rehabilitation execution activities. The growth media depth, potential amelioration options and the surface treatments to support the establishment of vegetation for each PMLU, are shown in Table 23. Opportunities to use other amelioration and surface treatment methods may be investigated.

The relationship between soils and vegetation ecosystems for the PMLUs is detailed in Section 6.1.8.

Table 23: Topsoil ameliorant options and surface treatments for the RHM PMLUs

PMLU	Topsoil	Ameliorant options	Surface treatments
Cattle grazing	Minimum depth of 150mm is sufficient to store moisture and nutrients to initiate and sustain pasture growth	- Elemental Sulphur - Manures - Urea - Diammonium phosphate - Superphosphate - Fertiliser - Gypsum - Incorporated organic matter - Surface mulching (e.g. hay mulch)	- Ameliorate growth media as recommended by an AQP (if required) - Rip along contour - Direct seed as per seed mixes and rates for cattle grazing revegetation (Section 6.1.8.5)
Woodland habitat	Minimum depth of 100mm to support establishment of woodland species and to limit the effects of competition from exotic pasture species	- Elemental Sulphur - Manures - Superphosphate - Fertiliser - Gypsum	- Ameliorate growth media as recommended by an AQP (if required) - Rip along contour - Direct seed as per seed mixes and rates for woodland habitat revegetation (Section 6.1.8.7)

PMLU	Topsoil	Ameliorant options	Surface treatments
		- Incorporated organic matter - Surface mulching (e.g. hay mulch)	
Watercourse	Minimum depth of 150mm to encourage a vegetative cover to provide erosion resistance	- Elemental Sulphur - Manures - Superphosphate - Gypsum - Incorporated organic matter - Surface mulching (e.g. hay mulch)	- Ameliorate growth media as recommended by an AQP (if required) - Rip along contour as required - Direct seed as per seed mixes and rates for watercourse revegetation (Section 6.1.8.9)

Relationship with PRCP schedule

There is minimal planned disturbance to soil, with topsoil stripping only expected in some exploration and infrastructure areas, and where required in the subsidence areas for larger crack repairs or drainage works. Therefore, there is sufficient quantity of suitable quality topsoil available on-site for rehabilitation of disturbed areas to cattle grazing, woodland habitat and watercourse PMLUs.

An assessment of the growth media characteristics will be completed by an AQP prior to rehabilitation, to determine the amelioration and surface treatments required to achieve the planned PMLU.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM4	4.1 Topsoil placed at minimum depth of 150mm in areas where topsoil has previously been removed. 4.2 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP and reviewed and endorsed by a third party AQP, to ensure growth media is suitable for target vegetation establishment, the PMLU and stability of the landform. 4.3 Ameliorant and physical treatments such as fertiliser, gypsum and/or organic matter are applied as identified in criteria 4.2. 4.4 Deep rip at least 300mm into soil/subsoil profile along contour of slopes.
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The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
RM5	5.1 Topsoil placed at minimum depth of 100mm in areas where topsoil has previously been removed. 5.2 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP and reviewed and endorsed by a third party AQP, to ensure growth media is suitable for target vegetation establishment, the PMLU and stability of the landform. 5.3 Ameliorant and physical treatments such as fertiliser, gypsum and/or organic matter are applied as identified in criteria 5.2. 5.4 Deep rip at least 300mm into soil/subsoil profile along contour of slopes.
RM6	6.1 Topsoil placed at minimum depth of 150mm in areas where topsoil has previously been removed. 6.2 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP and reviewed and endorsed by a third party AQP, to ensure growth media is suitable for target vegetation establishment, the PMLU and stability of the landform. 6.3 Ameliorant and physical treatments such as fertiliser, gypsum and/or organic matter are applied as identified in criteria 6.2. 6.4 Deep rip at least 300mm into soil/subsoil profile along contour of slopes.

6.1.5 Landform design

PRCP Guideline (Section 3.6.1)

The final landform design must be based on the proposed PMLUs and NUMAs and demonstrate that the land will be safe and structurally stable.

Landform design considers the reshape of all relevant activity areas after the removal of infrastructure, and prior to placement of topsoil and seed.

Due to the underground mining method and the relevant activities on-site, the final landform will not result in significant variations to the pre-mining topography or significant reshaping. The major landform change is due to subsidence (Section 6.4).

6.1.5.1 3D design

The conceptual 3D closure landform for RHM prior to backfill and drainage of the subsidence areas, is reflected in the modelled subsidence, provided in Figure 17. The landform detail with the conceptual subsidence backfill and drains is shown in Appendix G Figure 5-3.

6.1.5.2 Method of determining landform design

There are no significant constructed landforms at RHM. The relevant activities (Section 1.4.1) considered when determining the RHM landform design are detailed in Table 24.

Removal of infrastructure (Section 6.5) and contaminated land requirements (Section 6.5.3) will be completed where required, prior to any required backfill and/or drainage works (Sections 6.1.2.3, 6.4.3, 6.4.4) or reshaping of the final landform. Topsoil and ameliorants are applied, where required, to support the PMLU (Section 6.1.4), the area is seeded (Section 6.1.8), and monitoring and maintenance completed to ensure rehabilitation is tracking to a stable condition (Section 8).

Table 24: Landforms at RHM and proposed designs

Landform	Landform design
Subsidence areas (RA21)	• Areas to be partially backfilled and/or drainage installed to limit inundation to maximum 1m depth in a 2% AEP rainfall event (RA21) (Sections 6.1.2.3, 6.4.3, 6.4.4) where practical • Subsidence results in slopes along the edges of the subsidence troughs. These slopes will be short (maximum vertical subsidence is 5.8m) with an average slope of 6 - 7% and maximum slopes of 10% (Section 6.4.1.1) • As slopes are within the acceptable maximum for the PMLU, no reshaping of subsidence slopes is expected
Infrastructure, mine dams and general areas	• Majority of areas will be relatively flat pads created by levelling the natural ground (minimal change to pre-mining topography) • Area will be reshaped to be free-draining where required with maximum 12% slopes for cattle grazing PMLU • Area will be reshaped to be free-draining where required with maximum 15% slopes for woodland habitat PMLU

Materials available for landform rehabilitation

Topsoil details to support revegetation are included in Section 6.1.4.

Hydrological and hydrogeological assessments

Flooding and hydrogeology details are included in Section 6.1.2 and 6.1.1 respectively.

6.1.5.3 Long-term landform stability

As there are no spoil dumps at RHM, no landform evolution modelling is required. The main area of erosion risk will be associated with the slopes along the edge of the subsidence troughs. These areas have a modelled vertical depth of less than 6m with an average slope of 6 - 7%, and a maximum slope of 10% (Section 6.4.1.1). Groundcover will be used to manage the erosion risk.

To establish the vegetation cover as soon as possible and limit the window of erosion risk, the following measures are planned:

- Ripping along the contour to key the growth media with the underlying subsoil, reduce compaction, improve water infiltration and create surface roughness to slow water flow (Section 6.1.4.3)
- Application of seed at the optimal time when there is sufficient soil moisture in the profile to assist germination and sustain establishment (Sections 6.1.8.5, 6.1.8.7 and 6.1.8.9)
- Inclusion of a sterile cover crop in the seed mix, which establishes quickly on the exposed surfaces and works to provide a root system that will stabilise the surface (Sections 6.1.8.5 and 6.1.8.9)
- Surface mulching where appropriate, to provide instant groundcover (e.g. hay mulch) (Section 6.1.4.3)
- Monitoring as scheduled and maintenance as required (Section 8)

6.1.5.4 Quality assurance / quality control

The proposed actions referenced in Table 24 are the key controls that will be put in place to manage the landform risks associated with achieving the PMLUs. Quality assurance and quality control (QA/QC) activities are built

into all necessary execution and verification activities of these controls. Monitoring and reporting processes verify controls and ensure that controls are executed effectively (Section 8).

6.1.5.5 Trial methodology

No trials are proposed at RHM. Monitoring will verify if the landforms are on a trajectory towards achievement of the milestone criteria and eventual certification, or whether corrective actions, maintenance or changes to the rehabilitation methodology is required.

6.1.5.6 Limitations and assumptions

The limitations and assumptions of the final closure landform design include:

- The subsidence modelling (Section 6.4) has been completed based on the best available inputs at this time, plus a maximum extraction thickness, which may over-estimate the subsidence
- The conceptual backfill and drainage works to manage the subsidence inundation (Sections 6.1.2.3, 6.4.3, 6.4.4) are based on the modelled subsidence, however the design of the final backfill and drainage works will be completed when final subsidence is realised, after flooding of the underground workings. This ensures that the design is based on the actual subsidence and achieves the required outcomes.

Relationship with PRCP schedule

Due to the underground mining method and the relevant activities on-site, the final landform will not result in significant variations to the pre-mining topography or require significant reshaping. The major landform change is due to subsidence, however partial backfill and drainage works will limit potential depths of inundation and minimise the potential for adverse impacts to the PMLU. The closure landform design achieves a safe and stable landform.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM3	3.1 Landforms are reshaped with slopes not exceeding 12% (RA3). 3.2 Reshape watercourse crossings to a profile similar to the pre-disturbance condition (RA11). 3.3 Backfill and/or install drainage to limit subsidence inundation (RA21): • To maximum 1m depth in a 2% AEP rainfall event demonstrated by modelling completed by an AQP, or • Does not adversely impact achieving the PMLU as assessed by an AQP.
RM10	10.2 AQP certifies that: • There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and • Mass movement is absent; and

The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	- All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 10.3 Despite criteria 10.2, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP: - Do not exceed 1m in depth at any point; and - Do not expose environmentally problematic materials; and - The cause of the gully is known and has been resolved; and - Have established and persistent vegetation cover at the head of the gullies; and - Are in a stabilised state, demonstrated by monitoring data over a 2-year period; and - Do not provide a safety hazard within the context of the PMLU; and - Do not impact the stability or performance of engineered drainage features.
RM11	11.3 AQP certifies that: - There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and - Mass movement is absent; and - All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 11.4 Despite criteria 11.3, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP: - Do not exceed 1m in depth at any point; and - Do not expose environmentally problematic materials; and - The cause of the gully is known and has been resolved; and - Have established and persistent vegetation cover at the head of the gullies; and - Are in a stabilised state, demonstrated by monitoring data over a 2-year period; and - Do not provide a safety hazard within the context of the PMLU; and - Do not impact the stability or performance of engineered drainage features. 11.5 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP.
RM12	12.3 AQP certifies that: - There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and - Mass movement is absent; and - All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 12.4 Despite criteria 12.4, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP: - Do not exceed 1m in depth at any point; and

The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	- Do not expose environmentally problematic materials; and - The cause of the gully is known and has been resolved; and - Have established and persistent vegetation cover at the head of the gullies; and - Are in a stabilised state, demonstrated by monitoring data over a 2-year period; and - Do not provide a safety hazard within the context of the PMLU; and - Do not impact the stability or performance of engineered drainage features. 12.5 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP.
RM13	13.1 Hazard assessment completed by an AQP to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use. 13.5 AQP certifies that: - There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and - Mass movement is absent; and - All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 13.6 Despite criteria 13.5, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP: - Do not exceed 1m in depth at any point; and - Do not expose environmentally problematic materials; and - The cause of the gully is known and has been resolved; and - Have established and persistent vegetation cover at the head of the gully; and - Are in a stabilised state, demonstrated by monitoring data over a 5-year period; and - Do not provide a safety hazard within the context of the PMLU; and - Do not impact the stability or performance of engineered drainage features.
RM14	14.1 Hazard assessment completed by an AQP to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use. 14.2 AQP certifies that: - There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and - Mass movement is absent; and - All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 14.3 Despite criteria 14.2, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP: - Do not exceed 1m in depth at any point; and - Do not exposed environmentally problematic materials; and

The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	• The cause of the gully is known and has been resolved; • Have established and persistent vegetation cover at the head of the gully; and • Are in a stabilised state, demonstrated by monitoring data over a 5-year period; and • Do not provide a safety hazard within the context of the PMLU; and • Do not impact the stability or performance of engineered drainage features. 14.7 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP.
RM15	15.1 Hazard assessment completed by an AQP to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use. 15.2 AQP certifies that: • There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and • Mass movement is absent; and • All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 15.3 Despite criteria 15.2, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP: • Do not exceed 1m in depth at any point; and • Do not exposed environmentally problematic materials; and • The cause of the gully is known and has been resolved; and • Have established and persistent vegetation cover at the head of the gully; and • Are in a stabilised state, demonstrated by monitoring data over a 5-year period; and • Do not provide a safety hazard within the context of the PMLU; and • Do not impact the stability or performance of engineered drainage features. 15.4 Geomorphic index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method). 15.6 Assessment by an AQP that the watercourse diversion has an Index of Diversion Condition score >10. 15.7 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP. 15.8 Watercourse bank stability is not adversely impacted by subsidence as assessed by an AQP.

6.1.6 Cover design

PRCP Guideline (Section 3.6.1)

A cover design is required for the surface treatment of a mine landform or other waste material. Hence, the cover system design must be appropriate for the type(s) of waste the project will generate and reflect a risk-based approach. Where waste has the potential for AMD, neutral mine drainage or saline mine drainage, an appropriate cover system must be designed.

The cover design should include:

- *identification and specification of the objectives of the cover system*
- *a detailed description of the design including the thickness of each layer*
- *a detailed description of construction methodology including any proposed staging of the cover system*
- *a quantitative assessment that identifies the location and quantity of proposed capping material available on-site*
- *proposed QA/QC for the construction of the cover system including the timely implementation of corrective actions where deviations from the design are identified.*

A cover system is required where there is potential for stored materials to cause acid and metalliferous drainage, neutral and metalliferous drainage or saline drainage, to ensure contaminants are not released to the receiving environment. There will be no rejects, tailings or spoil disposed at RHM, therefore there are no materials stored on-site which may require a cover design.

6.1.7 Water management

PRCP Guideline (Section 3.6.1)

The rehabilitation planning part must include a description of the following:

- *a description of the contaminants that pose a risk to environmental values of the receiving environment*
- *source, pathway and fate of contaminants that have the potential to impact environmental values*
- *infiltration and seepage intervention and collection controls*
- *surface water diversions and long-term management requirements*
- *dewatering requirements*
- *ongoing water management and reduction requirements (i.e. treatment).*

Due to the underground mining method, the changes to the landform are predominantly associated with subsidence. All shafts and bore holes will be decommissioned in line with safety standards at the time of decommissioning and all other BMA infrastructure will be decommissioned and removed to 0.5m below ground surface or covered to a minimum depth of 0.5m to enable establishment of the PMLUs. The operations at RHM do not include any spoil dumps or waste disposal areas.

The reach of the Isaac River that runs through RHM follows the natural alignment and no diversions are present.

Subsidence modelling, which is considered a conservative prediction, indicates that subsidence will occur above the underground mining panels to a maximum depth below natural ground surface in the order of 6m (Section 6.4.1). Rehabilitation of the subsidence areas includes the repair of surface cracks, sealing of shafts, decommissioning of bore holes, select partial backfill and cutting of drains, and revegetation (Section 6.4.4). Pluvial modelling within the modelled subsidence landform indicates that, outside of the watercourse alignments and within one pre-existing farm dam, inundation can be kept to less than or equal to 1m in a 2% AEP event and the area maintained as predominantly free draining (Section 6.1.2.3). Ponding in the watercourse alignments is considered consistent with the PMLU of watercourse.

6.1.7.1 Contaminants and sources

BMA's surface disturbances, other than subsidence, is limited to ventilation shafts, exploration, degassing infrastructure, rehabilitation works, workforce accommodation village and other auxiliary type disturbances. No significant hazardous materials storage, waste disposal, processing facilities or industrial support facilities, that are potential sources of contamination, are proposed as part of the RHM operations. Therefore, no additional significant contamination sources from the RHM operations have been identified. Any minor spills from mobile

plant, sewage treatment and from the activities that are undertaken as part of RHM operations will be rectified as part of operations.

The area covered by RHM has been subject to anthropogenic activities prior to the commencement of mining activities by BMA, which may have contributed to contamination of the area (Section 1.2.11). Activities that could contribute to contamination include: operation of cattle dips; petroleum product or oil storage; crushing/quarry; homestead waste disposal; chemical storage; and stockyards.

Contaminated land investigations (RM2) will be undertaken to assess areas being rehabilitated by BMA. These investigations will assess for the range of identified potential contaminants and will provide an assessment of the risk presented to achievement of the PMLUs and the receiving environment.

Underground workings at the completion of operations are proposed to be flooded to assist with stabilising further subsidence (Section 6.4.1.4). As the coal seam will have been largely removed, and the overburden/interburden is non-acid forming and has acid neutralising capacity, limited potential for acid and metalliferous drainage risks is present (BMA, 2013c).

6.1.7.2 Pathway of contaminants

Contaminated land investigations will be undertaken as part of rehabilitation activities to confirm sources, pathways and receptors within the post-mining environment. These contaminated land investigations will inform any required remediation works and allow for the management of identified unacceptable risks associated with potential contaminant pathways.

The closure landform surface will drain directly to the surrounding watercourses and will not require on-going surface water management beyond that required under normal operations of the PMLU. Potential contaminant pathways for the closure landform surface include surface water runoff, generation of airborne particulate and through direct contact with the PMLUs. Through landform designs, remediation works and other engineering controls, the closure landform surface is intended to be suitable for the direct discharge of surface water runoff to the surrounding watercourses and for use of the area for the nominated PMLU.

Numerical groundwater predictive modelling and particle tracking (Appendix D) indicate that, upon stabilisation of the groundwater, inward hydraulic gradients are maintained by the immediately adjacent GRM Goonyella residual void with the area of influence including RHM. This gradient is driven and maintained by evaporative losses from the residual void lake. This inward hydraulic gradient provides for the long-term collection of groundwater from the RHM workings.

6.1.7.3 Fate of contaminants

The contaminated land investigations undertaken as part of RM2, where required, will include fate and transport modelling for identified contaminant plumes to understand the mobilisation, evolution and risks of contaminants.

The inward groundwater hydraulic gradients created by the adjacent GRM Goonyella residual void will minimise the potential migration of contaminants beyond the mining disturbance areas within the Permian hosted groundwater units. The groundwater modelling undertaken indicated contaminant migration would terminate within the GRM Goonyella residual void.

6.1.7.4 Ongoing water management

On completion of rehabilitation works, ongoing water management or dewatering is not envisaged to be required. Subsidence areas will be rehabilitated, and surface water managed through a combination of partial backfill and cutting of drains where required to achieve 1m or less of inundation depth in a 2% AEP event and a predominantly free draining landform (Sections 6.1.2.3, 6.4.3, 6.4.4). Groundwater gradients within the mined seams will be towards the adjacent GRM Goonyella residual void which will act as a terminal groundwater sink (Section 6.1.1).

Relationship with PRCP schedule

The closure landform will provide a landscape that does not require any ongoing active water management. Subsidence areas outside of the watercourses will be predominantly free draining and be limited to 1m or less of inundation in a 2% AEP event.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following PRCP Conditions will contribute to achievement of PMLU to a stable condition:

PRCP13	With respect to surface water: a) The holder must install monitoring equipment at the relevant surface water monitoring locations specified in Table 42: Surface water sample locations and undertake at least one year of surface water quality monitoring prior to the completion of surface preparations for the entire site; and b) Surface water quality must be monitored at the locations specified in Table 42: Surface water sample locations at least once per month when flows at the downstream gauging station record $\geq 5\text{m}^3/\text{second}$ for the Isaac River and $\geq 1\text{m}^3/\text{second}$ for other monitored watercourses, when safe to collect samples. c) The holder must develop site-specific surface water quality limits for the watercourses listed in Table 42: Surface water sample locations.
PRCP14	With respect to surface water the following must be demonstrated prior to surrender: a) Surface water quality must not exceed the site-specific surface water quality limits within the five-year period immediately prior to surrender; b) If the surface water quality exceeds criteria a), the applicable upstream/reference site must be compared to the downstream site result; and quality result measured at a downstream site must be equal to or less than the quality result measured at the applicable upstream/reference site.
PRCP15	Where the surface water quality at the downstream site exceeds the upstream site result as per PRCP14b), an AQP must complete an assessment of the cause of the exceedance and risk of rehabilitation not achieving a stable condition (PRCP 14) within the schedule timeframe and: a) Where there is a low risk to achieving a stable condition from the mining tenure (ML1763 and ML70421), then no further action is to be taken; or b) Where there is a risk greater than low to achieve a stable condition, then an assessment of potential environment harm and any changes or rectification actions to rehabilitation activities must be determined and implemented.
PRCP16	The assessment/s under PRCP15 must be completed and provided to the administering authority within 3 months of receiving the relevant sampling results.
PRCP17	Despite PRCP14, PRCP15a) can be triggered 3 times over 5 consecutive years prior to surrender.

The following PRCP Conditions will contribute to achievement of PMLU to a stable condition:

PRCP18	If PRCP15b) is triggered the 5 year timeframe under PRCP14a) is reset.
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The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM1	1.6 With the exception of 1.2, 1.3, 1.4 and 1.5 above, the following are complete: • All pipelines drained and removed • All surface water drainage infrastructure removed • All drillholes, bores, sediment ponds and sumps decommissioned • Mine water dams are decommissioned • Watercourse crossings and culverts removed. 1.7 Assessment of mine water dams is completed by an AQP and identified sediment and water management actions are completed.
RM2	2.1 Contaminated Land Investigation Document completed in accordance with the <i>Environmental Protection Act 1994</i>, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan. 2.2 The Contaminated Land Investigation Document confirms the area within the mining leases (ML1763, ML70421) does not present an unacceptable risk to the post-mining land use.
RM3	3.2 Reshape watercourse crossings to a profile similar to the pre-disturbance condition (RA11). 3.3 Backfill and/or install drainage to limit subsidence inundation (RA21): • To maximum 1m depth in a 2% AEP rainfall event demonstrated by modelling completed by an AQP, or • Does not adversely impact achieving the PMLU as assessed by an AQP.
RM13	13.7 Verification by a suitably qualified person through a site inspection, records review and aerial imagery to confirm: • Requirements of any Site Management Plan have been met; • Notifiable activities have not been undertaken post completion of RM2 that would impact the use of the land for the intended PMLU; and • There is no evidence indicating an adverse change to the contaminated land status has occurred post the completion of RM2.
RM14	14.6 Verification by a suitably qualified person through a site inspection, records review and aerial imagery to confirm: • Requirements of any Site Management Plan have been met; • Notifiable activities have not been undertaken post completion of RM2 that would impact the use of the land for the intended PMLU; and • There is no evidence indicating an adverse change to the contaminated land status has occurred post the completion of RM2.

The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM15	15.4 Geomorphic index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method). 15.6 Assessment by an AQP that the watercourse diversion has an Index of Diversion Condition score >10. 15.8 Watercourse bank stability is not adversely impacted by subsidence as assessed by an AQP.
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6.1.8 Revegetation

PRCP Guideline (Section 3.6.1)

The revegetation plan must propose activities that will establish self-sustaining vegetation communities that are appropriate for the intended PMLU (e.g. natural ecosystems, grazing, forestry and some agricultural and other land uses). Revegetation should, therefore, not only establish a ground cover, but also, in some domains, establish associated fauna habitat and other ecological services.

The rehabilitation planning part must include details of the site preparation required for rehabilitation activities.

6.1.8.1 Revegetation objectives

The revegetation objectives of the planned PMLUs of cattle grazing, woodland habitat and watercourse are consistent with the rehabilitation requirements of the RHM EIS (BMA, 2013b) and EA as follows:

- Cattle grazing:
 - Achieve >50% vegetation groundcover
 - Good density of 3P grasses
 - Appropriate management of restricted invasive plants
 - Establishment of cattle grazing pasture with land suitability class ≤3
- Woodland habitat:
 - Achieve groundcover ≥50% on slopes ≤15%, or ≥80% on slopes >15%
 - Establishment of vegetation from REs of the surrounding vegetation communities or substitute REs (RE 11.3.2b and RE 11.3.27f) suited to ponding
 - Appropriate management of restricted invasive plants
- Watercourse:
 - Achieve riparian vegetation index ≥ upstream or downstream values
 - Establishment of watercourse vegetation with species richness of native trees and shrubs, tree canopy cover, and recruitment
 - Appropriate management of restricted invasive plants

The above revegetation objectives for groundcover consider groundcover to be anything in contact with the soil surface, for example live cover, standing dry cover, organic litter (including leaves, hay, woody debris) or rocks.

No infrastructure is proposed to support the revegetation plan.

6.1.8.2 Species of conservation significance

RHM has no obligations under the EA requiring specific inclusion of species of conservation significance in the revegetation planning. Nonetheless, areas adjoining undisturbed Endangered or Of Concern REs (Section 1.2.8) or threatened species habitats (Section 1.2.9) will be rehabilitated to a woodland habitat PMLU wherever

possible. This approach will provide connectivity between rehabilitated areas and existing vegetation and habitat values. Similarly, areas rehabilitated to a watercourse PMLU will connect existing riparian habitat values for several conservation significant species.

6.1.8.3 Fauna habitat and use requirements

There are no obligations under the EA to establish fauna habitat and/or fauna use in the rehabilitation areas for RHM. However, areas adjoining undisturbed threatened fauna species habitats (Section 1.2.9) will be rehabilitated to a woodland habitat PMLU wherever possible, and disturbed areas of watercourses will be rehabilitated to a watercourse PMLU, including the Isaac River riparian zone.

Woodland habitat and watercourse revegetation will include a combination of *Eucalyptus*, *Corymbia* and non-Eucalyptus framework tree species and woody understorey species that will provide broad habitat values for highly mobile fauna taxa including birds and mobile mammals (e.g. kangaroos and wallabies), as well as longer term foraging and shelter opportunities for common fauna species and several species of conservation significance (e.g. koala, greater glider and echidna).

6.1.8.4 Revegetation seed provenance

The provenance (where the seed comes from) is considered important for all species. Seeds will be sourced as locally as possible from natural populations. Although the local provenance boundary locations may differ between species, seed should ideally be obtained from the Brigalow Belt North bioregion.

Proof of provenance will be sought from the seed supplier(s) along with germination and viability certificates for all purchased seeds.

6.1.8.5 Cattle grazing revegetation species and seeding rates

Areas of cattle grazing are predominately planned for infrastructure areas that have been partly cleared for cattle grazing pre-mining (RA3).

The recommended revegetation species mix for cattle grazing PMLU is based on seeding native and naturalised exotic species that are preferred, palatable and productive (3P) grasses and legumes, cognisant of grazing best management practice (DES, 2022a; Future Beef, 2024). Preferred pasture species have been recommended based on species known to occur on RHM, as well as a selection of pasture species suitable for the soil management groups described in Section 6.1.4.

The recommended species list and seeding rates are detailed in Table 25. A seeding rate of 16kg/ha of coated pasture seed and 4kg/ha of uncoated legume seed is recommended for a cattle grazing PMLU. All seed mixes will also include 5kg/ha of Japanese millet (*Echinochloa esculenta*) or similar as a sterile cover crop to protect topsoil from erosion. The cover crop will establish quickly on the exposed surfaces and work to provide a root system that will stabilise the surface and prevent erosion until new seedlings have established.

Species availability may vary, however at least four preferred pasture grass species including at least two native species and two legumes listed in Table 25 are required. The cattle grazing seed mix composition and seeding rates may be adjusted by an AQP based on the results of ongoing rehabilitation monitoring (Section 8).

Pasture seed mixes are recommended to be sown in the warmer months of the year from September to March, when the probability of rainfall is highest. Seeding may be undertaken at other opportune times, such as for unseasonal climatic conditions.

No seeding of *Leucaena* (*Leucaena leucocephala*) is planned at RHM.

Table 25: Recommended species list and seeding rates for cattle grazing PMLU

Scientific name	Common name	Clay topsoil	Sand/loam topsoil	Seeding rate (kg/ha)
Grass species				
<i>Astrelba lappulacea</i> , <i>A. squarrosa</i> , <i>A. elymoides</i>	Mitchell grasses (curly, bull and hoop)	✓	-	2 ^c (per species)
<i>Bothriochloa bladhii</i>	forest blue grass	-	✓	4 ^c
<i>Bothriochloa insculpta</i> cvv. Bisset*	Bisset creeping blue grass	✓	✓	4 ^c
<i>Bothriochloa ewartiana</i>	desert bluegrass	✓	✓	2 ^c
<i>Chloris gayana</i> cvv. Callide*	Callide Rhodes grass	✓	✓	4 ^c
<i>Chloris gayana</i> cvv. Katambora*	Katambora Rhodes grass	✓	✓	4 ^c
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>	Queensland blue grass	✓	-	4 ^c
<i>Dichanthium aristatum</i>	Angleton grass	✓	-	2 ^c
<i>Heteropogon contortus</i>	black spear grass	✓	✓	2
<i>Leersia hexandra</i>	swamp rice grass	✓	✓	4
<i>Leptochloa digitata</i>	umbrella cane grass	✓	✓	4
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i> *	green panic	-	✓	4 ^c
<i>Panicum coloratum</i> var. <i>makarikariense</i> *	bambatsi Panic	✓	-	4 ^c
<i>Panicum decompositum</i>	native millet	✓	✓	4 ^c
<i>Setaria incrassata</i> *	purple pigeon	✓	-	4 ^c
<i>Urochloa mosambicensis</i> *	Sabi grass	-	✓	4 ^c
Grass species - Total seed weight coated				16^c
Legume species				
<i>Chamaecrista rotundifolia</i> *	Wynn cassia	-	✓	2
<i>Macroptilium bracteatum</i> *	burgundy bean	✓	-	2
<i>Rhynchosia minima</i> var. <i>australis</i>	rhynchosia	✓	✓	2
<i>Rhynchosia minima</i> var. <i>minima</i>	rhynchosia	✓	✓	2
<i>Stylosanthes hamata</i> *	shrubby stylo	-	✓	2
<i>Stylosanthes seabrana</i> *	stylo	✓	-	2
Legume species - Total seed weight uncoated				4
Cover Crop				
<i>Echinochloa esculenta</i>	Japanese millet	✓	✓	5 ^c

^c Seeding rate for coated seed. If not coated, use half the prescribed rate; * Naturalised exotic pasture species

6.1.8.6 Woodland habitat revegetation

The species selection for the woodland habitat revegetation areas considers the ecological functional groupings according to the role or function they perform in both rehabilitation and non-mined environments (Table 26) (Emmerton, et al, 2016a; Emmerton, et al, 2016b). Short lived wattles (*Acacia* spp.) should be excluded from the species mix as they are unlikely to provide the necessary structure and longer-term ecological function. Intermediate lifespan wattles should be limited in the seed mix with framework tree species and shrubby understorey species are maximised to provide longer-term ecosystem resilience, structure and function. Competitive pasture species will be excluded from the woodland habitat seed mix and only non-aggressive grass species are recommended (Emmerton, et al, 2016b).

Table 26: Life form and functional groups assigned to species based on their structural form or ecological function

Life form and functional group	Code	Explanatory notes
Framework trees		
Eucalypt/ Bloodwood (Corymbia) species	E/C	<i>Eucalyptus</i> , <i>Corymbia</i> , occasionally <i>Angophora</i> species (of any height) which can form an upper storey and often form recognisable vegetation communities but may exist within other communities.
Non-eucalypt, non-acacia species	NE/NA	Non-eucalypt, non-wattle species (of any height) which can form recognisable communities, or which may exist in isolation and are capable of becoming part of the upper storey.
Long lived acacias	LLA	Wattle species which may form recognisable communities or exist as part of the upper storey in other communities
Woody understorey components		
Shrubby understorey	SU	A shrub is defined as: a woody plant that is multi-stemmed from the base (or within 200mm from ground level) up to 8m in height or if single stemmed, less than 2m tall (Eyre, et al., 2015). It therefore may include species which are sometimes regarded as small to medium trees.
Groundcover shrubs	GCS	Shrubs which form a groundcover.
Vines/creepers	V/C	Vines or creepers that are perennial and have a woody component.
Intermediate lifespan acacias	ILA	Sub-dominant acacias which do not form a community in undisturbed natural ecosystems but can become dominant in rehabilitation areas.
Short lifespan wattles	SLA	Wattles prevalent as an understorey in eucalypt communities with some level of disturbance and relatively short lived (≤ 10 years).
Introduced woody perennials	IWP	Introduced woody species potentially becoming weeds in some circumstances.
Groundcover components		
Competitive pasture grasses	CPG	Aggressive introduced pasture grass species (considered to detract from ecosystem values).

Life form and functional group	Code	Explanatory notes
Introduced grasses	IG	Less competitive naturalised species (less aggressive than the CPG group).
Native grasses	NG	Perennial and annual native grasses. Includes grass like plants (e.g. <i>Cyperus</i> , <i>Dianella</i> , <i>Lomandra</i>).

6.1.8.7 Woodland habitat seed species and seeding rates

Woodland habitat PMLU is planned for areas impacted by underground mining, which includes remnant vegetation and some cleared areas (RA21).

Rehabilitation, including areas with minor surface cracks, will utilise the in-situ topsoil. For larger crack repairs that require infilling with material, drainage works and/or subsidence backfill areas, the topsoil stripped and stockpiled from the area prior to the works will be re-spread once works are complete.

Some areas may have limited vegetation impacts from mining, therefore seed application may not be required in all areas.

The conceptual surface water hydraulic design for subsidence areas provides for a predominantly free draining landform with a maximum of 1m depth of peak inundation within a 2% AEP rainfall event (Section 6.1.2.3). Where seeding is required, the area will be seeded with similar species as the surrounding REs (Section 1.2.8.1), as recommended by an AQP, as there is limited impact from subsidence. The areas to be revegetated will include where topsoil has been disturbed or replaced (such as crack repairs, drainage works or backfilled areas), or previously cleared areas where additional seeding is required to achieve the revegetation objectives. Other areas with limited impacts from mining may not require seed application.

The preferred seeding timing for woodland habitat is either April/May or September/early October when there is sufficient soil moisture in the profile. Sowing in cooler months offers longer periods of surface moisture resulting from rain events, as well as reduced grass competition. Seeding may be undertaken at other opportune times, such as for unseasonal climatic conditions.

Should some ponded areas remain, the revegetation plan would aim to achieve a fringing woodland habitat with tree, shrub, grass, and sedge species capable of persisting in the altered abiotic and biotic conditions. Revegetation will follow the 'substitute' approach as described by Spain, et al. (2023) and will be based on seeding with species from the following representative substitute REs:

- RE 11.3.2b - *Eucalyptus camaldulensis* (sometimes *E. populnea* and/or *E. tereticornis*) woodland in drainage depressions
- RE 11.3.27f - *Eucalyptus coolabah* and/or *E. tereticornis* open woodland to woodland fringing swamps

Revegetation of woodland habitat areas with ponding will utilise the in-situ topsoil and seed with the recommended species listed in Table 27. The revegetation plan includes 6kg/ha of framework tree species, 4kg/ha of woody understory species and 8kg/ha of ground species. Seed availability may vary, however seed mixes should include at least four species from each of the main revegetation groups (i.e. framework tree, woody understory and ground species) listed in Table 27, to achieve the required species richness. Revegetation species and rates for woodland habitat may be adjusted by an AQP, to ensure continuous improvement of the rehabilitation outcomes, based on the results of ongoing monitoring (Section 8).

Table 27: Recommended species list and seeding rates for woodland habitat PMLU – ponded areas

Species name	Common name	Life form	Seed rate (kg/ha - uncoated weight)
Framework tree species			
<i>Casuarina cristata</i> *	belah	E/C	1 - 2
<i>Eucalyptus camaldulensis</i> *	river red gum	E/C	1 - 2
<i>Eucalyptus coolabah</i>	Coolabah	E/C	1 - 2
<i>Eucalyptus populnea</i>	poplar box	E/C	0.5 - 1
<i>Eucalyptus tereticornis</i> *	Queensland blue gum	E/C	1 - 2
<i>Melaleuca bracteata</i> *	black tea tree	NE/NA	0.5 - 1
<i>Terminalia oblongata</i>	yellowwood	NE/NA	0.5 - 1
Framework tree species - total seed weight uncoated			6
Woody understorey species			
<i>Cassia brewsteri</i> *	Leichardt bean	SU	0.5 - 1
<i>Dodonaea viscosa</i>	sticky hop bush	SU	0.5 - 1
<i>Eremophila bignoniiflora</i>	emu bush	SU	0.5 - 1
<i>Eremophila mitchellii</i>	false sandalwood	SU	0.5 - 1
<i>Ficus opposita</i>	sandpaper fig	SU	0.5 - 1
<i>Geijera parvifolia</i>	wilga	SU	0.5 - 1
<i>Lysiphyllum carronii</i>	red bauhinia	NE/NA	0.5 - 1
<i>Psyrdrax oleifolia</i>		SU	0.5 - 1
Woody understorey species - total seed weight uncoated			4
Ground species			
<i>Bothriochloa bladhii</i>	Forest blue grass	NG	0.5 - 1
<i>Bothriochloa decipiens</i> var. <i>decipiens</i>	pitted blue grass	NG	0.5 - 1
<i>Chrysopogon fallax</i>	golden beard grass	NG	0.5 - 1
<i>Cyperus</i> spp. (<i>C. gracilis</i> , <i>C. polystachyos</i> , <i>C. fulvus</i> , <i>C. exaltatus</i>)*	sedges	Native other	0.5 - 1
<i>Eleocharis</i> spp. (<i>E. sphacelata</i> , <i>E. pallens</i> , <i>E. plana</i>)	spike like sedges	Native other	0.5 - 1
<i>Iseilema</i> sp. (<i>I. vaginiflorum</i> , <i>I. membranaceum</i>)	Flinders grass	NG	0.5 - 1
<i>Leersia hexandra</i>	swamp rice grass	NG	0.5 - 1
<i>Leptochloa digitata</i>	umbrella cane grass	NG	0.5 - 1
<i>Panicum decompositum</i> var. <i>decompositum</i>	native millet	NG	0.5 - 1

Species name	Common name	Life form	Seed rate (kg/ha - uncoated weight)
<i>Paspalidium caespitosum</i>	brigalow grass	NG	0.5 - 1
<i>Paspalidium distans</i>	Shot grass	NG	0.5 - 1
<i>Paspalidium jubiflorum</i>	Warrego summer grass	NG	0.5 - 1
Ground species - total seed weight uncoated			8

* Medium salinity tolerance (DERM 2011)

6.1.8.8 Watercourse revegetation

Watercourse revegetation activities will be implemented to establish riparian vegetation associated with watercourses which have been impacted by mining activities, such as crossings or subsidence cracks (RA11).

The revegetation zones for natural watercourses (Figure 15) are defined as follows:

- Upper bank: defines the lateral limits of both sides of the watercourse. It does not include the land adjacent. The upper bank generally extends down the riparian profile and is dominated by taller *Eucalyptus* spp, with a mixed woody and grassy understorey.
- Mid bank: occurs between the upper and lower banks and will vary in size depending on the watercourse geomorphology. The mid bank may include benches created from high flow events. The vegetation on the mid bank comprises a mix of species including scattered *Eucalyptus* spp., as well as species that are more adapted to periodic inundation of water and can withstand some disturbance from floods (i.e. *Melaleuca* spp).
- Lower bank (including bank toe): commences at the edge of the low flow channel or stream bed and extends up the bank to the area affected by more regular lower flows. The vegetation in the lower bank is dominated by scattered trees adapted to wetter environments (i.e. *Melaleuca* spp) and a high ground cover of grasses, reeds, sedges and rushes.

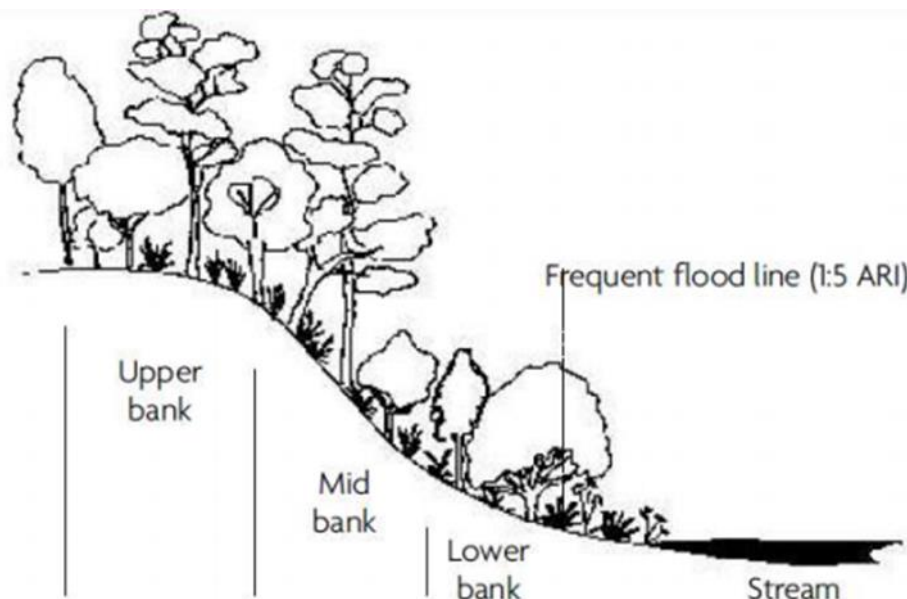


Figure 15: Typical riparian revegetation plantings zone (Vegetation Matters, 2014)

The growth media for watercourse PMLU will be pre-stripped topsoil, spread over the bank areas of the rehabilitated landforms at a depth $\geq 150\text{mm}$, and ameliorated if recommended by an AQP (Section 6.1.4).

6.1.8.9 Watercourse revegetation species and seeding rates

The watercourse revegetation species are based on selecting framework trees, woody understorey and groundcover species associated with the predominant natural watercourse RE 11.3.25 occurring on the RHM site (Table 10).

The recommended watercourse revegetation species and seeding rates are listed in Table 28 and Table 29. The planned seeding rate for upper and mid banks is 20kg/ha comprised of 6kg/ha uncoated framework tree, 4kg/ha uncoated woody understorey species and 10kg/ha uncoated grasses and other groundcover species.

The planned seeding rate for lower banks is 15kg/ha comprised of 5kg/ha uncoated framework tree and 10kg/ha uncoated ground species. The revegetation on the lower banks has been designed to establish a higher percentage of groundcover species, including grasses and rushes. Competitive pasture species have been excluded from the seed mix and only non-aggressive grass species are recommended. Short lived wattle species have also been excluded in the seed mix.

Planting in all revegetation zones will also include the addition of a sterile cover crop (e.g. Japanese millet or similar) seeded at 5kg/ha.

The preferred seeding timing for watercourse revegetation is August to October. There is low chance of frost and less likelihood of significant rainfall in this period allowing the best opportunity for vegetation to establish in a relatively non-erosive period. Seeding may be undertaken at other opportune times, such as for unseasonal climatic conditions.

Table 28: Recommended species list and seeding rates for watercourse PMLU – upper and mid banks

Species name	Common name	Life form and functional group code	Seed rate (kg/ha - uncoated weight)
Framework tree species			
<i>Acacia stenophylla</i> *	river myall	LLA	0.5 - 1
<i>Alphitonia excelsa</i>	red ash	NE/NA	0.5 - 1
<i>Angophora floribunda</i>	rough barked apple	E/C	0.5 - 1
<i>Angophora leiocarpa</i>	smooth barked apple	E/C	0.5 - 1
<i>Angophora subvelutina</i>	broadleaf apple	E/C	0.5 - 1
<i>Casuarina cristata</i> *	belah	E/C	0.5 - 1
<i>Casuarina cunninghamiana</i> *	river she oak	NE/NA	0.5 - 1
<i>Corymbia tessellaris</i> *	Moreton Bay ash	NE/NA	0.5 - 1
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i> *	river red gum	E/C	1 - 2
<i>Eucalyptus coolabah</i> subsp. <i>coolabah</i>	Coolabah	E/C	1 - 2
<i>Eucalyptus melanophloia</i>	silver leaved ironbark	E/C	0.5 - 1
<i>Eucalyptus populnea</i>	poplar box	E/C	0.5 - 1
<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i> *	Queensland blue gum	E/C	0.5 - 1
<i>Lysiphyllum hookeri</i>	white bauhinia	NE/NA	0.5 - 1
<i>Melaleuca bracteata</i> *	black tea tree	NE/NA	0.5 - 1
<i>Terminalia oblongata</i>	yellowwood	NE/NA	0.5 - 1

Species name	Common name	Life form and functional group code	Seed rate (kg/ha - uncoated weight)
Framework tree species - total seed weight uncoated			6
Woody understorey species			
<i>Acacia excelsa</i>	ironwood wattle	ILA	0.5 - 1
<i>Acacia fasciculifera</i>	scaly bark	ILA	0.5 - 1
<i>Carissa ovata</i>	current bush	GCS	0.5 - 1
<i>Cassia brewsteri</i> *	Leichardt bean	SU	0.5 - 1
<i>Dodonaea viscosa</i>	sticky hop bush	SU	0.5 - 1
<i>Eremophila mitchellii</i>	false sandalwood	SU	0.5 - 1
<i>Erythroxylum australe</i>	cocaine tree	SU	0.5 - 1
<i>Ficus coronata</i>	creek sandpaper fig	SU	0.5 - 1
<i>Ficus fraseri</i>	white sandpaper fig	SU	0.5 - 1
<i>Ficus opposita</i>	sandpaper fig	SU	0.5 - 1
<i>Grevillea striata</i>	beefwood	SU	0.5 - 1
<i>Grewia latifolia</i>	dogs balls	SU	0.5 - 1
<i>Hakea lorea</i>	bootlace oak	SU	0.5 - 1
<i>Mallotus philippensis</i>	red kamala	SU	0.5 - 1
<i>Petalostigma pubescens</i>	quinine	SU	0.5 - 1
Woody understorey species - total seed weight uncoated			4
Ground species			
<i>Bothriochloa bladhii</i>	forest blue grass	NG	1 - 2
<i>Capillipedium spicigerum</i>	scented top	NG	1 - 2
<i>Cymbopogon refractus</i>	barbwire grass	NG	1 - 2
<i>Cynodon dactylon</i> *	couch	IG	2
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>	Queensland bluegrass	NG	1 - 2
<i>Digitaria brownii</i>	cotton panic	NG	1 - 2
<i>Eulalia aurea</i>	silky brown top	NG	1 - 2
<i>Eustrephus latifolius</i>	wombat vine	V/C	1 - 2
<i>Heteropogon contortus</i>	bunched speargrass	NG	1 - 2
<i>Jasminum simplicifolium</i> subsp. <i>australiense</i>	stiff jasmine	V/C	0.2 - 0.5
<i>Lomandra longifolia</i>	mat rush	NG	0.2 - 0.5
<i>Panicum effusum</i>	hairy panic	NG	1 - 2
<i>Paspalidium distans</i>	shot grass	NG	1 - 2

Species name	Common name	Life form and functional group code	Seed rate (kg/ha - uncoated weight)
<i>Rhynchosia minima</i>	Rhynchosia	V/C	1 - 2
<i>Themeda triandra</i>	kangaroo grass	NG	1 - 2
Ground species - total seed uncoated			10
Cover Crop			
<i>Echinochloa esculenta</i>	Japanese millet	Cover crop	5

* Species adapted to moderate to high salinity tolerance (DERM, 2011)

Table 29: Recommended species list and seeding rates for watercourse PMLU – lower banks

Species name	Common name	Life form and functional group code	Seed rate (kg/ha - uncoated weight)
Framework tree species			
<i>Casuarina cunninghamiana</i> *	river she oak	NE/NA	0.5 - 1
<i>Lophostemon suaveolens</i>	swamp box	NE/NA	0.5 - 1
<i>Melaleuca bracteata</i> *	black tea tree	NE/NA	0.5 - 1
<i>Melaleuca fluviatilis</i>	weeping tea-tree	NE/NA	0.5 - 1
<i>Melaleuca leucadendra</i> *	broad-leaved tea tree	NE/NA	0.5 - 1
<i>Melaleuca linariifolia</i> *	snow in summer	NE/NA	0.5 - 1
<i>Melaleuca trichostachya</i>	flax-leaf paperbark	NE/NA	0.5 - 1
<i>Melaleuca viminalis</i> *	red bottlebrush	NE/NA	0.5 - 1
Framework tree species - total seed weight uncoated			5
Ground species			
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	forest blue grass	NG	1 - 2
<i>Cymbopogon refractus</i>	barbwire grass	NG	1 - 2
<i>Cynodon dactylon</i> *	couch	IG	2 - 3
<i>Cyperus</i> spp. (<i>C. gracilis</i> , <i>C. polystachyos</i>)**	sedge	NG	2 - 3
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>	Queensland bluegrass	NG	1 - 2
<i>Eleocharis</i> spp.	spike-rush	NG	0.5 - 1
<i>Eustrephus latifolius</i>	wombat vine	V/C	0.5 - 1
<i>Leptochloa digitata</i>	Umbrella cane grass	NG	0.5 - 1
Ground species - total seed weight uncoated			10

Species name	Common name	Life form and functional group code	Seed rate (kg/ha - uncoated weight)
Cover Crop			
<i>Echinochloa esculenta</i>	Japanese millet	Cover crop	5

* Species adapted to moderate to high salinity tolerance (DERM, 2011); ** Bank toe area only

6.1.8.10 Reference sites

Details for the establishment of reference sites for cattle grazing, woodland habitat and watercourse PMLUs are outlined in Section 8.4.

Relationship with PRCP schedule
The revegetation approach for the PMLUs focuses on selection and establishment of suitable species based on the growth media and rehabilitated landforms. Woodland habitat and watercourse rehabilitation strongly considers the inclusion of framework tree species, woody understorey and ground species from the REs of remnant vegetation occurring within RHM. The recommended species will best support achievement of the cattle grazing, woodland habitat and watercourse PMLUs.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule														
RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
RM7	7.1 Completed seeding in accordance with recommended pasture mixes and seeding rates as shown in Table 25: Recommended species list and seeding rates for cattle grazing PMLU. 7.2 At least four species of 3P pasture species and two legumes, including at least two native pasture species, from Table 25: Recommended species list and seeding rates for cattle grazing PMLU are to be applied per application area. 7.3 Minimum seeding rates of 16kg/ha of coated pasture seed and 4kg/ha of uncoated legume seed will be used, unless adjusted by an AQP based on results of rehabilitation monitoring.
RM8	8.1 Completed seeding in accordance with woodland habitat species and seeding rates² recommended by an AQP¹ if vegetation is targeting a regional ecosystem, or in accordance with Table 27: Recommended species list and seeding rates for woodland habitat PMLU – ponded areas. 8.2 Minimum seeding rates for ponded areas to include 6kg/ha of tree species, 4kg/ha of woody understory species and 8kg/ha of ground species, unless adjusted by an AQP¹ based on results of rehabilitation monitoring. 8.3 Non-native seed must not be used for the revegetation of woodland habitat PLMU (except when sterile cover crops or <i>Cynodon dactylon</i> are used).
RM9	9.1 Completed seeding in accordance with recommended watercourse species mix and seeding rates in Table 28: Recommended species list and seeding rates for watercourse

The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	PMLU – upper and mid banks and Table 29: Recommended species list and seeding rates for watercourse PMLU – lower banks. 9.2 Species chosen should reflect regional ecosystem 11.3.25. 9.3 Minimum seeding rates of: - For the upper and mid banks – 6kg/ha uncoated trees species, 4kg/ha uncoated woody understorey species and 10kg/ha uncoated ground species - For the lower banks – 5kg/ha of uncoated tree species, 10kg/ha uncoated ground species. 9.4 Non-native seed must not be used for the revegetation of watercourse PLMU (except when sterile cover crops or <i>Cynodon dactylon</i> are used).
RM10	10.1 Vegetation meets the following: >50% established and self-sustaining vegetation groundcover, of which at least 50% of dry matter yield is 3P pasture species as listed in Table 25: Recommended species list and seeding rates for cattle grazing PMLU - Minimum composition of three species of 3P grasses present per hectare (averaged).
RM11	11.1 Groundcover: >15% slopes must achieve ≥80% groundcover, consisting of at least 50% vegetation groundcover ≤15% slopes must achieve ≥50% groundcover, consisting of at least 50% vegetation groundcover. 11.2 Woodland habitat vegetation meets the following: - Species richness of ≥2 native trees, ≥3 native shrubs and ≥4 ground species (exotic or native).
RM12	12.1 Groundcover: >15% slopes must achieve ≥80% groundcover, consisting of at least 50% vegetation groundcover ≤15% slopes must achieve ≥50% groundcover, consisting of at least 50% vegetation groundcover. 12.2 Watercourse vegetation meets the following: - Species richness: ≥2 native trees and ≥2 native shrubs representative of RE 11.3.25 ≥2 grass species (exotic or native species) - Tree canopy cover ≥13%.
RM13	13.2 Vegetation meets the following criteria: >50% established and self-sustaining vegetation groundcover - At least 60% of pasture dry matter yield consists of preferred, palatable and productive (3P) grasses with a minimum composition of three 3P grasses present per hectare (averaged)

The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise $\leq 5\%$ of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP as appropriately managed. 13.3 Land suitability class assessed by an AQP and certified that the land has achieved a post-mining land suitability class of 3 or better for cattle grazing, or not different from pre-mining class if it is class 4; where assessment of rehabilitation is in accordance with Short (2023). Class 4 is only accepted if the limitations are water availability, soil nutrient or sub-soil erosion. 13.4 For any Class 4 land suitability areas, land condition is assessed as Good (A) condition for non-grazed areas, or Good (A) or Fair (B) condition for grazed areas using the Grazing Land Management ABCD land condition framework.
RM14	14.4 Groundcover: >15% slopes must achieve $\geq 80\%$ groundcover, consisting of at least 50% vegetation groundcover $\leq 15\%$ slopes must achieve $\geq 50\%$ groundcover, consisting of at least 50% vegetation groundcover. 14.5 Woodland habitat vegetation meets the following: - Species richness of ≥ 2 native trees, ≥ 3 native shrubs and ≥ 4 ground species (exotic or native) - Tree canopy cover of $\geq 10\%$ - Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise $\leq 5\%$ of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP as appropriately managed.
RM15	15.5 Watercourse vegetation meets the following: - Riparian vegetation index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method) - Species richness: ≥ 2 native trees and ≥ 2 native shrubs - Tree canopy cover $\geq 20\%$ - Median tree canopy height $\geq 10\text{m}$ - Recruitment of at least two woody perennial species in ecological dominant layer - Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise $\leq 5\%$ of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP as appropriately managed. 15.6 Assessment by an AQP that the watercourse diversion has an Index of Diversion Condition score > 10.

6.2 Tailings storage facilities

PRCP Guideline (Section 3.6.2)

The tailings require characterisation to determine the geochemistry, rheology and geotechnical parameters that influence the rehabilitation or management strategies and the capacity of the site to support revegetation.

The design for a TSF must include relevant elements:

- *lining of TSF (i.e. embankments and base of structure)*
- *leak detection systems*
- *cellular design of TSF*
- *seepage collection systems*
- *design storage allowance*
- *spillway location*
- *designing TSF for progressive rehabilitation.*

There are no tailings storage facilities at RHM. All RHM coal will be processed at CHPPs located on GRM and BRM and tailings will be disposed of at GRM and BRM.

6.3 Voids

PRCP Guideline (Section 3.6.3)

The information requirements of this domain are dependent on the nature of the proposed PMLU or NUMA for the void. For mine sites with voids, the rehabilitation planning part must include a void closure plan, which includes options for minimising final void area and volume; final void dimensions; pit wall geotechnical and geochemical stability, final slope angles, void hydrology, groundwater modelling, water balance and predicted long-term water quality.

A geotechnical report should focus on how the void will achieve post-closure slopes that will exhibit stability characteristics consistent with the planning and design of the post-closure mine void.

If floodwaters are likely to move over backfilled material, an assessment of the hydraulic properties must be conducted to assess whether instability may occur.

The rehabilitation and management strategies in the plan must include the supervision, verification and auditing of engineering works carried out to achieve the post-closure void landform, to ensure construction is consistent with the geotechnical design.

The rehabilitation and management strategy must also include confirmation that the post-closure landform demonstrates the level of stability as specified by the design.

There are no voids planned at RHM.

6.4 Underground mining

PRCP Guideline (Section 3.6.4)

For underground mining operations, the rehabilitation planning part must include:

- *a geotechnical study*
- *an assessment of groundwater interactions and potential lowering of groundwater levels*
- *the development of a hydrogeological conceptual model*
- *subsidence analysis and modelling and a subsidence vegetation/habitat impact assessment*
- *consideration of how potential entries to underground workings will be sealed (i.e. through some form of capping or back filling)*
- *how surface ponding and cracking will be mitigated*
- *identification of post-closure stabilisation of underground workings in order to manage the potential for unplanned surface subsidence and unplanned ground collapse such as sinkholes and pot holing.*

RHM is an underground longwall mining operation using top coal caving. The current life-of-mine plan for RHM proposes a total of 17 longwall panels in the GMS with a mining depth ranging from 250 to 650m from ground surface. The longwall panels are orientated roughly north-south and are typically 2 - 3km in length and approximately 320m in width.

The mine will be accessed via the GRM Goonyella residual void with the first RHM longwall panels covered under the GRM and BRM PRCP area on ML1763. The RHM underground operation within ML1763 is reduced from the approved layout in the EIS due to the GRM open cut operation extending further than planned at the time of the EIS. Up to the full extent of the EIS approved footprint for RHM may be mined, if there are further changes to the GRM open cut operation. If changes occur to GRM and BRM or RHM mine plans, a PRCP amendment will be submitted to the administering authority, if required.

The underground mine layout is shown in Figure 16.



Figure 16: RHM underground layout

6.4.1 Geotechnical study

An underground geotechnical study has been compiled to support the development of this PRCP. The detailed plan – *Geotechnical considerations for closure of Red Hill Mine* (Byrnes Geotechnical, 2024) is provided in Appendix H.

6.4.1.1 Subsidence

For longwall mining, maximum subsidence depths occur along the centre of the mined-out panels, with the main pillars and main heading remaining at, or close to, pre-mining ground levels. Subsidence generally starts to occur shortly after mining, with most subsidence typically completed within about 12 months of mining. The time frame and depth of subsidence can vary depending on the type of rock overlaying the mined area, as well as the depth to the extracted coal. The final surface depends on pre-mining topography, geology, the seam thickness extracted, width of panels, and the depth of the longwall mining.

When coal is extracted from a longwall panel, the overburden load carried by the coal is redistributed onto the chain pillars on each side of the longwall panel. This increase in overburden load may result in the chain pillars failing over time, resulting in additional minor subsidence.

Full realisation of subsidence at the surface is only achieved once the underground mine has been flooded post-mining. Flooding can occur either naturally with the recovery of the groundwater or directly by active pumping post-mining. Upon flooding, the goaf undergoes additional softening and consolidation, and further subsidence occurs. RHM underground mine is planned to be purposely flooded at the end of mining.

The RHM subsidence modelling is shown in Figure 17. The modelling indicates that RHM is expected to have 29km² of subsided ground on the surface. The modelled maximum vertical subsidence is less than 6m with a maximum tilt of 4.6% and strains that range from -19mm/m to +21mm/m. The overall average slope on the surface, along the edge of the subsidence troughs, is 6 - 7%, with a maximum of 10%. The modelling predicts the maximum subsidence is through the centre of each panel, with minor subsidence above the chain pillars and no subsidence over the mains pillars.



Figure 17: RHM modelled subsidence

6.4.1.2 Cracking

For longwall operations, such as RHM, where larger panel 'width:cover' depth ratios occur, cracking is to be expected at the surface. Cracking may present in longitudinal (parallel to the panel edge) or arcuate (parallel to the mining face) fractures along each longwall panel. The relationship between the width of the cracking and the predicted tensile strain depends on the spacing of the cracks at the surface. Maximum cracking depth is expected to be no greater than 10m from the surface and is not directly connected to the goaf below.

Subsidence cracks will be managed according to the erosion and safety risks, and are likely to self-heal where the surface geology permits. At RHM, the surface is covered by a 0.5 to 30m thick layer of poorly consolidated Tertiary and Quaternary sediments, meaning surface cracks are expected to self-heal over time.

6.4.1.3 Underground entries

RHM underground workings are planned to be accessed via the high-wall in the Goonyella residual void, therefore closure of the mine entrances are detailed in the GRM and BRM PRCP.

At the cessation of underground mining at RHM, an AQP will provide a plan for the closing of the mine entrances and shafts.

6.4.1.4 Flooding of the underground

As indicated in Section 6.4.1.1, flooding of the underground workings can occur either naturally with the recovery of the groundwater or directly by active pumping post-mining. RHM is planned to be purposely flooded at the end of mining. This will be undertaken with guidance from an AQP to ensure a safe, stable and non-polluting outcome.

Purposely flooding the workings will enable the full subsidence at the surface to be realised quicker and ensure geotechnical stabilisation of the closure landform. Final rehabilitation of subsidence areas (RA11 and RA21) is scheduled following flooding to ensure no further subsidence or surface cracking will impact the achievement of the PMLU.

6.4.2 Groundwater interaction

Interaction with the groundwater at closure has been modelled in Section 6.1.1. The modelling includes the active flooding of the underground workings and used variations in the model to account for the hydrogeological changes associated with fractured overburden.

Post flooding and stabilisation of the groundwater, the groundwater hydraulic gradients within the goaf are towards the immediately adjacent GRM Goonyella residual void. The Goonyella residual void provides long-term groundwater management for RHM through the capture of any poor-quality groundwater within the mined-out coal seam.

6.4.3 Surface water interaction

Where appropriate, subsided longwall panels will be partially backfilled and/or connected by drains that flow towards the Isaac River or its tributaries, to achieve a predominantly free draining landform. The backfilling and cutting of drains will aim to achieve a peak depth of inundation at or below 1m for a 2% AEP rainfall event (Section 6.1.2.3 and Appendix G) with the intention to maintain a landform that can support woodland habitat ecosystems of a similar composition to the existing REs.

To limit the impact associated with rehabilitation of subsidence areas, the conceptual design for the surface hydraulics where practical, limits disturbance of endangered REs, utilises existing drains and flow paths and minimises the number of disturbance points on the banks of the Isaac River.

Conceptual hydraulic design has been based on the predicted subsidence and is a proof of concept. Final design for the backfill and drainage network will need to be based on actual subsidence levels to achieve the nominated PMLU.

Ponding resulting from subsidence within the watercourses are expected to self-heal over time as a result of natural sediment transportation processes. Ponding within the watercourses is considered consistent with the PMLU of watercourse and will not be subject to active rehabilitation works to limit ponding.

6.4.4 Rehabilitation strategies

6.4.4.1 Surface infrastructure

Surface infrastructure related to the underground mining, including gas drainage infrastructure, ventilation infrastructure, water management and boreholes, will be decommissioned progressively as areas are no longer required to support mining. Decommissioning will be in accordance with Section 6.5 and will include:

- Removal of all above ground infrastructure
- Bore holes to be cut off below the ground, grouted and capped according to the *Coal Mine Safety and Health Act 1999* and the Code of Practice for construction and abandoning coal seam gas wells current at the time
- Ventilation shafts to be decommissioned as per the relevant standards in place at the time
- Pads around each bore, redundant access tracks and other infrastructure surface disturbance areas will be ripped, topsoiled and seeded
- Water and gas pipelines will be drained and removed to a depth of 0.5m below the surface

Regional infrastructure will be moved or repaired, in consultation with the relevant owners, if subsidence impacts the operation of the infrastructure or causes a safety risk.

6.4.4.2 Surface cracking

The surface geology at RHM indicates subsidence cracking is likely to self-heal. Mechanical repair of surface cracks should be limited to those cracks assessed as having a low probability to self-heal and likely to adversely impact achieving the PMLU. This will minimise unnecessary vegetation and soil disturbance and potential for additional erosion issues.

Where surface cracks are assessed as not self-healing and adversely impacting the PMLU, rehabilitation will include:

- Minor surface cracks:
 - Undertake minimal clearing of area around cracks
 - Disturbance of areas to infill minor cracks
 - Topsoil placement where required
 - Seed bare areas with appropriate species as recommended by an AQP to achieve the PMLU (Section 6.1.8)
- Larger surface cracks:
 - Undertake minimal clearing of areas around cracks
 - Strip topsoil from areas adjacent to the crack and stockpile
 - Infill cracks
 - Respread topsoil where topsoil has been removed
 - Seed disturbed areas with appropriate species as recommended by an AQP to achieve the PMLU (Section 6.1.8)

Repair of initial cracking will be undertaken progressively as part of mining operations. Final crack repairs will be scheduled after flooding of the underground workings, when realisation of final subsidence has occurred.

6.4.4.3 Inundation areas

The RHM EIS modelled subsidence ponding and proposed a final landform with ponded areas at depths of 2.0m to 2.5m (BMA, 2013b).

As part of the PRCP, subsidence areas will be managed to minimise the potential for adverse impacts to the PMLU through a combination of drains and partial backfill to limit potential depths of inundation. Where drainage and backfill can be achieved without significant disturbance to endangered REs, it will be designed and installed to enable water to flow to the Isaac River or its tributaries.

Based on the pluvial modelling (Section 6.1.2.3), the rehabilitation of subsided areas is proposed to include a combination of partial backfill and cutting of drains to achieve a predominantly free draining landform with a peak inundation depth of 1m outside of the watercourses in a 2% AEP event, where practical. This inundation depth balances the impacts of inundation with minimising impacts to endangered REs required for the installation of the drains and backfill.

The proposed backfill and drainage are a proof of concept based on the subsidence modelling (Section 6.4.1). The modelled subsidence is a conservative estimate and actual depths will vary.

Initial backfilling and drainage works is undertaken progressively as part of mining operations. Final drainage design and works will be scheduled after flooding of the underground workings when realisation of final subsidence has occurred, to ensure the drainage to the Isaac River is possible topographically.

6.4.4.4 Vegetation/habitat

The main PMLU planned for the underground mine and subsidence areas is woodland habitat (RA21). The revegetation plan for subsided woodland habitat areas impacted by surface cracking, backfilling or drainage works, or ponding is outlined in Section 6.1.8.7. Vegetation species within the subsidence areas will be dependent on the final hydrology of the closure landform. Areas not impacted by temporal ponding will be revegetated with similar species to the surrounding REs, as recommended by an AQP. Should some ponded areas remain, the revegetation plan would aim to achieve a fringing woodland habitat capable of persisting in the altered abiotic and biotic conditions.

Minimal vegetation disturbance is expected in most of the underground mining and subsidence impacted areas, therefore seed application may not be required in all areas. Disturbance to existing vegetation, required to undertake rehabilitation of the subsidence areas, will be minimised where possible.

The revegetation plan for watercourse subsided areas (RA11) is outlined in Section 6.1.8.9.

6.4.4.5 Watercourses

The major watercourse within the RHM subsidence area is the Isaac River. Minor watercourses Goonyella Creek and Twelve Mile Gully, which drain to the Isaac River are also present within the subsidence area.

Ponded areas within the watercourses are predicted to fill in naturally associated with natural sediment transportation. The time required for the natural healing of subsidence in the watercourses is dependent on the frequency and duration of rain and flow events and the volume of alluvial material mobilised (BMA, 2013b). The RHM EIS assessment of subsidence impacts on geomorphology concluded that the subsidence ponds in the Isaac River will have their storage capacity diminish over time and eventually fill with alluvial material. The subsidence created ponds within the watercourse channels will have a temporal and limited impact on the hydrological flows (BMA, 2013d).

Furthermore, BRM operational monitoring of the Isaac River has indicated that alluvial inputs from upstream have infilled some of the GMS subsidence panels (Alluvium, 2024). It is expected that self-healing and sediment transport processes will continue such that watercourse bank stability will not be adversely impacted by subsidence at achievement of the PMLU.

Operational watercourse subsidence impacts will be managed through compliance with the EA conditions (F10 – F18).

6.4.4.6 Hydrogeological

Hydrogeological modelling has been undertaken for RHM (Section 6.1.1). Groundwater modelling within the subsidence areas indicates the following:

- Upon flooding of the underground workings and stabilisation of the groundwater levels, the adjacent GRM Goonyella residual void establishes and maintains an inward hydraulic groundwater gradient across the RHM underground mining area through on-going evaporative losses from the void lake
- Although some increased vertical hydraulic conductivity is created by subsidence cracking, there is limited to no impact to the temporal groundwater hosted within the alluvial materials associated with the Isaac River or the GDEs associated with the alluvial materials
- One registered groundwater supply bore, located in the proximity of the underground workings and the Goonyella residual void, becomes dry. However, this bore is in the operational areas of the mines and is not considered a viable supply bore location.

6.4.5 Monitoring

Monitoring requirements for subsidence areas rehabilitated to a woodland habitat PMLU are outlined in Sections 8.1 and 8.2. Monitoring points for woodland habitat rehabilitation areas will be established as a part of the initial Year 1 monitoring, as detailed in Section 8.2.2.

Monitoring of watercourses impacted by subsidence will be undertaken, as per the frequency in Table 41, to assess the watercourse's geomorphic and riparian performance and to identify maintenance requirements. This will include identification and repair of active erosion and operational subsidence cracking. Monitoring points for watercourse rehabilitation areas will be established as a part of the initial Year 1 monitoring, as outlined in Section 8.3.

In addition, each subsided longwall panel will be inspected in compliance with EA conditions, which currently requires an annual inspection by an AQP. At each annual inspection, the condition of each subsided longwall panel must be assessed, including the structural, geotechnical and hydraulic adequacy of the subsided longwall panel.

Post-closure monitoring will continue until the achievement of the relevant PMLU to a stable condition.

Relationship with PRCP schedule

Areas impacted by RHM underground mining will be rehabilitated to woodland habitat and watercourse PMLUs. Surface crack repairs and drainage works will occur progressively during operations and final rehabilitation post realisation of final subsidence. The subsidence areas outside of the watercourses will be predominantly free draining.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM1	1.4 Underground shafts are closed according to AQP design (RA21). 1.6 With the exception of 1.2, 1.3, 1.4 and 1.5 above, the following are complete: • All services disconnected, terminated and removed • All pipelines drained and removed
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The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	- All waste, not authorised under the Environmental Authority (EPML03337715) waste schedule, removed - All drillholes, bores, sediment ponds and sumps decommissioned - All machinery and equipment removed from site
RM3	3.2 Reshape watercourse crossings to a profile similar to the pre-disturbance condition (RA11). 3.3 Backfill and/or install drainage to limit subsidence inundation (RA21): - To maximum 1m depth in a 2% AEP rainfall event demonstrated by modelling completed by an AQP, or - Does not adversely impact achieving the PMLU as assessed by an AQP.
RM11	11.5 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP.
RM12	12.5 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP.
RM14	14.7 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP.
RM15	15.7 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP. 15.8 Watercourse bank stability is not adversely impacted by subsidence as assessed by an AQP.

6.5 Built infrastructure

PRCP Guideline (Section 3.6.5)

The administering authority's expectation of rehabilitation relating to built infrastructure is that it will be decommissioned, demolished, salvaged and/or disposed of unless it is being formally retained by the landholder to achieve an appropriate PMLU.

The rehabilitation planning part must include:

- Identification of infrastructure that will be decommissioned and the methods for decommissioning.*
- A description of infrastructure that will remain post rehabilitation and the identification of ongoing maintenance requirements.*
- Evidence of agreement for any infrastructure that will have ownership transferred.*

All BMA owned surface infrastructure with no beneficial use to the PMLU will be decommissioned and removed. Surface infrastructure that may be retained to support the PMLUs will have a demonstrable benefit and may include selected: fencing; access tracks; services related infrastructure; sheds and buildings; bridges and water related infrastructure. The infrastructure associated with the mining activities at RHM are summarised in Table 30.

Infrastructure not constructed for the purpose of mining, such as dams used for grazing, gates, cattle grades, stock handling/watering areas, access tracks, fire breaks etc., will not be removed as part of rehabilitation works.

Priority will be to repurpose, salvage or recycle any infrastructure to be removed. Demolition and disposal within the underground drives, or the GRM and BRM mining voids or spoil dumps, will only be undertaken when repurpose, salvage or recycle alternatives are deemed by BMA not to be viable. This approach is in line with the waste and resource management hierarchy outlined in the Queensland Waste Management and Resource Recovery Strategy created under the Queensland *Waste Reduction and Recycling Act 2011*.

Table 30: Infrastructure associated with the approved RHM mining activities

Category		Infrastructure
Built infrastructure	Steel, concrete and brick infrastructure	• Bridge over Isaac River • Accommodation village • Sewerage treatment plant • Various buildings • Fences
	Supporting services	• Pipes and pumps • Power lines • Electrical equipment • Communication and lighting towers • Concrete pads and bitumen
Water infrastructure		• Mine dams • Drains • Culverts
Underground infrastructure		• Longwall shearers and hydraulic roof supports • Conveyors • Gas drainage bores and associated infrastructure • Ventilation shafts

The timing of the decommissioning and removal of the infrastructure is based on the proposed timing of the RHM operation.

Any regional infrastructure associated with roads, power, water and communications supply to landowners or townships is not included in the PRCP schedule.

Further detail on the rehabilitation stages after decommissioning of the infrastructure, such as landform reshape, surface preparation, revegetation and monitoring, are covered in the relevant sections of this PRCP.

6.5.1 Built infrastructure

Decommissioning of the built and service infrastructure with no beneficial use to the PMLU will follow the resource management hierarchy and will include:

- Disconnecting services
- Removing surface built and service infrastructure through salvage or recycling activities, or demolishing and burying in the underground drives, or GRM and BRM mining voids or spoil dumps
- Removing below-ground built and service infrastructure to a depth of 0.5m below the surface and recycling, or burying in the underground drives, or GRM and BRM mining voids or spoil dumps, or covering to a minimum depth of 0.5m to enable establishment of the PMLUs
- Removing concrete to a depth of 0.5m below the surface and recycling, or burying in the underground drives, or GRM and BRM mining voids or spoil dumps, or covering to a minimum depth of 0.5m to enable establishment of the PMLUs

- Removing bitumen and recycling, or burying in the underground drives, or GRM and BRM mining voids or spoil dumps
- Disposing of demolition-related putrescible and hazardous wastes at an appropriately licenced facility

Ventilation shafts and other boreholes/shafts may remain at ground level and not be removed to a depth of 0.5m if the relevant standards and guidelines at the time of closure require the cap to be on the surface.

Below-ground infrastructure, services, waste and underground equipment deeper than 0.5m in relation to the final landform surface can be retained provided it can meet the following:

- Pipelines have been drained
- Below-ground infrastructure is mapped
- The intended PMLU is not compromised
- There is no ongoing risk of environmental harm

6.5.2 Water infrastructure

Decommissioning of the water-related infrastructure constructed for mining activities with no beneficial use to the PMLU or the neighbouring GRM and BRM operation, will include:

- Removing any remaining water to the underground workings or GRM and BRM or in accordance with:
 - EA condition C3: *“Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party (with the consent of the third party)”*.
- Disposing of mine dam sediment according to the results of an assessment by an AQP
- Removing any mine dam liners
- Breaching mine dam walls and reshaping of the area to make it free-draining
- Removing culverts and drains constructed for mining activities and operations

6.5.3 Contaminated land assessment

In accordance with the EA conditions, contaminants must not be released in a manner that constitutes environmental harm, and spillage of any wastes, contaminants or other materials must be cleaned up as quickly as practicable, stored in accordance with relevant standards and handled in a way that prevents environmental harm.

At completion of mining operations and prior to landform reshaping, surface preparation and revegetation, a contaminated land investigation will be undertaken in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (RM2). The contaminated land investigation will assess the site for the presence of contamination with the potential to adversely impact the nominated PMLUs and/or environmental values. Should land contamination be identified, the potential risks will be assessed and, where required, remediation will be undertaken. A Contaminated Land Investigation Document will be completed in accordance with the EP Act, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan to allow the ML area to be safely utilised for the nominated PMLUs (Section 3).

Verification will be undertaken as part of the final rehabilitation milestone of achievement of PMLU to a stable condition to confirm there are no changes to the contaminated land status completed for RM2 and the requirements of any Site Management Plans have been met.

Relationship with PRCP schedule

Surface infrastructure owned by BMA and not beneficial to the PMLU will be decommissioned and removed. Below ground infrastructure will be removed if required to a depth of 0.5m or covered to enable

Relationship with PRCP schedule

establishment of the PMLU. Ventilation shafts and other boreholes/shafts will be closed according to the relevant standards and guidelines at the time.

A contaminated land investigation will be undertaken at the completion of operations and prior to final landform development and shaping. Remediation and/or management of any identified contamination that has the potential to present unacceptable risks to the nominated PMLU or environmental values, will be undertaken.

The information in this section is relevant to the following shaded RAs and RMs in the PRCP schedule

RA3					RA11					RA21				
RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	RM9	RM10	RM11	RM12	RM13	RM14	RM15

The following milestone criteria will contribute to achievement of PMLU to a stable condition:

RM1	1.1 All infrastructure to be retained onsite must be safe, stable and not cause environmental harm. 1.2 All infrastructure and services to be retained onsite must have a signed landholder statement, declaring that they will accept responsibility for the infrastructure (except for those items in 1.4 and 1.5). 1.3 If the underlying landholder is also the EA holder (or a parent corporation or a subsidiary corporation), consent to retain the infrastructure is required from the administering authority (except for those items in 1.4 and 1.5). In seeking consent, the holder must justify how the infrastructure will provide a benefit or improvement to the use of the land and/or community once mining has ceased. 1.4 Underground shafts are closed according to AQP design (RA21). 1.5 Except for 1.4, below-ground infrastructure, services and waste (as per the Environmental Authority (EPML03337715) waste schedule) deeper than 0.5m in relation to the final landform surface can be retained provided it can meet the following: • All pipelines have been drained; and • All below-ground infrastructure to be retained must be mapped; and • The intended PMLU is not compromised; and • There is no ongoing risk of environmental harm. 1.6 With the exception of 1.2, 1.3, 1.4 and 1.5 above, the following are complete: • All services disconnected, terminated and removed • All buildings and associated infrastructure dismantled and removed • All hardstand, concrete areas and roads (bitumen, blue metal, aggregate) removed • All pipelines drained and removed • All waste, not authorised under the Environmental Authority (EPML03337715) waste schedule, removed • All surface water drainage infrastructure removed
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The following milestone criteria will contribute to achievement of PMLU to a stable condition:	
	• All drillholes, bores, sediment ponds and sumps decommissioned • All machinery and equipment removed from site • Mine water dams are decommissioned • Watercourse crossings and culverts removed. 1.7 Assessment of mine water dams is completed by an AQP and identified sediment and water management actions are completed.
RM2	2.1 Contaminated Land Investigation Document completed in accordance with the <i>Environmental Protection Act 1994</i>, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan. 2.2 The Contaminated Land Investigation Document confirms the area within the mining leases (ML1763, ML70421) does not present an unacceptable risk to the post-mining land use.
RM13	13.7 Verification by a suitably qualified person through a site inspection, records review and aerial imagery to confirm: • Requirements of any Site Management Plan have been met; • Notifiable activities have not been undertaken post completion of RM2 that would impact the use of the land for the intended PMLU; and • There is no evidence indicating an adverse change to the contaminated land status has occurred post the completion of RM2.
RM14	14.6 Verification by a suitably qualified person through a site inspection, records review and aerial imagery to confirm: • Requirements of any Site Management Plan have been met; • Notifiable activities have not been undertaken post completion of RM2 that would impact the use of the land for the intended PMLU; and • There is no evidence indicating an adverse change to the contaminated land status has occurred post the completion of RM2.

6.6 Summary of key rehabilitation and management practices

The key rehabilitation activities and associated rehabilitation milestones are shown in Table 31.

Table 31: Key rehabilitation activities and rehabilitation milestones for RHM

RA	Relevant Activities	Rehabilitation activities	Commencement of rehabilitation timing	RMs
RA3	- Accommodation village - General infrastructure and disturbance	- Disconnect services - Remove surface built and service infrastructure where there is no beneficial use to the PMLU - Remove below ground built and service infrastructure within 0.5m of the surface or cover to a minimum depth of 0.5m where there is no beneficial use to the PMLU - Remove concrete and bitumen within 0.5m of the surface or cover to a minimum depth of 0.5m where there is no beneficial use to the PMLU - Remove waste not authorised under the EA waste schedule, including demolition waste - Assess mine dam water and sediment and dispose appropriately - Assessment of contaminated land risks - Reshape the landform to be maximum 12% slopes - Install erosion and sediment control systems, if required - Spread topsoil a minimum thickness of 150mm, where topsoil has previously been removed - Assess growth media characteristics to determine ameliorant and other treatment requirements - Apply ameliorants and other treatments (if required) - Rip along contour of slopes - Seed with recommended seed mix and rates	Facilities will be required to support the rehabilitation activities, therefore area will be available for rehabilitation at the end of major rehabilitation activities for the site	- RM1 - RM2 - RM3 - RM4 - RM7 - RM10 - RM13

RA	Relevant Activities	Rehabilitation activities	Commencement of rehabilitation timing	RMs
		Undertake monitoring and maintenance to demonstrate achievement of a cattle grazing PMLU		
RA11	Watercourses impacted by underground mining/subsidence	- Rehabilitate surface cracks that do not self-heal and adversely impact achieving the PMLU - Remove watercourse crossings and culverts - Reshape watercourse crossings within natural watercourse bed and banks to a profile similar to the pre-disturbance condition - Install erosion and sediment control systems, if required - Spread topsoil a minimum thickness of 150mm, where topsoil has previously been removed - Assess growth media characteristics to determine ameliorant and other treatment requirements - Apply ameliorants and other treatments (if required by the plan) - Deep rip along contour of slopes as required - Seed as per recommended seed mix and rates - Undertake monitoring and maintenance to demonstrate achievement of a watercourse PMLU	- Initial operational repair of subsidence cracks and drainage occurs progressively during mining operations once the initial subsidence is complete - Final rehabilitation is scheduled once final subsidence is complete after flooding of the underground workings at the end of mining	- RM1 - RM3 - RM6 - RM9 - RM12 - RM15
RA21	- Subsidence - Underground mining infrastructure - General infrastructure and disturbance within	- Remove surface built and service infrastructure where there is no beneficial use to the PMLU - Remove below ground built and service infrastructure within 0.5m of the surface or cover to a minimum depth of 0.5m where there is no beneficial use to the PMLU - Seal shafts and gas drainage	Initial operational repair of subsidence cracks and drainage occurs progressively during mining operations once the initial subsidence is complete	- RM1 - RM2 - RM3 - RM5 - RM8

RA	Relevant Activities	Rehabilitation activities	Commencement of rehabilitation timing	RMs
	underground mining area	- Assessment of contaminated land risks - Backfill and/or install drainage to limit subsidence inundation to a maximum 1m depth for a 2% AEP rainfall event where practical to make the area predominantly free draining - Rehabilitate surface cracks that do not self-heal and adversely impact achieving the PMLU - Reshape infrastructure areas with maximum 15% slopes - Install erosion and sediment control systems, if required - Spread topsoil to a minimum thickness of 100mm, where topsoil has previously been removed - Assess growth media characteristics to determine ameliorant and other treatment requirements - Apply ameliorants and other treatments (if required by the plan) - Rip along contour of slopes - Seed with recommended seed mix and rate - Undertake monitoring and maintenance to demonstrate achievement of a woodland habitat PMLU	Final rehabilitation is scheduled once final subsidence is complete after flooding of the underground workings at the end of mining	- RM11 - RM14

7 RISK ASSESSMENT

Legislative Requirement

In accordance with section 126C(1)(f) of the EP Act, the rehabilitation planning part of the PRC Plan must identify the risks of a stable condition for land described as a post-mining land use not being achieved, and how the applicant intends to manage or minimise the risks.

PRCP Guideline (Section 3.7)

As per section 126C(1)(j) of the EP Act, the administering authority considers it necessary for the proposed PRC plan to contain a risk assessment of all proposed NUMAs. The risk assessment must be carried out to identify the risks of the NUMA causing environmental harm and not being safe and structurally stable and detail how the applicant intends to manage and minimise the identified risks.

The AS ISO 31000:2018 Risk Management – Guidelines (Standards Australia, 2018) describes risk assessment as the overall process of risk identification, risk analysis, risk evaluation and risk treatment. Each of these aspects must be included in the risk assessment in the rehabilitation planning part.

Information requirements in this section apply to all applicants whether or not they are an existing EA holder. Existing holders may have the required information available from previously submitted plans/reports/applications that, if still valid, can be used in the PRC plan.

7.1 Identifying, assessing and treating risks

7.1.1 Risk methodology

A risk-based approach to the RHM PRCP has been undertaken in term of the method described in Figure 18.

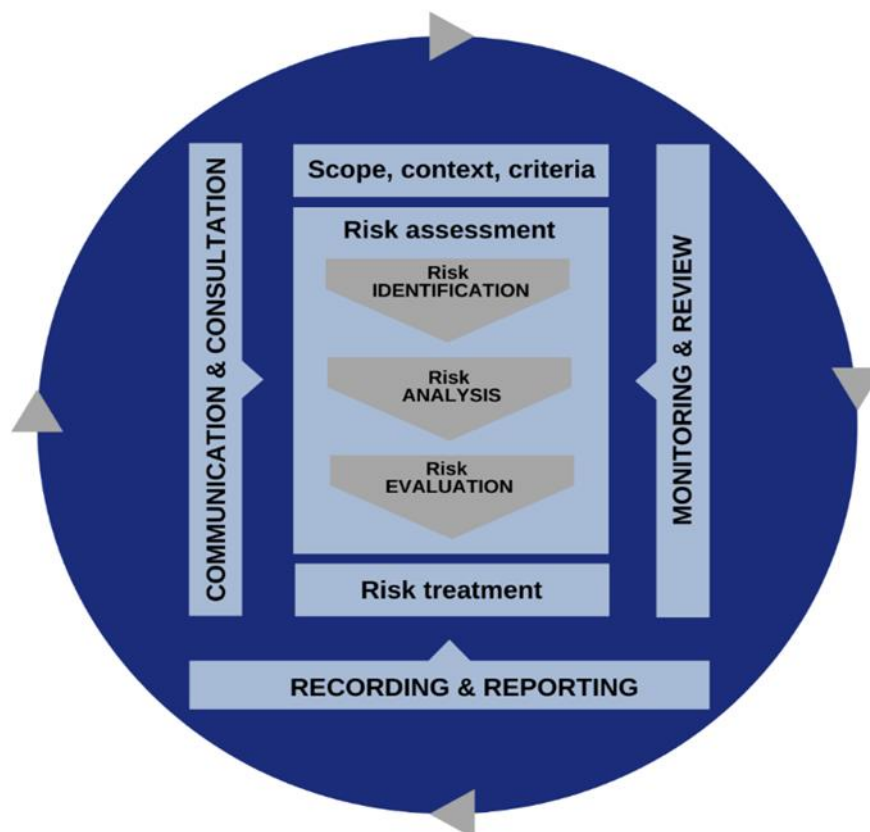


Figure 18: ISO 31000-compliant risk-based approach followed for the RHM PRCP

7.1.2 Risk identification

The risk event - a stable condition for land described as a PMLU not being achieved - was assessed per ISO 31000 methodology described in Figure 18 above, where stable condition is defined as per section 111A of the EP Act:

- The land is safe and structurally stable, and
- There is no environmental harm being caused by anything on or in the land, and
- The land can sustain a PMLU

For RHM, the PMLUs being assessed are cattle grazing, woodland habitat and watercourse (Section 3).

7.1.3 Risk analysis, evaluation and relevant treatments

The full risk assessment – *Red Hill Mine PRCP Risk Assessment* is included in Appendix I and provides the risk analysis, risk evaluation and risk treatments for each risk scenario.

Worst case outcomes were assessed for each scenario, preventative and mitigating controls identified and then a residual risk rating (RRR) was calculated. The BHP likelihood and severity tables, as well as the outcomes of the RRR heat map ratings matrix are provided in Table 32, Table 33 and Table 34, respectively.

Table 32: BHP risk likelihood table

Likelihood table			
Uncertainty	Frequency	Likelihood factor	Guidance
Highly Likely	Likely to occur within a 1-year period	3	Event is expected to occur >80% of the time during a 5-year planning cycle
Likely	Likely to occur within a 1 – 5-year period	1	Event is expected to occur 60% to 80% of the time during a 5-year planning cycle
Probable	Likely to occur within a 5 – 20-year period	0.3	Event is expected to occur 30% to 60% of the time during a 5-year planning cycle
Unlikely	Likely to occur within a 20 – 50-year period	0.1	Event is expected to occur 10% to 30% of the time during a 5-year planning cycle
Highly Unlikely	Not likely to occur within a 50-year period	0.03	Event is expected to occur <10% of the time during a 5-year planning cycle

Table 33: BHP risk severity table

Severity table		
Severity level	Descriptor	Severity factor
5	Severe impact to the environment and where recovery of ecosystem function takes 10 years or more	1000
4	Serious impact to the environment, where recovery of ecosystem function takes between 3 and up to 10 years	300

Severity table		
Severity level	Descriptor	Severity factor
3	Substantial impact to the environment, where recovery of ecosystem function takes between 1 and up to 3 years	100
2	Measurable but limited impact to the environment, where recovery of ecosystem function takes less than 1 year	30
1	Minor, temporary impact to the environment, where the ecosystem recovers with little intervention	10

Table 34: BHP RRR heat map

			Severity level	S1	S2	S3	S4	S5
			Severity factor	10	30	100	300	1000
Likelihood	Likelihood	Likelihood factor	Timeframe	Residual risk calculation (with controls in place and effective)				
	Highly Likely	3	Within 1 year	30	90	300	900	3000
	Likely	1	Within 1-5 years	10	30	100	300	1000
	Probable	0.3	Within 5-20 years	3	10	30	90	300
	Unlikely	0.1	Within 20-50 years	1	3	10	30	100
	Highly Unlikely	0.03	Not within 50 years	0.3	1	3	10	30

With controls in place and implemented effectively, the RRR for the identified risk scenarios of the risk event – a stable condition for land described as a PMLU not being achieved, is deemed to be low (RRR of 10).

The risk treatments for each scenario that are necessary for achieving a stable condition for the land described as the PMLUs are shown below in Table 35.

Table 35: Necessary risk treatments identified to achieve a stable condition for the PMLUs

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
PMLU Scenario 1: Landform failure	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: Approval	Technical services

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
Implementation	Site operations
Proposed actions	- Materials characterisation - Growth media assessment to determine ameliorant and physical treatment requirements - Application of ameliorants and physical treatments as per assessment - PMLU selected based on most appropriate for landform and materials - Groundcover of vegetation and rock (where appropriate) to provide erosion resistance - Flooding of underground workings - Subsidence crack repairs and drainage to reduce inundation/ponding to acceptable limits - Rehabilitation and subsidence monitoring and maintenance
Resource requirements	- Available material inventory - Equipment capabilities - Survey - Rehabilitation monitoring - Growth media assessment - Stockpile materials if required
Performance measures and constraints	- Comparison against design - Tracking against milestone criteria
Reporting and monitoring	- Rehabilitation monitoring - Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring
Risk timing and scheduling	From commencement of rehabilitation activities to final achievement of PMLU
PMLU Scenario 2: Alteration of hydrogeological conditions	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Environment team - Water team

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
	Site operations
Proposed actions	- All imported hazardous materials to be stored and used in accordance with relevant standards and removed from site on completion of operations - Installation of relevant groundwater monitoring bores - Collection and analysis of data to support the development of site-specific groundwater quality limits - Revisiting and updating the groundwater models every five years (commencing from 2080) - Contaminated land investigation to be undertaken at time of closure and implementation of remediation and/or site management plans as required - Cumulative groundwater modelling to be undertaken at mine closure
Resource requirements	- Groundwater monitoring infrastructure - Sample collection and laboratory analysis - Development of site-specific groundwater quality limits
Performance measures and constraints	Compliance with PRCP Condition/milestone criteria
Reporting and monitoring	Groundwater monitoring data analysis and implementation of any necessary remediation activities identified
Risk timing and scheduling	From commencement of mining to final achievement of PMLU
PMLU Scenario 3: Alteration of surface water systems	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Environment team - Water teams - Site operations
Proposed actions	- All imported hazardous materials to be stored and used in accordance with relevant standards and removed from site on completion of operations - Surface water monitoring to be undertaken in accordance with EA conditions

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
	• Installation of monitoring equipment, where appropriate, at the relevant surface water monitoring locations • Collection and analysis of data to support the development of site-specific surface water quality limits for relevant watercourses • Mine dams to be decommissioned and areas rehabilitated • Contaminated land investigations will be undertaken at the completion of operations and remediation works undertaken as appropriate • Rehabilitation and monitoring of disturbed reaches of watercourse undertaken • Subsidence landform to limit reduction in flows to Isaac River and reduce inundation to acceptable limits
Resource requirements	• Monitoring equipment installed in relevant watercourses • Surface water sampling • Development of site-specific surface water quality limits • Sampling equipment and infrastructure to allow collection of samples during runoff events • Flood and subsidence modelling • Subsidence monitoring • Suitably qualified person (SQP) to undertake contaminated land investigations and oversee on-going monitoring requirements
Performance measures and constraints	• Surface water PRCP Conditions/milestone criteria and water quality objective
Reporting and monitoring	• Monitoring when surface water flows are available • Monitoring of subsidence • Reporting under EA requirements • Implementation of any necessary remediation or maintenance activities identified through monitoring
Risk timing and scheduling	• During runoff events suitable for the collection of surface water samples
PMLU Scenario 4: Contaminated land impacting on environmental receptors, rehabilitation and attainment of the PMLUs	
Reasons for selecting treatment option	• Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
Responsibility for plan: - Approval - Implementation	- Environment team - Water teams - Site operations
Proposed actions	- Environmental monitoring and reporting as per the EP Act and existing EA requirements - All stored hazardous materials and infrastructure that have a reasonable potential to release contaminants, will be appropriately recycled or disposed - Contaminated land investigations to be undertaken at the completion of operations to identify contamination that has the potential to adversely impact PMLUs - Implementation of remediation and/or site management plans as required to reduce potential contaminated land risks
Resource requirements	- SQP to undertake contaminated land investigations and oversee on-going monitoring requirements - Sample collection, laboratory analyses and engineering controls
Performance measures and constraints	Attainment of surface water and groundwater milestone criteria and a site suitability statement
Reporting and monitoring	Contaminated land investigation report and reporting of water quality as per EA
Risk timing and scheduling	Contaminated land Investigation at closure and water sampling as per PRCP monitoring program
PMLU Scenario 5: Flooding influences on rehabilitation and final landforms	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Technical services - Site operations
Proposed actions	- Removal of infrastructure from watercourse (e.g. culverts, etc), that could adversely impact flow - Decommissioning of dams - Design of landforms within flood extents that are safe and stable

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
	- Establishment of vegetation suitable for the landform and reduces erosion risks - Undertake monitoring for potential landform risks and undertake maintenance - Subsidence drainage works to limit inundation/ponding to acceptable limits
Resource requirements	- Flood modelling - Rehabilitation monitoring post flood events
Performance measures and constraints	- Inundation from a 2% AEP rainfall event not more than 1m - Final landform to be predominantly free draining
Reporting and monitoring	- Rehabilitation monitoring - Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring
Risk timing and scheduling	As per PRCP monitoring program
PMLU Scenario 6: Rehabilitated landforms result in alteration of flood hydrology upstream and downstream	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Technical services - Site operations
Proposed actions	- Removal of infrastructure within watercourse alignments (e.g. culverts) that could adversely impact flows - Decommissioning of dams - Subsidence crack repairs and drainage works to limit inundation/ponding to acceptable limits - Establishment of landforms that are stable - Undertake modelling, monitoring and maintenance works where required to maintain landforms
Resource requirements	- Flood modelling - Rehabilitation monitoring post flood events
Performance measures and constraints	No unacceptable damage to infrastructure or ecosystems as a result of changes to flood regime or change to flood extent

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
Reporting and monitoring	- Rehabilitation monitoring - Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring
Risk timing and scheduling	As per PRCP monitoring program
PMLU Scenario 7: Insufficient or inappropriate growth media required for rehabilitation	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Technical services - Environment team - Site operations
Proposed actions	- Management of topsoil stockpiling - Management of rehabilitation material application - Review of the growth media material balance periodically during operations - Growth media assessment to determine ameliorant requirements and physical treatments - Application of ameliorants and physical treatments as per assessment - Rehabilitation monitoring and maintenance
Resource requirements	- Topsoil inventory - Survey - Equipment capabilities - Rehabilitation monitoring data - Growth media assessment
Performance measures and constraints	Tracking against milestone criteria
Reporting and monitoring	- Rehabilitation monitoring - Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring
Risk timing and scheduling	From planning of soil stripping to final achievement of PMLU
PMLU Scenario 8: Inadequate and/or inappropriate revegetation	

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Environment team - Site operations
Proposed actions	- Growth media assessment to determine ameliorant and physical treatment requirements for the PMLU - Application of ameliorants and physical treatments as per assessment - Revegetation species and application rate aligned to growth media, landforms, subsidence impacts and PMLU - Management of seed selection, provenance and quality - Subsidence crack repairs and drainage works to limit inundation/ponding to acceptable limits - Rehabilitation and reference site monitoring - Rehabilitation maintenance
Resource requirements	- Growth media assessment - Seed - Rehabilitation and reference site monitoring
Performance measures and constraints	- Tracking against milestone criteria - Self-sustaining vegetation suited to PMLU
Reporting and monitoring	- Rehabilitation and reference site monitoring - Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring
Risk timing and scheduling	From growth media planning to final achievement of PMLU
PMLU Scenario 9: Deterioration of built infrastructure conditions	
Reasons for selecting treatment option	Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform
Responsibility for plan: - Approval - Implementation	- Environment team - Site operations

Aspect	Risk treatment
Risk event: Stable condition for land described as a post-mining land (reference RHM EA Table F1 - cattle grazing, woodland habitat and watercourse) use is not achieved	
Proposed actions	• Surface infrastructure not being retained on-site to be decommissioned and removed, and underlying land rehabilitated • Undertake a preliminary contaminated land assessment prior to the completion of the approved activities, conduct a detailed site investigation and implement remediation and/or site management plan if required • Capping and sealing of surface infrastructure for underground operations (e.g. shafts, holes) • Rehabilitation monitoring and maintenance
Resource requirements	• SQP to undertake contaminated land investigations and oversee on-going monitoring requirements • Rehabilitation monitoring
Performance measures and constraints	• Tracking against milestone criteria
Reporting and monitoring	• Rehabilitation monitoring • Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring
Risk timing and scheduling	• Throughout operations to final achievement of PMLU

Relationship with PRCP schedule
A risk-based approach has been adopted to develop the milestones in the PRCP schedule. This is primarily driven by a residual risk rating. Should a risk event materialise, the additional proposed actions identified in this risk section will be implemented and, where necessary, adjusted accordingly (in line with the risk treatment identified in this section).

7.2 Rehabilitation trials

PRCP Guideline (Section 3.7.1)

In accordance with section 126C(1)(j) of the EP Act, if rehabilitation trials are planned, the rehabilitation planning part must state:

- the objective of the trial(s)
- the trial design including, but not limited to, the location, underlying land characteristics and potential issues
- the details of how the trial(s) will be carried out
- when the trial(s) will commence
- the duration of the trial(s)
- how the trial(s) will be assessed for success
- how the results of the trial(s) will be incorporated into rehabilitation strategies and the development of milestones, and
- where the trials have previously been carried out by the applicant.

The information requirements in this section will apply to all applicants, whether or not they are an existing EA holder, who have planned or commenced rehabilitation trials. Existing EA holders can provide details of any rehabilitation trials that have occurred prior to the submission of the proposed PRC plan.

No rehabilitation trials are proposed at RHM. Current rehabilitation practices will be executed in line with the PRCP rehabilitation milestone criteria for each PMLU.

8 MONITORING AND MAINTENANCE

PRCP Guideline (Section 3.8)

Under section 126C(1)(j) of the EP Act, the administering authority considers monitoring and maintenance necessary to decide if the PRC plan is consistent with the requirements of the legislation. The rehabilitation planning part must contain a monitoring and maintenance program that identifies and describes the monitoring systems that will be carried out in order to demonstrate a milestone and milestone criteria have been achieved. The program must include, where relevant to the milestone and milestone criteria (but is not limited to):

- schedule of monitoring, reporting and review for each milestone
- description of methodologies and standards, which could include field-based assessments and the application of new remote sensing, GIS and other relevant emerging technologies
- monitoring that enables the repeatable collection of relevant statistically valid data
- monitoring using appropriate quality assurance and data management processes and systems
- regular analysis of site data including multi-year comparison trends and bench-marking against analogue/reference sites
- contingency strategies if monitoring data indicates milestone criteria are not being met
- post-closure monitoring to ensure milestone criteria has been demonstrated
- intent of monitoring reports, such as provision of results and key findings

The information requirements in this section will apply to all applicants whether or not they are an existing EA holder. However, existing holders may already have the required information available from previously submitted plans/reports/applications that, if still valid, could be used in the PRC plan. If there has/is any monitoring or maintenance of areas already rehabilitated, details must be included in the PRC plan.

8.1 Rehabilitation monitoring

Rehabilitation milestone monitoring will be undertaken at RHM by an AQP to demonstrate achievement of the rehabilitation milestones, as they relate to achieving the PMLUs of cattle grazing, woodland habitat or watercourse. The RMs and associated milestone criteria for RHM are detailed in Section 1.4.2 and Section 10.4. A combination of monitoring, reporting and data analysis approaches will be used to demonstrate the achievement of the RMs as detailed in Table 36.

Table 36: Rehabilitation milestones with relevant reporting requirements

RM	Rehabilitation milestone	Reporting requirements
RM1	Infrastructure decommissioning and removal	- Document visual inspections - Map of retained below-ground infrastructure - Document regulated waste removal - Assessment report for mine water dams
RM2	Remediation and/or management of contaminated land	Contaminated Land Investigation Document, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan
RM3	Landform development and reshaping	- Survey/LiDAR of landform - Analysis of final landform against design
RM4	Surface preparation (cattle grazing)	- Document growth media depth - Growth media assessment and amelioration and physical treatment plan - Document ameliorants and physical treatments applied
RM5	Surface preparation (woodland habitat)	- Document growth media depth - Growth media assessment and amelioration and physical treatment plan - Document ameliorants and physical treatments applied
RM6	Surface preparation (watercourse)	- Document growth media depth - Growth media assessment and amelioration and physical treatment plan - Document ameliorants and physical treatments applied
RM7	Revegetation (cattle grazing)	Document seed mix, purity information, planting timing, seed application rates and areas
RM8	Revegetation (woodland habitat)	Document seed mix, purity information, planting timing, seed application rates and areas
RM9	Revegetation (watercourse)	Document seed mix, purity information, planting timing, seed application rates and areas
RM10	Achievement of surface requirements (cattle grazing)	Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5
RM11	Achievement of surface requirements (woodland habitat)	Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5

RM	Rehabilitation milestone	Reporting requirements
RM12	Achievement of surface requirements (watercourse)	Rehabilitation monitoring as per Sections 8.1, 8.3 and 8.5
RM13	Achievement of post-mining land use to a stable condition (cattle grazing – RA3)	- Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5 - Hazard assessment - SQP contaminated land verification report
RM14	Achievement of post-mining land use to a stable condition (woodland habitat – RA21)	- Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5 - Hazard assessment - SQP contaminated land verification report
RM15	Achievement of post-mining land use to a stable condition (watercourse – RA11)	- Rehabilitation monitoring as per Sections 8.1, 8.3 and 8.5 - Hazard assessment

8.1.1 Remote sensing and technology

The current rehabilitation monitoring program utilises the capture and analysis of field data. Future advances in monitoring could include developments in remote sensing, technology and/or digital data capture which may be incorporated into the program, wherever practical.

8.1.2 Erosion monitoring

Erosion monitoring will be conducted for all PMLUs at the frequencies in Table 38 and Table 41, and will support achievement of surface requirements (RM10 – RM12) and the PMLU to a stable condition (RM13 – RM15).

There is no consensus in Australia on a quantitative or precise definition of what constitutes minor, moderate and/or severe erosion (CSIRO, 2009). For this reason, the best approach to assess the state and severity of erosion is by an AQP during monitoring.

Sheet, rill or gully erosion classified as severe according to the Australian soil and land survey field handbook (CSIRO, 2009) will be remediated (Table 37). All minor or moderate erosion, plus other erosion types, such as tunnel erosion, will be assessed by an AQP and will be remediated if assessed as requiring intervention to ensure the PMLU is achieved. This ensures the erosion is assessed holistically, such as to ensure repair will not cause more damage, instead of a purely quantitative assessment. Additional criteria has been proposed for gully erosion as this is considered the major erosion risk to achievement of a PMLU to a stable condition:

- Gullies do not exceed 1m in depth at any point
- Gullies do not expose geochemically problematic materials
- The cause of the gully is known and has been resolved
- Gullies have established and persistent vegetation cover at the head of the gullies
- Gullies are stabilised

The rehabilitation milestones for the achievement of PMLU to a stable condition also require a safety hazard assessment to be completed, which also ensures any erosion that is a safety hazard is remediated. RHM plan to develop site-based criteria to assess erosion within 5 years of the commencement of this PRCP.

Table 37: Erosion classifications

Erosion*	Minor	Moderate	Severe
Sheet erosion	Indicators may include shallow soil deposits in downslope sediment traps (fencelines, farm dams). Often very difficult to assess as evidence may be lost with cultivation, pedoturbation or revegetation.	Indicators may include partial exposure of roots, moderate soil deposits in downslope sediment traps (fencelines, farm dams)	Indicators may include loss of surface horizons, exposure of subsoil horizons, pedestalling, root exposure, substantial soil deposits in downslope sediment traps (fencelines, farm dams)
Rill erosion	Occasional rills	Common rills	Numerous rills forming corrugated ground surface
Gully erosion	Gullies are isolated, linear, discontinuous and restricted to primary or minor drainage lines	Gullies are linear, continuous and restricted to primary and minor drainage lines	Gullies are continuous or discontinuous and either tend to branch away from primary

**Erosion classification definitions (CSIRO, 2009)*

8.1.3 Subsidence cracking

Subsidence areas will be assessed for surface cracking via LiDAR and/or on-ground inspections. Subsidence cracking will be monitored as scheduled in Table 38 and Table 41, but may be assessed more frequently based on risk. Subsidence cracking will be managed according to erosion risk and likelihood of self-healing (Section 6.4.4.2).

8.1.4 Drainage and ponding areas

Subsidence areas may have partial backfill and/or drainage constructed to reduce subsidence induced ponding and to manage the entry of surface flows into the Isaac River and its tributaries (Section 6.4.4). Drainage features will be monitored as scheduled in Section 8.2.1, but may be assessed more frequently based on risk. Monitoring of the drainage features will be undertaken to confirm they remain stable and function as intended and to identify maintenance requirements. Areas subject to potential ponding will be monitored for the standard PMLU rehabilitation parameters as detailed in Section 8.2.

8.2 Cattle grazing and woodland habitat monitoring

8.2.1 Monitoring schedule

The rehabilitation monitoring program follows a phased approach as detailed in Table 38. Initial monitoring is undertaken on an annual basis for the first three-years to primarily assess vegetation establishment. This approach allows a timely assessment of the performance of rehabilitation post initial seeding and provides critical information to determine if rehabilitation is on track towards achieving surface requirements, or if maintenance is required.

Additional rehabilitation parameters are included in the monitoring program in years three, five, 10 and five-yearly thereafter, to assess and track achievement of surface requirements (RM10 and RM11) and achievement of PMLU to a stable condition (RM13 and RM14). The phased approach of the monitoring program enables regular analysis of rehabilitation monitoring data, including multi-year comparison of trends.

Monitoring of cattle grazing and woodland habitat reference sites will be undertaken for the parameters listed in Table 38 and will be implemented as per the monitoring schedule from Year 3.

Table 38: Cattle grazing and woodland habitat PMLU monitoring schedule and measured rehabilitation parameters

Rehabilitation parameter	Monitoring schedule				
	Year 1	Year 2	Year 3	Year 5	Year 10+ (5-yearly thereafter)
Cattle grazing and woodland habitat PMLUs					
Landform and erosion	✓	✓	✓	✓	✓
Soil	✓	-	✓	✓	✓
Subsidence cracking (RA21)	✓	✓	✓	✓	✓
Cattle grazing PMLU					
Groundcover	✓	✓	✓	✓	✓
Invasive plants	✓	✓	✓	✓	✓
Grazing land suitability assessment	✓	-	✓	✓	✓
Land condition	-	-	✓	✓	✓
Pasture condition	-	-	✓	✓	✓
Woodland habitat PMLU					
Groundcover (including native perennial grass cover, little cover, non-native plant cover)	✓	✓	✓	✓	✓
Species richness (trees, shrubs, grass, forbs/other)	✓	✓	✓	✓	✓
Tree height	-	-	✓	✓	✓
Tree canopy and shrub layer cover	-	-	✓	✓	✓
Recruitment	-	-	✓	✓	✓
Invasive species	✓	✓	✓	✓	✓
Tree stem count/basal area	-	-	✓	✓	✓

8.2.2 Rehabilitation monitoring sites

Permanent rehabilitation monitoring sites will be established as part of the initial rehabilitation monitoring (Year 1) and will be assessed during all phases of rehabilitation monitoring. The permanent field monitoring sites should be selected using the following criteria:

- Representative of rehabilitation slope or subsidence impacts
- Accessible (vehicle access preferred)

8.2.3 General rehabilitation monitoring parameters

8.2.3.1 Landform and erosion

Landform and erosion will be assessed as part of all monitoring phases (Table 38). Prior to commencing the field monitoring work, a desktop assessment using LiDAR data and aerial imagery will be completed to assess the rehabilitated slope against the landform design (Year 1), and the ongoing monitoring of the landform and slopes.

The desktop analysis will identify potential areas of ponding due to subsidence, areas of deposition (where the ground level has increased over time), as well as the progression of erosion features such as developing gullies.

Field-based erosion monitoring will be conducted at the permanent monitoring sites, as well as any new areas identified in the desktop assessment. If erosion is present, an erosion monitoring transect will be established by running a 50m tape perpendicular to the slope and across the erosional activity identified by the LiDAR analysis.

There is no consensus in Australia on a quantitative or precise definition of what constitutes minor, moderate and/or severe erosion (CSIRO, 2009). For this reason, the state and severity of erosion and the requirement for remediation will be assessed by an AQP during monitoring.

8.2.3.2 Soil

The parameters detailed in Table 39 will be analysed during all monitoring events for soils. Soil profile pits or cores will be located within close proximity to the permanent rehabilitation monitoring sites. Surface sampling depth refers to the top 0 – 10cm; and sub-surface sampling depth refers to layers at 10 – 30cm, 30 – 60cm and 90 – 100cm.

Table 39: Soil analysis parameters for rehabilitation monitoring

Category	Analyte	Purpose of analyte	Depth	
			Surface	Sub-surface
Acidity/alkalinity	pH	Identify anomalies that may affect plant growth and sustainability.	✓	✓
Salinity	EC	Identify leaching profile. High salinity can lead to poor vegetation germination and establishment, reduced plant growth and vigour.	✓	✓
Exchangeable cations	CEC	Major factor in soil fertility. Controls soil stability, nutrient availability and buffers soil's chemical properties.	✓	✓
	ESP	ESP is a measure of the dominance of sodium ions on the soil's cation exchange complex. Sodicity in soils can lead to slaking and dispersion which impact soil structure and stability.	✓	✓
Organic matter	Organic carbon	An indicator of soil nutrient stores and a contributor to improvements in soil structure. Increases in organic carbon is a key indicator of rehabilitation success.	✓	-
Major elements	Total Nitrogen	Indicator of soil nutrient store and is also a major plant nutrient.	✓	-

Category	Analyte	Purpose of analyte	Depth	
			Surface	Sub-surface
	Extractable Phosphorous (Colwell method)	Indicator of phosphorous readily available to plants.	✓	-
	Total Phosphorous	Indicator of total store of phosphorous, some of which is readily available. Key indicator of potential for long-term success or failure of rehabilitation.	✓	-

8.2.4 Cattle grazing specific rehabilitation parameters

8.2.4.1 Groundcover

Groundcover will be assessed at the permanent rehabilitation monitoring sites as part of all monitoring events. Groundcover type is recorded as either live cover (with species recorded), standing dry cover, organic litter (including leaves, hay and woody debris (i.e. logs or dead timber)), rocks, or bare ground. The percentage of total groundcover (anything in contact with the soil surface) is calculated.

8.2.4.2 Invasive plants

An invasive plant is a prohibited or restricted matter under the *Queensland Biosecurity Act 2014*, and is defined as a species that has, or is likely to have an adverse impact on a biosecurity consideration because of the introduction, spread or increase in population size of the species in an area. Prohibited invasive plants are currently not present or known to be present in Queensland and have therefore been excluded from any proposed criteria. A complete list of invasive plant species is listed in Schedule 2, Part 2 (Restricted matter – invasive biosecurity matter) of the *Queensland Biosecurity Act 2014*.

'Restricted' invasive plants will be assessed at the permanent rehabilitation monitoring sites and reference sites as part of all monitoring phases. The presence and percent cover of invasive plants, calculated as a percentage of the total vegetation cover, will be recorded at each site.

8.2.4.3 Grazing land suitability assessment

Land suitability (Section 3.1.1.2) will be assessed at Year 1 to determine the effectiveness of ameliorants or if further treatments are required. Ongoing grazing land suitability assessments will be undertaken at the permanent rehabilitation monitoring sites as part of all monitoring events from Year 3. The land suitability will be classed 1 to 5 as per the limitations in Table 17.

8.2.4.4 Land condition

Grazing Land Management ABCD land condition will be assessed at the permanent cattle grazing rehabilitation monitoring sites from Year 3. This allows at least two seasons after seeding for pasture species to establish. Land condition will be assessed and rated Good (A), Fair (B), Poor (C) or Degraded (D) as described in the *Queensland Reef Protection Regulations Farming in Reef Catchments Grazing Guide* (DES, 2022a)(Table 17).

8.2.4.5 Pasture condition

Pasture condition will be assessed at the permanent rehabilitation monitoring sites from Year 3.

The density and coverage of 3P grasses is a key indicator of pasture condition (DES, 2022a). Pasture condition monitoring will be undertaken in accordance with the Stocktake GLM method (Department of Agriculture and

Fisheries, 2021). The assessment includes an estimate of the percentage of dry matter (DM) yield in kg/ha comprised of 3P pasture species versus the percentage DM yield in kg/ha of annual and undesirable grasses. Based on the monitoring data, pasture condition will be rated per the condition indicators in Table 40.

Table 40: Pasture condition assessment table

Condition rating	Condition indicators			
	Preferred pasture species		Annual grass % DM yield	Undesirable grasses and other weeds % DM yield
	% DM yield	Crown cover		
Excellent (A=1)	> 80%	Dense and plants healthy	< 20%	< 20%
Good (B=2)	60 – 80%	High to moderate density and some plants unhealthy	20 – 39%	20 – 29%
Poor (C=3)	10 – 59%	Moderate to low density and some plants dead	40 – 70%	30 – 80%
Very poor (D=4)	< 10%	Sparse and many plants dead	> 70%	> 80%

8.2.5 Woodland habitat specific rehabilitation parameters

8.2.5.1 Groundcover

Groundcover will be assessed at the permanent rehabilitation monitoring sites as part of all monitoring events. The percentage of total groundcover (anything in contact with the soil surface) is calculated.

For groundcover, the following will be assessed and recorded (noting the total sum of cover will equal 100%):

- Native ground cover (shrubs, grasses and forbs)
- Non-native plant ground cover
- Organic litter (fine and coarse organic material, such as fallen leaves, twigs and branches)
- Rock
- Bare ground

8.2.5.2 Species richness

All woody species are recorded for each survey plot. Species richness will be assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases. Species richness includes a full floristic assessment and count of trees, shrubs, grasses (native and exotic), and forbs and other ground species at each site.

8.2.5.3 Tree height

Tree height and height range will be assessed at the permanent rehabilitation monitoring sites from Year 3. Tree height (measured to the top of the highest leaves) refers to the median canopy height for trees in the canopy layer (Eyre, et al., 2015).

8.2.5.4 Tree canopy and shrub layer cover

Tree canopy cover and shrub layer cover will be assessed at the permanent rehabilitation monitoring sites from Year 3 using the line intercept method. The crown of each tree (single-stemmed woody plant greater than 2m

tall) and the crown of each shrub (woody plant that is multi-stemmed from the base (or within 200mm from ground level) or if single stemmed, less than 2m tall) (Eyre, et al., 2015) is recorded and summed as a total tree canopy or shrub distance and converted to a percent cover at each monitoring site.

8.2.5.5 Recruitment

Recruitment will be assessed at the permanent rehabilitation monitoring sites from Year 3. Recruitment of canopy species is assessed by observing the proportion of the dominant canopy species regenerating (<5cm diameter at breast height) at each monitoring site.

8.2.5.6 Invasive plants

'Restricted' invasive plants will be assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases. The presence and percent cover of invasive plants, calculated as a percentage of the total vegetation cover, will be recorded at each site.

8.2.5.7 Tree stem count/basal area

Tree stem count provides another measure of species' abundance which helps describe the vegetation community. The tree stem count records the number of individual trees in a 50m x 10m plot by species. A tree that branches into two or more stems 30cm above the ground is counted as one individual (Neldner, 2022).

Basal area is recorded by species using a single sweep of a Bitterlich stick or similar with basal area factor of 1 (BAF1) from the centre of the plot.

8.3 Watercourse monitoring

Watercourse monitoring will be conducted at RHM to assess the performance of the rehabilitated watercourses disturbed by mining activities. The purpose of the monitoring is to assess the performance of the rehabilitated watercourses in achieving watercourse surface requirements (RM12) and the final PMLU milestone criteria (RM15).

Watercourse monitoring will be undertaken in accordance with the IDC methodology which is outlined in the *Monitoring and Evaluation Program for Bowen Basin River Diversions* (ID&A, 2001). The IDC is a quantitative monitoring method used to measure the geomorphic and riparian vegetation condition of watercourse diversions; however, it can be utilised for both diverted and rehabilitated reaches of watercourses. For rehabilitated watercourses reaches where crossings/culverts are removed, a modified IDC method with a reduced number of monitoring points within each reach is required due to the reduced impact area.

The RHM watercourse monitoring schedule is detailed in Table 41. The monitoring schedule indicates the IDC parameters are measured in Year 1, Year 2, Year 5 and then 5-yearly thereafter.

The IDC methodology encompasses:

- Visual inspection of the rehabilitated watercourse, upstream and downstream reaches (i.e. reference sites)
- Assessment of geomorphic index and riparian vegetation index at nominated monitoring points within the rehabilitated watercourse, upstream and downstream reaches
- Determination of reach-averaged geomorphic index and riparian vegetation index and overall IDC scores for the rehabilitated watercourse, upstream and downstream reaches
- Comparison of the geomorphic index and riparian vegetation index and overall IDC scores for the rehabilitated watercourse reach to the relative upstream and downstream reaches

In addition to the IDC index parameters, several other parameters will also be monitored as listed in Table 41.

Table 41: Watercourse PMLU monitoring schedule and measured rehabilitation parameters

Monitoring parameters		Monitoring schedule			
Parameter	Monitoring detail	Year 1	Year 2	Year 5	Year 10+ (5-yearly thereafter)
Geomorphic index parameters					
Stream width	Width of high flow channel (m) Width of active channel (m) Width of low flow channel (m)	✓	✓	✓	✓
Bank condition	Presence of erosion	✓	✓	✓	✓
Piping of banks	Presence of piping on the banks	✓	✓	✓	✓
Bed condition	Presence of aggradation or degradation within the channel bed	✓	✓	✓	✓
Spoil piles	Proximity of spoil dumps in relation to the monitoring point	-	-	-	-
Recovery	Presence or absence of benches with/without vegetation	✓	✓	✓	✓
Instream structures	Stability of each identified instream structure	✓	✓	✓	✓
Riparian vegetation index parameters					
Riparian zone	Width of riparian zone (m)	✓	✓	✓	✓
Structural intactness	Over-storey, understorey and ground cover (% density)	✓	✓	✓	✓
Regeneration	Presence or absence of regeneration on banks	-	-	✓	✓
Longitudinal continuity	Assess the gaps in the riparian vegetation corridor along the banks	✓	✓	✓	✓
Additional parameters					
Erosion	Assessment of sheet, rill, gully, tunnel and mass movement	✓	✓	✓	✓
Groundcover	Groundcover (%)	✓	✓	✓	✓
Species richness - trees and shrubs	Native plant species richness for life-forms trees and shrubs	✓	✓	✓	✓
Tree canopy cover	Native tree canopy cover (%)	-	-	✓	✓

Monitoring parameters		Monitoring schedule			
Parameter	Monitoring detail	Year 1	Year 2	Year 5	Year 10+ (5-yearly thereafter)
Tree canopy height	Tree median canopy height (m) for ecologically dominant layer or canopy layer	-	-	✓	✓
Recruitment of woody perennial species	Recruitment of woody perennial species in ecological dominant layer	-	-	✓	✓
Subsidence cracking	Assessment of subsidence cracks (where applicable)	✓	✓	✓	✓

8.4 Reference sites

Representative cattle grazing and woodland habitat reference sites will be established when rehabilitation at RHM commences. Cattle grazing reference sites will be established in areas cleared for agriculture and will be assessed against the land suitability framework (Short, 2023). Woodland habitat reference sites will be established in areas of remnant vegetation undisturbed by mining.

Watercourse reference sites will be established in the Isaac River, Goonyella Creek and Twelve Mile Gully when mining commences at RHM. Reference sites will be monitored in accordance with the watercourse monitoring requirements outlined in Section 8.3. Where revegetation is required to rehabilitate a watercourse crossing, a reduced number of reference sites (compared to the IDC method (ID&A, 2001)) will be established due to the reduced impact area.

8.5 Surface water monitoring

Surface water runoff monitoring will be undertaken for watercourse locations included in the Table 42, commencing prior to the completion of surface preparation (RM4 – RM6) works for the entire site.

The surface water monitoring data currently held for the site was collected as part of the RHM EIS and is not suitable for the development of site-specific criteria. Also, as per ANZG (2018), the default guideline values are for generic applications and may not be representative of local conditions, and therefore are not suitable for use as water quality limits for a specific mine site.

Water quality limits should be site-specific and developed through appropriate sampling analytical and quality plans that include data quality objective processes aligned with the intended use of the data. BMA have requested the transitional PRCPs be conditioned to allow the appropriate development of site-specific water quality limits. As the watercourses at RHM are highly ephemeral and do not support baseflows, the establishment of the site-specific water quality limits will be based on the ANZECC guidance for temporary waters (Smith, 2020).

Due to the variability and availability of the stream flows in the target ephemeral watercourses, there is some uncertainty around the timing for completing the establishment of site-specific water quality limits. However, the surface water quality limits will be derived prior to the commencement of coal extraction at RHM.

Water quality monitoring will be undertaken in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009* (DES, 2018).

8.5.1 Rehabilitation area surface water monitoring

Due to the limited surface disturbance within the RHM operations and the nature of the subsidence rehabilitation, it is not proposed to collect surface water samples from representative areas. The assessment of closure surface

water quality will be undertaken through the receiving environment surface water monitoring detailed in Section 8.5.2.

8.5.2 Receiving environment surface water monitoring

The collection and analysis of surface water samples from watercourses will commence, with at least one year of monitoring undertaken, prior to the completion of surface preparation (RM4 – RM6) for the entire site. The objective of the watercourse samples is to facilitate relinquishment of the site through confirming the rehabilitated site is not causing environmental harm through surface water discharges and has generated a stable landform suitable to support the PMLUs.

Surface water quality will be monitored at least once per month when flows at the downstream gauging station record $\geq 5\text{m}^3/\text{second}$ within the Isaac River and $\geq 1\text{m}^3/\text{second}$ for other monitored watercourses (when safe to collect samples). Due to the ephemeral nature of the watercourses that cross RHM, there are no baseflows to allow for collection of samples on a predetermined schedule, and therefore sampling will be undertaken following rainfall events that generate the target flows at the downstream gauging stations.

The water quality within the watercourses, within the five-year period immediately prior to surrender, will be assessed via the following process:

1. Downstream monitoring results will be compared to the site-specific surface water quality limits (once developed). Where downstream monitoring results are below the surface quality limits, no further actions will be required.
2. Where exceedances of the surface water quality limits are identified at the downstream sample locations, the downstream results will be compared to the upstream results for that monitoring round. Where downstream results are equal to or less than the upstream results, no further actions will be required.
3. Where downstream results are above both the specified water quality limits and the upstream results, an AQP will be engaged to assess the risk to achieving a stable condition:
 - a. Where risks are determined to be low, no further action will be taken.
 - b. Where a risk greater than low is identified by the AQP, an assessment of potential environmental harm and any changes or rectification actions to rehabilitation activities will be assessed and implemented.
 - c. Where environmental harm is identified and/or rectification actions to rehabilitation activities are required, at least 5 years of further surface water monitoring will be undertaken.

The surface water monitoring locations are listed in Table 42 and shown in Figure 19. The monitoring locations may be amended as required to account for changes to upstream land uses/stream dynamics or to improve the effectiveness of the monitoring program.

Table 42: Surface water sample locations

Sample location ID	Approximate location (MGA2020 Zone 55)		Description
	Easting	Northing	
RHMPRCPSW03	607316	7598375	Isaac River Upstream
MP3	604899	7590686	Isaac River Downstream
MP7	604556	7601907	Goonyella Creek Upstream
GRMPRCPSW04	605222	7594064	Goonyella Creek Downstream
RHMPRCPSW01	608544	7595135	Twelve Mile Gully Creek Upstream
RHMPRCPSW02	605855	7591235	Twelve Mile Gully Creek Downstream

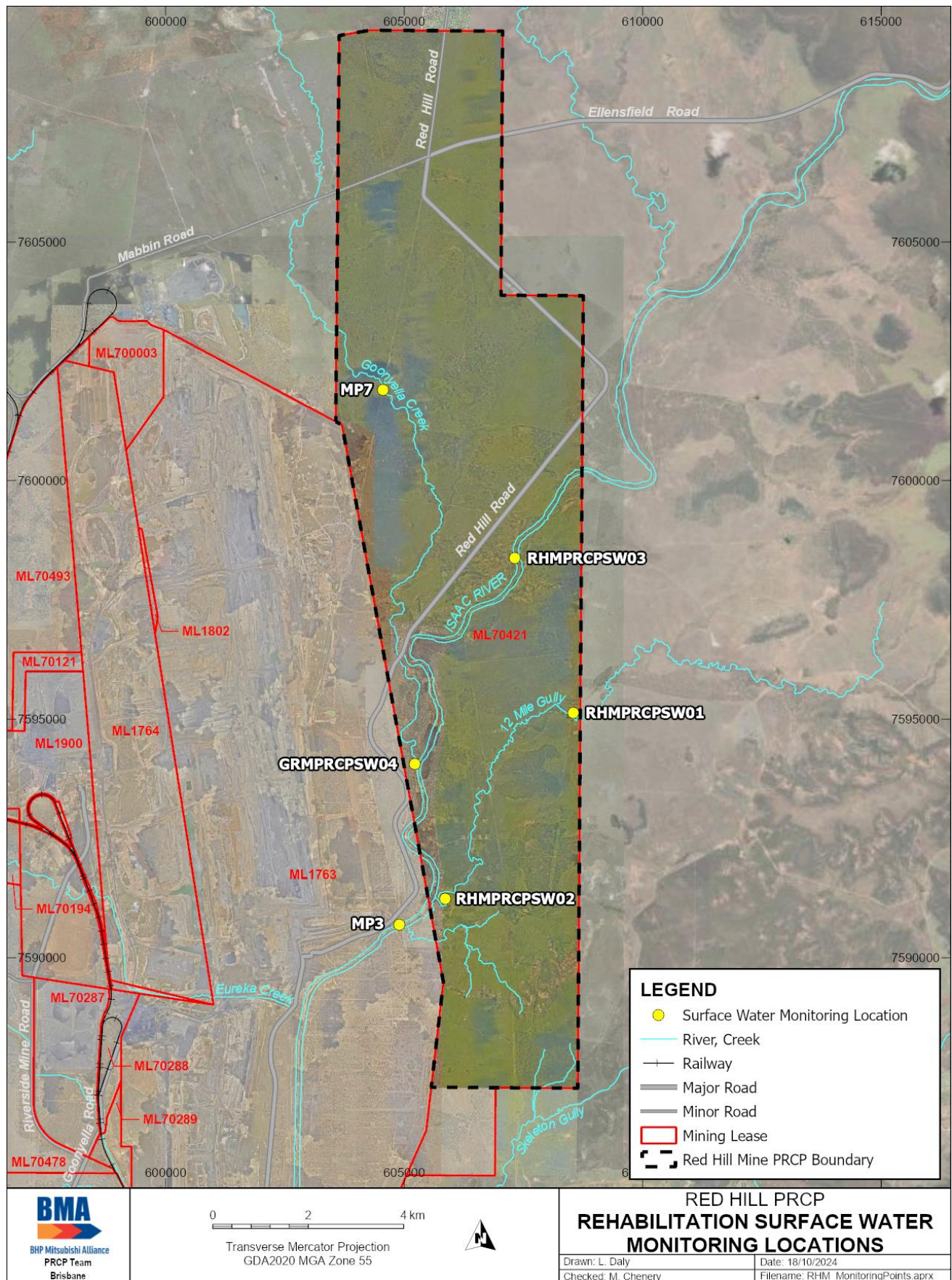


Figure 19: RHM surface water monitoring locations

8.6 Groundwater monitoring

In line with the Guideline for Progressive Certification for Resource Activities (DES, 2022b), deep drainage water quality will be “*addressed holistically for a site at surrender*”. The objective and acceptance criteria for groundwater is not considered relevant to progressive rehabilitation of discrete packages of rehabilitated land due to the scale and nature of groundwater aquifers. Therefore, groundwater monitoring will commence by 2080 and provide more than a decade of water monitoring data prior to the scheduled completion of mining.

8.6.1 Groundwater quality

As operations at RHM have not commenced, there is limited groundwater monitoring data. The groundwater data set held was collected sporadically for specific projects, for which different sampling methodologies and data quality objectives were applied. Therefore, this data was not collected with the intent of using it to develop site-specific criteria. Also, as per ANZG (2018), the default guideline values are for generic applications and may not be representative of local conditions, and therefore are also not suitable for use as water quality limits. The execution of scopes for the installation of monitoring infrastructure and collection of appropriate data sets to support the development of site-specific criteria, could not be completed within the transitional PRCP notice timeframes.

Water quality limits should be site-specific and developed through appropriate sampling analytical and quality plans that include data quality objective processes aligned with the intended use of the data. BMA have requested the transitional PRCPs are conditioned to allow the appropriate development of site-specific water quality limits.

To allow sufficient time to install required monitoring infrastructure, and collect a reasonable data set of the required quality to support the development of the required site-specific criteria, the development of the criteria is expected to take in the order of 10 years and will be completed prior to the commencement of operations at RHM.

Water quality monitoring will be undertaken in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009* (DES, 2018).

8.6.2 Groundwater levels

Monitoring of groundwater levels will focus on the relationship between the Permian groundwater level recovery and the GRM Goonyella residual void's lake level. Groundwater level/gradient trends over time will be assessed against the more dynamic pit lake levels to demonstrate the groundwater within the Permian is progressing to where it will develop a hydraulic gradient towards the GRM Goonyella residual void and thus minimising the potential for an unacceptable risk of environmental harm.

Due to the timeframes involved post-dewatering to achieve stabilisation of the groundwater levels (~100 years), the intention of the groundwater level monitoring is to obtain suitable data to support predictive groundwater numerical modelling. The predictive modelling will be used to confirm progress towards development of the inward hydraulic gradient towards the Goonyella residual void, which will act as a long-term groundwater sink for the mined Permian lithology. Demonstrating the progress towards development of inward hydraulic gradients is to be done through predictive numerical modelling completed by AQP.

8.6.3 Groundwater monitoring schedule

During operations, groundwater monitoring will continue as per the applicable EA conditions.

Groundwater monitoring to assess the rehabilitated site will commence in 2080 prior to the scheduled completion of mining at RHM. Groundwater at the nominated locations will be monitored six monthly and compared against the site-specific groundwater quality limits.

8.6.4 Groundwater monitoring locations

Groundwater monitoring to support the assessment of closure conditions will be undertaken on bores that provide a reasonable assessment of aquifers that could form complete exposure pathways. The groundwater

monitoring bore network to assess closure conditions will include selected bore locations that are appropriate and accessible in the closure landform, bores shared with neighbouring GRM and BRM, bores installed specifically to close data gaps and replacement bores. The groundwater monitoring network to be utilised for assessment of rehabilitation are provided in Table 43 and illustrated in Figure 20.

The groundwater monitoring program may be amended to include additional bores to better assess hydrogeological conditions, or to replace lost or damaged bores, as required. Planned new bores to be installed as part of the rehabilitation monitoring program will be dependent on safe access and the presence of the target hydrogeological unit (e.g. alluvium) and groundwater at the selected locations.

Table 43: RHM rehabilitation groundwater monitoring locations

Sample location ID	Approximate location (MGA2020 Zone 55)		Description	Hydro-geologic unit
	Easting	Northing		
GRM_MB_114	605172	7596072	Adjacent to Isaac River and Goonyella Creek on easter side of lease	Alluvial/Tertiary
GRMMB04_01_HY	606953	7599206	Central portion of tenement. Planned new bore	Alluvial/Tertiary
GRMMB04_02_HY	606946	7599201	Central portion of tenement. Planned new bore	Alluvial/Tertiary
GRMMB04_03_HY	606938	7599195	Central portion of tenement. Planned new bore	Fort Cooper Measures - Coal Seam
GRMPRCPGW01	604217	7598105	Western tenement boundary adjacent to the Goonyella residual void. New bore.	GLS
GRMPRCPGW02	604906	7590821	West of tenement boundary immediately to the south of Goonyella residual void. New bore	GLS
GRM_MB_115	606690	7593368	Adjacent to Twelve Mile Gully. Planned new bore	Alluvial/Tertiary
GRM_MB_116	607639	7591258	Southern end of subsidence area. Planned new bore	Tertiary

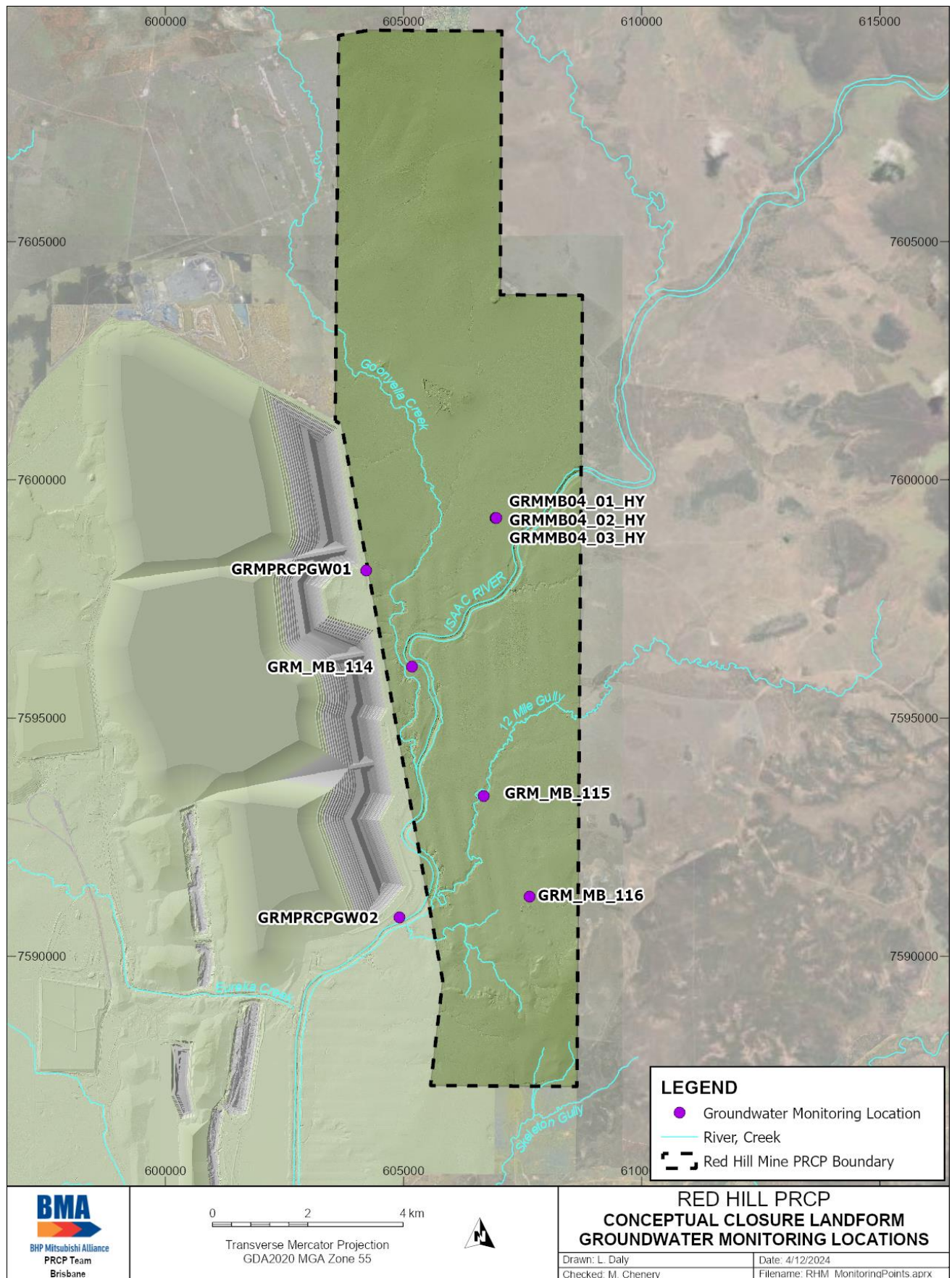


Figure 20: RHM rehabilitation groundwater monitoring bores

8.7 Achievement schedule

The timing of the rehabilitation milestones specific to achievement of surface requirements and achievement of cattle grazing, woodland habitat and watercourse PMLUs are listed in Table 44. These timeframes have regard to the risks presented in Section 7.

Achievement of surface requirements for cattle grazing (RM10) is proposed within a 10-year timeframe from revegetation and a further five-years for achievement of PMLU to a stable condition for cattle grazing (RM13). There are a number of factors which can influence the successful establishment of pastures on post-mined land including landform, soil management and amelioration, species selection, seeding rates and seeding timing, plus rainfall. This will allow for sufficient time to demonstrate the ongoing sustainability of the PMLU for cattle grazing through rehabilitation monitoring data associated with land condition and pastures.

Achievement of surface requirements for woodland habitat (RM11) and watercourse (RM12) are proposed within a 10-year timeframe from revegetation. A further 10-years is allowed for initial establishment and successional processes and natural recruitment to occur, prior to achievement of the PMLUs to a stable condition (RM14 and RM15).

Table 44: Time for achievement of surface requirements and PMLUs rehabilitation milestones

RM	Rehabilitation milestone	Milestone achievement time after revegetation (in PRCP schedule)
RM10	Achievement of surface requirements (cattle grazing)	10-years
RM11	Achievement of surface requirements (woodland habitat)	10-years
RM12	Achievement of surface requirements (watercourse)	10-years
RM13	Achievement of post-mining land use to a stable condition (cattle grazing)	Up to 15-years
RM14	Achievement of post-mining land use to a stable condition (woodland habitat)	Up to 20-years
RM15	Achievement of post-mining land use to a stable condition (watercourse)	Up to 20-years

8.8 Data analysis and reporting

Rehabilitation monitoring data will be collected and analysed by an AQP and assessed against the milestone criteria. The data will be analysed to identify changes and trends, as well as map the trajectory of rehabilitation to identify whether it is on track to achieve the milestone criteria or requires corrective actions or maintenance.

The rehabilitation data will be stored and processed within internal geospatial and document management systems.

8.9 Maintenance

Maintenance will be implemented when monitoring identifies issues with the rehabilitation, or when milestone criteria are not being met. In order to select the most appropriate corrective actions, rehabilitation monitoring data will be analysed to identify the likely cause(s). Required maintenance/corrective actions will be entered into BMA's work management system for actioning and record management.

To support ongoing operations, exploration and minor ancillary activities may be required in areas not within a RA in some circumstances (Section 1.4.2). Rehabilitation of these activities will be managed as part of maintenance works and executed as soon as practicable and within at least six months of the completion of the

exploration or minor disturbance. Maintenance works may include removing infrastructure, reshaping the area, re-spreading stripped topsoil, applying seed mix aligned to the PMLU, weed control or managing erosion. These rehabilitated areas will be monitored as per Section 8.

8.10 Quality assurance and quality control

The QA/QC process to be followed as part of RHM ongoing rehabilitation monitoring is illustrated in Figure 21. The process provides for initial execution of the rehabilitation in accordance with the rehabilitation plan, followed by verification of the execution against the rehabilitation plan. Based on the verification outcomes, allowance is made for implementation of corrective actions, as needed. All rehabilitated areas then undergo rehabilitation monitoring; and subsequent execution of maintenance actions identified through the monitoring (Section 8) and improvements to the rehabilitation methodology. This process allows for a repetitive execution-verification-corrective action-monitoring QA/QC approach, to ensure rehabilitation areas progress on a trajectory towards achievement of milestone criteria and eventual certification.



Figure 21: Rehabilitation monitoring quality assurance / quality control process

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B: PRCP SCHEDULE

10 PRCP SCHEDULE

Legislative Requirement

In accordance with section 126D(1) of the EP Act, the PRCP Schedule in the PRC Plan must:

- a) describe the area of each resource tenure either a post-mining land use or non-use management area, and
- b) for each post-mining land use state:
 - i. each rehabilitation milestone required to achieve a stable condition, and
 - ii. when each rehabilitation milestone is to be achieved, and
- c) for each non-use management area state:
 - i. each management milestone, and
 - ii. when each management milestone is to be achieved, and
- d) include maps showing the land mentioned in (a), (b) and (c).

PRCP Guideline (Section 4)

The development and implementation of the PRCP schedule is an essential element of a PRC plan. The administering authority approves a PRCP schedule and applicants are required to comply with the conditions and milestones of the schedule. A PRCP schedule must include:

- either a PMLU or NUMA for all land within the relevant resource tenures, including undisturbed land
- identification of when land becomes available for rehabilitation or improvement
- rehabilitation or management milestones to achieve the PMLU or NUMA outcomes
- milestone criteria that demonstrate when each milestone has been completed
- completion dates for each milestone to be achieved
- any conditions considered necessary or desirable.

Applicants are required to develop and submit a proposed PRC plan when they make a site-specific application for an EA or receive a notice from the administering authority requiring the submission of a proposed PRC plan. The administering authority will assess the proposed PRCP schedule in conjunction with the rehabilitation planning part (see section 3 of this guideline) and decide whether to approve or refuse the PRCP schedule, amend the proposed PRCP schedule as necessary or impose milestones and conditions as necessary and impose conditions as necessary or desirable (see section 2.5 of this guideline). Once approved by the administering authority, the PRCP schedule becomes a legally binding and enforceable instrument with which the holder must comply.

10.1 Final site design

The RHM final site design is provided in Figure 22.

10.2 Reference map

The RHM reference map is provided in Figure 23.

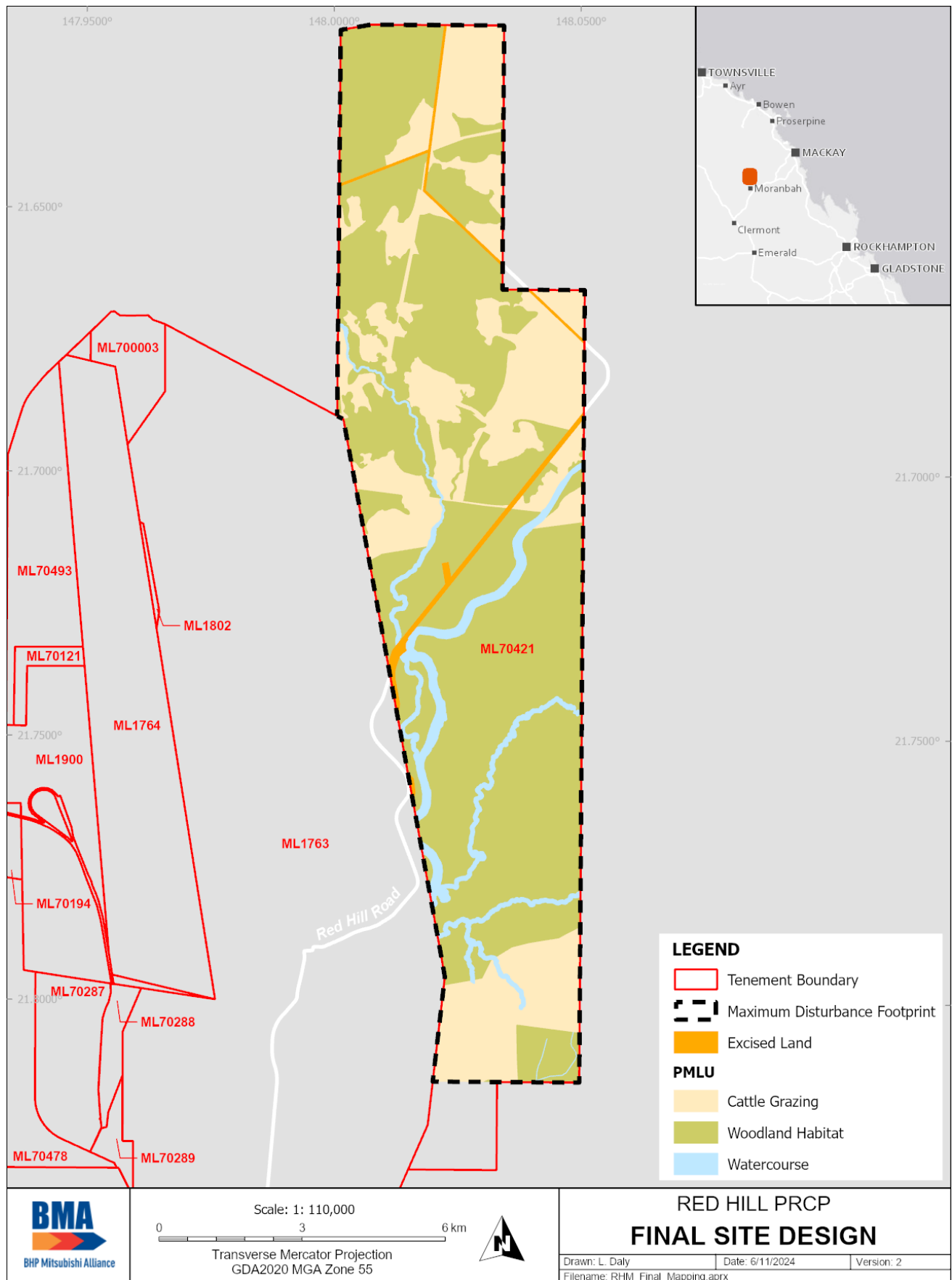


Figure 22: RHM Final site design

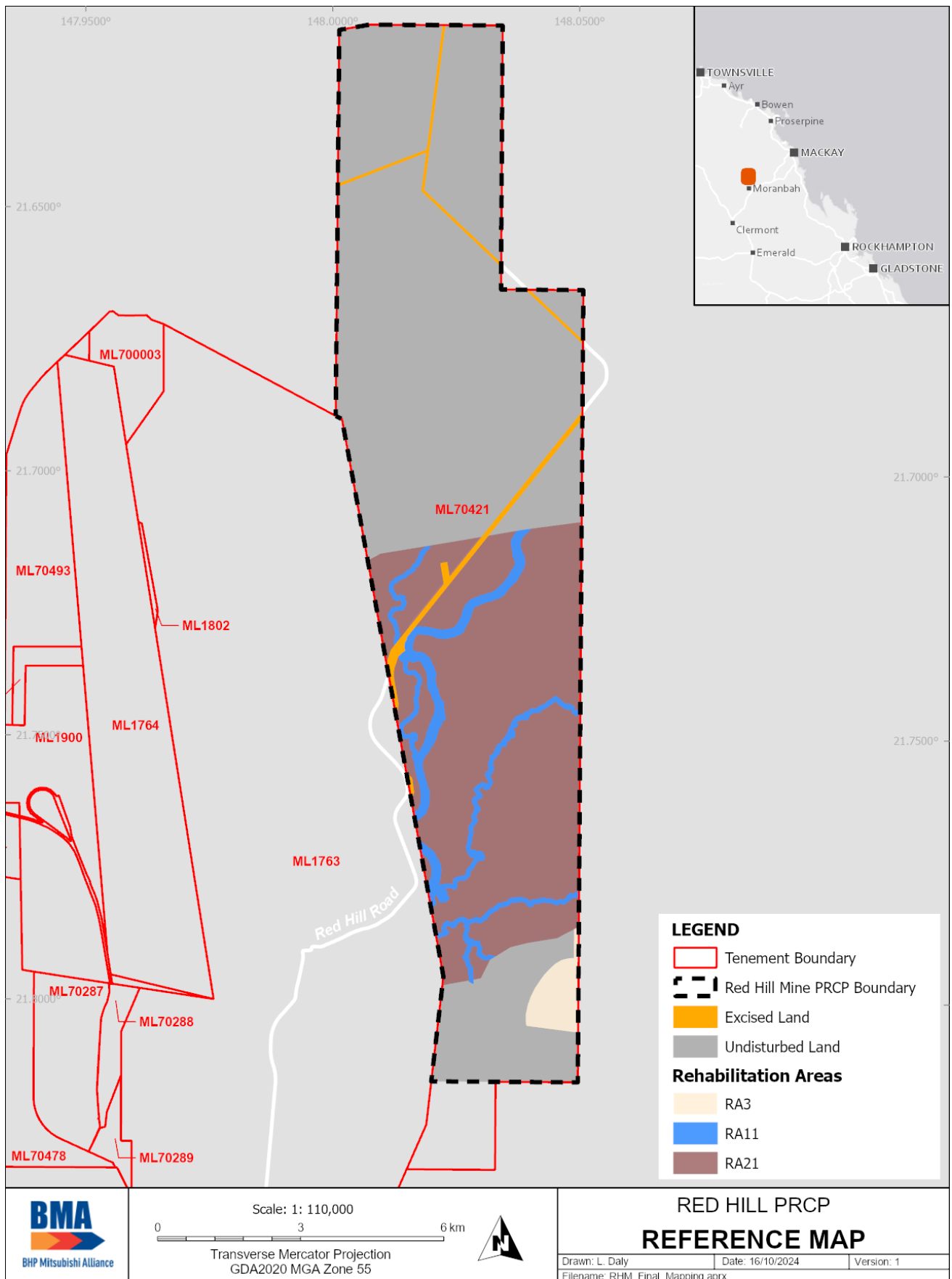


Figure 23: RHM Reference map

10.3 Schedule Conditions

The proposed groundwater and surface water conditions for the RHM PRCP are shown in Table 45.

Table 45: RHM PRCP conditions for groundwater and surface water

Condition #	PRCP Condition
PRCP11	With respect to groundwater: a) The monitoring bores listed in Table 43: RHM rehabilitation groundwater monitoring locations must be installed by 2080; and b) Following monitoring bore installation, groundwater quality must be monitored six monthly at, but not limited to, bores specified in Table 43: RHM rehabilitation groundwater monitoring locations; and c) The holder must develop site-specific groundwater quality limits prior to the commencement of operations; and d) The groundwater model must be recalibrated and predictions rerun at least every five years commencing from 2080.
PRCP12	With respect to groundwater the following must be demonstrated prior to surrender: a) Groundwater quality results for compliance bores have not exceeded the site-specific groundwater quality limits, for 3 consecutive results within the five-year period immediately prior to surrender.
PRCP13	With respect to surface water: a) The holder must install monitoring equipment at the relevant surface water monitoring locations specified in Table 42: Surface water sample locations and undertake at least one year of surface water quality monitoring prior to the completion of surface preparations for the entire site; and b) Surface water quality must be monitored at the locations specified in Table 42: Surface water sample locations at least once per month when flows at the downstream gauging station record $\geq 5\text{m}^3/\text{second}$ for the Isaac River and $\geq 1\text{m}^3/\text{second}$ for other monitored watercourses, when safe to collect samples. c) The holder must develop site-specific surface water quality limits for the watercourses listed in Table 42: Surface water sample locations.
PRCP14	With respect to surface water the following must be demonstrated prior to surrender: a) Surface water quality must not exceed the site-specific surface water quality limits within the five-year period immediately prior to surrender; b) If the surface water quality exceeds criteria a), the applicable upstream/reference site must be compared to the downstream site result; and quality result measured at a downstream site must be equal to or less than the quality result measured at the applicable upstream/reference site.
PRCP15	Where the surface water quality at the downstream site exceeds the upstream site result as per PRCP14b), an AQP¹ must complete an assessment of the cause of the exceedance and risk of rehabilitation not achieving a stable condition (PRCP 14) within the schedule timeframe and: a) Where there is a low risk to achieving a stable condition from the mining tenure (ML1763 and ML70421), then no further action is to be taken; or

Condition #	PRCP Condition
	b) Where there is a risk greater than low to achieve a stable condition, then an assessment of potential environment harm and any changes or rectification actions to rehabilitation activities must be determined and implemented.
PRCP16	The assessment/s under PRCP15 must be completed and provided to the administering authority within 3 months of receiving the relevant sampling results.
PRCP17	Despite PRCP14, PRCP15a) can be triggered 3 times over 5 consecutive years prior to surrender.
PRCP18	If PRCP15b) is triggered the 5 year timeframe under PRCP14a) is reset.

10.4 Rehabilitation milestones

The rehabilitation milestones and milestone criteria for RHM are shown in Table 46.

Table 46: RHM rehabilitation milestones and milestone criteria

Milestone reference	Rehabilitation milestone	Milestone criteria
RM1	Infrastructure decommissioning and removal	1.1 All infrastructure to be retained onsite must be safe, stable and not cause environmental harm. 1.2 All infrastructure and services to be retained onsite must have a signed landholder statement, declaring that they will accept responsibility for the infrastructure (except for those items in 1.4 and 1.5). 1.3 If the underlying landholder is also the EA holder (or a parent corporation or a subsidiary corporation), consent to retain the infrastructure is required from the administering authority (except for those items in 1.4 and 1.5). In seeking consent, the holder must justify how the infrastructure will provide a benefit or improvement to the use of the land and/or community once mining has ceased. 1.4 Underground shafts are closed according to appropriately qualified person (AQP)¹ design (RA21). 1.5 Except for 1.4, below-ground infrastructure, services and waste (as per the Environmental Authority (EPML03337715) waste schedule) deeper than 0.5m in relation to the final landform surface can be retained provided it can meet the following: a) All pipelines have been drained; and b) All below-ground infrastructure to be retained must be mapped; and c) The intended PMLU is not compromised; and d) There is no ongoing risk of environmental harm. 1.6 With the exception of 1.2, 1.3, 1.4 and 1.5 above, the following are complete: a) All services disconnected, terminated and removed

Milestone reference	Rehabilitation milestone	Milestone criteria
		b) All buildings and associated infrastructure dismantled and removed c) All hardstand, concrete areas and roads (bitumen, blue metal, aggregate) removed d) All pipelines drained and removed e) All waste, not authorised under the Environmental Authority (EPML03337715) waste schedule, removed f) All surface water drainage infrastructure removed g) All drillholes, bores, sediment ponds and sumps decommissioned h) All machinery and equipment removed from site i) Mine water dams are decommissioned j) Watercourse crossings and culverts removed. 1.7 Assessment of mine water dams is completed by an AQP¹ and identified sediment and water management actions are completed. ¹Appropriately qualified person (AQP) means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.
RM2	Remediation and/or management of contaminated land	2.1 Contaminated Land Investigation Document completed in accordance with the <i>Environmental Protection Act 1994</i>, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan. 2.2 The Contaminated Land Investigation Document confirms the area within the mining leases (ML1763, ML70421) does not present an unacceptable risk to the post-mining land use.
RM3	Landform development and reshaping	3.1 Landforms are reshaped with slopes not exceeding 12% (RA3). 3.2 Reshape watercourse crossings to a profile similar to the pre-disturbance condition (RA11). 3.3 Backfill and/or install drainage to limit subsidence inundation (RA21): a) To maximum 1m depth in a 2% AEP rainfall event demonstrated by modelling completed by an AQP¹, or b) Does not adversely impact achieving the PMLU as assessed by an AQP¹.
RM4	Surface preparation (cattle grazing)	4.1 Topsoil placed at minimum depth of 150mm in areas where topsoil has previously been removed. 4.2 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP¹ and reviewed and endorsed by a third party AQP¹, to ensure growth media is suitable for target vegetation establishment, the PMLU and stability of the landform.

Milestone reference	Rehabilitation milestone	Milestone criteria
		4.3 Ameliorant and physical treatments such as fertiliser, gypsum and/or organic matter are applied as identified in criteria 4.2. 4.4 Deep rip at least 300mm into soil/subsoil profile along contour of slopes.
RM5	Surface preparation (woodland habitat)	5.1 Topsoil placed at minimum depth of 100mm, in areas where topsoil has previously been removed. 5.2 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP¹ and reviewed and endorsed by a third party AQP¹, to ensure growth media is suitable for target vegetation establishment, the PMLU and stability of the landform. 5.3 Ameliorant and physical treatments such as fertiliser, gypsum and/or organic matter are applied as identified in criteria 5.2. 5.4 Deep rip at least 300mm into soil/subsoil profile along contour of slopes.
RM6	Surface preparation (watercourse)	6.1 Topsoil placed at minimum depth of 150mm in areas where topsoil has previously been removed. 6.2 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP¹ and reviewed and endorsed by a third party AQP¹, to ensure growth media is suitable for target vegetation establishment, the PMLU and stability of the landform. 6.3 Ameliorant and physical treatments such as fertiliser, gypsum and/or organic matter are applied as identified in criteria 6.2. 6.4 Deep rip at least 300mm into soil/subsoil profile along contour of slopes.
RM7	Revegetation (cattle grazing)	7.1 Completed seeding in accordance with recommended pasture mixes and seeding rates as shown in Table 25: Recommended species list and seeding rates for cattle grazing PMLU. 7.2 At least four species of 3P pasture species and two legumes, including at least two native pasture species, from Table 25: Recommended species list and seeding rates for cattle grazing PMLU are to be applied per application area. 7.3 Minimum seeding rates of 16kg/ha of coated pasture seed and 4kg/ha of uncoated legume seed will be used, unless adjusted by an AQP¹ based on results of rehabilitation monitoring.
RM8	Revegetation (woodland habitat)	8.1 Completed seeding in accordance with woodland habitat species and seeding rates² recommended by an AQP¹ if vegetation is targeting a regional ecosystem, or in accordance with Table 27: Recommended species list and seeding rates for woodland habitat PMLU – ponded areas.

Milestone reference	Rehabilitation milestone	Milestone criteria
		8.2 Minimum seeding rates for ponded areas to include 6kg/ha of tree species, 4kg/ha of woody understory species and 8kg/ha of ground species, unless adjusted by an AQP¹ based on results of rehabilitation monitoring. 8.3 Non-native seed must not be used for the revegetation of woodland habitat PLMU (except when sterile cover crops or <i>Cynodon dactylon</i> are used). ²Seed application may not be required in all areas.
RM9	Revegetation (watercourse)	9.1 Completed seeding in accordance with recommended watercourse species mix and seeding rates in Table 28: Recommended species list and seeding rates for watercourse PMLU – upper and mid banks and Table 29: Recommended species list and seeding rates for watercourse PMLU – lower banks. 9.2 Species chosen should reflect regional ecosystem 11.3.25. 9.3 Minimum seeding rates of: a) For the upper and mid banks – 6kg/ha uncoated trees species, 4kg/ha uncoated woody understorey species and 10kg/ha uncoated ground species b) For the lower banks – 5kg/ha of uncoated tree species, 10kg/ha uncoated ground species. 9.4 Non-native seed must not be used for the revegetation of watercourse PLMU (except when sterile cover crops or <i>Cynodon dactylon</i> are used).
RM10	Achievement of surface requirements (cattle grazing)	10.1 Vegetation meets the following: a) >50% established and self-sustaining vegetation groundcover, of which at least 50% of dry matter yield is 3P pasture species as listed in Table 25: Recommended species list and seeding rates for cattle grazing PMLU b) Minimum composition of three species of 3P grasses present per hectare (averaged). 10.2 AQP¹ certifies that: a) There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and b) Mass movement is absent; and c) All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 10.3 Despite criteria 10.2, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP¹: a) Do not exceed 1m in depth at any point; and b) Do not expose environmentally problematic materials; and

Milestone reference	Rehabilitation milestone	Milestone criteria
		c) The cause of the gully is known and has been resolved; and d) Have established and persistent vegetation cover at the head of the gullies; and e) Are in a stabilised³ state, demonstrated by monitoring data over a 2-year period; and f) Do not provide a safety hazard within the context of the PMLU; and g) Do not impact the stability or performance of engineered drainage features. ³Stabilised erosion: one or both of the following conditions apply: no evidence of sediment movement; sides and/or floors of erosion form are revegetated.
RM11	Achievement of surface requirements (woodland habitat)	11.1 Groundcover: a) >15% slopes must achieve ≥80% groundcover, consisting of at least 50% vegetation groundcover⁴ b) ≤15% slopes must achieve ≥50% groundcover, consisting of at least 50% vegetation groundcover⁴. 11.2 Woodland habitat vegetation meets the following: a) Species richness of ≥2 native trees, ≥3 native shrubs and ≥4 ground species (exotic or native). 11.3 AQP¹ certifies that: a) There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and b) Mass movement is absent; and c) All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 11.4 Despite criteria 11.3, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP¹: a) Do not exceed 1m in depth at any point; and b) Do not expose environmentally problematic materials; and c) The cause of the gully is known and has been resolved; and d) Have established and persistent vegetation cover at the head of the gullies; and e) Are in a stabilised³ state, demonstrated by monitoring data over a 2-year period; and f) Do not provide a safety hazard within the context of the PMLU; and g) Do not impact the stability or performance of engineered drainage features. 11.5 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP¹. ⁴Vegetation groundcover: Means plants, plant litter, tree leaf litter, twigs and woody debris that protect the soil surface from erosion.

Milestone reference	Rehabilitation milestone	Milestone criteria
RM12	Achievement of surface requirements (watercourse)	12.1 Groundcover: a) >15% slopes must achieve $\geq 80\%$ groundcover, consisting of at least 50% vegetation groundcover⁴ b) $\leq 15\%$ slopes must achieve $\geq 50\%$ groundcover, consisting of at least 50% vegetation groundcover⁴. 12.2 Watercourse vegetation meets the following: a) Species richness: ≥ 2 native trees and ≥ 2 native shrubs representative of RE 11.3.25 ≥ 2 grass species (exotic or native species) b) Tree canopy cover $\geq 13\%$. 12.3 AQP¹ certifies that: a) There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and b) Mass movement is absent; and c) All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 12.4 Despite criteria 12.3, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP¹: a) Do not exceed 1m in depth at any point; and b) Do not expose environmentally problematic materials; and c) The cause of the gully is known and has been resolved; and d) Have established and persistent vegetation cover at the head of the gullies; and e) Are in a stabilised³ state, demonstrated by monitoring data over a 2-year period; and f) Do not provide a safety hazard within the context of the PMLU; and g) Do not impact the stability or performance of engineered drainage features. 12.5 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP¹.
RM13	Achievement of post-mining land use to a stable condition (cattle grazing)	13.1 Hazard assessment completed by an AQP¹ to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use. 13.2 Vegetation meets the following criteria: a) >50% established and self-sustaining vegetation groundcover b) At least 60% of pasture dry matter yield consists of preferred, palatable and productive (3P) grasses with a minimum composition of three 3P grasses present per hectare (averaged)

Milestone reference	Rehabilitation milestone	Milestone criteria
		c) Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise ≤5% of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP¹ as appropriately managed. 13.3 Land suitability class assessed by an AQP¹ and certified that the land has achieved a post-mining land suitability class of 3 or better for cattle grazing, or not different from pre-mining class if it is class 4; where assessment of rehabilitation is in accordance with Short (2023). Class 4 is only accepted if the limitations are water availability, soil nutrient⁵ or sub-soil erosion. 13.4 For any Class 4 land suitability areas, land condition is assessed as Good (A) condition for non-grazed areas, or Good (A) or Fair (B) condition for grazed areas using the Grazing Land Management ABCD land condition framework. 13.5 AQP¹ certifies that: a) There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and b) Mass movement is absent; and c) All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 13.6 Despite criteria 13.5, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP¹: a) Do not exceed 1m in depth at any point; and b) Do not expose environmentally problematic materials; and c) The cause of the gully is known and has been resolved; and d) Have established and persistent vegetation cover at the head of the gully; and e) Are in a stabilised³ state, demonstrated by monitoring data over a 5-year period; and f) Do not provide a safety hazard within the context of the PMLU; and g) Do not impact the stability or performance of engineered drainage features. 13.7 Verification by a suitably qualified person through a site inspection, records review and aerial imagery to confirm: a) Requirements of any Site Management Plan have been met; b) Notifiable activities have not been undertaken post completion of RM2 that would impact the use of the land for the intended PMLU; and c) There is no evidence indicating an adverse change to the contaminated land status has occurred post the completion of RM2. ⁵Only applies when soil nutrient status cannot reasonably be ameliorated, as determined by an AQP.

Milestone reference	Rehabilitation milestone	Milestone criteria
RM14	Achievement of post-mining land use to a stable condition (woodland habitat)	14.1 Hazard assessment completed by an AQP¹ to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use. 14.2 AQP¹ certifies that: a) There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and b) Mass movement is absent; and c) All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 14.3 Despite criteria 14.2, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP¹: a) Do not exceed 1m in depth at any point; and b) Do not exposed environmentally problematic materials; and c) The cause of the gully is known and has been resolved; d) Have established and persistent vegetation cover at the head of the gully; and e) Are in a stabilised³ state, demonstrated by monitoring data over a 5-year period; and f) Do not provide a safety hazard within the context of the PMLU; and g) Do not impact the stability or performance of engineered drainage features. 14.4 Groundcover: a) >15% slopes must achieve ≥80% groundcover, consisting of at least 50% vegetation groundcover⁴ b) ≤15% slopes must achieve ≥50% groundcover, consisting of at least 50% vegetation groundcover⁴. 14.5 Woodland habitat vegetation meets the following: a) Species richness of ≥2 native trees, ≥3 native shrubs and ≥4 ground species (exotic or native), b) Tree canopy cover of ≥10% c) Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise ≤5% of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP¹ as appropriately managed. 14.6 Verification by a suitably qualified person through a site inspection, records review and aerial imagery to confirm: a) Requirements of any Site Management Plan have been met; b) Notifiable activities have not been undertaken post completion of RM2 that would impact the use of the land for the intended PMLU; and

Milestone reference	Rehabilitation milestone	Milestone criteria
		c) There is no evidence indicating an adverse change to the contaminated land status has occurred post the completion of RM2. 14.7 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP¹.
RM15	Achievement of post-mining land use to a stable condition (watercourse)	15.1 Hazard assessment completed by an AQP¹ to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use. 15.2 AQP¹ certifies that: a) There is no severe sheet, rill or gully erosion present (as defined in Table 37: Erosion classifications); and b) Mass movement is absent; and c) All other erosion, including tunnel erosion, requiring intervention has been remediated and does not impact achieving the PMLU. 15.3 Despite criteria 15.2, gullies are acceptable on the final landform provided they meet the following criteria, as certified by an AQP¹: a) Do not exceed 1m in depth at any point; and b) Do not exposed environmentally problematic materials; and c) The cause of the gully is known and has been resolved; and d) Have established and persistent vegetation cover at the head of the gully; and e) Are in a stabilised³ state, demonstrated by monitoring data over a 5-year period; and f) Do not provide a safety hazard within the context of the PMLU; and g) Do not impact the stability or performance of engineered drainage features. 15.4 Geomorphic index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method⁶). 15.5 Watercourse vegetation meets the following: a) Riparian vegetation index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method⁶) b) Species richness: - ≥2 native trees and - ≥2 native shrubs c) Tree canopy cover ≥20% d) Median tree canopy height ≥10m e) Recruitment of at least two woody perennial species in ecological dominant layer f) Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise ≤5% of vegetation groundcover, with the exception of

Milestone reference	Rehabilitation milestone	Milestone criteria
		<i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP¹ as appropriately managed. 15.6 Assessment by an AQP¹ that the watercourse diversion has an Index of Diversion Condition (IDC) score >10. 15.7 Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP¹. 15.8 Watercourse bank stability is not adversely impacted by subsidence as assessed by an AQP¹. ⁶For watercourse rehabilitation (i.e. crossings/culverts), a modified IDC method with a reduced number of monitoring points within each reach will be used.

10.5 Schedule

The RHM PRCP schedule is provided below.

Post-mining land uses (PMLU)									
Rehabilitation area				RA3					
Relevant activities				Accommodation Area and Roads					
Total rehabilitation area size (ha)				138					
Commencement of first milestone: RM1				10/12/2108					
PMLU				Cattle Grazing					
Date area is available	10/12/2108								
Cumulative area available (ha)	138								
Milestone completed by	10/12/2110	10/12/2115	10/12/2117	10/12/2127	10/12/2132				
Milestone Reference	Cumulative area achieved (ha)								
RM1	138								
RM2		138							
RM3			138						
RM4			138						
RM7			138						
RM10				138					
RM13					138				

Post-mining land uses (PMLU)									
Rehabilitation area				RA11					
Relevant activities				Watercourses and crossing within underground mining/subsidence area					
Total rehabilitation area size (ha)				388					
Commencement of first milestone: RM1				10/12/2097					
PMLU				Watercourse					
Date area is available	10/12/2097								
Cumulative area available (ha)	388								
Milestone completed by	10/12/2100	10/12/2110	10/12/2120						
Milestone Reference	Cumulative area achieved (ha)								
RM1	388								
RM3	388								
RM6	388								
RM9	388								
RM12		388							
RM15			388						

Post-mining land uses (PMLU)									
Rehabilitation area				RA21					
Relevant activities				Subsidence, underground mining infrastructure, general infrastructure and disturbance within underground mining area					
Total rehabilitation area size (ha)				2818					
Commencement of first milestone: RM1				10/12/2097					
PMLU				Woodland Habitat					
Date area is available	10/12/2097								
Cumulative area available (ha)	2818								
Milestone completed by	10/12/2100	10/12/2105	10/12/2108	10/12/2118	10/12/2128				
Milestone Reference	Cumulative area achieved (ha)								
RM1	2818								
RM2		2818							
RM3			2818						
RM5			2818						
RM8			2818						
RM11				2818					
RM14					2818				

C: APPENDICES

Appendix A: Environment Authority (EPML03337715) (14 April 2021)

Appendix B: DES (13 December 2021) - PRCP Transition Notice

Appendix C: BHP (29 November 2021) - PRCP BMA RHM - Pre-Notification Memo

Appendix D: AECOM (2024) - Transitional PRCP Red Hill Mine Hydrogeology Assessment

Appendix E: GSS Environmental (2013) - Soil and Land Suitability Assessment RHM EIS

Appendix F: BMA (2024a) - Community Consultation Register

Appendix G: SLR (2024) - Rehabilitation Flood Assessment

Appendix H: Byrnes Geotechnical (2024) - Geotechnical considerations for closure of RHM

Appendix I: BMA (2024b) - Risk Assessment

Spatial information

GIS data associated with this application is available upon request to the Department of Environment and Science.

Information on how to make a request is available at:

<https://www.qld.gov.au/environment/pollution/licences-permits/public-register>