



INVINCIBLE COLLIERY REHABILITATION MANAGEMENT PLAN

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1. Introduction

1.1 History of Operations

Invincible Colliery (Invincible) is located approximately 25 kilometres (km) north-west of Lithgow in New South Wales (see Figure 1). Invincible currently operates under Project Approval07_0127 (as modified) (the Project Approval), which was granted by the NSW Department of Planning and Infrastructure (DP&I, now the Department of Planning and Environment (DPE)) on 4 December 2008. A Modification to the Project Approval was received on 8 October 2010 to increase the saleable coal limit to 1.2 Million tonnes per annum (Mtpa), with a commensurate road transport increase to the same tonnage.

In April 2013, mining operations were suspended at Invincible as the available coal within the approved mining area was exhausted. Remaining stockpiled run-of-mine (ROM) coal was progressively processed, with the last product coal being transported from site in September 2013. The suspension of mining operations was then approved by the then Department of Trade and Investment, Regional Infrastructure and Services - Division of Resources and Energy (now DPE - Resources Regular). As the previous owners were unable to secure an approval to allow further mining, the mine was placed into care and maintenance. As a result, administrators were appointed on 18 October 2013, and Shoalhaven Coal Pty Ltd (Shoalhaven Coal) acquired various tenements from the administrator. These tenements were transferred to Shoalhaven Coal (trading as Castlereagh Coal) on 2 June 2015. More recently, Shoalhaven Coal was purchased in November 2021 via a 100% share transaction by an all-Australian locally based ownership team which is primarily focussing on supply of coal to the power stations and domestic markets in NSW.

Castlereagh Coal sought to modify the Project Approval via a modification under Section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act) in 2016. The Modification sought to extend open cut mining operations to the south of the existing approved mining area (Southern Extension Project) within the Ben Bullen State Forest (east of the Castlereagh Highway), to provide specialty nut coal to the Shoalhaven Starches Plant in Bomaderry. Any coal extracted that was unsuitable for use in the Shoalhaven Starches operations was supplied to the domestic power market, primarily the Mount Piper Power Station (MPPS) located approximately 3 km south of Invincible.

On 2 September 2021, the NSW Resource Regulator issued Shoalhaven Coal a Section 240 notice (Notice) which required a review of the rehabilitation materials onsite and a review of the landform stability to identify further measures which could be implemented to manage these risks to rehabilitation activities. Shoalhaven Coal has previously provided responses to the Notice, however this Rehabilitation Management Plan (RMP) has considered the commitments previously made in response to the Notice.

Modification to the Project Approval was granted by the Planning Assessment Commission on 2 February 2018, which authorises:

- Extending the period in which mining can continue for a period of 8 years from approval of the modification application;
- Extending the open cut mining area to mine down to, and including, the Lithgow Seam to the south of the existing mine in the Southern Extension Area (SEA);
- Up to 1.2 Mtpa of product coal to be extracted or transported from the site;
- Hours of operation for mining operations in daytime (i.e. 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sunday and public holidays) with coal transport and processing operations undertaken to 10.00 pm and maintenance activities any time;
- Product coal transport arrangements (with coal to be transported from the site by road truck to either MPPS or Shoalhaven Starches Plant);
- Use of existing open cut voids and former underground workings for temporary water storage;
- Continued use of existing Invincible infrastructure (including maintenance work, and minor upgrades and operation of the existing Coal Handling and Preparation Plant (CHPP)); and
- Rehabilitation of the proposed SEA and all existing disturbance areas at Invincible by reshaping mining areas to remove voids and revegetating the reshaped landform with locally endemic woodland and forest communities.

1.2 Current Consents, Leases and Licences

Table 1 summarises the current consents, leases and licences applicable to Invincible.

Table 1 Status of Current Consents, Authorisations and Licences

Approval	Description	Consent Authority	Date Granted	Expiry Date
PA 07_0127 (as modified)	Invincible Colliery Expansion Project Approval	DPHI	31 December 2018	31 December 2025
Environment Protection Licence (EPL) 1095	Invincible Colliery. Outlines water quality, air quality, noise and blast monitoring criteria.	Environmental Protection Authority NSW (EPA)	28 February (Anniversary Date)	Renewed Annually
Exploration License (EL) 7517	Invincible Colliery	Resource Regulator NSW	NA	Renewal lodged, determination pending.
Mining Lease (ML) 1635	Invincible Colliery	Resource Regulator NSW	10 September 2009	10 September 2030

Approval	Description	Consent Authority	Date Granted	Expiry Date
Mining Lease (ML) 1638	Invincible Colliery	Resource Regulator NSW	6 November 2009	6 November 2030
ML 1844	Invincible Colliery	Resource Regulator NSW	21 February 2023	21 February 2044
ML 1859	Invincible Colliery. Taken up by Shoalhaven Coal as part of the transfer of CCL 702 to Shoalhaven Coal from Ivanhoe Coal.	Resource Regulator NSW	6 June 2024	28 June 2027
ML 1860	Invincible Colliery. Ancillary Mining Activities	Resource Regulator NSW	7 September 2023	7 September 2044
Consolidated Coal Lease (CCL) 702	Invincible Colliery. Variable depth lease.	Resource Regulator NSW	26 November 1990	24 November 2031
Water Access License (WAL) - Work Approval 10BL602584 "Washery Bore"	Invincible Colliery. Authorises the extraction of 26 units from the NSW Murray-Darling Porous Rock Groundwater Sources Water Sharing Plan.	Water NSW	23 December 2012	23 December 2027
WAL 36485	Invincible Colliery Groundwater extraction works	Water NSW	1 July 2013	18 February 2028

1.2.1 NSW Rehabilitation Reforms

The NSW Resources Regulator aimed to improve compliance and reporting requirements for rehabilitation through an Amendment Regulation under the *Mining Act 1992* (Mining Act). The *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2020 (the Mining Amendment)* commenced on 2 July 2021, referred to as the NSW Rehabilitation Reforms.

The new standard rehabilitation conditions apply to all new mining leases issued from the 2 July 2021. All existing mining leases that were in force prior to this date will have the new conditions applied from the 2 July 2022 for large mines or 2 July 2023 for smaller mines. The new conditions replaced existing rehabilitation conditions on current mining leases, including the requirement for a MOP.

Schedule 8A of the *Mining Regulation 2016* (the Regulation) provides for the following standard conditions:

- Section 4 - Lease holder to prevent or minimise harm to environment;
- Section 5 - Lease holder to rehabilitate as soon as reasonably practicable after disturbance;
- Section 6 - Lease holder to achieve approved rehabilitation outcomes and final land use;
- Section 7 - Lease holder to conduct rehabilitation risk assessment;
- Section 8 - Lease holder to prepare rehabilitation management plan for large mine;
- Section 9 - Lease holder to prepare rehabilitation outcomes;
- Section 10 - Lease holder to prepare annual rehabilitation report and forward program;
- Section 11 - When lease holder may amend approved rehabilitation outcomes and submitted forward program; and
- Section 17 - Lease holder to create and maintain records demonstrating compliance.
- The conditions encourage best practice progressive mine site rehabilitation and require leaseholders to prepare a suite of documents for the Secretary of the Department of Regional NSW in a 'form and way' approved by the Secretary. This includes for large mines:
 - Mine Rehabilitation Risk Assessment;
 - This Rehabilitation Management Plan (RMP);
 - Annual Rehabilitation Report;
 - Forward Program; and
 - Rehabilitation Outcome Documents, including: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan.

These documents have been prepared in accordance with time requirements under Clause 15 of Schedule 8A of the Regulation. This document has been prepared to fulfill the requirement for a RMP and will be placed on the Castlereagh Coal website.

1.3 Land ownership and Land Use

1.3.1 Land Ownership

Land ownership and land use is detailed in Figure 1 and 2 below. The land within the mining leases is either freehold land owned by Shoalhaven or Crown Land contained in the Ben Bullen State Forest. The Ben Bullen State Forest is managed by the Forestry

Corporation of NSW. A summary of land ownership within the Invincible mining authorities is outlined in Table 2.

Table 2 Land Ownership

Land Tenure	Land Ownership	Occur within ML or Adjacent
Mine Owned	Castlereagh	ML 1638, ML 1635, CCL702, ML 1859, ML 1844
Private Freehold	Private Residences	CCL702
Crown Land	Public Land	ML 1638, CCL702
State Forest	Forestry Corporation of NSW	ML 1635, ML 1638, CCL702,
Castlereagh Highway	Transport for NSW	ML 1635, ML 1638

1.3.2 Historic and Current Land Use

Invincible is predominantly situated on land occupied by the Ben Bullen State Forest, which has historically been utilised for forestry and mining operations. In addition to the Ben Bullen State Forest, other lands have previously been used for agricultural activities including sheep and cattle grazing, road and rail infrastructure (see Figure 2).

The Castlereagh Highway forms the western boundary of the Invincible and borders the CVM leases to the west. The Castlereagh Highway extends in a north-south direction between the two mines, connecting the Great Western Highway in the south and the Golden Highway in the north. The township of Cullen Bullen is also located at the junction of the Castlereagh Highway and the Portland - Cullen Bullen Road, immediately to the north-west of Invincible.

Land use in the broader region includes a number of other coal mining operations, power generation facilities and industrial activities, as well as National Parks and associated recreational uses, agricultural and forestry activities as well as various agricultural enterprises. The region also supports an array of other minor industries consistent with the rural community setting.

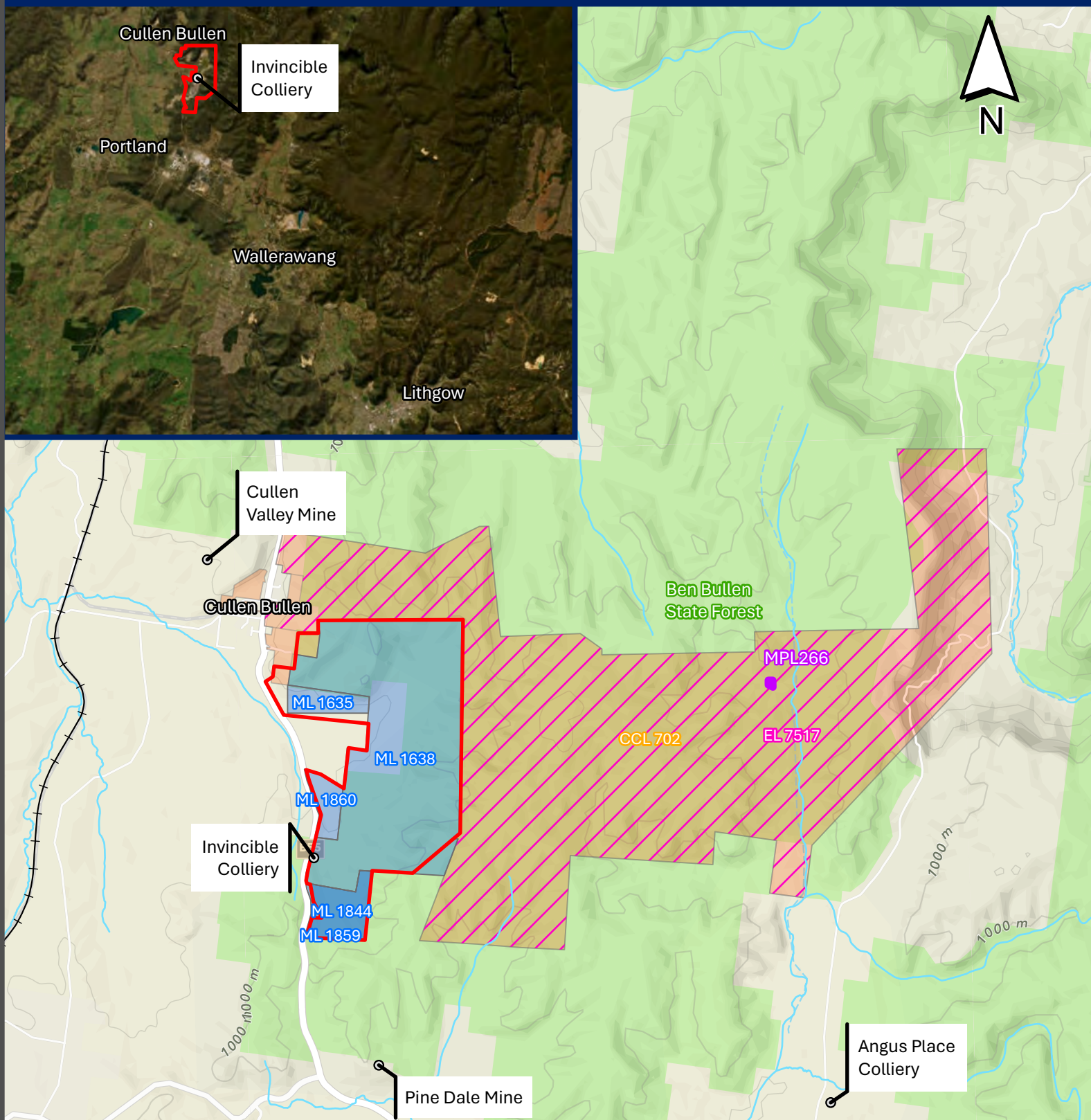
Cullen Bullen is a small rural township comprising residential properties, a school, community hall, hotel and a general store. The region also supports an array of other minor industries consistent with the rural community setting.

Coal mining has played an important role in the local economy of Cullen Bullen since 1888 following the establishment of the former Cullen Bullen Colliery. Since this time, coal mining has progressed across the region. In recent years, many of these operations have either recovered any viable coal resources and have been placed under care and maintenance, and/or are in its closure phase or are still in operation. The CVM is currently under care and maintenance. Invincible was modified in 2018 to recover coal from the Southern Extension Area.

1.3.3 Final Land Use

Disturbed areas within the mining leases will be progressively revegetated and regenerated to self-sustaining native vegetation communities. The proposed final land use aims to emulate the pre-mining environment and will enhance local and regional ecological linkages across the site and with proximate areas. Revegetation works will use local provenance species wherever possible.

Final land use requirements and planning for Invincible are summarised in Section 2.



- Project Approval Boundary
- Consolidated Coal Lease Boundary
- Exploration Licence Boundary
- Mining Lease Boundary
- Mining Purposes Lease boundary

- Highway
- Railway
- Watercourse

0 0.75 1.5 3
Kilometers

Date Created: 13/08/2025

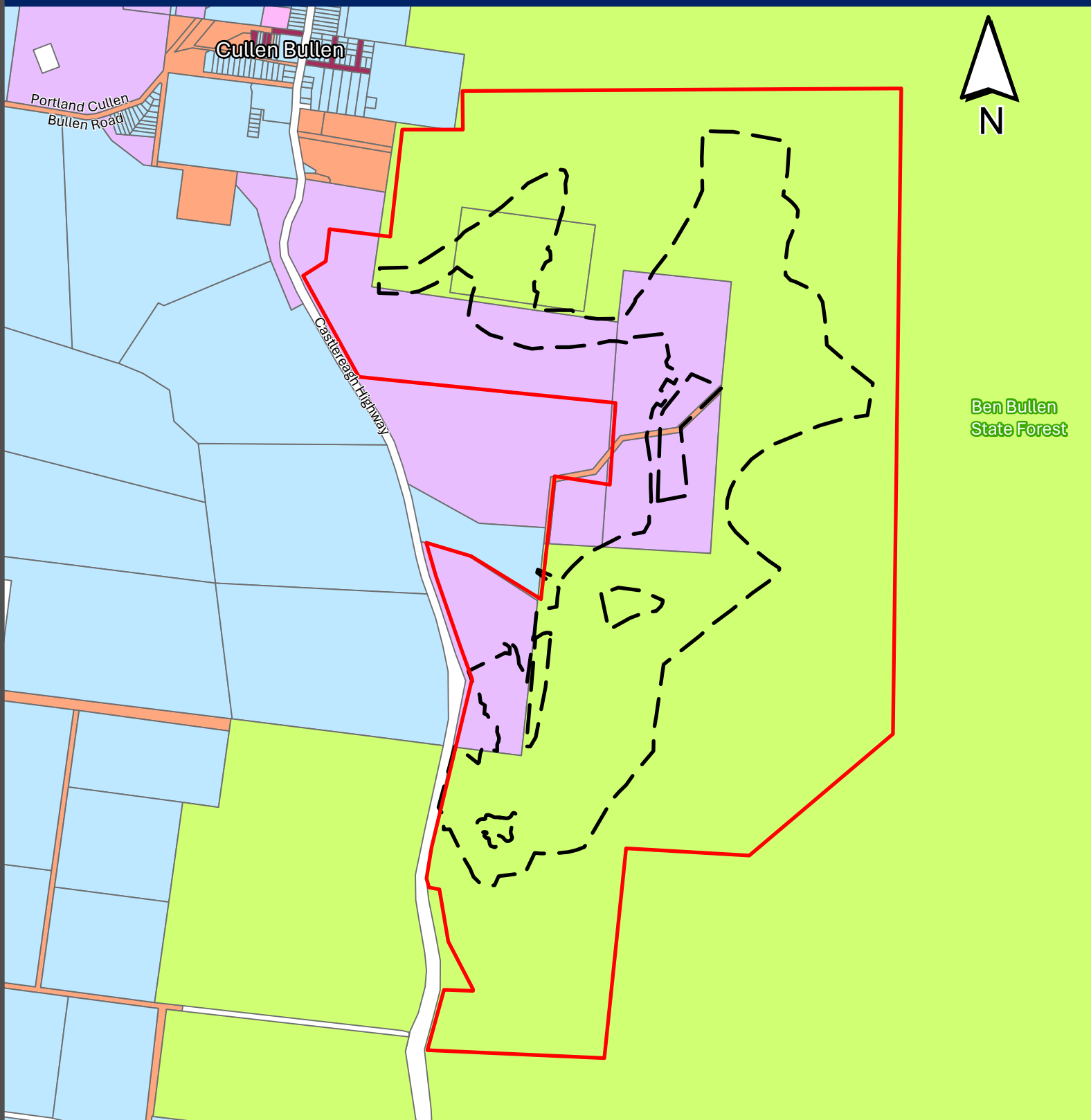
Map Created By: J Pawson

Map Size: A4 Portrait

Coordinate System: GDA2020 MGA Zone 56

Map Reference: ATLGIS25-033_A4-1.3

Figure 1



Project Approval Boundary

Existing Approved Mine Disturbance Boundary

Ownership

- Castlereagh
- Crown
- Lithgow City Council
- Minister For Education
- Private Freehold
- State Forest

0 0.25 0.5 1
 Kilometers

Date Created: 13/08/2025

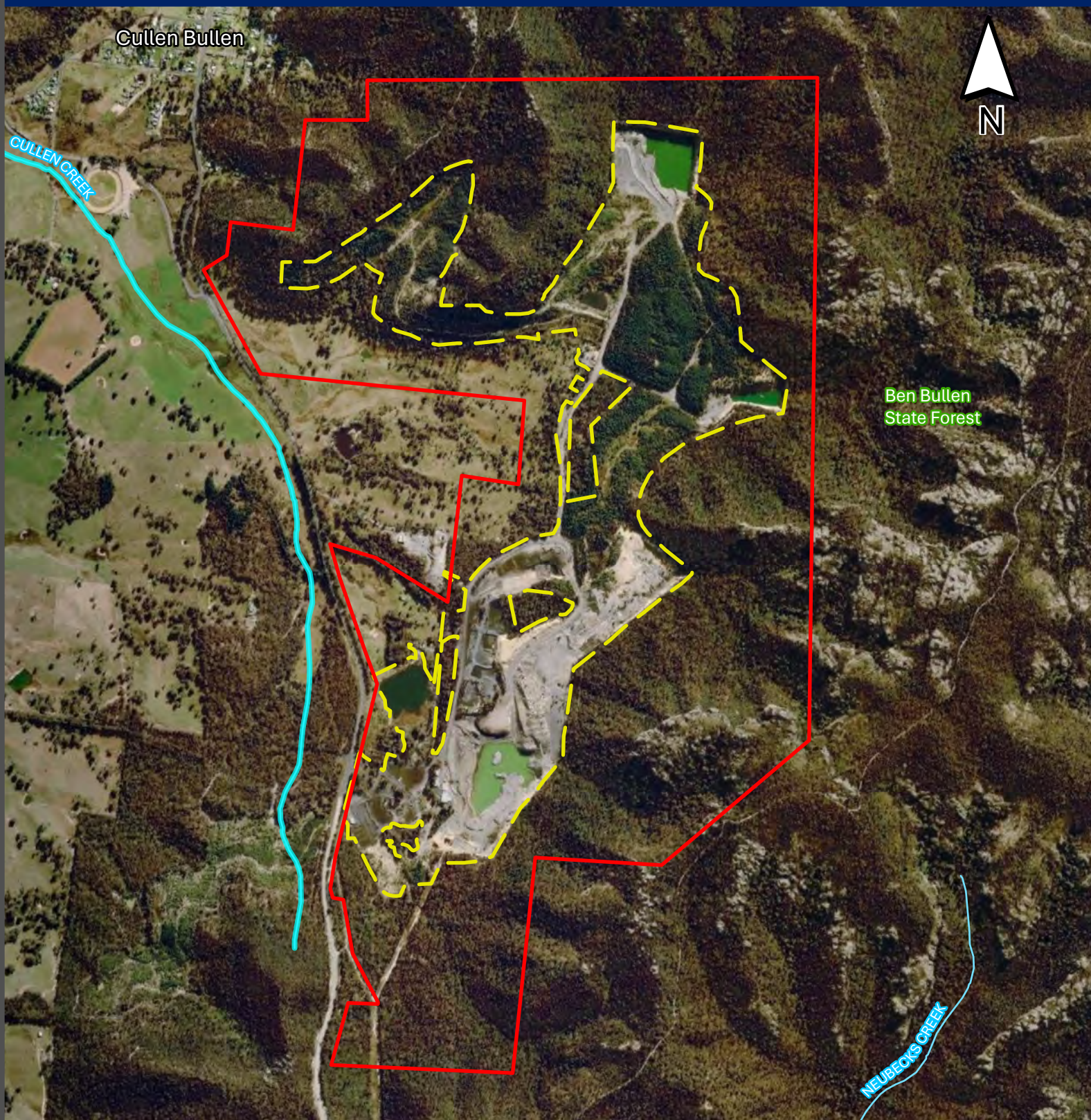
Map Created By: J Pawson

Map Size: A4 Portrait

Coordinate System: GDA2020 MGA Zone 56

Map Reference: ATLGIS25-033_A4-3.2

Figure 2



- Project Approval Boundary
- Existing Approved Mine Disturbance Boundary
- Watercourse

0 0.25 0.5 1
 Kilometers

Date Created: 14/08/2025
 Map Created By: J Pawson
 Map Size: A4 Portrait
 Coordinate System: GDA2020 MGA Zone 56
 Map Reference: ATLGIS25-033_A4-5

Figure 3

2. Final Land Use

2.1 Regulatory Requirements

Regulatory requirements relating to rehabilitation and post-mining land use are described in Table 3.

Table 3 Regulatory Requirements

Source		Requirement	RMP Section												
Development PA07_0127 Schedule 2 Condition 10	Consent	Prior to the recommencement of mining operations, the Applicant must prepare a detailed final mine plan and rehabilitation plan to the satisfaction of the Planning Secretary.	This RMP												
Development PA07_0127 Schedule 2 Condition 11	Consent	The Applicant must carry out the project in accordance with the approved mine plan and rehabilitation plan.	This RMP												
Development PA07_0127 Schedule 3 Condition 47	Consent	The Applicant must rehabilitate the site to the satisfaction of the Planning Secretary. This rehabilitation must be consistent with the final layout plans required under condition 10 of schedule 2, and comply with the objectives in Table 11.	Section 4												
Table 11: Rehabilitation Objectives <table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Mine site (as a whole)</td><td> • Safe, stable and non-polluting • Final landforms designed to minimise visual impacts as far as is reasonable and feasible, and integrate with surrounding landforms • Slopes of final landforms are minimised as far as is reasonable and feasible • Free draining • Constructed landforms to drain to the natural environment via natural drainage lines </td></tr><tr><td>Final Voids</td><td> • No final voids on site </td></tr><tr><td>Rehabilitation areas and other vegetated land</td><td> • Restore self-sustaining woodland ecosystems on the site that comprise flora species from locally occurring vegetation communities. • Establish areas of self-sustaining habitat for threatened flora and fauna species. </td></tr><tr><td>Surface infrastructure</td><td> • To be decommissioned and removed, unless the Secretary agrees otherwise </td></tr><tr><td>Community</td><td> • Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure </td></tr></table>				Feature	Objective	Mine site (as a whole)	• Safe, stable and non-polluting • Final landforms designed to minimise visual impacts as far as is reasonable and feasible, and integrate with surrounding landforms • Slopes of final landforms are minimised as far as is reasonable and feasible • Free draining • Constructed landforms to drain to the natural environment via natural drainage lines	Final Voids	• No final voids on site	Rehabilitation areas and other vegetated land	• Restore self-sustaining woodland ecosystems on the site that comprise flora species from locally occurring vegetation communities. • Establish areas of self-sustaining habitat for threatened flora and fauna species.	Surface infrastructure	• To be decommissioned and removed, unless the Secretary agrees otherwise	Community	• Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure
Feature	Objective														
Mine site (as a whole)	• Safe, stable and non-polluting • Final landforms designed to minimise visual impacts as far as is reasonable and feasible, and integrate with surrounding landforms • Slopes of final landforms are minimised as far as is reasonable and feasible • Free draining • Constructed landforms to drain to the natural environment via natural drainage lines														
Final Voids	• No final voids on site														
Rehabilitation areas and other vegetated land	• Restore self-sustaining woodland ecosystems on the site that comprise flora species from locally occurring vegetation communities. • Establish areas of self-sustaining habitat for threatened flora and fauna species.														
Surface infrastructure	• To be decommissioned and removed, unless the Secretary agrees otherwise														
Community	• Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure														
Development PA07_0127 Schedule 3 Condition 50	Consent	Progressive Rehabilitation The Applicant must rehabilitate the site progressively as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies must be employed when areas prone to dust generation cannot be permanently rehabilitated. <i>Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later state of the development. It is also accepted</i>	Section 6.2												

Source	Requirement	RMP Section
	<i>that delays in rehabilitation due to extended wet or dry conditions may occur.</i>	
Development Consent PA07_0127 Schedule 3 Condition 51	Rehabilitation Strategy By the end of May 2018, unless the Planning Secretary agrees otherwise, the Applicant must prepare a Rehabilitation Strategy to the satisfaction of the Planning Secretary. This strategy must: a) Investigate options to backfill the Northern and Eastern voids as soon as practicable; b) investigate options to avoid the disturbance of vegetation in proximity to the Eastern Void; and c) Include a detailed description of the measures to be implemented and a plan for the implementation of these measures.	The Rehabilitation Management Strategy (RMS) (separate document)
Development Consent PA07_0127 Schedule 3 Condition 52	The Rehabilitation Strategy approved by the Planning Secretary must be implemented.	This RMP
Development Consent PA07_0127 Schedule 3 Condition 52	Rehabilitation Management Plan Prior to recommencing mining operation, unless the Planning Secretary agrees otherwise, the Applicant must prepare a Rehabilitation Management Plan for the project to the satisfaction of the Planning Secretary. This plan must: a) Be prepared in consultation with DPI Water, CPHR, Council and the CCC; b) Be prepared in accordance with any relevant DRG guideline and be consistent with the rehabilitation objectives in the EA and in Table 11. c) Describe how the rehabilitation of the site would be integrated with the implementation of the biodiversity offset strategy; d) Include a detailed rehabilitation schedule for the life of the mine and an annual program for reviewing and revising this schedule, as informed by condition 51 of this schedule; e) Include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); f) Describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including mine closure, final landform, and final land use; g) Provide for detailed mine closure planning, including measures to minimise socio-economics effects due to mine closure, to be conducted prior to the site being placed on care and maintenance; h) Include interim rehabilitation where necessary to minimize the area exposed for dust generation; i) include a program to monitor and report on the effectiveness of the rehabilitation of the site, and progress against the detailed performance and completion criteria; and	This RMP Section 4.2 Sections 4.2 Section 6 Sections 4 and 7 Sections 4 and 8 Section 6 Section 6.2.1 Section 6.2 Section 8.3 Sections 6 and 8

Source	Requirement	RMP Section
	j) Be integrated with the other management plans required under this consent. Note: The Biodiversity Management Plan and Rehabilitation Management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine site.	
Development Consent PA07_0127 Schedule 3 Condition 51	The RMP approved by the Planning Secretary must be implemented.	Noted
Development Consent PA07_0127 Schedule 5 Condition 3	The Applicant must ensure that the management plans under this approval are prepared in accordance with any relevant guidelines, and include: a) detailed baseline data; b) a description of: The relevant statutory requirements (including and relevant approval, licence or lease conditions); Any relevant limits or performance measures/criteria; The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; d) a program to monitor and report on the: Impacts of environmental performance of the project; Effectiveness of any management measures (see c above); e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; f) program to investigate and implement ways to improve the environmental performance of the project over time; g) a protocol for managing and reporting any: Incidents; Complaints; Non-compliances with statutory requirements; and Exceedances of the impact assessment criteria and/or performance criteria; and h) a protocol for periodic review of the plan.	Sections 4.1, 6.2, 7.6 and 8.1 Section 2.1 Sections 4, 6 and 8 Sections 4, 6, 7 and 8 Sections 6, 8, 9, 10, 11 Sections 8, 9, 10, 11 Section 10 Sections 9, 10 and 11 Section 11.2 Section 11
Development Consent PA07_0127 Schedule 5 Condition 5	Within 3 months of: The submission of an annual review under condition 4 above; The submission of an incident report under condition 7 below; The submission of an audit report under condition 9 below; or Any modification to the conditions of this approval, (unless the conditions require otherwise), the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Planning Secretary. Where this review leads to revisions in any such document,	Section 11.2

Source	Requirement	RMP Section
	then within 4 weeks of the review, unless the Planning Secretary agrees otherwise, the revised document must be submitted to the Planning Secretary for approval. Note: This is to ensure the strategies, plans and programs are updated on a regular basis and incorporate any recommended measures to improve the environmental performance of the project.	
Development Consent PA07_0127 Schedule 5 Condition 6	To ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project, the Applicant may submit revised strategies, plans or programs required under this approval at any time. With the agreement of the Planning Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis.	Section 11.2
Development Consent PA07_0127 Schedule 5 Condition 7	The Planning Secretary may approve a revised strategy, plan or program required under this consent, or the staged submission of any of these documents, at any time. With the agreement of the Planning Secretary, the Applicant may prepare the revised or staged strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this consent.	Sections 4.2 and 11.2
Development Consent PA07_0127 Schedule 5 Condition 9	The Applicant must notify the Department within 24 hours of becoming aware of an incident. The notification must be made via the NSW planning portal (Major Projects) and address details of the incident including: (a) date, time and location; (b) a brief description of what occurred and why it has been classified as an incident; (c) a description of what immediate steps were taken in relation to the incident; and (d) identifying a contact person for further communication regarding the incident. The Applicant must immediately notify the Planning Secretary and any other relevant agencies	Section 11.3
Development Consent PA07_0127 Schedule 5 Condition 9A	The Applicant must provide the Department with a subsequent incident report in accordance with Appendix 7 (Incident Notification and Reporting Requirements).	Section 11.3
Development Consent PO07_0127 Schedule 5 Condition 9B	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing and must be submitted via the NSW planning portal (Major Projects). The notification must identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply, the reasons for the non-compliance (if known), and what actions been undertaken, or will be undertaken, and when, to address the non-compliance.	Section 11.3
Development Consent PA07_0127 Schedule 5	The Applicant must provide regular reporting on the environmental performance of the project on its website, in	Sections 1.2 and 11.2

[illegible]

Source	Requirement	RMP Section
	provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP; be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment . Note: The Rehabilitation Report replaces the Annual Environmental Management Report.	Annual Rehabilitation Report
MLA431	Application lodged, determination pending	
MLA 545	Application lodged, determination pending	
Exploration Licence 7517	Various	Compliance reporting will be completed annually as per Environmental Management Reporting process
Mining Regulation 2016 Schedule 8A Part 2, Clause 5	Rehabilitation to occur as soon as reasonably practicable after disturbance The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs.	Section 6
Mining Regulation 2016 Schedule 8A Part 2, Clause 6	Rehabilitation must achieve final land use The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area. The holder of the mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1). The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1). Note- Clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause. In this clause- final land use for the mining area means the final landform and land uses to be achieved for the mining area- as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and for a large mine-as spatially depicted in the final landform and rehabilitation plan, and if the final land use for the mining area is required by a condition of development consent for activities under the mining lease-as stated in the condition.	Sections 2, 3, 4 and 6

Source	Requirement	RMP Section
	planning approval means- a development consent within the meaning of the Environmental Planning and Assessment Act 1979, or an approval under that Act, Division 5.1.	
Mining Regulation 2016 Schedule 8A Part 2, Clause 7	Rehabilitation risk assessment The holder of a mining lease must conduct a risk assessment (a rehabilitation risk assessment) that- identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease- the rehabilitation objectives, the rehabilitation completion criteria, for large mines-the final land use as spatially depicted in the final landform and rehabilitation plan, and (b) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks. The holder of the mining lease must implement the measures identified. The holder of a mining lease must conduct a rehabilitation risk assessment- for a large mine-before preparing a rehabilitation management plan, and for a small mine-before preparing the rehabilitation outcome documents for the mine, and whenever a hazard is identified under clause 6(3)-as soon as reasonably practicable after it is identified, and d) whenever given a written direction to do so by the Secretary.	Section 3
Mining Regulation 2016 Schedule 8A Part 2, Clause 9	General requirements for documents A document required to be prepared under this Division must- be in a form approved by the Secretary, and Note- The approved forms are available on the Department's website. include any matter required to be included by the form, and c) if required to be given to the Secretary-be given in a way approved by the Secretary.	This RMP
Mining Regulation 2016 Schedule 8A Part 2, Clause 10	Rehabilitation management plans for large mines The holder of a mining lease relating to a large mine must prepare a plan (a rehabilitation management plan) for the mining lease that includes the following- a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area, a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation, a summary of rehabilitation risk assessments conducted by the holder, the risk control measures identified in the rehabilitation risk assessments,	Sections 3, 4, 6 and 7

Source	Requirement	RMP Section
	the rehabilitation outcome documents for the mining lease, a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored. If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document. A rehabilitation management plan is not required to be given to the Secretary for approval. The holder of the mining lease- must implement the matters set out in the rehabilitation management plan, and if the forward program specifies timeframes for the implementation of the matters- must implement the matters within those timeframes.	
Mining Regulation 2016 Schedule 8A Part 2, Clause 11	Amendment of rehabilitation management plans The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows- to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary- within 30 days after the document is approved, as a consequence of an amendment made under clause 14 to a rehabilitation outcome document- within 30 days after the amendment is made, to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment- as soon as practicable after the rehabilitation risk assessment is conducted, whenever given a written direction to do so by the Secretary- in accordance with the direction.	This RMP
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 12	Rehabilitation outcome documents The holder of a mining lease must prepare the following documents (the rehabilitation outcome documents) for the mining lease and give them to the Secretary for approval— the rehabilitation objectives statement, which sets out the rehabilitation objectives required to achieve the final land use for the mining area, the rehabilitation completion criteria statement, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives, for a large mine, the final landform and rehabilitation plan, showing a spatial depiction of the final land use. (2) If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.	Section 4
<i>Mining Regulation 2016</i> Schedule 8A	Forward program and annual rehabilitation report	Section 7

Source	Requirement	RMP Section
Part 2, Clause 13	The holder of a mining lease must prepare a program (a forward program) for the mining lease that includes the following— - a schedule of mining activities for the mining area for the next 3 years, - a summary of the spatial progression of rehabilitation through its various phases for the next 3 years, - a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs. The holder of a mining lease must prepare a report (an annual rehabilitation report) for the mining lease that includes— - a description of the rehabilitation undertaken over the annual reporting period, - a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period, - a report demonstrating progress made towards the achievement of the following— - the objectives set out in the rehabilitation objectives statement, - the criteria set out in the rehabilitation completion criteria statement, - for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan. If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document. The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary. (5) In this clause— - annual reporting period means each period of 12 months commencing on— (a) the date on which the mining lease is granted, or (b) if the Secretary approves another date in relation to the mining lease—the other date.	
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 14	Amendment of rehabilitation outcome documents and forward program This clause applies to— - a rehabilitation outcome document if it has been approved by the Secretary, and - a forward program if it has been given to the Secretary. The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless— - the Secretary gives the holder a written direction to do so, or - the Secretary, on written application by the holder, gives a written approval of the amendment. The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval. Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.	Section 7

Source	Requirement	RMP Section
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 15	Times at which documents must be prepared and given The holder of a mining lease must do the following before the end of the initial period— prepare a rehabilitation management plan, and prepare rehabilitation outcome documents and give them, other than the rehabilitation completion criteria statement, to the Secretary for approval, and prepare a forward program and give it to the Secretary. The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before— 60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or a later date approved by the Secretary. A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary. The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before— 60 days after a development consent is modified following an application referred to in clause 20(1)(b), or a later date approved by the Secretary. (5) A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3). (6) The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause. (7) The holder of the mining lease must comply with the direction. (8) In this clause— initial period means the period commencing when the mining lease is granted and ending— (a) 30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or (b) if this Division applies to the mining lease because of an increase in the required security deposit— (i) when the surface of the mining area is disturbed by activities under the mining lease, or (ii) at a later date approved by the Secretary.	This RMP
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 16	Certain documents to be publicly available This clause applies to the following documents— a rehabilitation management plan, a forward program, an annual rehabilitation report. The holder of a mining lease must make a document to which this clause applies publicly available by— publishing it on its website in a prominent position, or	This RMP

Source	Requirement	RMP Section
	if the holder does not have a website— providing a copy of it to a person— on the written request of a person, and without charge, and within 14 days after the request is received. If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published— for a rehabilitation management plan—within 14 days after it is prepared or amended, or for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended, (4) Personal information within the meaning of the Privacy and Personal Information Protection Act 1998 is not required to be included in a document made available to a person under this clause.	
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 17	Records demonstrating compliance The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part. Note— The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.	This RMP
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 18	Report on non-compliance (1) The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with— a condition of the mining lease, or Note— The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition. (2) a requirement of the Act or this Regulation relating to activities under the mining lease. The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance. The holder of the mining lease must ensure the report— identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and describes the causes or likely causes of the non-compliance, and describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.	Section 8 and 11
<i>Mining Regulation 2016</i> Schedule 8A Part 2, Clause 19	Nominated contact person The holder of a mining lease must nominate a natural person to be the contact person with whom the Secretary can communicate in relation to the mining lease for the purposes of the Act. Note—	This RMP, see the Summary Table

Source	Requirement	RMP Section
	The Act, section 383 sets out the ways in which notices or other documents may be issued or given to, or served on, a person for the purposes of the Act. The holder of the mining lease must give written notice to the Secretary of— the full name and contact details of the nominated person— within 28 days after the date on which the standard conditions apply to the mining lease under clause 31A of this Regulation, and any change in nomination or in the nominated person's contact details—within 28 days after the change occurs. (3) The holder of the mining lease must ensure that the contact details for the nominated person include the person's phone number and postal and email addresses.	

In addition to the regulatory requirements detailed in Table 3, the Southern Extension Project EA (Umwelt, 2016) includes a number of commitments relating to rehabilitation and final land use. These commitments, and where they are addressed within this RMP, are included in Table 4.

Table 4 EA Commitments for Rehabilitation

Commitment	Section
Castlereagh Coal will blend the created landforms with the surrounding landscape including existing and former foothills leading to the adjacent pagoda formations. No voids will remain in the final landform	Section 6.2
Shoalhaven Coal will adopt a progressive approach to rehabilitation to ensure that completed areas are shaped and vegetated to provide a stable landform	Section 6.2
The final landform developed for the Southern Extension Area and remaining areas of the existing open cut areas will take into account learnings from the rehabilitation in the west pit and will avoid slope designs which pose problems for topsoil spreading. Contour banks will be established on slopes to prevent runoff from reaching high velocities that may cause erosion	Section 6.2
The rehabilitation of the Southern Extension Project area will involve establishing three targeted vegetation communities, being: • Tableland Gully Ribbon Gum- Blackwood-Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes). The general location of these communities in the final landform is shown on Figure 6.34. Indicative seed mixes for each community are set out in Table 6.38. This exact seed mix used in different areas will depend on aspect, drainage and	Section 6.2 and 2.4

Commitment	Section
availability of seed at the time of sowing. Pioneer species may make up a large component of early seeding with subsequent seeding and infill planting used to establish species less suited to early successional phases.	
Shoalhaven Coal will update the approved RMP/MOP and Landscape Management Plan to include the Southern Extension Area and reflect the updated commitments for the Southern Extension Project	This document
Shoalhaven Coal will commission an annual inspection of rehabilitation success against objectives such as ground cover, biodiversity, weed invasion, erosion and sedimentation, and general condition	Section 8
Shoalhaven Coal will undertake annual monitoring of rehabilitation success. This will include regular inspections by the CCC, where requested, to provide for ongoing community input	Section 8
Ongoing monitoring of rehabilitation will continue to be undertaken annually and the Rehabilitation Management Plan/MOP and Landscape Management Plan will include TARPs which cover unexpected deviations from the expected successional pathways in regeneration and rehabilitation areas	Section 8 and 10
Shoalhaven Coal will undertake annual inspection of compensatory conservation areas and report on recommended improvements.	Section 8
Shoalhaven Coal will ensure coarse reject material is emplaced within the void of the open cut in such a manner that it does not encroach on in situ coal seams (i.e. emplaced 5m away from exposed in situ coal seams)	Section 6.2.3
Shoalhaven Coal will ensure coarse reject material is buried at a minimum 5m depth below the surface. This management measure is intended to significantly reduce the risk of any potential acid generating material entering the underlying water table, due to the coal seam being permeable. Dry tailings not sold as product will be disposed with overburden in the same manner as coarse reject material	Section 6.2.3
In addition to the above measures, coal rejects will be placed at least 5m from the exposed highwall to minimise any potential for acid mine leachate to enter the subsurface water system via the exposed interburden or coal seam.	Section 6.2.3
Shoalhaven Coal will remediate any material contaminated by hydrocarbons to OEHC criteria or standards or as considered appropriate through site decommissioning	Section 6.2.3

2.2 Final Land Use Options Assessment

As noted in Section 2.1, the Invincible Project Approval, mining authorities and supporting Environmental Assessments include requirements relating to rehabilitation and mine closure. This includes the requirement to implement a final land use that emulates the pre-mining environment, including the re-establishment of forest and woodland habitat generally consistent with the vegetation communities present in the area disturbed.

The final land use is consistent the objects of the Lithgow City Council (LCC) Local *Environmental Planning 2014* which indicates the areas for rehabilitation at Invincible are located within zones RU1 and RU3, for agricultural or environmental protection and forestry respectively.

2.3 Final Land Use Statement

In accordance with Invincible approvals and licencing, disturbed areas within the mining leases will be progressively revegetated and regenerated to self-sustaining native vegetation communities (i.e. Native Ecosystem). The proposed final land use aims to emulate the pre-mining environment and will enhance local and regional ecological linkages within the site and adjacent areas of the Ben Bullen State Forest.

The conceptual final rehabilitated landform design features are provided in Appendix A.

As part of the mine closure process, Castlereagh Coal is committed to the achievement of the completion objectives, as this will ensure the long-term protection and management of the post mine landscape and its biodiversity, aesthetic and agricultural values. Rehabilitation completion criterion for Invincible are provided in Section 4.

2.4 Final Land Use and Mining Domains

The primary objective of site revegetation and regeneration is to create a stable final landform that supports target post-mining land use (i.e. Native Ecosystem).

Rehabilitation areas are to be established progressively as mining operations progress. In the long term, rehabilitation areas are to become integrated with adjacent native vegetation communities. Rehabilitation areas are to be monitored on an annual basis and will be managed until they have achieved nominated completion criteria specified in the Section 4. Final Land Use domains are outlined in Table 5 Final Land Use Domains.

Table 5 Final Land Use Domains

Code	Mining Domain	Final Land Use
Primary Domains (Operational)		
1	Infrastructure areas	Native Ecosystem & Infrastructure
2	Tailings Storage Facility	Native Ecosystem
3	Water management structures	Native Ecosystem & Water Storage
4	Unshaped emplacement areas	Native Ecosystem
Secondary Domains (Post Mining)		
A	Rehabilitation Area – Woodland	Native Ecosystem
B	Rehabilitation Area – Forest	Native Ecosystem
C	Rehabilitation Area – Forest	Native Ecosystem
D	Rehabilitation Area – Coalpac	Native Ecosystem

2.4.1 Final Land Use Domain

The Final Land Use Domains for Invincible are shown on Appendix A. Each of these are discussed within the following sections.

Native Ecosystem

As discussed in Section 1.3.3, the primary final land use to be established on the mine rehabilitation areas is to be Native Ecosystem.

Revegetation works are undertaken in accordance with this RMP and the Biodiversity Management Plan. Rehabilitation areas to be managed to become integrated with adjacent native vegetation communities.

Rehabilitation areas to be monitored on an annual basis and managed until self-sustaining. Final rehabilitation areas will be managed until they are able to achieve the proposed rehabilitation completion criteria.

Water Storage (Excluding Final Void)

The Water Storage (Excluding Final Void) final land use at INV includes water management dams which are proposed to be retained in the final landform. The primary structure to be retained within the landform is the Main Storage Dam located on the western boundary of the site.

Infrastructure

The existing 11kV transmission line easement through the SEA and western edge of the Invincible MIA will remain cleared in the rehabilitated final landform to meet ongoing requirements of the infrastructure owner Endeavour Energy.

2.4.2 Mining Domains

Prior to the planned recommencement of mining operations at Invincible in 2022, the disturbed areas within the mining leases included existing rehabilitation areas, shaped and unshaped overburden emplacement areas, mining voids, infrastructure areas and water management areas.

The primary and secondary domains relevant to the site are described in Table 6 and shown on Appendix A.

Table 6 Primary and Secondary Domains

Code	Domain	Description
Primary Domains (Operational)		
1	Infrastructure areas	Offices, workshops, mining infrastructure, ROM stockpiles and mine access roads.
2	Tailings Storage Facility	Tailings dams

Code	Domain	Description
3	Water management structures	Environmental dams, sump dams, sediment ponds used in management of mine affected water.
4	Unshaped emplacement areas	Previously mined areas backfilled with overburden.
Secondary Domains (Post Mining)		
A	Rehabilitation Area – Woodland	Two areas located in the south east of the project area to be rehabilitated to satisfy the Exposed Blue Mountains Sydney Peppermint-Silvertop Ash Shrubby Woodland community.
B	Rehabilitation Area – Forest	Rehabilitation areas which satisfy the forest community of the Tableland Gully Ribbon Gum – Blackwood-Apple Bos Forest (Northern Gullies).
C	Rehabilitation Area – Forest	Rehabilitation areas which satisfy the forest community of the Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies)).
D	Rehabilitation Area – Coalpac	Previously mined rehabilitated areas (2008-2012) with native plant species representative of locally occurring vegetation communities.

3. Rehabilitation Risk Assessment

3.1 Environmental Risk Assessment

The Invincible Environment Management System (EMS) provides the overarching structure for the management of the operation, incorporates current leading practices and supports Castlereagh Coal performance standards.

The EMS enables Castlereagh Coal to apply specific tools that support the implementation, execution and effectiveness of environmental performance standards at Invincible. The EMS is designed on the principles of continuous improvement and generally follows the layout of common international standards (including ISO14001) and the Plan, Do, Check and Review cycle:

- Plan: Identify what is required;
- Do: Implement the activities;
- Check: Monitor performance through checking and corrective action; and
- Review: Evaluate suitability, adequacy and effectiveness of the system through the management review.

These steps are incorporated into each of the environmental management plans required by the Project Approval and were adopted in the Rehabilitation Risk Assessment completed for this RMP.

3.2 Rehabilitation Risk Assessment

Shoalhaven Coal completed a rehabilitation risk assessment for its CVM and Invincible Collieries on 3rd September 2025 to identify the rehabilitation related risks to achieving the Rehabilitation Objectives, Completion Criteria and Final Land Use. The joint rehabilitation risk assessment was considered to be appropriate given that the two sites are situated within close proximity to each other and comprise similar risks to rehabilitation across the two mining areas.

CVM and Invincible also have similar rehabilitation requirements of a landform returned to the previous mining environment which was native forestry as delineated in the 2003 Cullen Valley Mine Lease Extension Project EIS (2003 EIS) and the 2018 Invincible Southern Extension Project Environmental Assessment (2018 EA) respectively. Additionally, as both sites are owned and operated by Shoalhaven Coal, they are governed by many of the same values, procedures, and protocols making the combined rehabilitation risk assessment a reasonable decision.

The Risk Assessment for Invincible and CVM was performed by a suitably qualified team of appropriately skilled people representing a cross-section of the workforce and activities.

The risks to achieving successful rehabilitation were assessed for each of the rehabilitation phases described in Section 6.2.

The following personnel were present at the Rehabilitation Risk Assessment:

- Tim Haig, General Manager Castlereagh Coal;
- Nigel Wallis, Operations Coordinator Castlereagh Coal;
- Teresa Hatley, Environmental Superintendent Castlereagh Coal;
- Jason Desmond, Principal Consultant Atlantech (Rehabilitation Specialist);
- Nerida Manley, Principal Consultant.

Risks were ranked as low, medium, high or critical. The RMP Risk assessment identified 65 low risks, and 17 medium risks. No risks were considered high or critical. A summary of the medium risks and where these have been outlined in the RMP are provided in **Error! Reference source not found..**

This risk assessment will be updated in accordance with the triggers listed in Section 11 or as otherwise required.

Table 7 Rehabilitation Risk Assessment

Risk to Rehabilitation	Risk Control	Where Addressed in RMP
Inadequate topsoil and capping material quantity available to be salvaged during operations for later use in rehabilitation.	• Ground disturbance Permit • Biodiversity Management Plan • Soil and Rehabilitation Materials Management Procedure • RMP	Section 6.2.3
Inappropriate management/disposal of waste during operations	• Hazardous Materials Registers (Known locations of PCBs and similar assets) • Waste management plan • Dangerous goods registers in chemalert and hard copy • Approved waste provider	Section Error! Reference source not found.
Less than adequate management of spontaneous combustion in overburden areas.	• Site inspections PHMP CC-HSE-PC-190201 Inspection and Monitoring Arrangements • CC-PHMP-06 Spontaneous Combustion • Rehabilitation works undertaken	Section Error! Reference source not found.
Adverse surface and groundwater quality and quantity (underground and surface operations).	• Water Management Plan • Water balance reporting • Water Licences • Water investigation currently being undertaken by EMM for INV and CVM • Surface water and groundwater monitoring and comparison against baseline values in accordance with the Water Management Plan	Section 6.2.3

	- Hydrogeological assessment to characterise ground and surface water - Management of site influence on surface and groundwater	
Groundwater accumulation in former underground workings (e.g. potential for fill and spill or impacts on regional ground water users).	- Infilling of slumped areas with excess topsoils and planing in areas of slump or pond repairs. - RCE - Rehabilitation alterations of non-approved landform profile to meet approved landform. - Water investigations currently being undertaken by EMM.	Section 6.2.3
Tailings dam rehabilitation/capping does not support the final land use (Invincible Colliery only).	Mine out the tailings and backfill with overburden.	Section Error! Reference source not found.
Exposure or release of geochemical and/or geotechnically adverse material (typically tailings or waste rock) associated with containment design and construction, including capping/cover system, drainage and liner (if required).	- Geochemical contamination assessment. - Water management structures - Established rehabilitation - Monthly water quality monitoring	Sections 6.2.1, 6.2.3 and 6.2.6
Lack of detail around final void management strategy (e.g. water balance, water quality, geotechnical assessments, future water licencing requirements).	- No final voids to be left. - The Water Storage (Excluding Final Void) final land use at INV includes water management dams which are proposed to be retained in the final landform. The primary structure to be retained within the landform is the Main Storage Dam located on the western boundary of the site.	Section Error! Reference source not found.
Lack of information regarding the geochemical nature of the substrate and associated materials (e.g. subsoils, topsoils, organic additives, overburden surface).	- RMP - Sourcing suitable ameliorants (as required) - Annual Rehabilitation and Closure Plan - Timing of growth media application and seed bed preparation. - Topsoil stripping procedure - provides	Sections 6.2.1, 6.2.3 and 6.2.6

	• for maximum recovery of suitable resources available.	
Lack of information around ameliorants and or strategies required to address constraints and or enhance the substrate.	• RMP • Sourcing suitable ameliorants (as required) • Annual Rehabilitation and Closure Plan • Timing of growth media application and seed bed preparation. • Topsoil stripping procedure - provides • for maximum recovery of suitable resources available.	Section Error! Reference source not found.
Less than adequate weed and feral animal control techniques (all phases)	• RMP providing review of rehabilitation performance and trigger of intervention as appropriate • Biodiversity Management Plan - Biodiversity Monitoring • Program • Annual Rehabilitation and Closure Management Plan - • Weed and pest control programs . • Application of herbicides to remove weeds and unwanted vegetation. • LOM planning to keep growth medium removed and stored appropriately for reapplication as soon as reasonable.	Section Error! Reference source not found. and Section Error! Reference source not found.
Less than adequate environmental monitoring and management of surface water, groundwater, ecology, land capability.	• RMP Final Landform design and drainage design • consistent rehabilitation strategy • Water management plan provides for monitoring • program, review and calibration of water balance • Hydrogeological assessment to characterise ground and surface water.	Section 7

Weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	• Bushfire Management Plan provides for hazard assessment and appropriate land management activities • Land Management and environmental Inspections • Maintain suitable access in rehab areas • Maintain water sources in proximity to rehab areas • Hot works permits • Equipment maintenance	Section Error! Reference source not found. and Section Error! Reference source not found.
Long term water quality and quantity issues (e.g. acid-drainage, high salinity).	• Water Management Plan • RMP • Groundwater model • Monitoring. • Erosion and sediment control advice for operational and rehabilitation areas. • Environmental inspections • Dirty water dams • Final landform design is incorporated into mine planning to ensure problematic materials are not emplaced near final surface • Regular testing of geochemical properties of waste materials to identify PAF/other problematic waste • Inspection of final landform surface to ensure no carbonaceous materials are present	Sections 6.2.1 and 6.2.2
Insufficient establishment of target species and limited species diversity	• RMP Rehabilitation Monitoring Program providing • review of rehabilitation performance and trigger of intervention as appropriate • Biodiversity Management Plan - Biodiversity	Section Error! Reference source not found. and Section Error! Reference source not found.

	Monitoring Program • Weed and pest control programs • Pre clearing inspection required to identify suitable habitat features/rehabilitation materials • Mulching of flora material incorporated in the topsoil • Engagement of seed collectors	
Limited vegetation structural development and habitat for targeted fauna species.	• Inspections and monitoring. • Incorporation of logs and rocks during rehab. • Use of nest boxes. • Rehab maintenance. • Pest management. • Rehabilitation Reform documentation describes soil and rehabilitation materials management to be implemented • Pre-clearing inspection to identify suitable habitat features/rehabilitation materials	Section 6.2.1
Less than adequate subsidence mitigation and remediation techniques implemented.	• Subsidence monitoring and reporting. • Records of subsidence mitigation measures. • Sealing of mine openings and bore holes • Decommission and remove equipment and infrastructure • Design a mine subsidence monitoring program • Assessment of level of risk of subsidence	Section 6.3

4. Rehabilitation Objectives and Completion Criteria

Castlereagh Coal has prepared proposed Rehabilitation Objectives and Completion Criteria for the Final Land Use Domains and Mining Domains as described in Section 2.4. The proposed Rehabilitation Objectives and Rehabilitation Criteria are presented in Appendix B. This table has been developed in accordance with the Guideline: Rehabilitation Objectives and Rehabilitation Completion Criteria (NSW Resources Regulator, 2023). The Spatial References correspond to the areas shown on the RMP plans in Appendix A.

The proposed Rehabilitation Objectives were submitted to the Regulator Portal on 21 November 2024 and are currently with the NSW Resources Regulator for approval. Accordingly, these Rehabilitation Objectives and Completion Criteria are to be referred to as Proposed Rehabilitation Objectives and Completion Criteria until the NSW Resources Regulator approves them.

As previously described within Section 2, the Rehabilitation Objectives for Invincible have been derived from the various project related documentation e.g., the Project Approval, Environmental Assessments and the former Invincible Care and Maintenance MOP (Sedgman, 2015). The Rehabilitation Objectives are further discussed within Section 4.1.

Rehabilitation and biodiversity monitoring will assess rehabilitation performance and compliance against the Rehabilitation Objectives and Completion Criteria. Additionally, monitoring results will be used to validate the rehabilitation phase.

4.1 Revision to Rehabilitation Objectives and Completion Criteria

The Proposed Rehabilitation Objectives and Completion Criteria have been submitted to the Resources Regulator for review and approval. Upon Resources Regulator approval, this RMP will be revised and updated.

It should be noted, however, that the Rehabilitation Completion Criteria may require refinement during the life of the Project in response to:

- The outcomes of further rehabilitation monitoring and mine closure studies undertaken as part of site rehabilitation works;
- Government stakeholder expectations following consultation with government agencies;

- Results of ongoing monitoring programs including ecological monitoring undertaken within baseline ecological monitoring sites;
- Research and development from relevant industry trials or site experiences; and
- Long term sustainability in relation to both landform stability and ecosystem functionality.
- Any revisions which are identified to the proposed Rehabilitation Objectives and Completion Criteria will be undertaken in close consultation and with the approval of the Resources Regulator.

4.2 Stakeholder Consultation

As previously noted, the Proposed Rehabilitation Objectives and Completion Criteria for Invincible have been derived from the Project Approval and associated Environmental Assessments. The Proposed Rehabilitation Objectives are also generally consistent with those previously included within the Invincible Care and Maintenance MOP (Sedgman, 2015) which was approved by the NSW Resources Regulator. Accordingly, these proposed rehabilitation objectives have previously been subject of review and comment by the relevant regulatory agencies and community stakeholders.

Further consultation will be undertaken with the relevant community and regulatory stakeholders. Stakeholder comments will be reviewed and addressed within the proposed Rehabilitation Objectives and Completion Criteria where relevant. Stakeholders who may be interested in the proposed Rehabilitation Objectives and Completion Criteria may include (but not limited to):

- Forestry Corporation of NSW;
- INV Community Consultative Committee (CCC), including near neighbours;
- NSW Resources Regulator;
- DPHI;
- DPHI - Water Division and/or Water NSW;
- DPHI- Crown Lands Division;
- DPE DCCEEW - Biodiversity Conservation Division; and
- Lithgow City Council.

5. Final Landform and Rehabilitation Plan

The Final Landform and Rehabilitation Plan spatially defines the preferred final land use and the conceptual final landform contours at the completion of rehabilitation at INV. The Final Landform is generally consistent with the conceptual final landform presented in the Invincible EA and the former Invincible Care and Maintenance MOP (Sedgman, 2015).

5.1 Final Landform and Rehabilitation Plan

Appendix A illustrates the Final Landform and Rehabilitation Plan in accordance with Section 5.1 of the Form and Way: Rehabilitation Management Plan for Large Mines (NSW Resources Regulator, 2024) and the Guideline: Mine Rehabilitation Portal (NSW Resources Regulator, 2021). This plan illustrates the Final Land Use and Mining Domains as described in Section 2.4 and links to the spatial references provided in the Rehabilitation Objectives and Closure Criteria in Section 4. The spatial information provided within the Proposed Final Landform and Rehabilitation Plan was submitted to the NSW Resources Regulator via the Mine Rehabilitation Portal on 21 November 2024

6. Rehabilitation Implementation

This section details the rehabilitation of the site from the commencement of the RMP until lease relinquishment, including the rehabilitation schedule and the phases of rehabilitation and general methodologies for each phase.

6.1 Life of Mine Rehabilitation Schedule

Mining operations at Invincible are approved to take place until 31 December 2025. As noted in Section 1.1 the site has been in care and maintenance since 2013, with open cut mining operations scheduled to recommence in 2022.

The current status of Invincible is shown on Figure 3, with the indicative progression of rehabilitation during the term of this RMP provided in Appendix A. Mining operations are scheduled to recommence within the Invincible Southern Extension Area (SEA), with emplacement of overburden within existing disturbed areas in the central and southern areas of the site to assist in the progressive development of the final landform. The final landform will continue to be progressively developed as mining progresses within the SEA and will complement rehabilitation previously completed at Invincible prior to 2015. Infrastructure will be removed as soon as reasonably practical after it is no longer required. The void created as a result of mining in the SEA will be filled and shaped to blend with the surrounding terrain following the completion of mining.

Progressive rehabilitation activities will be undertaken throughout the life of mining operations as areas become available for final rehabilitation. Rehabilitated areas will continue to be monitored and maintained as described within the approved BMP and as further outlined within Section 8, with any rehabilitation issues identified during this monitoring addressed in accordance with the processes described within 6.

The Life of Mine rehabilitation schedule will be reviewed on at least an annual basis, with any material changes captured in revisions to the Forward Program provided to the NSW Resources Regulator and discussed in the site Annual Review.

6.2 Phases of Rehabilitation and General Methodologies

The primary objective of rehabilitation activities at Invincible is to establish a safe, stable and non-polluting final landform which is suitable of re-establishing native woodland communities, consistent with that which existed prior to mining operations and which occur within the adjacent areas of the Ben Bullen State Forest.

Rehabilitation activities at Invincible are achieved through the conduct of the following rehabilitation phases to achieve the overall rehabilitation objectives:

- Active Mining;
- Decommissioning;
- Landform Establishment;

- Growth Medium Development;
- Ecosystem and Land Use Establishment;
- Ecosystem and Land Use Development; and
- Rehabilitation Completion.

The key rehabilitation methodologies which are implemented across each rehabilitation phase are discussed within the following sections. These methodologies and control measures have been adopted to manage the potential risks of rehabilitation achieving the overall rehabilitation objectives for Invincible as identified in the Project Approval and during the Rehabilitation Risk Assessment (see Section 3).

6.2.1 Active Phase

This section summarises the risks and actions for rehabilitation to be completed within the active mining phase across the primary mining domains. The rehabilitation work to be performed during the phase are included below.

Soils and Materials

Materials used to create the final landform will be determined during this phase including the quantity available, type of materials such as topsoil, subsoil, capping materials and overburden, and their characteristics and suitability for use in final closure.

Appropriate stripping salvaging and storage for topsoil, subsoil and overburden identified and implemented to avoid loss and contamination of rehabilitation materials. Potential deficiencies in suitable topsoil volumes will be confirmed and appropriate sources to supplement existing materials will be identified. Overburden from mining operations will be trucked to existing voids at Invincible for backfilling purposes. Current Project Approval conditions (PA 07_0127 MOD5) do not allow the importation of VEMN or EMN to site. A Modification to Project Approval conditions would therefore need to be approved prior to any importation of material needed to make up any deficiency required for site rehabilitation.

The depth or thickness of soil materials suitable for recovery in the SEA was assessed as part of a Soil and Land Capability Assessment undertaken by Ecobiological (2011).

Soil types mapped within the SEA include Deep Orange Clay Loam, Shallow Brown Sandy Loam and Skeletal Sandy Loam. The topsoil from the Deep Orange Clay Loam and Shallow Brown Sandy Loam soils are both suitable for stripping and use in rehabilitation. These soils are typically deficient in nitrogen, phosphorus and potassium. During the seeding process, chemical fertilizers may be added to increase soil nutrients and promote greater seed germination within the rehabilitated landscape. The recommended topsoil stripping depths for the SEA are shown in Table 8.

Table 8 Soil Materials Suitable for Recovery in the SEA

Soil Unit	Recommended stripping depth (cm)	Ha (within SEA)
Deep Orange Clay Loam	15-20	42
Shallow Brown Sandy Loam	10-15	8.9
Skeletal Sandy Loam	Not suitable for stripping	2.8

These soil units will be generally replaced in terrain similar to that from which they were recovered.

To ensure there is sufficient topsoil retained for rehabilitation of the site, topsoil management procedures will continue to be implemented at Invincible. These measures include:

- All proposed material to be reapplied as topsoil in the final landform will be identified and a register maintained by site management;
- Topsoil will be stripped using appropriate equipment (e.g. dozer or scraper) to the appropriate depths identified in Table 9 or in accordance with the outcomes of further investigations undertaken as required;
- Topsoil will, where possible, be removed late winter early spring and placed directly (i.e. without stockpiling) to minimise any potential for degradation of the topsoil and/or the seed bank (i.e. maximise its potential contribution to the rehabilitation phase);
- Stripped topsoil will preferentially be immediately respread onto shaped overburden areas for rehabilitation and the construction of erosion and sediment control structures;
- Stockpiled topsoil dumps will be limited to 2 m height and 3 m for subsoil material;
- Topsoil stockpiles will be placed in proximity to the canopy of existing vegetation across the site which will act as a viable seed source;
- Topsoil stockpiles will be developed away from traffic areas and at an appropriate distance from watercourses to minimise the potential for compaction and/or erosion;
- Topsoil stockpiles will be emplaced separately based on the soil unit classification;
- Weed growth will be monitored and subsequently controlled if necessary;
- Appropriate sediment controls will be installed around topsoil stockpiles to manage the potential for erosion and loss of valuable soil resources; and

Following land shaping works, stockpiled soil and resources from pre-stripping activities will be spread over shaped areas and stockpiled logs scattered over the area for habitat enhancement purposes. These areas will then be seeded and/or direct planted.

Flora and Fauna

A key rehabilitation objective for Invincible is to establish forest habitat with comparable structure and floristics to surrounding areas of the Ben Bullen State Forest. Accordingly, to assist with achieving this rehabilitation objective, it is vital to recover vegetative and habitat resources for reuse on the mine rehabilitation areas.

Vegetative and habitat resources are identified for salvage during the initial pre-clearance surveys as described within the approved BMP. The pre-clearing surveys includes the identification of opportunities to collect seeds, hollow bearing trees, logs, large rock features other materials suitable in rehabilitation activities. These items will then be subject to salvage and storage for future use on rehabilitation areas.

Further, opportunities to collect viable seed from threatened flora species found in nearby analogous sites will be investigated. If determined to be viable, these seed resources will be collected, stored and managed for use in the Ecosystem and Land Use Establishment phase.

Seed and/or tubestock to be used within rehabilitation activities will be sourced from a local or regional reputable contractor. Weeds will be managed in accordance with the measures described in the approved BMP.

Habitat features such as hollow bearing trees, logs and large rock features will be collected and stored during clearing in the SEA for reuse in the rehabilitation landscape in accordance with the process described in the approved BMP. Should the presence of pest or feral animal species be identified as an issue during the Ecological Monitoring Program, suitably qualified contractors will be employed for their control.

Rock/Overburden Emplacement

Invincible has been in care and maintenance since the 2013. With the recommencement of mining operations scheduled for 2022, mine planning has focussed on minimising the required haulage distances and the need for future rehandle of overburden materials where possible. Mine planning has also considered the need to avoid and/or minimise the disturbance of previously rehabilitated areas, where possible.

Mine planning involved the consideration of the materials balance required to achieve the final landform design. This work has demonstrated that the final landform design can practicably be achieved in accordance with the staged LOM plans.

Overburden material from the SEA will be loaded onto trucks and hauled to active emplacement areas. Some overburden may be pushed directly by dozer to areas behind active mining rather than being haulage by truck (Umwelt, 2016). As the OEAs are developed, they will be progressively shaped and rehabilitated.

Waste Management

Management of the waste produced at Invincible is primarily managed by an appropriately licenced contractor. With the recommencement of works in 2022, the following waste streams are likely to be generated and will require ongoing management.

Sewerage

All sewage from the crib huts and office areas is directed to septic systems which are pumped out by a licensed waste contractor on an as-needs basis. Sewage waste will continue to be managed in this manner during the term of this RMP.

Oil/grease Containment and Workshop Wastes

Any maintenance works required during the RMP term will be undertaken within existing workshop areas at Invincible. Waste oils and grease from these bunded areas is pumped or gravity flows to an oil-water separator for collection by a waste contractor on an as needs basis. Under emergency circumstances, i.e. breakdowns in the pit area, oils and grease will be pumped from the equipment to a tank on the service truck using an evacuation pump and will subsequently be transferred to the bulk waste oil storage tank at the maintenance workshop.

All parts, packaging etc. will also be collected and transferred to the maintenance workshop for disposal or for future recycling. Waste oils and grease stored at the maintenance workshop are collected by a licensed waste recycling contractor on an as needs basis.

General Waste Management

All paper and general wastes originating from Invincible site offices will be disposed of in garbage bins located adjacent to the administration buildings. The bins are collected by a licensed waste collector as needed.

Contaminated Soils

Areas of potential contamination will be identified for further remediation or disposal in the decommissioning and growth medium development phase.

Geology and Geochemistry

A geochemical assessment of Invincible was undertaken by RGS Environmental (2011) and considered the geochemical properties and constraints associated with overburden and coal reject material at Invincible. The key findings of the RGS Environmental report are summarised below.

Overburden

- Overburden materials are likely to be non-acid forming (NAF) and have a high factor of safety with respect to potential acid generation. Most overburden samples tested had negligible total sulphur content and a low-moderate acid neutralising capacity (ANC);
- The concentration of total metals in overburden solids is well below applied guideline criteria for soils and is unlikely to present any environmental issues associated with revegetation and rehabilitation;
- Most overburden material will generate pH neutral, low salinity runoff and seepage following surface exposure. The major ion chemistry of initial surface runoff and seepage from overburden materials is likely to be dominated by sodium and sulphate with lesser amounts of bicarbonate and chloride;

- The concentration of dissolved trace metals in initial and ongoing runoff and seepage from overburden materials is unlikely to present any significant environmental issues associated with surface and ground water quality;
- Overburden materials below 10 m depth are likely to be non-sodic and may be suitable for revegetation and rehabilitation activities (in final surfaces or as a growth medium).

Material Prone to Spontaneous Combustion

There are no known occurrences of spontaneous combustion at Invincible. Experience to date has demonstrated that the overburden material, stockpiled coal and reject materials from previous mining operations have a low propensity to spontaneously combust. There are therefore no potential adverse impacts expected as a result of spontaneous combustion at Invincible.

Material Prone to Generating Acid Mine Drainage

Historically, acid mine drainage (AMD) has not been an issue at Invincible. Invincible will continue to monitor the quality of the water in its dams each month as an indicator of potential AMD from reject emplaced during previous mining operations on site.

No reject or tailings will be generated during mining operations within the term of this RMP.

Erosion and Sediment Control

A number of erosion and sediment control structures remain in place at Invincible to manage surface water runoff from the mining and rehabilitation areas.

Regular inspections of water management and associated erosion and sediment control structures will be undertaken to confirm that they are operating efficiently or identify any requirement for change to the existing site water management system.

Any new erosion and sediment control structures will be constructed in accordance with Managing Urban Stormwater: Soils and construction (2004 Landcom), as required under the Project Approval.

Air Quality Management

The establishment of progressive rehabilitation as soon as reasonably practical following disturbance will reduce dust emission impacts. The final landform will be progressively developed as mining progresses to the south and will complement rehabilitation previously completed at Invincible. The void created as a result of mining in the Southern Extension Area will be filled and shaped to blend with the surrounding terrain following the completion of mining. Following land shaping works, stockpiled soil resources from pre-stripping activities will be spread over shaped areas and stockpiled logs scattered over the area for habitat enhancement purposes. These areas will then be seeded and/or direct planted.

The Invincible Air Quality Management Plan (AOMP) describes the management strategies, procedures, controls and monitoring programs implemented to minimise potential impacts on air quality. A number of dust mitigation measures described in the AOCMP are available to minimise air quality impacts during rehabilitation activities, including:

- Awareness training for mobile plant operators regarding measures to minimise dust impacts;
- Modification of activities in response to identified triggers such as dry, windy conditions with wind blowing towards sensitive receptors;
- Watering of travel routes and operating areas;
- Progressively shaping and rehabilitating overburden emplacements; and
- Minimising exposed areas that will not form part of the active mining operations for periods of 12 months or more through seeding with a suitable groundcover mix, to reduce potential for wind erosion and dust emissions.

Ongoing Management of Biological Resources for Use in Rehabilitation

Disturbance within the SEA proposed during the term of this RMP will require the ongoing salvage and management of biological resources for use in the development of the final landform.

Materials will be salvaged and stockpiled in accordance with the approved BMP.

Mine Subsidence

There will be no underground or highwall mining undertaken at Invincible during the RMP term. As such, no subsidence monitoring or management will be required.

Cultural Heritage

The SEA will impact on six Aboriginal sites, consisting of isolated finds and artefact scatters. The management of these sites will be undertaken in accordance with the approved Aboriginal Cultural Heritage Management Plan (ACHMP), which has been prepared in consultation with the Registered Aboriginal Parties. The ACHMP reflects the outcomes and management activities included in the Aboriginal Cultural Heritage and Archaeological Assessment for the SEA Project, including the collection of affected sites prior to surface impacts.

No items of historic (European) heritage are located within the SEA as such, mining operations within the term of the RMP are not predicted to have an impact on historic heritage items. Measures to manage potential blast impacts on heritage items are detailed in the Invincible Blast Management Plan.

Socio-economic Impacts

A review of socio-economic risks associated with mine closure will be conducted for Invincible at least five years prior to the completion of mining operations. This review will identify and assess measures available to minimise socio-economic effects to the local region and to the Castlereagh Coal workforce and suppliers.

Exploration Activities

Exploration activities are not planned, but may be required in future works at Invincible. Following any exploration activity undertaken drill holes will be sealed in accordance with the *Borehole Sealing Guideline (DTI - Resources and Energy 2012)* and the *Exploration Code of Practice: Rehabilitation (DRG, July 2015)*.

Disturbance will be kept to a minimum during exploration activities, with topsoil will be stripped as required prior to commencement. Stripped topsoil will be stockpiled separately to subsoil and subsequently used in the rehabilitation of exploration disturbance. Disturbance areas caused by exploration activities will be rehabilitated to a free draining landscape and revegetated to reflect the local ecology.

6.2.2 Decommissioning

During the decommissioning process, access to the site will need to be restricted to site personnel, to prevent potential impacts to public safety. Signage and exclusion fencing will be erected as required during the recommissioning phase, with notifications made to local landholders, if required.

The location of rehabilitation areas, heritage places or objects and any infrastructure to be retained for final land use will be delineated until such time as it has been approved for decommissioning and removal.

Site Security

During the decommissioning process, access to the site will need to be restricted to site personnel, to prevent potential impacts to public safety. Signage and exclusion fencing will be erected as required during the recommissioning phase, with notifications made to local landholders, if required.

The location of rehabilitation areas, heritage places or objects and any infrastructure to be retained for final land use will be delineated until such time as it has been approved for decommissioning and removal.

Infrastructure to be Removed or Demolished

During the RMP term, several infrastructure areas are proposed to be decommissioned once they are no longer required to support mining operations. This includes the:

- Redundant utilities, services and bulk storage infrastructure (including pipelines - underground and surface, powerlines, fuel storages and hazardous material storages);
- Water management and erosion and sediment control infrastructure (where this will not be retained post- mining);
- Hardstand and bitumen sealed areas, haul roads and access tracks; and
- Ancillary buildings at the Mine Infrastructure Area (MIA).

Any required demolition work will be carried out in accordance with AS 2601-2001: The Demolition of Structures.

Buildings, Structures and Fixed Plant to be Retained

The general final land use for the site as defined in the 2018 EIS for Invincible is a return to the pre-mine environment which has been identified as Native Ecosystem establishment. As such, limited infrastructure is to be retained following mine closure.

The existing 11kV transmission line easement through the SEA and western edge of the Invincible MIA will remain cleared in the rehabilitated final landform to meet ongoing requirements of the infrastructure owner Endeavour Energy.

Management of Carbonaceous/Contaminated Material

Carbonaceous material from the CHPP, coal stockpiles and haul roads will be removed for emplacement within OEAs.

Areas with potential for land contamination include the MIA, workshop, refuelling areas and any areas in-pit maintenance areas. During mine closure, these areas will be assessed in accordance with the Contaminated Land Management Act 1997 and Protection of the Environment Operations Act 1997. Remedial Action Plans will be prepared for any contaminated areas identified, to outline any mitigation works required.

Hazardous Materials Management

Contamination from maintenance and hydrocarbon management areas represents the primary hazardous materials risk to rehabilitation at Invincible. During mine closure, these areas will be assessed in accordance with the Contaminated Land Management Act 1997 and Protection of the Environment Operations Act 1997. Remedial Action Plans will be prepared for any areas that require active management for hazardous materials, to outline any mitigation works required.

6.2.3 Landform Establishment

Landform establishment includes the activities of shaping unformed rock or other substratum material into a desired land surface profile, which includes earthworks activities such as cut and fill, rock raking, water storage and drainage construction. The objective of Landform Establishment is to construct a stable final landform foundation including slopes, erosion controls, and drainage lines which are integrated with and compatible with surrounding landforms.

The post-mining landform will be developed generally in accordance with the conceptual final landform identified in the Invincible EA. Landform establishment plans will be reviewed by suitably qualified individuals to determine landform suitability and conformance with final land use and rehabilitation objectives and assess potential environmental risks.

The performance indicators and completion objectives for the Landform Establishment phase address: stabilising landforms; minimising erosion; preventing water pollution; preventing access to open pits or other hazardous locations; enhancing visual amenity; and site user, stock and fauna safety.

The final landform and rehabilitation domain types for Invincible during the life of the RMP are described in Section 4.

Several strategies were proposed in the report to manage potential risks to the long-term performance of the post-mining landform. These included:

- The use of concave slopes on small slopes with only limited upslope run on. This reduces the risk of erosion as concave slopes where gradients flatten with increasing catchment area have a lower risk than those that steepen with increasing catchment area. Without significant intervention flows onto flat surface will not dissipate and will cut an extended drainage line.
- The use of geomorphic designs on sites with significant upslope flow concentration. This reduces the risk of erosion as this ensures that concentrated flows remain in designated drainage lines which can be armoured with rocks.

Water Management Infrastructure

The majority of the site water infrastructure is to be removed at the cessation of mining operations. Water management infrastructure to be removed and remediated include former Tailings Storage areas, sediment traps, Environmental Dam, SD2, , SD4, , SD7, SD8, Northern Void, Eastern Void and Southern Void (which will be created when mining commences in the SEA).

Decommissioning of water management infrastructure will generally be performed by first desilting then be dewatering and reshaping dam structures to provide a stable, free-draining landform for rehabilitation.

One dam in the south-eastern section of the site is proposed to be retained for habitat purposes. The dam will be re-assessed at the completion of mining to confirm whether it remains fit-for-purpose and identify any potential risks and modes of failure that will require.

Water drainage structures will be constructed using appropriate rock materials, to be determined by a suitably qualified geologist.

An assessment of the impact of the site on the surface and ground water at Invincible will be performed prior to the commencement of landform establishment. This assessment will determine the impact of the final landform on the surrounding landform, the successful establishment of revegetated areas and ecosystem development and the water table. Management and mitigation measures will be implemented based on this assessment and in accordance with the WMP.

Final Landform Construction: General Requirements

WSP Golder (2022) was employed to perform a risk assessment on the material inventory and erosion risk at Invincible and CVM. Soil testing was performed on 1 stockpiles proposed for use in the growth medium at Invincible. These included particle size distribution, Atterberg limits and Emerson testing for the erosional characteristics of the soil. Soil testing will occur as stockpiling continues to ensure topsoil characterisation can be established for the entire topsoil balance. Where subsoils are utilised as surface materials, ameliorants will be added as required to achieve rehabilitation criteria.

As noted in Section 6.2.1, OEAs will continue to be developed towards the conceptual final landform as mining is undertaken within the SEA.

Final Landform Construction: Reject Emplacement Areas and Tailings Dams

The majority of the existing coal reject materials have been identified as Non-Acid Forming (NAF) though for some the geochemical characteristics are uncertain or are potentially acid forming (PAF). The few PAF coal reject materials appear to be associated with the Lithgow Seam and particularly coarse reject materials. In contrast, tailings materials previously generated from processing the Lithgow Seam appear to be NAF. PAF coarse reject materials from the Lithgow Seam may generate acidic and more saline runoff and seepage if exposed to oxidising conditions.

The major ion chemistry of initial surface runoff and seepage from NAF coal reject materials is likely to be dominated by sodium and sulphate, with lesser amounts of bicarbonate and chloride. For PAF coarse reject materials, the initial concentration of soluble sulphate in surface runoff and seepage is expected to be relatively low, although further exposure to oxidising conditions may lead to increased sulphate conditions.

PAF material will be emplaced at an appropriate depth in the final landform and surrounded with NAF materials. The emplaced of PAF material within the final landform has been incorporated into the Forward Program and LOM planning.

Final Landform Construction: Final Voids, Highwalls and Low Walls

The Invincible Project Approval and supporting Environmental Assessments confirms that there will be no final voids, with a free draining landscape to be implemented for the site.

6.2.4 Growth Medium Development

Growth Medium Development is the initial processes to achieve a soil which is capable of supporting a sustainable plant community. Soil testing will be performed to determine the properties of each type of material proposed as a growth medium in the final land use. This testing will monitor (at least) pH, EC, major cations (K, Na, Al, Ca, Zn), sulphur and nitrate and the results will be compared to analogue sites to indicate if materials are suitable to support vegetation growth. The growth media at Invincible has been identified previously as having generally poor fertility with limited nutrients to promote vegetation growth. Due to this characteristic the application of additional material or ameliorants may be required to assist rehabilitation in meeting nominated rehabilitation criteria.

To assist in meeting rehabilitation objectives the following steps will be taken during the landform establishment phase:

- The grade and slope will be designed to be stable to assist in the retention of the topsoil material for vegetation growth;
- Topsoil will be spread to a depth of approximately 100 mm, or to match reference sites of comparable gradient, landscape features and final vegetation profiles;
- Weeds will be managed through the Weed Management Strategy outlined in the BMP and be of an equal or less prevalence in the rehabilitation area as adjacent vegetative communities;

- Implementation of a short-lived pioneer species will be employed in areas should adverse conditions delay vegetation establishment to reduce dust and erosion. An analysis of soil properties will be performed if vegetation establishment continues to not meet expectations. Ameliorants will be applied where required; and
- Annual rehabilitation monitoring will include monitoring of the development of an organic or litter layer to determine that the soil profile is effectively forming.

Growth Media indicators will also be included in future phases to reflect the natural cycle. The performance indicators and completion objectives, together with the reference and source are provided in Section 4. It includes consideration of the chemical, physical and biological properties of the media and takes into account issues such as soil ameliorants aligned to the revegetation of the disturbed areas, whilst also incorporating consideration of land-use that may deviate from the traditional post mining land-use.

6.2.5 Ecosystem and Land use Establishment

Ecosystem and land use establishment incorporates the requirements for: the management and control of fire, weed and vertebrate pest species; establishment of desired flora species in terms of the planned end use, the development of systems to enhance opportunities for nutrient cycling; development and enhancement of habitat for key fauna species, the optimal use of onsite resources, e.g. woody debris, rock and mulch.

Rehabilitation at Invincible is generally divided into areas of woodland and forest native vegetation communities and areas which were rehabilitated prior to 2015. The framework for the development of the performance indicators and completion objectives for ecosystem and land use establishment are provided in Appendix B.

Rehabilitation of disturbed areas of the SEA will target three key vegetation communities:

- Tableland Gully Ribbon Gum- Blackwood -Apple Box Forest (Northern Gullies);
- Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies); and
- Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).

The general location of these communities in the final landform is shown in Appendix A. The seed mix used to establish the target vegetation communities is based on the ecological communities observed in analogue and adjacent reference sites. These reflect the optimum conditions for each ecological community proposed to be revegetated in the final land use. These optimum conditions include slope, aspect, air flow, insolation and runoff for each community. Indicative seed mixes for each community are set out in Appendix C. Pioneer species may make up a large component of early seeding with subsequent seeding and infill planting used to establish species less suited to early successional phases.

Habitat features will be replaced during the commencement of this phase from stock stored during the Active Mining Phase in Section 6.2.1 Habitat features will be put in place in locations and positions that best promote native fauna use. Hollow bearing trunks will be spread appropriately throughout the rehabilitation areas and/or stood to provide for perching and nesting sites whilst rehabilitation establishes.

Pest invertebrate species will be monitored during ecological monitoring based on vegetation health. Should vegetation health diminish unexpectedly an investigation will be performed to identify the source. If pest invertebrates are identified as a contributing factor mitigation measures will be implemented through pest control programs.

Weed control will be undertaken during the life of the mining within the SEA and during the establishment of vegetation in rehabilitation areas, as required. Weeds will generally be managed in accordance with the BMP.

Table 9 identifies potential threats to vegetation during the ecosystem and land use establishment phase.

Table 9 Potential Threats to Vegetation Establishment

Potential Threat	Potential Impact	Management Measure
Erosion and sedimentation	Washout of vegetation and/or inability of vegetation to establish on eroded surfaces	Regular site inspections and maintenance/repair of erosion and sedimentation controls as required in accordance with the WMP.
Failure of seed to establish	Poor vegetation cover and plant densities	Use of recommended rehabilitation seed mix and adjustment of seed mix as required. Proven seeding methods (broadcast) and equipment and dedicated training systems for personnel. Review of seeding methods by a specialist prior to implementation. Seeding when seasonal conditions are favourable, where possible. Ensuring landform is established correctly and growth medium development has been achieved prior to seeding i.e. completion objectives achieved. Annual monitoring and management in accordance with the RMP and BMP. Reseeding failed areas as required. Application of fertilisers and water irrigation where required. Seed stocks with Ant deterrent coating where required.
Dieback of established vegetation	Poor vegetation cover and plant densities	Annual monitoring and management in accordance with the Environmental Monitoring Program. Investigation into cause of dieback.

Potential Threat	Potential Impact	Management Measure
		Identification of remediation techniques to be implemented including ameliorants required. Reseeding/replanting failed areas as required.
Over-dominance of species and low species diversity	Inappropriate vegetation structural diversity	Annual monitoring and management in accordance with the RMP and BMP. Use of recommended rehabilitation seed mix and adjustment of seed mix as required.
Weed encroachment	Weed establishment outcompeting native plant species	Regular site inspections and annual monitoring and management in accordance with the RMP and BMP. Regular weed control by a licensed weed spraying contractor.
Feral and pest species	Feral and pest species cause destruction of ecosystem	Monitoring of identified feral and pest species in the area. Baits and traps specific to feral and pest species. Exclusion fencing where required.
Bushfire	Loss of vegetation and structural diversity	Maintenance of fire-fighting equipment and reduction of fuel loads as appropriate, in consultation with NSW Rural Fire Service.

6.2.6 Ecosystem and Land use Development

Ecosystem and land use development incorporates the: development of the soil profile in the growing media; introduction of land uses which are compatible with the landform and surrounding areas; vegetation communities capable of withstanding severe events, for example drought, bushfires and storms; nutrient cycling; species diversity and abundance for both flora and fauna and re-colonisation of the site by key indicator species. The performance indicators and completion objectives which describe structures and methods for this phase of rehabilitation are provided in Section 4.

As described in Section 8, rehabilitation monitoring will continue to be undertaken on an annual basis to assess the performance of rehabilitation areas against analogue sites and identify required management measures.

There is potential for erosion and sedimentation on rehabilitated areas at Invincible. The landform will be monitored during this stage with the purpose of identifying emerging erosional issues and if sedimentation is occurring in the water management infrastructure that has been retained in the final landform. Existing and emerging erosional and sedimentation issues identified during this monitoring will be managed in accordance with the WMP, BMP and this RMP. Rapid response sediment control structures such as sediment fences, screens, logs and repair work will be implemented if any maintenance actions are identified during monitoring.

Sodicity and surface crusting may emerge as a potential issue for ecosystem development in areas previously used for tailings storage. Geochemical monitoring and testing will be performed to determine areas afflicted by sodicity and surface crusting in areas not meeting expected growth rates. Growth rates will be determined through a comparison between areas of ecosystem development on rehabilitated land at Invincible and analogue sites. Ameliorants will be applied where identified as required by Geotechnical monitoring and testing.

Bushfires have the potential to cause significant damage to rehabilitation areas if not managed correctly. Some of the management measures to mitigate the damage caused by bushfires in rehabilitated areas include:

- Fuel loads in mature rehabilitation areas may be cool burned during cooler seasons, if required;
- Equipment including light vehicles will remain outside of vegetated areas where possible;
- All vehicles will be fitted with fire extinguishers;
- Equipment and vehicle exhaust systems will be fitted with spark arresters; and
- Fire-fighting access pathways will be maintained to allow fire crews access to strategic firefighting areas.

The Project Approval requires the implementation of a Biodiversity Offset Strategy, in accordance with the Southern Extension Project EA (Umwelt, 2016). Linkages between Biodiversity Offset Areas approved for Invincible (Lot 112/DP 87719, Lot 1/DP 180294, Lot 113/DP 877190 and the Hillcroft Offset Site) and mine rehabilitation areas will be promoted during the ecosystem and land use development phase. This will be achieved through the progressive establishment of self-sustaining vegetation communities in rehabilitation areas as described in this section and improvement of existing vegetation condition in the existing Biodiversity Offset Areas, in accordance with the Biodiversity Management Plan. The performance of rehabilitation areas and the ability of rehabilitation communities to complement the values of adjacent Biodiversity Offset Areas will be validated by routine inspections and the annual biodiversity monitoring program (see Section 8.1).

6.3 Rehabilitation of Areas Affected by Subsidence

Open cut mining within the SEA will disturb areas currently affected by subsidence from the former historic Ivanhoe Colliery underground workings. Parts of the Southern Extension Area are impacted by subsidence from the former Ivanhoe No.2 underground operations. The mining of this area removes all future subsidence risks from this area. Castlereagh Coal will reinstate a landform that does not present any subsidence risks

7. Rehabilitation Quality Assurance Process

To ensure that rehabilitation is being performed adequately to meet rehabilitation criteria, key actions and/or processes will be recorded for the phases outlined in Section 6.2. The validation methods will provide records of completion for each phase of rehabilitation. These records will assist in identifying that the risks to rehabilitation have been adequately addressed before the commencement of the next phase. The records will also be used to provide evidence that rehabilitation criteria have been met.

It is the responsibility of the Mine Manager to ensure that the implementation of the assurance process is occurring. This process will be included in forward plans as well as a review process which is to be performed on an annual basis. The Mine Manager shall also ensure that adequate resources are available to implement the site rehabilitation plan and review the RCE following any material changes to LOM plans.

7.1 Active Mining

Validation methods for this phase include:

- Survey and delineation of disturbance boundaries and completion of pre-clearance permits prior to vegetation disturbance;
- Maintaining records of pre-clearance surveys; and
- Maintenance of a register for topsoil and any other material that is stockpiled in advance of active mining for use in rehabilitation works.

7.2 Decommissioning

Validation methods for this phase include:

- Asset register for all infrastructure, services, equipment and roads has been allocated a keep or remove status and the relevant infrastructure removed;
- Decommissioning report for the removal of infrastructure, services and equipment other than that identified as required by post mining land use, water dams to remain for habitat purposes or subsequent land uses are to be fit for purpose;
- Inspection for access tracks, fences and gates and to ensure the surface layer is free of hazardous materials; and
- Photographs to confirm that all the infrastructure has been removed and to ensure the surface layer is free of hazardous materials.

7.3 Landform Establishment

Validation methods for this phase include:

- An as constructed plan for all water management structures incorporated into the landform;

- An as built conformance survey for constructed landforms; and
- Visual inspection to ensure the landform is free-draining and Overflow point is stable and there is at least one point of egress to / from the dam.

On the 18 and 19 May 2021, the RR conducted Landform Establishment TAPs at Invincible Colliery (Invincible) and Cullen Valley Mine (CVM) respectively. Following the TAPs, the RR issued Castlereagh Coal Pty Ltd with notices under Section 240 of the Mining Act 1992 requiring action at both Invincible and CVM with regard to landform establishment and stability. Umwelt (Australia) Pty Ltd (Umwelt) was engaged by Castlereagh Coal to undertake the works required to address the Section 240 notices. WSP Golder (Golder) was engaged as a subconsultant to Umwelt to assist with these works and specifically undertake an analysis of the erosional risk of the Invincible and CVM final conceptual landforms and material balances for final landform establishment.

The recommendations from the report and the site's commitments to address the recommendations are outlined in Table 10.

Table 10 Recommendations from Landform Stability Studies

Recommendation	Site response and commitment
Ongoing monitoring and analysis of final landform areas with established vegetation but also with failed drainage structures and erosion on slopes to determine likelihood of stabilisation over time or whether intervention is required to achieve long term stability. This should include an ecological evaluation of existing rehabilitation. These activities could be incorporated into the existing annual Biodiversity monitoring program which occurs at both sites.	The Mine commits to continuing monitoring of established vegetation and erosion-prone areas through the annual Biodiversity Monitoring Program. Additional monitoring parameters will be included to assess slope stability and drainage performance. Where monitoring results indicate that stabilisation is unlikely without intervention, the Mine will implement targeted remediation measures to achieve long-term stability.
Source high density LiDAR (20 points/m ²) and develop a high resolution DTM to enable detailed assessment of the stability of established areas of final landform	The Mine acknowledges the benefits of high-density LiDAR and commits to investigating cost-effective options to acquire high-resolution data to support landform stability assessment. Should LiDAR acquisition not be immediately practicable, the Mine will continue to utilise drone-based imagery and conventional survey methods to ensure adequate monitoring coverage.
For areas requiring intervention, assess possible options for long term stability (referencing Golder 2022 memorandum).	The Mine will assess intervention options for any areas identified as unstable through monitoring. These assessments will be guided by Section 3.3.3 of the Golder (2022) memorandum. Preference will be given to options that apply geomorphic principles and are proportionate to the scale of the site, while ensuring compliance with rehabilitation obligations.
Prepare a detailed final landform design with geomorphic principles applied to areas not yet established.	The Mine commits to preparing a revised final landform design informed by monitoring outcomes and stability assessments. Geomorphic design principles will be applied to all unestablished areas of the final landform to ensure long-term sustainability and compliance

Recommendation	Site response and commitment
	with Rehabilitation Management Plan requirements.
Prepare detailed designs for final landform drainage structures following revised landform design.	The Mine will prepare detailed drainage structure designs following completion of the revised final landform design. The designs will be developed to ensure erosion control, adequate capacity for extreme rainfall events, and integration with local catchment hydrology.
Prepare a revised material balance based on the detailed final landform design.	The Mine commits to preparing a revised material balance aligned with the updated landform design. This material balance will be used to confirm material availability and requirements and will inform the scheduling and delivery of rehabilitation works.
Progress discussions with Transport for NSW and Walker Quarries regarding import material suitability and availability.	The Mine will continue engagement with Transport for NSW and Walker Quarries to determine the suitability and availability of imported materials. These discussions will be progressed in parallel with final landform and drainage design work to ensure that any additional material requirements are identified early and managed in compliance with regulatory expectations.

7.4 Growth Medium Development

Validation methods for this phase include:

- Soil testing to confirm that soil/growth medium chemical and physical properties are suitable for establishment of the post mining land use;
- Photographs and visual inspections to ensure there are no significant signs of accelerated and/or active erosion that compromise landform stability or public safety within the rehabilitation areas and woody debris has been incorporated into the final landform; and
- Vegetation surveys to determine if topsoil/organic material or a suitable alternative growth media is suitable to support vegetation growth.

7.5 Ecosystem and Land Use Establishment

Validation methods for this phase include:

- Ecological monitoring to confirm that the soil profile in rehabilitated areas has developed correctly, that there are self-sustaining vegetation communities that comprise flora species from locally occurring vegetation communities in rehabilitation areas and are used by native animals, and that it improves and adds to the biodiversity of the area;
- Photographs to provide evidence that the soil profile in rehabilitated areas has developed correctly, that there are self-sustaining vegetation communities that

comprise flora species from locally occurring vegetation communities in rehabilitation areas and are used by native animals, and that it improves and adds to the biodiversity of the area; and

- Visual inspection to confirm that native animals use the area and the areas biodiversity is added to by the rehabilitation area.

7.6 Ecosystem and Land Use Development

Validation methods for this phase include:

- Visual inspection to ensure that the landform is safe, stable and non-polluting, and that they are self- sustaining vegetation communities that comprise flora species from locally occurring vegetation communities in rehabilitation areas;
- Ecological monitoring to confirm that that they are self-sustaining vegetation communities that comprise flora species from locally occurring vegetation communities in rehabilitation areas; and
- Water quality testing to determine that the pH, EC and TSS is the same as historical baseline averages.

8. Rehabilitation Monitoring Program

The monitoring methodology and frequency are designed to assess the rehabilitation performance against the performance indicators and the overall completion objectives, as detailed in Section 4. Depending on the aspect and identified risks, the monitoring is generally conducted at various hold points during the life of the project or annually as part of BMP monitoring program. The BMP was developed to describe the biodiversity management strategies, procedures, controls and monitoring programs to manage the potential biodiversity impacts associated with Invincible operations. The monitoring program is designed to assess what is working/completed and what is not/trending towards completion or otherwise. Where applicable the data gathered is used to refine and assess the progress of completion criteria as a part of the Quality Assurance process.

8.1 Analogue Site Baseline Monitoring

Annual biodiversity surveys will continue to be conducted in the Biodiversity Offset Areas in and around Invincible land and on rehabilitated lands, in accordance with the approved BMP and this RMP. This monitoring will provide feedback on the status of rehabilitated areas and its progression towards achieving relevant completion criteria. Biodiversity target levels have been set based on the density and diversity of flora and fauna in adjacent native vegetation communities.

Biodiversity Offset Areas have been selected as analogue sites as they are within close proximity to Invincible and show the representative vegetation communities that are proposed for the final land use. Monitoring in this area is performed in the local state forest and biodiversity offsets annually and reported in the Annual Review.

8.2 Rehabilitation Monitoring

8.2.1 Rehabilitation Monitoring Program

Castlereagh Coal has implemented a monitoring program that assesses rehabilitation performance across the site. The monitoring program utilises a range of mechanisms (e.g. correspondence, records, visual inspection records, ecological monitoring reports, photographs etc), to demonstrate performance indicators have been met. These mechanisms provide evidentiary material to document and demonstrate compliance with performance indicators and can be used to demonstrate changes over time.

The majority of the rehabilitation monitoring involves confirmation via field inspection, documentary evidence is held or that actions have been completed. Monthly rehabilitation inspections will be completed by Castlereagh Coal personnel, with corrective maintenance actions recorded and tracked to completion. Records of rehabilitation inspections will be maintained for future review and consideration as part of the detailed annual biodiversity and rehabilitation monitoring studies. The outcome of

this monitoring determines the status of each rehabilitation area against relevant completion criteria. Each area assessed is classified as either complete, in progress, not satisfactory [rectification works required] or not commenced. TARPs will be implemented when monitoring shows that there have been unexpected deviations from the expected successional pathways in rehabilitation areas (refer Section 10).

Rehabilitation Monitoring begins during Phase 1 - Decommissioning and is undertaken through to Land Relinquishment to assess and document the progression of rehabilitation. Castlereagh Coal undertakes annual rehabilitation monitoring of its rehabilitation areas against the performance indicators as detailed in Section 4. Any maintenance works identified during monitoring are scheduled for completion or incorporated into the mines yearly program of works. Rehabilitation maintenance is a function of either the rehabilitation methodology or is triggered through outcomes of the field monitoring program, where mitigation actions are developed and implemented (i.e. where the desired vegetation types are not being achieved). Typical maintenance activities at Invincible focus on erosion control, weed and pest management, and revegetation progress. The TARPs process is detailed further in Section 10.

A summary of rehabilitation monitoring results will be provided within the Annual Review. The Annual Review will be prepared and submitted to the Secretary in accordance with Project Approval requirements and include a discussion of rehabilitation monitoring results and a comparison against relevant EIS/EA predictions and the forward plans submitted to the NSW-Resources Regulator.

8.2.2 Ecological Rehabilitation Monitoring Program

The ecological rehabilitation monitoring commences during Phase of rehabilitation Ecosystem and Land Use Establishment and involves:

- Annual Walkover Inspections; and
- Detailed Ecological Monitoring (contingent upon rehabilitation age).

The monitoring methodology adopted for the above are standard procedures (i.e. vegetation plots and transects etc) that can be replicated over any vegetation community or rehabilitation area and allows results to be compared to the analogues communities.

These monitoring requirements are discussed further below.

8.2.2.1 Annual Biodiversity Survey

The annual biodiversity survey focuses on survivorship of the plantings and presence/absence of weeds. The inspection monitoring involves rapid visual assessment, estimation of survival rates and photographs. Transects and photo monitoring points are established in year one and are used in all subsequent monitoring events.

8.2.2.2 Detailed Ecological Monitoring

Detailed ecological monitoring focuses on the vegetation type and the collection of relevant qualitative monitoring data in combination with rapid visual assessment techniques used as part of the annual walkover inspections.

The commencement and frequency of detailed ecological monitoring is informed by the annual walkover inspections. Functionally the vegetation needs to mature to a stage (age, type and structure) to allow meaningful ecological data to be collected. Detailed ecological monitoring is likely to include the use of vegetation plots and comparison to analogue/reference sites and will be undertaken at interval of between 2 and 5 years.

The permanent transect-based rehabilitation monitoring programme involves several components, comprising the CSIRO-developed Ecosystem Function Analysis (EFA) tool (Tongway & Hindley, 2004), vegetation dynamics, habitat complexity and disturbance assessments, pasture assessments, soil sampling and analyses, and photographic monitoring.

Overall, the data derived from the monitoring program provides a scientifically robust platform against which the effectiveness of post mining rehabilitation techniques can be assessed and, where applicable, amended. It also allows for the identification of potential risks as they arise. This is done with the aim of achieving sustainable post mining vegetation communities which are aligned to the proposed post mining land use for Invincible.

In addition to fixed plot and transect monitoring, walkthrough inspections are planned annually through revegetated areas to determine if any remedial action is required with the intention to identify maintenance actions required.

Monitoring of erosion will be undertaken at Invincible on at least a quarterly basis, supplemented by the annual rehabilitation monitoring process outlined above. During the operational phase, monthly inspections of long-term erosion and sediment control structures will also be undertaken by Castlereagh Coal personnel, including inspections prior to and after significant rainfall events.

8.3 Performance Against Rehabilitation Objectives and Criteria

The overall performance of the project against the rehabilitation objectives and criteria will be identified using rehabilitation monitoring data and monitoring data at analogue sites.

Data trends will be identified through a comparative analysis of rehabilitation areas to analogue sites. Vegetation growth trends in adjacent areas will be used to identify growth predictions that will define annual biodiversity target levels for vegetation communities in the rehabilitation areas. Deficiencies in areas of rehabilitation that are not reflected in others, variations from predicted values and/or a comparison to analogues sites can indicate issues in the establishment and development of a self-sustaining vegetation community. These trends will provide indication of whether the rehabilitation area is projected to achieve final land use.

Trends in the rehabilitation monitoring data will also be monitored to identify emerging risks that have the potential to cause a failure to achieve final land use.

A summary of the key performance and completion objectives for each rehabilitation domain is shown in Appendix B.

9. Rehabilitation Research, Modelling and Trials

9.1 Current Rehabilitation Research, Modelling and Trials

9.1.1 Trials and Research

Ecological Monitoring

Monitoring of flora and fauna communities in the analogue and adjacent sites within the Ben Bullen State Forest are currently being conducted as part of the biodiversity surveys outlined in the BMP and this RMP. This monitoring program will continue to be undertaken to provide comparative data for assessment of the success of the rehabilitation works. The monitoring program will be updated to include soil monitoring at analogue sites as a basis for comparison against monitoring sites on the final rehabilitation.

The data obtained from the analogue sites will provide a range of values from replicated examples of similar vegetation communities. Rehabilitation areas are compared to reference sites which best represent the final land use, vegetation community and management conditions to which they will be subjected.

These analogue sites will also provide detailed information on fauna assemblage (birds, bats and invertebrates), their habitats and utilisation within the surrounding state forest. The analogue sites will allow rehabilitation monitoring to determine the successful establishment of fauna assemblages within the rehabilitation areas, their distribution across the rehabilitation areas.

To meet rehabilitation criteria, specific indicators will be expected to equal or exceed values obtained from the analogue sites under the same set of conditions. Criteria will be created from the analogue site monitoring results on a yearly basis to assist in determining if rehabilitation shows progression towards meeting rehabilitation criteria.

Nest Boxes Trial

A nesting box trial was implemented in June 2013 to provide supplementary habitat for native fauna species in rehabilitated areas. Monitoring of the existing nest boxes take place in conjunction with the annual biodiversity surveys. This monitoring indicates that installation of nest boxes in rehabilitated areas is an effective strategy in attracting gliders and native birds and increasing biodiversity. Existing nest boxes continue to be monitored, with the feasibility of installing nest boxes within existing rehabilitation areas and integrating their use into future rehabilitation programs and management plans continues to be assessed.

Reporting on nest box performance monitoring is documented in annual biodiversity monitoring reporting and documented in the site Annual Review.

9.2 Future Rehabilitation Research, Modelling and Trials

Future rehabilitation modelling and trials may include:

- Investigating the feasibility of using a Landscape Evolution Model (or similar method) to assess the long-term suitability of the final landform in meeting completion criteria;
- An annual review of industry trials and research into different rehabilitation techniques will continue. These trials and research are assessed if they are generally reasonable and feasible and have similar conditions to those at Invincible. If determined to be a viable research method the potential for implementation at Invincible will be assessed; and
- Though initial results for the nest boxes are promising, further testing of the method is proposed in other areas to determine if it is a viable method to promote fauna biodiversity within rehabilitation areas.

10. Intervention and Adaptive Management

10.1 Threats to Rehabilitation and Trigger Action Response Plan

Table 11 details the potential rehabilitation threats, monitoring triggers requiring a response and actions to be implemented if the threats are identified. The management techniques utilised to avoid these potential threats to the success of rehabilitation from occurring are detailed in Section 6.

The annual monitoring of rehabilitation areas as outlined in Section 8 is the main tool used to identify if any maintenance actions required, assess general rehabilitation performance and whether further works are required to achieve the specific closure criteria (refer to Section 4). In addition, regular site inspections are conducted of site erosion and sediment controls in accordance with the WMP and BMP. Weed monitoring is conducted both during regular site inspections and annual biodiversity monitoring and weed spraying is conducted by a licenced contractor.

This monitoring/inspection program will be continued as required until it can be demonstrated that the rehabilitation has satisfied the closure criteria.

Table 11 Threats to Rehabilitation and Trigger Action Response Plan (TARP)

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
Landform slope instability	Stability and drainage risks	Trigger	Site survey, inspections identify landform stability is in accordance with conceptual landform design.	Site survey, inspections identify potential stability issues; non- conformance with conceptual landform design that does not threaten to cause rehabilitation failure.	Site survey, inspections identify potential stability issues; non- conformance with conceptual landform design that threatens to cause rehabilitation failure.
		Response	No response required. Continue monitoring program.	Develop and implement plan with suitably trained person of works to rectify issues identified. Remediate as appropriate.	Undertake review of landform stability and drainage design to provide recommendations to remediate. Remediate as soon as practicable.
Erosion and sedimentation	Washout of vegetation and/or inability of vegetation to establish on eroded surfaces	Trigger	Routine site inspections indicate no visible signs of erosion/washout in rehabilitation areas as per Section 4.	Routine site inspections indicate minor visible signs of erosion/washout in rehabilitation areas as per Section 4.	Routine site inspections indicate significant visible signs of erosion/washout in rehabilitation areas as per Section 4.
		Response	No response required. Continue monitoring program.	Rectification of eroded sites and installation of additional erosion and sediment controls such as silt fences, as required, using <i>Managing Urban Stormwater: Soils and construction</i> as reference. Remediate as appropriate.	Undertake a review of the drainage of the area and provide recommendations to appropriately remediate the erosion in accordance with <i>Managing Urban Stormwater: Soils and construction</i> . Remediate as soon as practicable.
	Stripping methods and storage results in contamination or	Trigger	Inspection of topsoil after preliminary stripping	Inspection of topsoil after preliminary stripping activities	Inspection of topsoil after preliminary stripping activities indicate

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
Contamination or loss of soil resources	loss of soil resources		activities indicate soils will support final land use	indicate isolated soils will now not support final land use	widespread soils will now not support final land use
		Response	No response required. Continue monitoring program.	Undertake soil testing to assist with ameliorants and fertilisers that can improve soil. Sourcing external topsoil and ameliorants to supplement and deficiencies	Engage with consultant to assist with recommendations to appropriately test soils and remediate soils. Sourcing external topsoil and ameliorants to supplement and deficiencies. Remediate as soon as possible.
Contaminated materials	Poor vegetation cover and plant densities. Landform is polluting	Trigger	Water testing at the edge of rehabilitated areas (down slope) indicated water quality is within criteria.	Water testing at the edge of rehabilitated areas (down slope) indicates water contains pollutants.	Water testing at the edge of rehabilitated areas (down slope) indicates water contains pollutants and exceeds criteria.
		Response	No response required. Continue monitoring program.	Application of ameliorants where required. May require physical removal of contaminating substance.	Report exceedance of water quality criteria. Application of ameliorants and physically removal contaminating substance. Remediate as soon as possible.
Failure of seed to establish	Poor vegetation cover and plant densities	Trigger	Annual monitoring indicates vegetation cover and densities is conforming with performance indicators in Section 4.	Annual monitoring indicates vegetation cover and densities is not conforming with performance indicators in Section 4.	Annual monitoring indicates vegetation cover and densities is not conforming with performance indicators in Section 4 and poses a long term threat to rehabilitation success.

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
		Response	No response required. Continue monitoring program.	Investigation into why seeding failed. Review procedures were required to increase vegetation cover and densities.	A suitably trained person to inspect rehabilitation and investigate why seeding failed. Implement mitigation measures such as fertilisers, pesticides and herbicides where appropriate. Reseeding failed areas as required.
Dieback of established vegetation	Poor vegetation cover and plant densities	Trigger	Annual monitoring indicates no sign of dieback of established vegetation.	Annual monitoring indicates dieback of established vegetation and non-conformance with performance indicators in Section 4.	Annual monitoring indicates dieback of established vegetation and non-conformance with performance indicators in Section 4, leading to long term threat to rehabilitation success.
		Response	No response required. Continue monitoring program.	Investigation as to why vegetation is experiencing dieback. Implement mitigation measures such as fertilisers, pesticides and herbicides where appropriate.	A suitably trained person to inspect rehabilitation and investigate why vegetation is experiencing dieback. Implement mitigation measures such as fertilisers, pesticides and herbicides where appropriate. Supplementary planting or re-seeding in failed rehabilitation areas as required.
Over-dominance of species and low species diversity	Inappropriate vegetation structural diversity	Trigger	Annual monitoring indicates no signs of over-dominance of species, low species diversity.	Annual monitoring indicates over-dominance of species, low species diversity and non-conformance with	Annual monitoring indicates over-dominance of species, low species diversity and non-conformance with

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
				performance indicators in Section 4.	performance indicators in Section 4, leading to long term threat to rehabilitation success.
		Response	No response required. Continue monitoring program.	Investigation as to why there is an over-dominance of a species. Review seed mix applied to rehabilitation areas where required to increase species diversity.	A suitably trained person to inspect rehabilitation and investigate over-dominance or low species diversity. Implement mitigation measures such as adjustment of the seed mix applied to rehabilitation areas, thinning of vegetation, supplementary planting or re-seeding as required and thinning of species as required.
Weed encroachment	Weeds outcompeting native plant species	Trigger	Annual monitoring and inspections indicate weed presence is within range found at analogue sites and does not present a risk to rehabilitation.	Annual monitoring and inspections indicate weeds present a risk to establishment of native species and Non-conformance with performance indicators in Section 4.	Annual monitoring and inspections indicate weeds are limiting establishment of native species and Non-conformance with performance indicators in Section 4.
		Response	No response required. Continue monitoring program.	Increased frequency of weed spraying and/or use of species-specific herbicides for targeted weed species as required.	Increased frequency of weed spraying and/or use of species-specific herbicides for targeted weed species as required. Investigate management measures to assist native plant establishment including use of ameliorants

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
					and implement as appropriate.
Weed contamination	Poor vegetation cover and plant densities. Loss of soil resources.	Trigger	Annual monitoring and inspections indicate weed presence is within range found at analogue sites and does not present a risk to rehabilitation.	Annual monitoring and inspections indicate weeds present a risk to establishment of native species and Non-conformance with performance indicators in Section 4.	Annual monitoring and inspections indicate weeds are limiting establishment of native species and Non-conformance with performance indicators in Section 4.
		Response	No response required. Continue monitoring program.	Increased frequency of weed spraying and/or use of species-specific herbicides for targeted weed species as required.	Increased frequency of weed spraying and/or use of species-specific herbicides for targeted weed species as required. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate.
Pest and feral animals	Loss of vegetation and impact on native fauna	Trigger	Ecological monitoring indicates pest and feral animal species are not impacting on vegetation growth and habitat of rehabilitation areas by native species.	Ecological monitoring indicates pest and feral animal species are impacting on vegetation growth and habitat of rehabilitation areas by native species.	Ecological monitoring indicates pest and feral animal species are impacting on vegetation growth and habitat of rehabilitation areas by native species and poses a long term threat to rehabilitation success.
		Response	No response required. Continue monitoring program.	Implementation of a pest a feral animal control plan. Plan to include culling of pest species, hare guards on	Engage a consultant to assist with development and implementation of targeted pest a feral animal

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
				tubestock, exclusion fencing, installing structures for target fauna species, baits for foxes and dogs.	control plan. Plan to include culling of pest species, hare guards on tubestock, exclusion fencing, installing structures for target fauna species, baits for foxes and dogs. Remediate as appropriate.
Bushfire	Fuel Load	Trigger	Fuel loads are assessed and managed as required. Maintenance of fire-fighting equipment and reduction of fuel loads in consultation with NSW Rural Fire Service and NSW Forestry Corporation.	Monitoring indicates fuel loads have not been managed and fire breaks have not been maintained. In the event of a fire, this would result in firefighters not being able to access the site or water resources.	A fire on site damages rehabilitated areas.
		Response	No response required. Continue monitoring program.	Reduce fuel loads and ensure access tracks are cleared. Inspect water sources and ensure sufficient water is available.	Review and update (if required) the Biodiversity Offset Management Plan to ensure monitoring and maintenance is completed for fuel loads and access tracks.
Subsurface heating	Loss of vegetation and/or erosion	Trigger	No evidence of spontaneous combustion in rehabilitation areas.	Routine site inspections indicate visible signs of isolated subsurface heating.	Routine site inspections indicate visible signs of widespread subsurface heating.
		Response	No response required. Continue monitoring program.	Implement subsurface heating treatment proposal as per Appendix C and as outlined in Section 9.1.	Consult with regulators to develop remediation plan. Review subsurface heating treatment proposal as per

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
					Appendix C and as outlined in Section 9.1.
Sodicity and surface crusting	Poor vegetation cover and plant densities. Landform is polluting	Trigger	Annual monitoring indicates vegetation cover and densities is conforming with performance indicators in Section 4.	Annual monitoring indicates sodicity and surface crusting is limiting vegetation cover and densities are not conforming with performance indicators in Section 4.	Annual monitoring indicates sodicity and surface crusting is limiting vegetation cover and densities is not conforming with performance indicators in Section 4 and poses a long term threat to rehabilitation success.
		Response	No response required. Continue monitoring program.	Undertake soil testing to assist with ameliorants and fertilisers that can improve soil. Sourcing external topsoil and ameliorants to supplement and deficiencies	Engage with consultant to assist with recommendations to appropriately test soils and remediate soils. Sourcing external topsoil and ameliorants to supplement and deficiencies. Remediate as soon as practicable.
Adverse Weather Conditions	Loss of vegetation and/or erosion. Poor vegetation cover and plant densities. Loss of soil resources. Topsoil not suitable	Trigger	No signs of adverse weather conditions during planned rehabilitation activities.	Adverse weather potentially to cause erosion/washout, soils not supporting final land use, wash away native seed, and create a surface that is not suitable for seeding.	Adverse weather expected to cause erosion/washout, soils not supporting final land use, wash away native seed, and create a surface that is not suitable for seeding. And poses a long term threat to rehabilitation success.

Rehabilitation Risk	Potential Impact	Trigger/Response	Condition Green	Condition Amber	Condition Red
	for seeding.	Response	No response required. Continue rehabilitation activities.	Limit works during inclement weather and cross rip surface of slopes if heavy rainfall is forecasted. Rectification of eroded sites and installation of additional erosion and sediment controls prior to continuing/remediating rehabilitation. Reinstate topsoil and reseed rehabilitation areas as required to final vegetation community. Rip topsoil prior to seeding rehabilitation areas.	Limit works during inclement weather and cross rip surface of slopes if heavy rainfall is forecasted. Rectification of eroded sites and installation of additional erosion and sediment controls prior to continuing/remediating rehabilitation. Reinstate topsoil and reseed rehabilitation areas as required to final vegetation community. Rip topsoil prior to seeding rehabilitation areas. Remediate as practicable.

11. Review, Revision and Implementation

11.1 Statutory Review Requirements

Table 12 outlines the statutory triggers for reviewing the Rehabilitation Management Plan (refer Section 11.2)

In accordance with the Project Approval conditions, ML conditions and other regulatory requirements.

Table 12 Statutory Triggers for Reviewing the Rehabilitation Management Plan

Statutory Context	Triggers for Reviewing the RMP	Section Reference
Clause 11 of Schedule 8A of the <i>Mining Regulation 2016</i>	The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows- a) as a consequence of an amendment made to the rehabilitation objectives, rehabilitation completion criteria or final landform and rehabilitation plan b) to reflect any changes to the risk control measures in the rehabilitation management plan that are identified in a rehabilitation risk assessment c) whenever directed in writing to do so by the Secretary	Section 11.2
Condition 3 of Schedule 5 of PA 07_0127	The Applicant must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (h) a protocol for periodic review of the plan.	Noted
Condition 5 of Schedule 5 of PA 07_0127	Within 3 months of: - the submission of an annual review under condition 4 above; - the submission of an incident report under condition 7 below; - the submission of an audit report under condition 9 below; or - any modification to the conditions of this approval, (unless the conditions require otherwise), the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Planning Secretary. Where this review leads to revisions in any such document, within 4 weeks of the review, unless the Planning Secretary agrees otherwise, the revised document must be submitted to the Planning Secretary for approval.	This RMP

11.2 RMP Review

A review of rehabilitation documentation will occur before any alterations to LOM planning, including the rehabilitation objectives and criteria, final landform and land use to ensure that mining and rehabilitation activities are being conducted in accordance with this RMP. The RMP will be reviewed on an annual basis within 4 weeks of the submission of the Annual Review, or:

- When changes are proposed for rehabilitation objectives, completion criteria, implementation methods or final landform;
- When there are material alterations to risk control measures implemented to assist in achieving rehabilitation criteria;
- Following submission of a related incident report;
- Following submission of an Independent Environmental Audit;
- When there is a modification to the conditions of the Project Approval; or
- As directed by regulatory agencies.

11.3 Incidents and Non-compliances

In accordance with Condition 9 Schedule 5 of the Project Approval, in the event that Castlereagh Coal becomes aware of a set of circumstances that:

- causes or threatens to cause material harm to the environment; and/or
- breaches or exceeds the limits or performance measures/criteria in the Project Approval,

The Castlereagh Coal Representative or delegate will notify the Planning Secretary and any other relevant agencies of any such incident, within 24 hours. The notification will be made via the NSW planning portal (Major projects) and address details of the incident including:

- Date, time and location;
 - A brief description of what occurred and why it has been classified as an incident;
 - A description of what immediate steps were taken in relation to the incident; and
 - Identifying a contact person for further communication regarding the incident.
-
- Additionally, in accordance with Condition 9A Schedule 5 of the Project Approval, within seven days of the date of the incident, Castlereagh Coal will provide the Planning Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested. This report will:

- Identify how the incident was detected;
- Identify when Castlereagh Coal became aware of the incident;
- Identify any actual or potential non-compliance with conditions of consent;
- Identify further action(s) that will be taken in relation to the incident; and
- Provide a summary of the incident;
- Provide outcomes of an incident investigation, including identification of the cause of the incident;
- Detail corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence, including the period of implementing any corrective and/or preventative actions, and;
- Detail any communication with other stakeholders regarding the incident.

In accordance with Condition 9B Schedule 5 of the Project Approval, in the event that Castlereagh Coal becomes aware of a non-conformance, Castlereagh Coal will notify the Planning Secretary within seven days. The notification will be in writing and submitted via the NSW planning portal (Major Projects). The notification will include

- the development application name and number;
- the condition of consent that is in non-compliance;
- and explanation as to why it does not comply and the reasons, and;
- the actions undertaken or that will be undertaken to address the non-compliance.

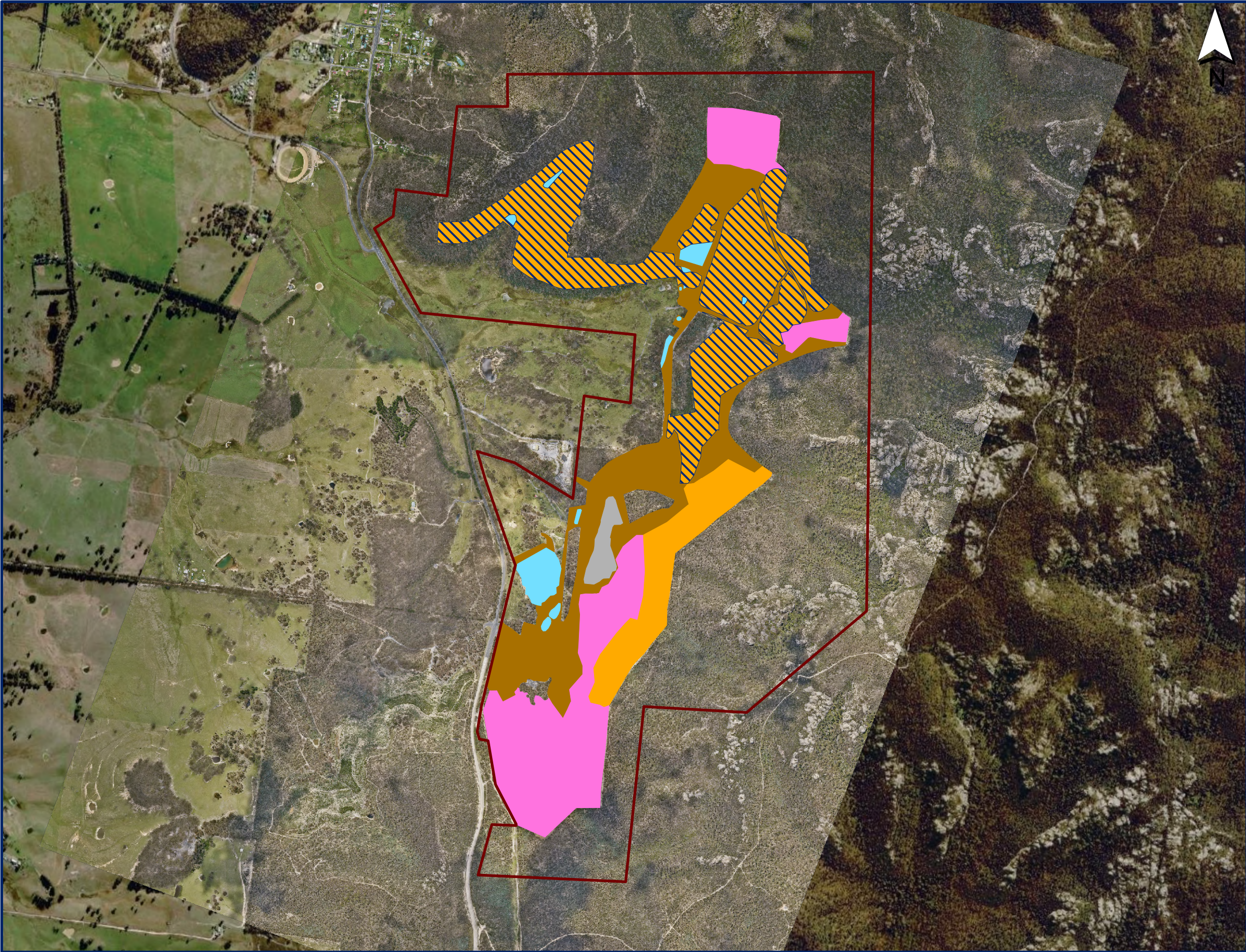
12. References

- NSW Resources Regulator (2021). *Guideline: Mine Rehabilitation Portal*.
- NSW Resources Regulator (2023) *Guideline: Rehabilitation objectives and rehabilitation completion criteria*.
- NSW Resources Regulator (2024) *Form and Way: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan for Large Mines*.
- RGS Environmental Pty Ltd (2011) *Coalpac Consolidation Project, Geochemical Assessment of Overburden and Potential Coal Rejects Material*.
- Sedgman (2015), *Invincible Colliery Care and Maintenance Mine Operations Plan*.
- Umwelt (2016) *Invincible Southern Extension Project Environmental Assessment Section 75W Modification Final September 2016*.
- Umwelt (2020). *Cullen Valley Mine Care and Maintenance Mining Operations Plan (2021-2025)*
- Umwelt (2022). *Invincible Colliery and Cullen Valley Mine Final Landform, Stability*
- WSP Golder (2022). *Invincible and Cullen Valley Mine Rehabilitation Material Inventory and Erosion Risk Assessment*

Appendix A:

Overview Plans

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LEGEND

Project Approval Boundary

Rehabilitation Phase

Ecosystem and Land Use Development

Mining Domain Type

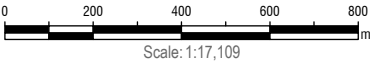
Domain 1: Infrastructure Area

Domain 2: Tailings Storage Facility

Domain 3: Water Management Area

Domain 4: Overburden Emplacement Area

Domain 5: Active Mining Area (Open cut void)



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Mine name	Invincible Colliery	Data theme submission ID No.	TBA following Portal Submission
Plan name	Invincible Colliery ARR (ATL01-002)	Spatial Reference	GDA2020 MGA Zone 56
Year of anticipated relinquishment	TBA following Portal Submission	Plan date (date created)	28/02/2025

Source: Project Approval Boundary, Final Landform and Current Authorisations from xxxx (202x). Roads, watercourses and electricity transmission lines from LPI (2021). Aerial imagery from xxxx (202x)

Castlereagh Coal Pty Ltd

Current Status

Mining and Rehabilitation

PLAN 1A



PLAN 1B

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LEGEND

Project Approval Boundary

Forecast Year 1 (2026)

Forecast Disturbance

Forecast Land Prepared for Rehabilitation

Previous Disturbance



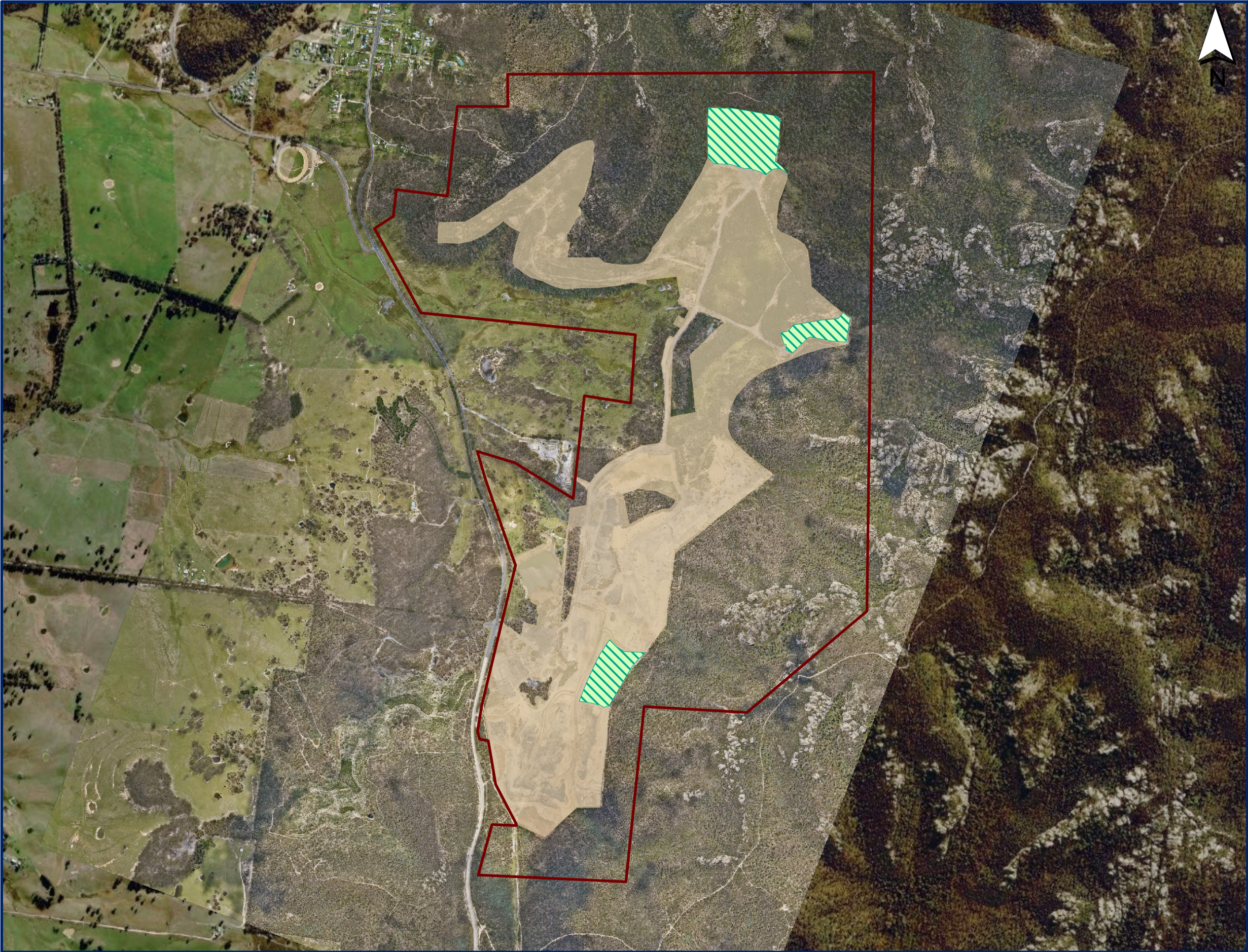
ATLANTECH Atlantech 2 Portside Cres, Maryville NSW 2293 www.atlantech.com.au	Mine name	Invincible Colliery	Data theme submission ID No.	TBA following Portal Submission
	Plan name	Invincible Colliery ARR (ATL01-002)	Spatial Reference	GDA2020 MGA Zone 56
	Year of anticipated relinquishment	TBA following Portal Submission	Plan date (date created)	28/02/2025

Source: Project Approval Boundary, Final Landform and Current Authorisations from xxxx (202x). Roads, watercourses and electricity transmission lines from LPI (2021). Aerial imagery from xxxx (202x)

Castlereagh Coal Pty Ltd

Mining and Rehabilitation
Year 1
PLAN 2A

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LEGEND

 Project Approval Boundary

Forecast Year 2 (2027)

 Forecast Land Prepared for Rehabilitation

 Previous Disturbance



Atlantech
2 Portside Cres, Maryville NSW 2293
www.atlantech.com.au

Mine name	Invincible Colliery	Data theme submission ID No.	TBA following Portal Submission
Plan name	Invincible Colliery ARR (ATL01-002)	Spatial Reference	GDA2020 MGA Zone 56
Year of anticipated relinquishment	TBA following Portal Submission	Plan date (date created)	28/02/2025

Source: Project Approval Boundary, Final Landform and Current Authorisations from xxxx (202x). Roads, watercourses and electricity transmission lines from LPI (2021). Aerial imagery from xxxx (202x)

Castlereagh Coal Pty Ltd

Mining and Rehabilitation
Year 2
PLAN 2B

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LEGEND

 Project Approval Boundary

Forecast Year 3 (2028)

 Forecast Land Prepared for Rehabilitation

 Previous Disturbance





Atlantech
2 Portside Cres, Maryville NSW 2293
www.atlantech.com.au

Mine name	Invincible Colliery	Data theme submission ID No.	TBA following Portal Submission
Plan name	Invincible Colliery ARR (ATL01-002)	Spatial Reference	GDA2020 MGA Zone 56
Year of anticipated relinquishment	TBA following Portal Submission	Plan date (date created)	28/02/2025

Source: Project Approval Boundary, Final Landform and Current Authorisations from xxxx (202x). Roads, watercourses and electricity transmission lines from LPI (2021). Aerial imagery from xxxx (202x)

Castlereagh Coal Pty Ltd

Mining and Rehabilitation

Year 3

PLAN 2C

Appendix B:

**Rehabilitation
Objectives**

ROBJ0001474

Approved rehabilitation objectives statement

Invincible Colliery

26 November 2024

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Application summary

Detail	Approval
Reference	ROBJ0001474
Date of decision	26 November 2024
Mine	Invincible Colliery
Contact	Kim Nguyen
Nominated contact person	Kim Nguyen

Important note

While every effort is being made to ensure that documents hosted by the NSW Resources Regulator are WCAG 2.0 Level AA compliant, we acknowledge that not all resources have achieved this. If you require this document in an alternative format, please email industry.engagement@regional.nsw.gov.au

The Regulator may make the information in your application and any supporting information (including this report) available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your application to be confidential, please communicate this to the Regulator via the message function on this application within the Portal.

Rehabilitation Objectives

The following rehabilitation objectives have been approved. Please note the table below will also include any previously approved rehabilitation objectives.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0048283	Native Ecosystem	Infrastructure Area	A1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0048286	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0048284	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with the following native vegetation communities found in the local area (as described in the 2014 EA and RMP): • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048285	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation is similar to that of the following native vegetation communities found in the local area: • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048294	Native Ecosystem	Infrastructure Area	A1	Groundwater	Groundwater quality and groundwater regime are within range as predicted in environmental assessment, EPL 1095 and Water Management Plan. The risk to important groundwater assets has been addressed by the rehabilitation.
ROB0048290	Native Ecosystem	Infrastructure Area	A1	Land contamination	There is no residual soil contamination on the Project area that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0048292	Native Ecosystem	Infrastructure Area	A1	Landform stability	Final landforms designed to minimise visual impacts as far as is reasonable and feasible
ROB0048293	Native Ecosystem	Infrastructure Area	A1	Landform stability	Landform that is free draining and commensurate with surrounding natural landform where appropriate.
ROB0048291	Native Ecosystem	Infrastructure Area	A1	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna.
ROB0048287	Native Ecosystem	Infrastructure Area	A1	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
ROB0048289	Native Ecosystem	Infrastructure Area	A1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)
ROB0048288	Native Ecosystem	Infrastructure Area	A1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community
ROB0048295	Native Ecosystem	Infrastructure Area	A1	Surface water	Surface water runoff quality is comparable to analogue sites (background water quality since 2011 (2014 EA)). Surface water quality in accordance with the Water Management Plan (Approved November 2022) and EPL 1095.
ROB0048296	Native Ecosystem	Tailings Storage Facility	A2	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0048299	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0048297	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with the following native vegetation communities found in the local area (as described in the 2014 EA and RMP): • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0048298	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation is similar to that of the following native vegetation communities found in the local area: • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048306	Native Ecosystem	Tailings Storage Facility	A2	Groundwater	Groundwater quality and groundwater regime are within range as predicted in environmental assessment, EPL 1095 and Water Management Plan. The risk to important groundwater assets has been addressed by the rehabilitation.
ROB0048302	Native Ecosystem	Tailings Storage Facility	A2	Land contamination	There is no residual soil contamination on the Project area that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0048304	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	Final landforms designed to minimise visual impacts as far as is reasonable and feasible
ROB0048305	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	Landform that is free draining and commensurate with surrounding natural landform where appropriate.
ROB0048303	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna.
ROB0048300	Native Ecosystem	Tailings Storage Facility	A2	Management of waste and process materials	Capping/ treatment of facilities will be appropriately designed and constructed so as to ensure geotechnical stability and successful containment of tailings material and hazardous leachate drainage or seepage.
ROB0048301	Native Ecosystem	Tailings Storage Facility	A2	Management of waste and process materials	The Project’s tailings storage facilities will be capped to minimise the potential for exposure of potentially environmentally sensitive tailings material in the rehabilitated landform
ROB0048307	Native Ecosystem	Tailings Storage Facility	A2	Surface water	Surface water runoff quality is comparable to analogue sites (background water quality since 2011 (2014 EA)). Surface water quality in accordance with the Water Management Plan (Approved November 2022) and EPL 1095.
ROB0048308	Native Ecosystem	Water Management Area	A3	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0048311	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0048309	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with the following native vegetation communities found in the local area (as described in the 2014 EA and RMP): • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048310	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation is similar to that of the following native vegetation communities found in the local area: • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048316	Native Ecosystem	Water Management Area	A3	Groundwater	Groundwater quality and groundwater regime are within range as predicted in environmental assessment, EPL 1095 and Water Management Plan. The risk to important groundwater assets has been addressed by the rehabilitation.
ROB0048312	Native Ecosystem	Water Management Area	A3	Land contamination	There is no residual soil contamination on the Project area that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0048314	Native Ecosystem	Water Management Area	A3	Landform stability	Final landforms designed to minimise visual impacts as far as is reasonable and feasible

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0048315	Native Ecosystem	Water Management Area	A3	Landform stability	Landform that is free draining and commensurate with surrounding natural landform where appropriate.
ROB0048313	Native Ecosystem	Water Management Area	A3	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna.
ROB0048317	Native Ecosystem	Water Management Area	A3	Surface water	Surface water runoff quality is comparable to analogue sites (background water quality since 2011 (2014 EA)). Surface water quality in accordance with the Water Management Plan (Approved November 2022) and EPL 1095.
ROB0048318	Native Ecosystem	Overburden Emplacement Area	A4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0048321	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0048319	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with the following native vegetation communities found in the local area (as described in the 2014 EA and RMP): • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048320	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation is similar to that of the following native vegetation communities found in the local area: • Tableland Gully Ribbon Gum- Blackwood – Apple Box Forest (Northern Gullies) • Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest (Southern Gullies) and • Exposed Blue Mountains Sydney Peppermint- Silvertop Ash Shrubby Woodland (Exposed Slopes).
ROB0048326	Native Ecosystem	Overburden Emplacement Area	A4	Groundwater	Groundwater quality and groundwater regime are within range as predicted in environmental assessment, EPL 1095 and Water Management Plan. The risk to important groundwater assets has been addressed by the rehabilitation.
ROB0048322	Native Ecosystem	Overburden Emplacement Area	A4	Land contamination	There is no residual soil contamination on the Project area that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0048324	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	Final landforms designed to minimise visual impacts as far as is reasonable and feasible
ROB0048325	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	Landform that is free draining and commensurate with surrounding natural landform where appropriate.
ROB0048323	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna.
ROB0048327	Native Ecosystem	Overburden Emplacement Area	A4	Surface water	Surface water runoff quality is comparable to analogue sites (background water quality since 2011 (2014 EA)). Surface water quality in accordance with the Water Management Plan (Approved November 2022) and EPL 1095.
ROB0048330	Infrastructure	Infrastructure Area	I1	Land contamination	There is no residual soil contamination on the Project area that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0048331	Infrastructure	Infrastructure Area	I1	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna.
ROB0048329	Infrastructure	Infrastructure Area	I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)
ROB0048328	Infrastructure	Infrastructure Area	I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0048332	Infrastructure	Infrastructure Area	I1	Surface water	Surface water runoff quality is comparable to analogue sites (background water quality since 2011 (2014 EA)). Surface water quality in accordance with the Water Management Plan (Approved November 2022) and EPL 1095.

Appendix C:

**Rehabilitation
Community Seed Mix**

<i>Species</i>	Common name	Tableland Gully Ribbon Gum Blackwood Apple Box Forests	Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest	Exposed Blue Mountains Sydney Peppermint· Silvertop Ash Shrubby Woodland
<i>Acacia dealbata</i>	silver wattle		X	
<i>Acacia buxifolia</i>	box-leaved wattle		X	X
<i>Acacia deanei</i>	green wattle		X	
<i>Acacia falcata</i>				
<i>Acacia falciformis</i>		X	X	
<i>Acacia gunnii</i>	ploughshare wattle		X	X
<i>Acacia longifolia</i>	Sydney golden wattle		X (eastern gully only)	
<i>Acacia melanoxydon</i>		X		
<i>Acacia obtusifolia</i>			X	
<i>Acacia terminalis</i>	sunshine wattle			X
<i>Acacia ulicifolia</i>	prickly moses		X	
<i>Aristida vagans</i>			X	
<i>Bursaria spinosa</i>	native blackthorn		X	
<i>Carex inversa</i>		X		
<i>Cassinia arcuata</i>	Sifton bush		X	
<i>Chrysocephalum apiculatum</i>	common everlasting		X	
<i>Clematis aristata</i>	old man's beard		X	
<i>Clematis glycinoides</i>			X	
<i>Cymbonotus lawsonianus</i>		X	X	
<i>Daviesia ulicifolia</i>	gorse bitterpea		X	
<i>Dianella caerulea</i>			X	
<i>Dianella revoluta</i> var. <i>revoluta</i>			X	X
<i>Dianella revoluta</i>			X	
<i>Dichondra repens</i>	kidney weed	X	X	
<i>Entolasia stricta</i>				X

<i>Species</i>	Common name	Tableland Gully Ribbon Gum Blackwood Apple Box Forests	Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest	Exposed Blue Mountains Sydney Peppermint Silvertop Ash Shrubby Woodland
<i>Eucalyptus albens</i>	White box			
<i>Eucalytus amplifolia</i>	Cabbage gum		X (eastern gullies only)	
<i>Eucalyptus blakelyi</i>	Blakely's red gum		X (eastern gullies only)	
<i>Eucalyptus bridgesiana</i>	Apple box	X	X	
<i>Eucalyptus cameronu</i>	Diehard stringybark		X	
<i>Eucalyptus dalrympleana</i>	Mountain gum		X	
<i>Eucalyptus dives</i>	Broad-leaved peppermint		X	
<i>Eucalyptus mannigera</i>	Brittle gum		X	X
<i>Eucalyptus meliodora</i>	Yellow box		X	
<i>Eucalyptus pauciflora</i>			X	
<i>Eucalyptus piperita</i>	Sydney peppermint			X
<i>Eucalyptus polyanthemos</i>		X		
<i>Eucalyptus punctata</i>		X		
<i>Eucalyptus radiata</i>	Narrow-leaved peppermint		X	
<i>Eucalyptus rossii</i>	Inland scribbly gum		X	X
<i>Eucalyptus sclerophylla</i>				X
<i>Eucalyptus sieberi</i>	Silvertop ash			X
<i>Eucalyptus sparsifolia</i>	Narrow-leaved stringybark	X		
<i>Eucalyptus viminalis</i>	Ribbon gum	X	X	
<i>Glycine clandestina</i>	Twining glycine	X	X	
<i>Glycine tabacina</i>			X	
<i>Hakea dactyloides</i>				X
<i>Hardenbergia</i>	False sarsaparilla		X	

<i>Species</i>	Common name	Tableland Gully Ribbon Gum Blackwood Apple Box Forests	Tableland Gully Mountain Gum, Broadleaved Peppermint Grassy Forest	Exposed Blue Mountains Sydney Peppermint· Silvertop Ash Shrubby Woodland
<i>Hibbertia obtusifolia</i>	Hoary guinea flower		X	
<i>Hypericum gramineum</i>	Small St Johns wort		X	
<i>Indigofera australis</i>	Australian indigo		X	
<i>Lepidosperma laterale</i>			X (eastern gullies only)	
<i>Leptospermum juniperinum</i>	Prickly tea-tree		X	
<i>Leptospermum polygalifolium</i>			X	
<i>Leptospermum trinervium</i>				X
<i>Leucochrysum albicans</i> subsp. <i>Albicans</i> x			X	
<i>Lomandra confertifolia</i>			X	X
<i>Lomandra filiformis</i>		X	X	X
<i>Lomandra longifolia</i>		X	X (eastern gullies only)	X
<i>Lomandra multiflora</i> subsp. <i>Multiflora</i>		X		
<i>Melichrus urceolatus</i>	Urn-heath		X (drainage lines)	
<i>Mentha satereioides</i>		X		
<i>Microlaena stipoides</i> var. <i>stipoides</i>				X
<i>Patersonia glabrata</i>				X
<i>Pattersonia seicea</i>	Laurel geebung			X