



# **METROPOLITAN COAL MINE REHABILITATION MANAGEMENT PLAN**

Prepared by Metropolitan Coal Pty Ltd

**August 2022**

### Rehabilitation Management Plan Summary Table

<b>METROPOLITAN COAL MINE REHABILITATION MANAGEMENT PLAN SUMMARY TABLE</b>		
<b>Name of Mine:</b>	Metropolitan Colliery (Metropolitan Coal Mine)	
<b>Rehabilitation Management Plan Commencement Date:</b>	1 August 2022	
<b>Rehabilitation Management Plan Revision Dates and Version Numbers:</b>	R01	
<b>Mining Lease(s) / Lease Numbers / Expiry Dates:</b>	Consolidated Coal Lease 703	Expiry Date: 26/01/2024
	Mining Lease 1610	Expiry Date: 18/12/2031
	Mining Lease 1702	Expiry Date: 13/10/2035
	Coal Lease 379	Expiry Date: 4/10/2033
	Mining Purpose Lease 320	Expiry Date: 9/12/2035
<b>Name of Lease Holder(s):</b>	Metropolitan Collieries Pty Ltd	
<b>Name of Mine Operator:</b>	Metropolitan Coal Pty Ltd	
<b>Date of Submission:</b>	1 August 2022	

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# 1 INTRODUCTION TO MINING PROJECT

## 1.1 HISTORY OF OPERATIONS

### 1.1.1 Mine Operator and Proprietors

The Metropolitan Colliery (Metropolitan Coal Mine) is an underground coal mining operation located approximately 30 kilometres (km) north of Wollongong in New South Wales (NSW) (Figure 1). The Metropolitan Coal Mine is one of the oldest operating underground coal mines in Australia. The Metropolitan Coal Mine commenced operations in 1887.

Peabody Energy Australia Pty Ltd acquired 100% of Excel Coal in October 2006. Peabody Energy Australia Pty Ltd changed the name of the Metropolitan Coal Mine operator to Metropolitan Coal Pty Ltd (Metropolitan Coal).

Metropolitan Coal was granted approval for the Metropolitan Coal Project by the Minister for Planning under section 75J of the NSW *Environmental Planning and Assessment Act 1979* on 22 June 2009. This comprises the continuation, upgrade and extension of underground coal mining operations (Longwalls 20-27 and Longwalls 301-317) and surface facilities at the Metropolitan Coal Mine.

Development of the Metropolitan Coal Mine is approved under Mining Leases (ML) 1610 and ML 1702, Coal Lease (CL) 379, Consolidation Coal Lease (CCL) 703, Mining Purpose Lease (MPL) 320 and Project Approval (08\_0149). The current life of mine is approved to extend to 2032 under Project Approval (08\_0149).

This Rehabilitation Management Plan (RMP) has been prepared by Metropolitan Coal in accordance with the new standard rehabilitation conditions on mining leases imposed through an amendment to the *Mining Regulation 2016* under the *Mining Act 1992*. This RMP has been prepared in accordance with the rehabilitation requirements prescribed in the conditions of ML 1610 and ML 1702, CCL 703, CL 379, MPL 320 and Condition 4, Schedule 6 of the Project Approval (08\_0149).

The RMP describes the proposed rehabilitation activities for the Metropolitan Coal Mine that are implemented. This RMP replaces the Metropolitan Coal Mine Mining Operations Plan (MOP) (1 October 2021 to September 2023).

### 1.1.2 Significant Surface Disturbing Activities

The Metropolitan Coal Mine includes an Underground Mining Area and Surface Facilitates Area.

The total mine footprint includes the Metropolitan Coal Mine surface facilities, the No. 3 Ventilation Shaft facilities, the temporary cable runway and electricity cable, disturbance associated with exploration boreholes and monitoring equipment installed in the Underground Mining Area.

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MET-21-28 RMP\_201A



- LEGEND**
- Mining Lease Boundary
  - Road
  - Railway
  - National Parks and Wildlife Estate
  - Local Government Area
  - ⚒ Mining Operation

Source: Geoscience Australia, 2006; NSW Spatial Services (2021)  
Metropolitan Coal (2021)

**Peabody**

METROPOLITAN COAL  
Regional Location

Figure 1

The Surface Facilities Area is situated off Parkes Street in Helensburgh and includes administration buildings, workshop, bathhouse and ablution facilities, haul roads, access road, fuel and consumables storage facilities, hardstand areas, Coal Handling and Preparation Plant (CHPP), stockpiles (including run-of-mine [ROM] coal, product coal and CHPP reject stockpiles) and associated coal handling infrastructure (e.g. conveyors, transfer points and buffer bins). Existing water management infrastructure includes dams, settlement and filtration ponds, water diversions and a wastewater treatment plant. Other existing surface facilities include an electrical yard and ventilation facilities.

Coal extracted from the underground mining operations is transferred by conveyor to the ROM coal stockpile at the Surface Facilities Area. ROM coal is reclaimed, crushed, screened and washed at the CHPP. Under Project Approval (08\_0149), Metropolitan Coal is permitted to produce up to approximately 2.8 million tonnes per annum (Mtpa) of hard coking and semi-hard coking product coal.

The CHPP is located in the Surface Facilities Area and comprises crushers, screens, dense medium cyclones, spirals, floatation cells, separators, filters and thickeners to process the coal and separate coal reject materials.

The majority of product coal is transported by train to the Port Kembla Coal Terminal (Figure 1) to domestic and overseas customers.

The general arrangements of Metropolitan Coal Mine and the Surface Facilities Area are provided in Figure 2 and 3, respectively.

### 1.1.3 Rehabilitation Undertaken Since Mine Commencement

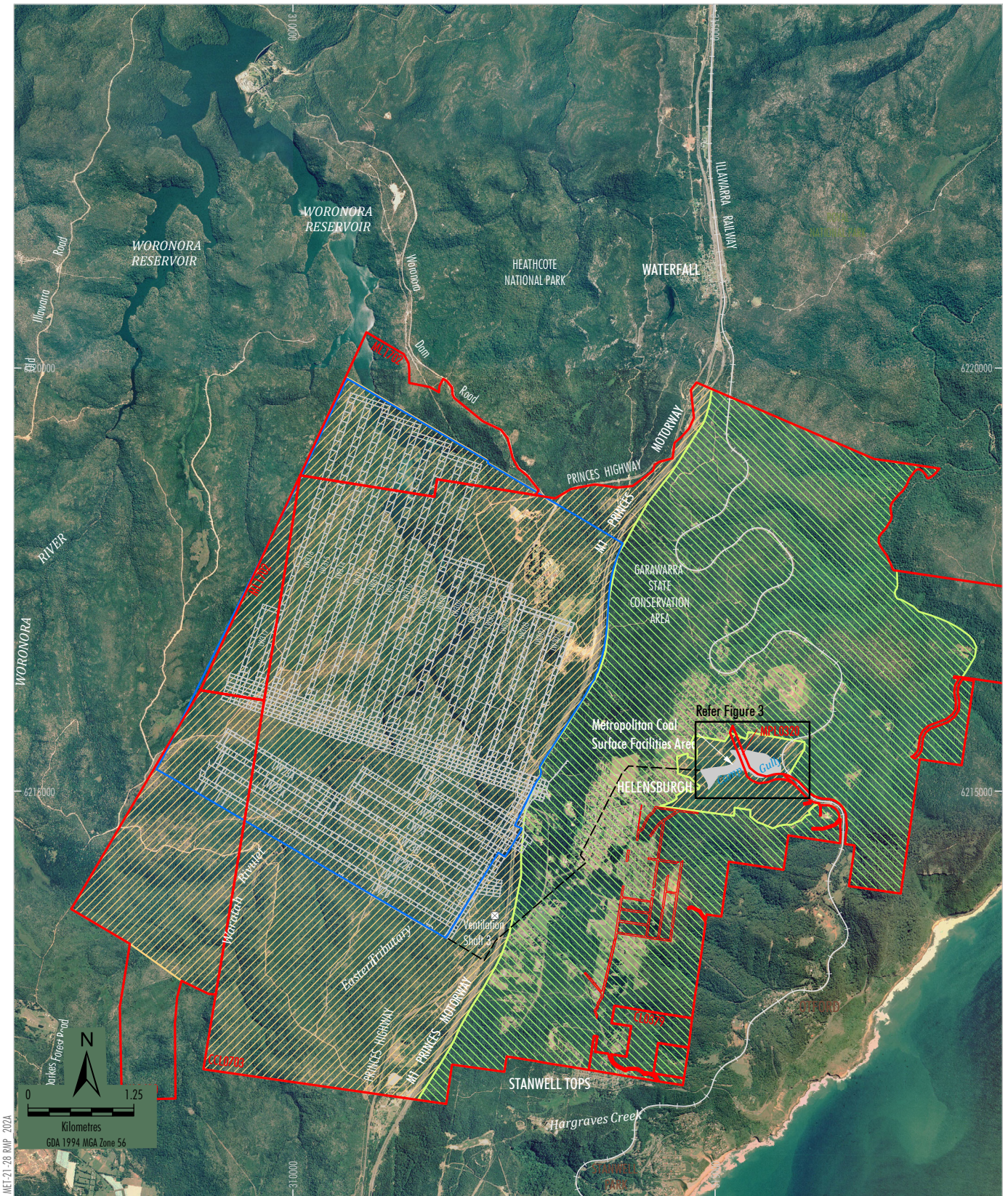
Some surface disturbance areas are able to be rehabilitated during the life of the Metropolitan Coal Mine (e.g. monitoring sites no longer required), while other surface disturbance areas will likely remain until after the completion of mining operations.

Disturbance areas at the Metropolitan Coal Surface Facilities Area are minimal and have remained relatively unchanged for many years. The Surface Facilities Area is an active operations area which are required for the entire mine life. As such, rehabilitation activities at the Surface Facilities Area under the Project Approval (08\_0149) have generally been limited to the control of introduced and environmental weeds across the designated rehabilitation zones (in particular Lantana [*Lantana camara*], Ginger Lily [*Hedychium gardnerianum*], Crofton Weed [*Ageratina adenophora*] and Mistflower [*Ageratina riparia*]). Control works were also undertaken on noxious weeds identified on Camp Creek (namely Pampas Grass [*Cortaderia selloana*] and Senegal Tea Plant [*Gymnocoronis spilanthoides*]).

To date, stream remediation activities have been undertaken at Pools A, F and G on the Waratah Rivulet in accordance with the Metropolitan Coal Stream Remediation Plan. The rock bars at Pools A and F are considered to largely control the pools located upstream of these rock bars. As a result, Metropolitan Coal anticipated that the restoration of surface flow and pool holding capacity at Pools A, and F would restore the surface flow and pool holding capacity of pools between Flat Rock Swamp and Pool F. Metropolitan Coal considers the pool remediation efforts to have largely been successful but continues to monitor the performance of these works.

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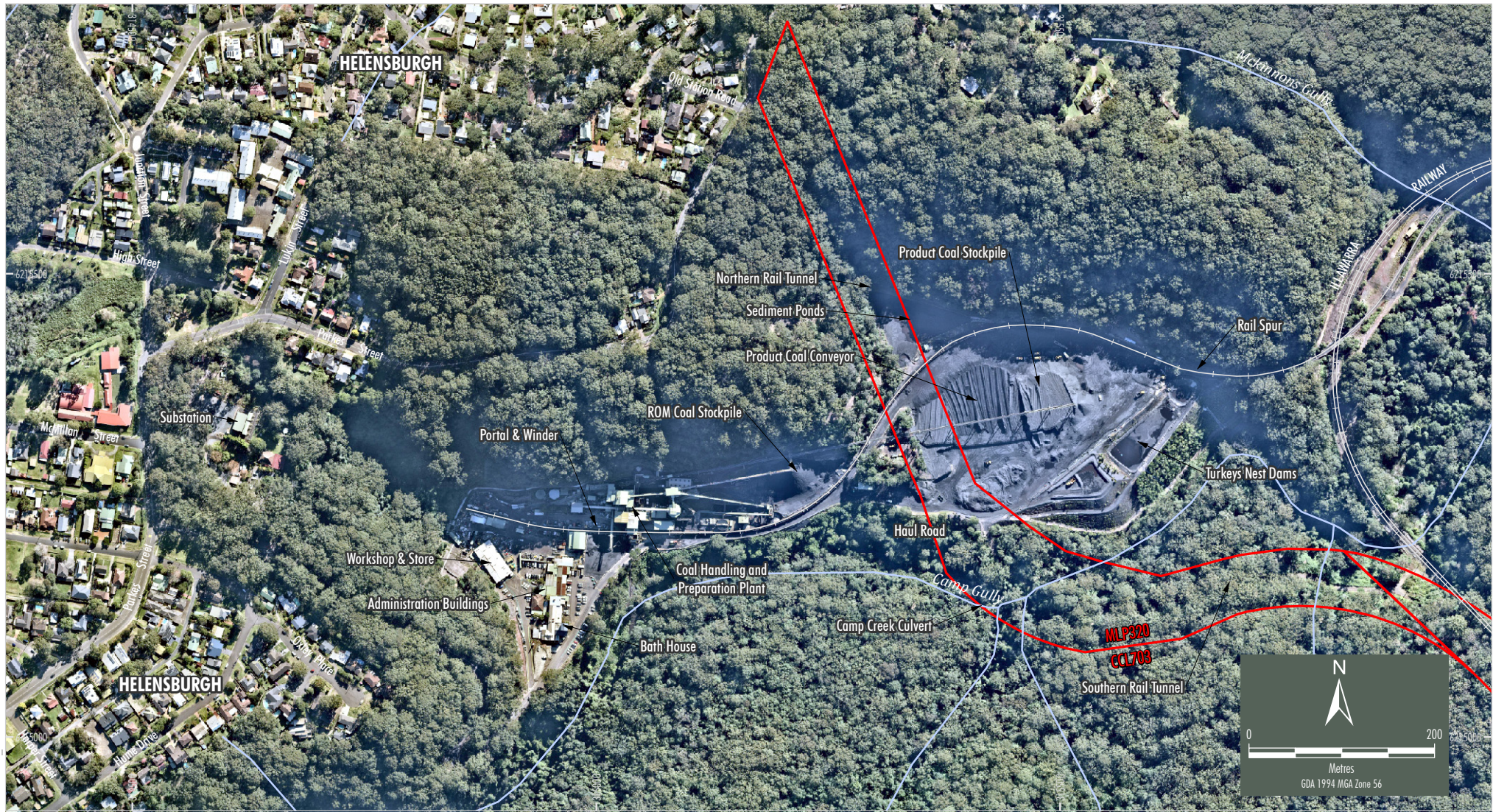


- LEGEND**
- Mining Lease Boundary
  - Railway
  - Project Underground Mining Area  
Longwalls 20-27 and 301-317
  - Existing Underground Access Drive (Main Drift)
  - Portion of Project Application Area –  
Excluding Surface to Depth of 50 m
  - Portion of Project Application Area

Source: Land and Property Information (2015); Date of Aerial Photography 1998;  
Department of Industry (2015); Metropolitan Coal (2021)

**Peabody**  
METROPOLITAN COAL  
Metropolitan Coal  
General Arrangement

**Figure 2**



1/NET-21-28 RMP - 203A

- LEGEND**
- Mining Lease Boundary
  - Railway
  - Waterways

Source: NSW Spatial Services (2020)  
 Orthophoto: Nearmap (2021)

**Figure 3**

In 2020, Metropolitan Coal conducted stream remediation at Pools ETAH and ETAK on the Eastern Tributary, located within the Eastern Tributary watercourse performance measure zone. Works consisted of drilling and installation of a polyurethane (PUR) grout curtain at the downstream rock bar of both pools to a depth of approximately 7 metres (m) in order to reduce rock bar permeability and restore surface water flow over the rock bar. Preliminary works have commenced to conduct stream remediation at Pool ETAL as well as additional remediation at ETAK and ETAH including track and work site clearing.

## 1.2 CURRENT DEVELOPMENT CONSENTS, LEASES AND LICENCES

Details of the dates of grant and duration of the Project Approval (08\_0149), authorisations and licenses issued by the relevant government agencies for the Metropolitan Coal Mine are provided in Table 1.

**Table 1:  
Overview of Current Development Consents, Leases and Licences**

Relevant Authority	Instrument	Approval/Licence No.	Issue Date	Expiry Date
Department of Planning and Environment (DPE)	Project Approval	PA 08_0149	22/06/2009	22/06/2032
		PA 08_0149 – Mod 1	08/09/2010	22/06/2032
		PA 08_0149 – Mod 2	02/07/2011	22/06/2032
		PA 08_0149 – Mod 3	03/10/2013	22/06/2032
NSW Resources Regulator	Mining Lease	CL 379	14/11/2013*	04/10/2033
		CCL 703	1/04/2004	26/01/2024
		ML 1610	19/05/2014	18/12/2031
		ML 1702	13/10/2014	13/10/2035
		MPL 320	16/06/2014	09/12/2035
Environment Protection Authority (EPA)	Environmental Protection Licence (EPL)	EPL 767	09/09/2002	-^
	Radiation Licence – Radiation	Management Licence 5063985	27/09/2020	27/09/2022
Wollongong City Council (WCC)	Coal Reject Emplacement and Colliery Upgrading Metropolitan Coal	Development Application D90/832	05/01/1995	-
SafeWork NSW	Licence to store explosives and/or security sensitive dangerous substance	Licence XSTR200082	15/06/2017	-

Note:

\* Date lease offer was signed.

^ This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister.

### 1.3 LAND OWNERSHIP AND LAND USE

Land uses in the vicinity of the Metropolitan Coal Mine are characterised by a combination of coal mining operations, residential development and environmental protection areas (Figure 4).

A number of reserved areas are located in the vicinity of the Metropolitan Coal Mine, including the Garrawarra State Conservation Area (located within ML boundaries), Heathcote National Park (located to the north-west), Dharawal National Park (located to the south-west), Royal National Park (located to the north) and Illawarra Escarpment State Conservation Area (located to the south).

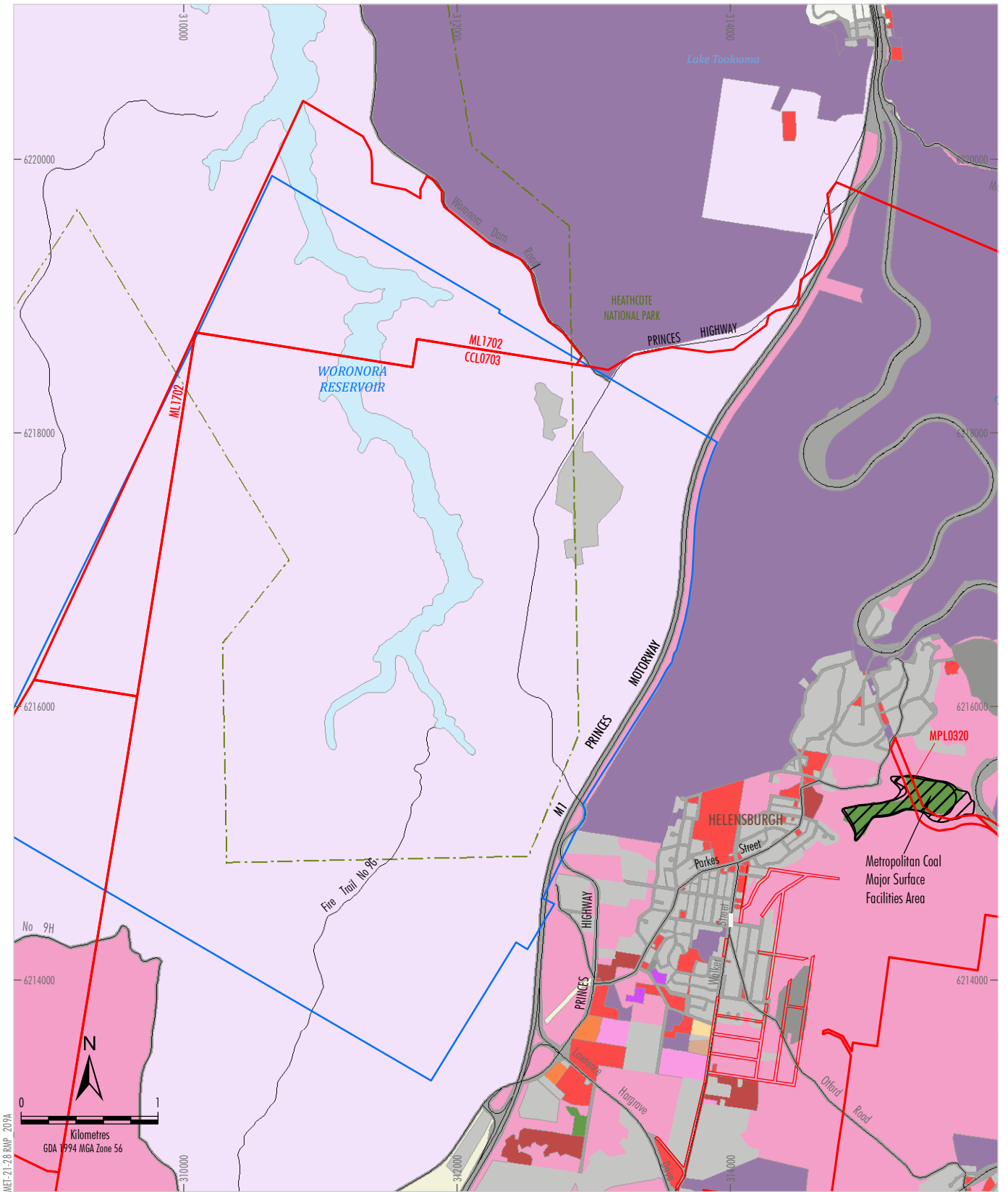
The primary land use of the Metropolitan Coal Mine Underground Mining Area is the water supply catchment. Land uses to the east of the Underground Mining Area include the Garrawarra Centre aged care facility, a cemetery, public road corridors including the F6 Southern Freeway and Princes Highway and associated infrastructure (e.g. electricity transmission lines, optical cables and water pipelines).

Historic and current land use in the vicinity of the Surface Facilities Area are dominated by mining and residential areas generally located between environmental protection areas. Land adjacent to the Surface Facilities Area relating to the rail spur is owned by Rail Corporation NSW (Figure 6). The management of the rail spur is not the responsibility of Metropolitan Coal and has not been addressed in this RMP.

Figure 5 identifies the schedule of land surrounding the Underground Mining Area while Table 2 and Figure 6 identify the schedule of land surrounding the Surface Facilities Area.

**Table 2:  
Overview of the Land Ownership Surrounding the Surface Facilities Area**

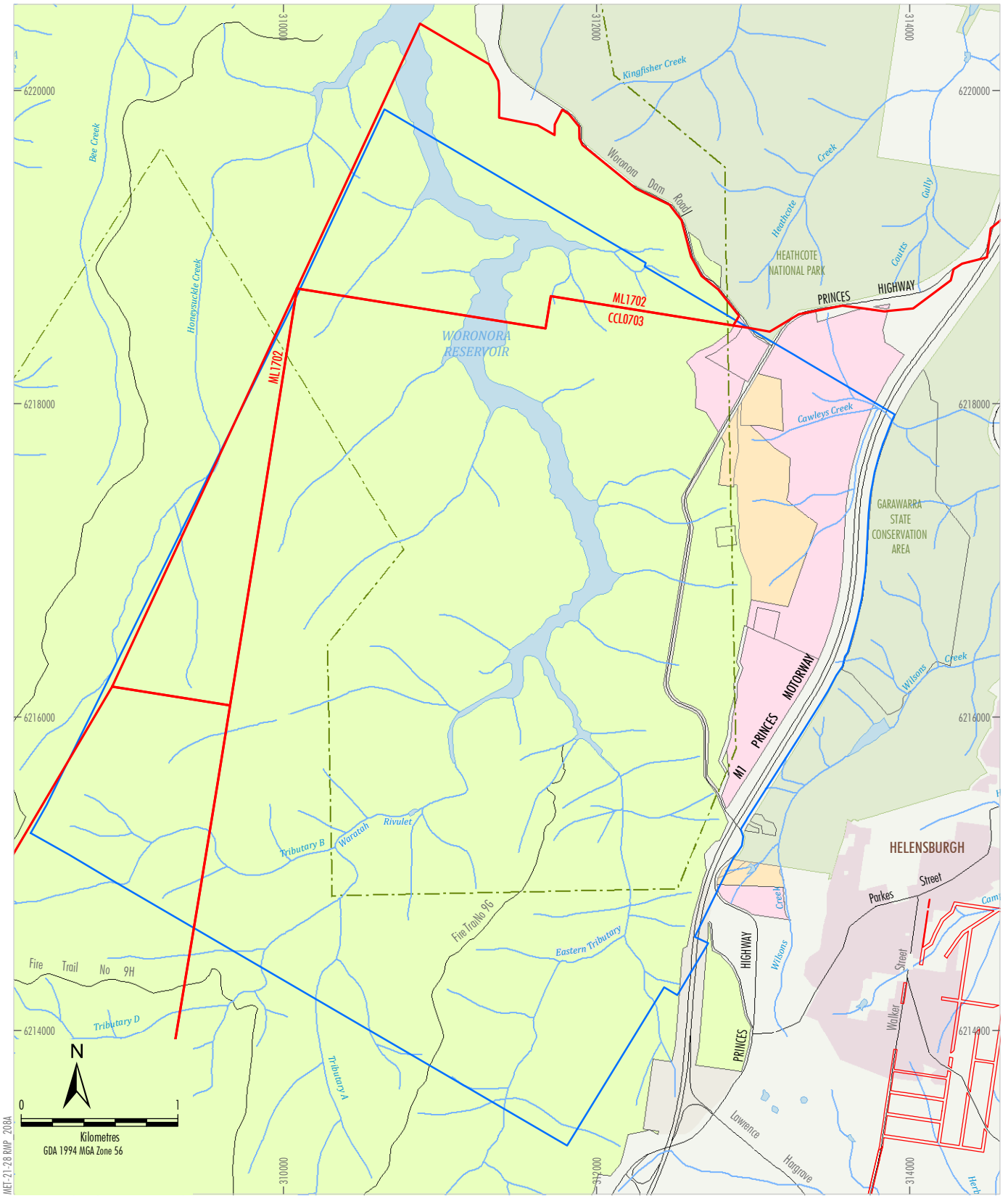
Lot/Deposited Plan (DP)	Land Tenure	Land Ownership
Lot 1 DP815356	Torrens	Metropolitan Collieries Pty Limited
Lot 2 DP815356	Torrens	Metropolitan Collieries Pty Limited
Part 7064 DP96787	Crown	The State of NSW
Lot 342 DP752033	Crown	The State of NSW
Part 617 DP752033	Crown	The State of NSW
Lot 500 DP836394	Torrens	Illawarra Local Aboriginal Land Council
Lot 503 DP836394	Torrens	Illawarra Local Aboriginal Land Council
Lot 7304 DP1142152	Crown	The State of NSW
Part Lot 7305 DP1142152	Crown	The State of NSW
Lot 2 DP1212680	Torrens	Metropolitan Collieries Pty Limited
Lot 692 DP752033	Torrens	Metropolitan Collieries Pty Limited
Lot 807 DP752033	Torrens	Metropolitan Collieries Pty Limited
Lot 835 DP752033	Crown	The State of NSW
Lot 21 DP1192548	Torrens	Rail Corporation NSW
Lot 1 DP1111555	Torrens	Rail Corporation NSW



LEGEND		Land Use	
	Mining Lease Boundary		Nature Conservation
	Railway		Managed Resource Protection
	Project Underground Mining Area Longwalls 20-27 and 301-317		Other Minimal Use
	Woronora Notification Area		Grazing Native Vegetation
			Grazing Modified Pastures
			Perennial Horticulture
			Land in Transition
			Intensive Horticulture
			Intensive Animal Production
			Manufacturing and Industrial
			Residential and Farm Infrastructure
			Services
			Utilities
			Transport and Communication
			Mining
			Reservoir/Dam

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2021); SEED (2022)

Figure 4



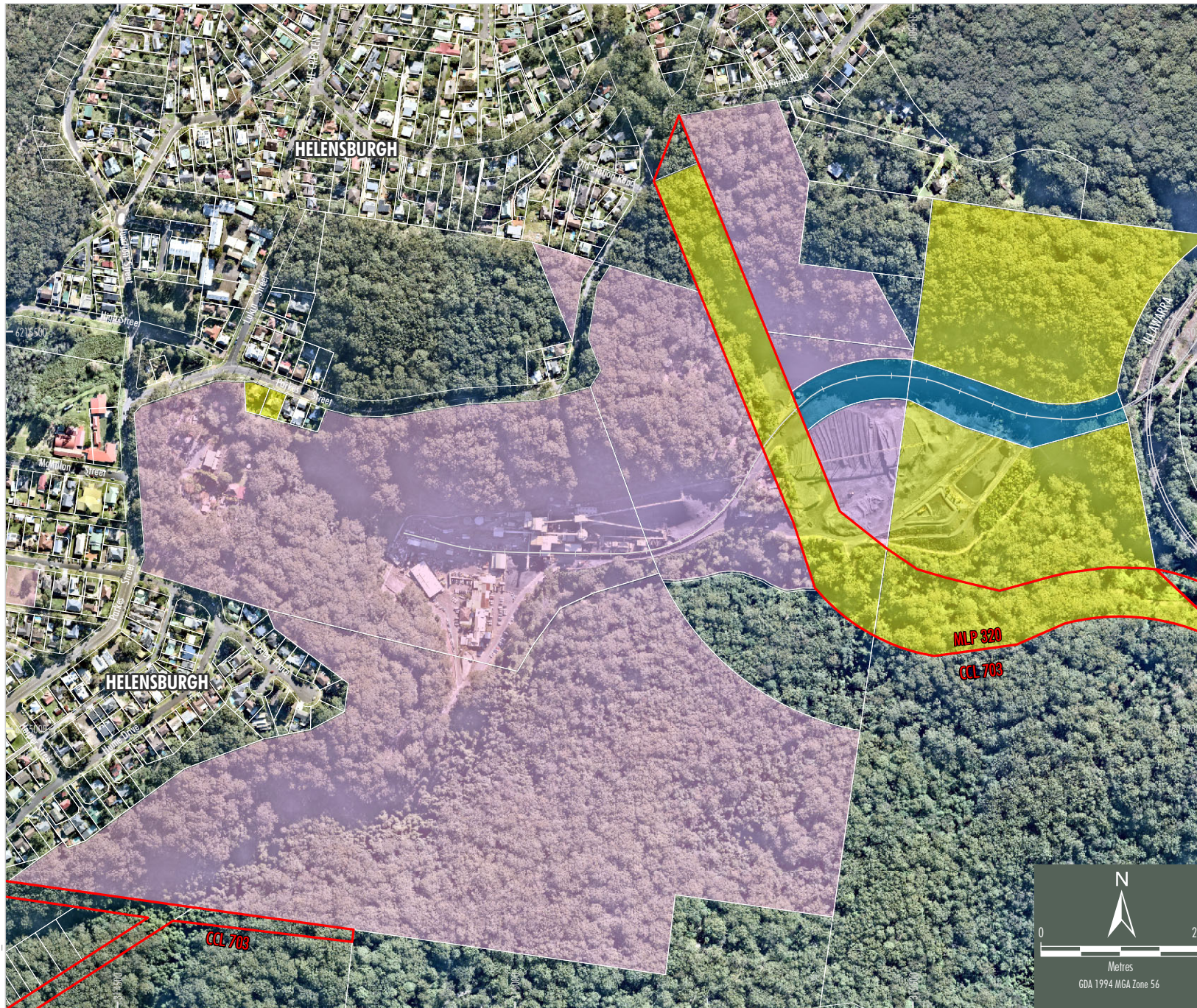
- LEGEND**
- Mining Lease Boundary
  - Woronora Special Area
  - Railway
  - Project Underground Mining Area Longwalls 20-27 and 301-317
  - Woronora Notification Area

- Landholder**
- WaterNSW
  - The State of New South Wales (Crown Land)
  - The State of New South Wales (National Parks and Wildlife Service Estate)
  - Private

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2021)

**Peabody**  
METROPOLITAN COAL  
Land Ownership Surrounding  
the Underground Mining Area

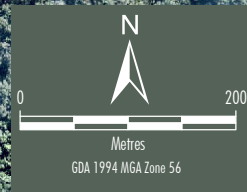
**Figure 5**



- LEGEND**
-  Railway
  - Landholders**
    -  Metropolitan Collieries Pty Limited
    -  The State of New South Wales (Crown Land)
    -  Rail Corporation New South Wales

Source: NSW Spatial Services (2020); Metropolitan Coal (2022)  
 Orthophoto: Nearmap (2021)

**Peabody**  
 METROPOLITAN COAL  
 Land Ownership Surrounding  
 the Surface Facilities Area



MET-21-28 MAP\_207A

**Figure 6**

## 2 FINAL LAND USE

### 2.1 REGULATORY REQUIREMENTS FOR REHABILITATION

Table 3 details the condition of the Project Approval (08\_0149), ML 1610, ML 1702, MPL 320 and CCL 703 and CL 379 relevant to rehabilitation at the Metropolitan Coal Mine. Table 3 also identifies the section of this RMP where each condition has been addressed.

**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation**

Condition	Requirements	Area	Section Reference																
<b>Project Approval (08_0149)</b>																			
Condition 1, Schedule 6	<p><i>The Proponent shall achieve the rehabilitation objectives in Table 11 to the satisfaction of the Executive Director Mineral Resources.</i></p> <p><i>Table 11: Rehabilitation Objectives</i></p> <table border="1"> <thead> <tr> <th><b>Domain</b></th> <th><b>Rehabilitation Objectives</b></th> </tr> </thead> <tbody> <tr> <td><i>Surface Facilities Area</i></td> <td><i>Set through condition 2 below</i></td> </tr> <tr> <td><i>Waratah Rivulet, between the downstream edge of Flat Rock Swamp and the full supply level of the Woronora Reservoir</i></td> <td><i>Restore surface flow and pool holding capacity as soon as reasonably practicable</i></td> </tr> <tr> <td><i>Eastern Tributary, between the maingate of Longwall 26 and the full supply level of the Woronora Reservoir</i></td> <td></td> </tr> <tr> <td><i>Cliffs</i></td> <td><i>Ensure that there is no safety hazard beyond that existing prior to mining</i></td> </tr> <tr> <td><i>Other land affected by the project</i></td> <td> <i>Restore ecosystem function, including maintaining or establishing self-sustaining native ecosystems:</i> <ul style="list-style-type: none"> <li>• <i>comprised of local native plant species; with</i></li> <li>• <i>a landform consistent with the surrounding environment</i></li> </ul> </td> </tr> <tr> <td><i>Built Features</i></td> <td><i>Repair/restore to pre-mining condition or equivalent</i></td> </tr> <tr> <td><i>Community</i></td> <td> <i>Minimise the adverse socio-economic effects associated with mine closure including the reduction in local and regional employment</i>   <i>Ensure public safety</i> </td> </tr> </tbody> </table>	<b>Domain</b>	<b>Rehabilitation Objectives</b>	<i>Surface Facilities Area</i>	<i>Set through condition 2 below</i>	<i>Waratah Rivulet, between the downstream edge of Flat Rock Swamp and the full supply level of the Woronora Reservoir</i>	<i>Restore surface flow and pool holding capacity as soon as reasonably practicable</i>	<i>Eastern Tributary, between the maingate of Longwall 26 and the full supply level of the Woronora Reservoir</i>		<i>Cliffs</i>	<i>Ensure that there is no safety hazard beyond that existing prior to mining</i>	<i>Other land affected by the project</i>	<i>Restore ecosystem function, including maintaining or establishing self-sustaining native ecosystems:</i> <ul style="list-style-type: none"> <li>• <i>comprised of local native plant species; with</i></li> <li>• <i>a landform consistent with the surrounding environment</i></li> </ul>	<i>Built Features</i>	<i>Repair/restore to pre-mining condition or equivalent</i>	<i>Community</i>	<i>Minimise the adverse socio-economic effects associated with mine closure including the reduction in local and regional employment</i>  <i>Ensure public safety</i>	Entire Site	Section 4.1
<b>Domain</b>	<b>Rehabilitation Objectives</b>																		
<i>Surface Facilities Area</i>	<i>Set through condition 2 below</i>																		
<i>Waratah Rivulet, between the downstream edge of Flat Rock Swamp and the full supply level of the Woronora Reservoir</i>	<i>Restore surface flow and pool holding capacity as soon as reasonably practicable</i>																		
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**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation (Continued)**

Condition	Requirements	Area	Section Reference
<b>Project Approval (08_0149) (Continued)</b>			
Condition 2, Schedule 6	<p><i>By the end of October 2011, the Proponent shall prepare a Rehabilitation Strategy for the surface facilities area to the satisfaction of the Director-General. This strategy must:</i></p> <ul style="list-style-type: none"> <li><i>(a) be prepared by a team of suitably qualified and experienced experts whose appointment has been endorsed by the Director-General;</i></li> <li><i>(b) be prepared in consultation with relevant stakeholders, including WCC and the CCC;</i></li> <li><i>(c) investigate options for the future use of the area upon the completion of mining;</i></li> <li><i>(d) describe and justify the proposed rehabilitation strategy for the area; and</i></li> <li><i>(e) define the rehabilitation objectives for the area, as well as the proposed completion criteria for this rehabilitation.</i></li> </ul>	Entire Site	<p>This RMP</p> <p>This RMP</p> <p>Section 2.2</p> <p>Section 2.2</p> <p>Section 6.1</p> <p>Section 4</p>
Condition 3, Schedule 6	<i>To the extent that mining operations permit, the Proponent shall carry out rehabilitation progressively, that is, as soon as reasonably practicable following the disturbance.</i>	Entire Site	Section 4
Condition 4, Schedule 6	<p><i>The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of the Executive Director Mineral Resources. This plan must be prepared in consultation with the relevant stakeholders, and submitted to DRE for approval prior to carrying out any second workings in the mining area.</i></p> <p><i>Note: In accordance with condition 12 of schedule 2, the preparation and implementation of Rehabilitation Management Plans is likely to be staged, with each plan covering a defined area (or domain) for rehabilitation. In addition, while mining operations are being carried out, some of the proposed remediation or rehabilitation measures may be included in the detailed management plans that form part of the Extraction Plan. If this is the case, however, then the Proponent are required to ensure that there is good cross-referencing between the various management plans.</i></p>	Entire Site	This RMP
Condition 5, Schedule 6	<p><i>The Proponent shall:</i></p> <ul style="list-style-type: none"> <li><i>(a) pay SCA \$100,000 by the end of 2011 to carry out catchment improvement works within the Woronora catchment area; or</i></li> <li><i>(b) carry out catchment improvement works within this area that have an equivalent value to the satisfaction of SCA.</i></li> </ul>	Woronora Catchment Area	N/A
Condition 6, Schedule 6	<p><i>If the Proponent exceeds the performance measures in Table 1 of this approval, and either</i></p> <ul style="list-style-type: none"> <li><i>(a) the contingency measures implemented by the Proponent have failed to remediate the impact; or</i></li> <li><i>(b) the Director-General determines that it is not reasonable or feasible to remediate the impact, then the Proponent shall provide a suitable offset to compensate for the impact to the satisfaction of the Director-General.</i></li> </ul> <p><i>Note: Any offsets required under this condition must be proportionate with the significance of the impact.</i></p>	Entire Site	Section 10

**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation (Continued)**

Condition	Requirements	Area	Section Reference
<b>ML 1610, ML 1702</b>			
Condition 4, Schedule 8A	<p><b>Must prevent or minimise harm to environment</b></p> <p>(1) <i>The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease.</i></p> <p>(2) <i>In this clause –</i></p> <p><b>harm</b> <i>to the environment has the same meaning as in the Protection of the Environment Operations Act 1997.</i></p>	Entire Site	This RMP  N/A
Condition 5, Schedule 8A	<p><b>Rehabilitation to occur as soon as reasonably practicable after disturbance</b></p> <p><i>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.</i></p>	Entire Site	Section 6.2
Condition 6, Schedule 8A	<p><b>Rehabilitation must achieve final land use</b></p> <p>(1) <i>The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area.</i></p> <p>(2) <i>The holder of the mining lease must ensure any planning approvals has been obtained that is necessary to enable the holder to comply with subclause (1).</i></p> <p>(3) <i>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).</i></p> <p><b>Note</b> – <i>Clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause.</i></p> <p>(4) <i>In this clause –</i></p> <p><b>final land use</b> <i>for the mining area means the final landform and land uses to be achieved for the mining area –</i></p> <p>(a) <i>as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and</i></p> <p>(b) <i>for a large mine – as spatially depicted in the final landform and rehabilitation plan, and</i></p> <p>(c) <i>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.</i></p> <p><b>planning approval</b> <i>means –</i></p> <p>(a) <i>a development consent within the meaning of the Environmental Planning and Assessment Act 1979, or</i></p> <p>(b) <i>an approval under that Act, Division 5.1.</i></p>	Entire Site	Section 4  Section 2.1  Section 3          N/A

**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation (Continued)**

Condition	Requirements	Area	Section Reference
<b>ML 1610, ML 1702 (Continued)</b>			
Condition 7, Schedule 8A	<p><b>Rehabilitation risk assessment</b></p> <p>(1) <i>The holder of a mining lease must conduct a risk assessment (a <b>rehabilitation risk assessment</b>) that –</i></p> <p>(a) <i>Identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease –</i></p> <p>(i) <i>the rehabilitation objectives,</i></p> <p>(ii) <i>the rehabilitation completion criteria,</i></p> <p>(iii) <i>for large mines – the final land use as spatially depicted in the final landform and rehabilitation plan, and</i></p> <p>(b) <i>identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks.</i></p> <p>(2) <i>The holder of a mining lease must implement the measures identified.</i></p> <p>(3) <i>The holder of a mining lease must conduct a rehabilitation risk assessment –</i></p> <p>(a) <i>for a large mine – before preparing a rehabilitation plan, and</i></p> <p>(b) <i>for a small mine – before preparing the rehabilitation outcome documents for the mine, and</i></p> <p>(c) <i>whenever a hazard is identified under clause 6(3) – as soon as reasonably practicable after it is identified, and</i></p> <p>(d) <i>whenever given a written direction to do so by the Secretary.</i></p>	Entire Site	<p>Section 3</p> <p>Section 3</p> <p>Section 3</p>

**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation (Continued)**

Condition	Requirements	Area	Section Reference
<b>ML 1610, ML 1702 (Continued)</b>			
Condition 10, Schedule 8A	<p><b><i>Rehabilitation management plans for large mines</i></b></p> <p><i>(1) The holder of a mining lease relating to a large mine must prepare a plan (a <b>rehabilitation management plan</b>) for the mining lease that includes the following –</i></p> <p><i>(a) a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area,</i></p> <p><i>(b) 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,</i></p> <p><i>(c) a summary of rehabilitation risk assessments conducted by the holder,</i></p> <p><i>(d) the risk control measures identified in the rehabilitation risk assessments,</i></p> <p><i>(e) the rehabilitation outcome documents for the mining lease,</i></p> <p><i>(f) 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.</i></p> <p><i>(2) 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.</i></p> <p><i>(3) A rehabilitation management plan is not required to be given to the Secretary for approval.</i></p> <p><i>(4) The holder of the mining lease –</i></p> <p><i>(a) must implement the matters set out in the rehabilitation management plan, and</i></p> <p><i>(b) if the forward program specifies timeframes for the implementation of the matters – must implement the matters within those timeframes.</i></p>	Entire Site	<p>This RMP</p> <p>Section 6.2</p> <p>Section 5</p> <p>Section 3</p> <p>Section 3</p> <p>Sections 4 and 5</p> <p>Section 4</p> <p>Sections 4 and 5</p> <p>N/A</p>

**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation (Continued)**

Condition	Requirements	Area	Section Reference
<b>ML 1610, ML 1702 (Continued)</b>			
Condition 12, Schedule 8A	<p><b>Rehabilitation outcome documents</b></p> <p>(1) The holder of a mining lease must prepare the following documents (the <b>rehabilitation outcome documents</b>) for the mining lease and give them to the Secretary for approval –</p> <p>(a) the <b>rehabilitation objectives statement</b>, which sets out the rehabilitation objectives required to achieve the final land use for the mining area,</p> <p>(b) the <b>rehabilitation completion criteria statement</b>, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives,</p> <p>(c) for a large mine, the <b>final landform and rehabilitation plan</b>, showing a spatial depiction of the final land use.</p> <p>(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.</p>	Entire Site	Section 4  Section 4  Section 5
<b>CCL 703</b>			
Condition 21	<i>If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister any lands with the subject area which may have been disturbed by the lease holder.</i>	CCL703	This RMP
Condition 22	<i>Upon completion of operations on the surface of the subject area or upon expiry or sooner determination of this authority or any renewal thereof, the lease holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.</i>	CCL703	This RMP
Condition 23	<i>If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any lands within the subject area which may have been disturbed by mining or prospecting operations whether such operations were or were not carried out by the lease holder.</i>	CCL703	This RMP
Condition 24	<i>The lease holder shall take all precautions against causing outbreak of fire on the subject area.</i>	CCL703	Section 6.2

**Table 3:  
Regulatory Requirements Relating to Post-mining Land Use and Rehabilitation (Continued)**

Condition	Requirements	Area	Section Reference
<b>Other Relevant Legislation</b>			
<i>Biodiversity Conservation Act 2016</i>	The NSW <i>Biodiversity Conservation Act 2016</i> may be applicable to the rehabilitation of the Project. A number of threatened flora and fauna species listed under the NSW <i>Biodiversity Conservation Act 2016</i> are known to occur, or have the potential to occur within the Underground Mining Area or surrounds.	Entire Site	N/A
<i>Heritage Act 1977</i>	Identified places and items of heritage significance at the Surface Facilities Area as listed in the <i>Wollongong Local Environmental Plan 2009</i> (Wollongong LEP) are provided below: <ul style="list-style-type: none"> <li>Metropolitan Colliery.</li> <li>No. 4 Tunnel (Illawarra Railway).</li> <li>No. 5 Tunnel (Illawarra Railway).</li> </ul>	Surface Facilities Area	N/A

Note: CCC = Community Consultative Committee and DRE = Division of Resources and Energy, within the Department of Trade and Investment, Regional Infrastructure and Services.

## 2.2 FINAL LAND USE OPTIONS ASSESSMENT

Historically, Metropolitan Coal has undertaken preliminary assessments of potential final land uses for the Surface Facilities Area during the preparation of the Metropolitan Coal Rehabilitation Strategy (Metropolitan Coal, 2011), previous MOPs and the RMP required under Condition 4, Schedule 6 of Project Approval (08\_0149).

As described in the Metropolitan Coal Rehabilitation Strategy (Metropolitan Coal, 2011) and the previous MOPs and RMPs, five potential final land use options have been considered by Metropolitan Coal, and have been developed in consideration of:

- applicable approval conditions, including Project Approval (08\_0149) and MLs;
- permissible land uses and land zonings as defined by the WCC (Figure 4); and
- consultation with relevant stakeholders.

A summary of these five options, and the associated key benefits and issues are presented in Table 4.

**Table 4**  
**Potential Final Land Use Options at the Surface Facilities Area**

<b>Final Land Use Option</b>	<b>Key Benefits</b>	<b>Key Issues</b>
Demolition of all infrastructure and rehabilitation of the Surface Facilities Area to a Native Ecosystem.	<ul style="list-style-type: none"> <li>Promotes the re-establishment of native vegetation communities and improves the visual amenity of the site.</li> <li>Removes the public safety risk associated with retaining infrastructure.</li> <li>Decreased ongoing liability associated with potentially hazardous infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Destruction of heritage items and limited opportunity to promote the heritage value of the site.</li> <li>Loss of community attachment to the mine site.</li> <li>No beneficial re-use of infrastructure such as buildings, roads, services etc.</li> </ul>
Retention of certain heritage items and rehabilitation of the remaining Surface Facilities Area to Native Ecosystem.	<ul style="list-style-type: none"> <li>Preserves a certain amount of the site's heritage in its existing context.</li> <li>Promotes the re-establishment of native vegetation communities and improves the visual amenity of the site.</li> <li>Reduces public safety risk.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced opportunity to promote the heritage value of the site.</li> <li>Heritage items must not present a risk to public safety.</li> <li>On-going liability to maintain the infrastructure retained on-site.</li> </ul>
Retention of all heritage items on-site without alteration of the infrastructure.	<ul style="list-style-type: none"> <li>Highest preservation of heritage value.</li> <li>No requirement to demolish or relocate infrastructure off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Safety issues associated with retention of certain heritage items.</li> <li>Minimal scope for beneficial re-use of the area.</li> </ul>
Redevelop to an industrial area or residential estate.	<ul style="list-style-type: none"> <li>Opportunity to relinquish the site and the associated liability to a developer.</li> <li>Socio-economic benefits to the local community.</li> <li>Continued use of existing infrastructure (e.g. access roads, services etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Limited availability of suitable land.</li> <li>Loss of heritage significance of the site due to a change in land use.</li> <li>There may not be a requirement for additional housing in the local area once the mine is closed.</li> </ul>
Retention of certain heritage items and development of an interpretative centre.	<ul style="list-style-type: none"> <li>Preserves a significant amount of the site's heritage in its existing context.</li> <li>Allows for the continued use of the area by the community following mine closure.</li> <li>Reduces public safety risk.</li> </ul>	<ul style="list-style-type: none"> <li>Heritage items must not present a risk to public safety.</li> <li>On-going liability to maintain the infrastructure retained on-site.</li> </ul>

Due to the historical significance of mining activities at the Metropolitan Coal Mine, and in line with the outcomes of consultation with relevant stakeholders and specialists, the preferred final land use for the Surface Facilities Area includes the retention of some items of mining heritage, the re-establishment of a stable landform and rehabilitation to a Native Ecosystem.

This preferred final land use option of retaining certain heritage items ensures that the historical significance of the site is maintained while allowing the remainder of the Surface Facilities Area to be rehabilitated to a stable native environment.

During the preparation of the Metropolitan Coal Rehabilitation Strategy (Metropolitan Coal, 2011) and previous MOPs, consultation was undertaken with the following key stakeholders:

- CCC.
- WCC.
- WaterNSW.
- The NSW Resources Regulator.
- The Biodiversity and Conservation Division within DPE (BCD).
- The Department of Planning, Industry and Environment (DPIE) (now DPE).
- DPIE – Water (now DPE – Water).
- The Department of Primary Industries – Fisheries.
- The Helensburgh and District Historical Society.
- Environmental specialists, including:
  - Godden Mackay Logan Pty Ltd;
  - Eco Logical Australia; and
  - Allan Watson Associates Pty Ltd.

This consultation included the opportunity to review and comment on the proposed final land use options described above. All issues raised through the consultation process with regard to the final landform and final land use have been considered in the preparation of this RMP.

Additional consultation regarding the proposed final land use and final landform at the Metropolitan Coal Mine may be undertaken with the NSW Resources Regulator and other departmental agencies. This RMP will be updated to reflect the outcomes of any consultation undertaken.

### ***Retention of Heritage Items***

As described above, a number of heritage items relating to the historical mining activities at the Metropolitan Coal Mine are located within the Surface Facilities Area. An inventory of these heritage items, as identified in the Metropolitan Coal Environmental Assessment (EA), is provided in Table 5.

As a result of the introduction of new technology and practices for underground coal mining, a number of the earliest structures have been demolished, modified or degraded over time. Some of these heritage items are listed in the Heritage Schedule of the Wollongong LEP and/or the *Illawarra Regional Environmental Plan No 1 1986* (Illawarra REP), although none are listed on the State Heritage Register or National Heritage List.



**Table 5:  
Inventory of Heritage Items at the Surface Facilities Area**

Item	Heritage Register	Description
Metropolitan Colliery	Wollongong LEP Illawarra REP	The Metropolitan Coal Surface Facilities Area.
No. 4 Tunnel (Illawarra Railway)	Wollongong LEP Illawarra REP	The southern portal of the Metropolitan Tunnel (No. 4) lies within the colliery lease area, the northern end being adjacent to the old Helensburgh railway station in Vera Street.
No. 5 Tunnel (Illawarra Railway)	Wollongong LEP Illawarra REP	A short tunnel across the valley south of the coal stockpiles. Ovoid single-track tunnel fully brick lined, abandoned 1914.
Power Pylon	Wollongong LEP Illawarra REP	A pylon located up slope of the power station, built of angle-iron lattice sections with three crosstrees of angle-iron. The pylon has collapsed from corrosion and lies amongst vegetation.
Shaft No. 1 Head Frame	Wollongong LEP Illawarra REP	The No. 1 headframe appears in early photographs of the colliery. It is a large steel headframe with circular bracing panels and decorative wrought iron hand rails. The bracing legs have been cut off, and the winding engine site is now occupied by conveyor belt towers.
Shaft No. 2 and Koepe Winder	Wollongong LEP	The No. 2 headframe is a concrete tower with internal steel framework inside, on top of the original No. 2 shaft, currently used as man-access. The cages are lowered by the Koepe winder of about 1900, modernized in 1985.
Shaft No. 2 Fan Evase	Wollongong LEP Illawarra REP	The fan evase is a concrete tube angled upward from the fan position adjacent to the shaft, with an octagonal outer form. The current fan evase appears to be of the same vintage as the No. 2 shaft headframe, probably dating to the 1950s.
Tunnel Opening, Portal and Winder House	Wollongong LEP	Referred to as the drift portal and winder and built in 1954, the drift is currently 1,164 m long, angled at 1:3. The British Thomson Houston Co. Ltd winding engine and cab was decommissioned in 2014 and remains preserved in place.
Coal Storage and Washery	Wollongong LEP	The coal storage and washery building is a building developed and altered over time commencing in 1959, with many components of different ages.
Office and Bathhouse	Wollongong LEP	The office is a single-storey brick building, and the Bathhouse two storeys with large rooms with hoists for miner's clothing and personal possessions, a shower block, lamp room and ancillary rooms. A major part of the bathhouse was built in the late 19th or very early 20th Century, and the office is a mid-20th Century structure.
No. 3 Ventilation Shaft	Wollongong LEP	A concrete brick engine house with two steel trunking fan evases leading from shaft top. Built 1976, located west of the M1 Princes Motorway south-west of Helensburgh.
Pit Pony Stables Underground	Wollongong LEP	Series of brick-floored, railed stalls along drives from bottom of No. 2 shaft, skip rails alongside. Pit horses were last used at Metropolitan in 1955.
Powerhouse	Wollongong LEP	Brick two-storey structure. Power generation equipment all removed. Houses a switch room and an empty workshop. Building is fenced off for safety due to deterioration.

**Table 5:  
Inventory of Heritage Items at the Surface Facilities Area (Continued)**

Item	Heritage Register	Description
Railway Viaduct	N/A	An arched brick structure is located at the eastern end of the southern conveyor, east of the bush 'island', half-way between railway tunnels 4 and 5. The structure is partially buried in material from the coal storage mounds, but is clearly a substantial structure, 1.8 m height of the arch being visible.
Camp Creek Culvert	N/A	A brick-lined culvert or tunnel, approximately 65 m long and approximately 6 m high and wide, built beneath a large earth bank that carried the main Illawarra rail line over Camp Creek. The line was abandoned in 1915.
Weir on Camp Creek	N/A	A mass-concrete weir wall extending across Camp Creek immediately upstream of the now-infilled side valley on which much of the post 1950s colliery infrastructure sits. The dam was built to provide water for mine operations.
Reduction Pond Base	N/A	Mass concrete footings on hill behind the bath house. Shown on approximately 1950s plan in Manager's office as 'reduction pond'. Feature is preserved underneath a concrete pad.
Manager's Residence	N/A	A mid-20th Century brick cottage with tiled roof and adjacent tennis court, located at the top of the gully immediately above the mine site and opposite Lukin Street.

In line with the outcomes of consultation with relevant stakeholders and specialists, Metropolitan Coal's final land use involves the retention of the following heritage items:

- the No. 4 Tunnel (Illawarra Railway);
- the No. 5 Tunnel (Illawarra Railway);
- the Underground Pit Pony Stables; and
- Camp Creek Culvert.

### 2.3 FINAL LAND USE STATEMENT

The final landform and land use of the Surface Facilities Area and Underground Mining Area have been developed in accordance with the proposed final landform detailed in the Metropolitan Coal Mine EA and further refined in consideration of the final land use options assessment described in Section 2.2.

The final land use at the Metropolitan Coal Mine will comprise of:

- Native Ecosystem;
- Infrastructure;
- Water Storage (Excluding Final Void); and
- Water Management Areas.

The proposed final landform and final land uses for the Surface Facilities Area and Underground Mining Area are depicted spatially in Section 5.

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## 2.4 FINAL LAND USE AND MINING DOMAINS

### 2.4.1 Final Land Use Domains

Final land use domains are land management units characterised by a similar post-mining land use objective. Consistent with contemporary rehabilitation guidelines and rehabilitation planning best practice, final land use domains have been developed for the Metropolitan Coal Mine. In accordance with the Final Landform and Rehabilitation Plan outlined in Section 5 of this RMP, the final land use domains at the Metropolitan Coal Mine are:

- Native Ecosystem;
- Infrastructure;
- Water Storage (Excluding Final Void); and
- Water Management Areas.

The codes associated with the Final Land Use Domains are presented in Table 6.

**Table 6:  
Final Land Use Domains**

Final Land Use Domains	Code
Native Ecosystem	A
Water Management Areas	F
Water Storage (Excluding Final Void)	G
Infrastructure	I

### 2.4.2 Mining Domains

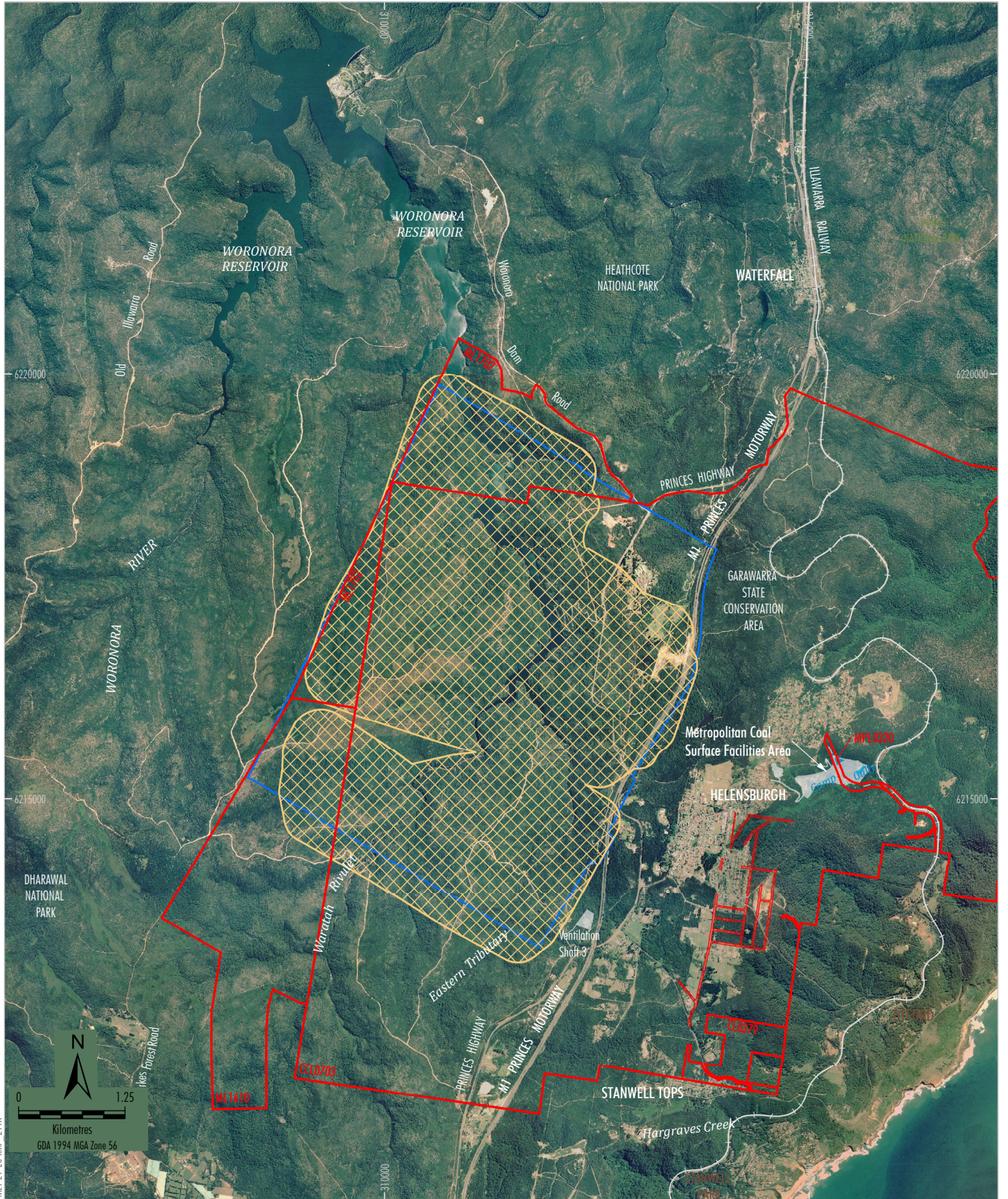
Mining domains refer to the footprint of areas disturbed for discrete mining-related activities. Mining domains at the Metropolitan Coal Mine consist of:

- Infrastructure Areas (e.g. administration facilities, coal handling and processing infrastructure, Ventilation Shaft 3, rail infrastructure, maintenance facilities and access roads);
- Water Management Areas (e.g. Turkeys Nest Dam); and
- the Underground Mining Area (SMP).

The codes associated with the Mining Domains are presented in Table 7 and Figures 7 and 8.

**Table 7:  
Mining Domains**

Mining Domains	Code
Infrastructure Area	1
Water Management Area	3
Underground Mining Area (SMP)	5

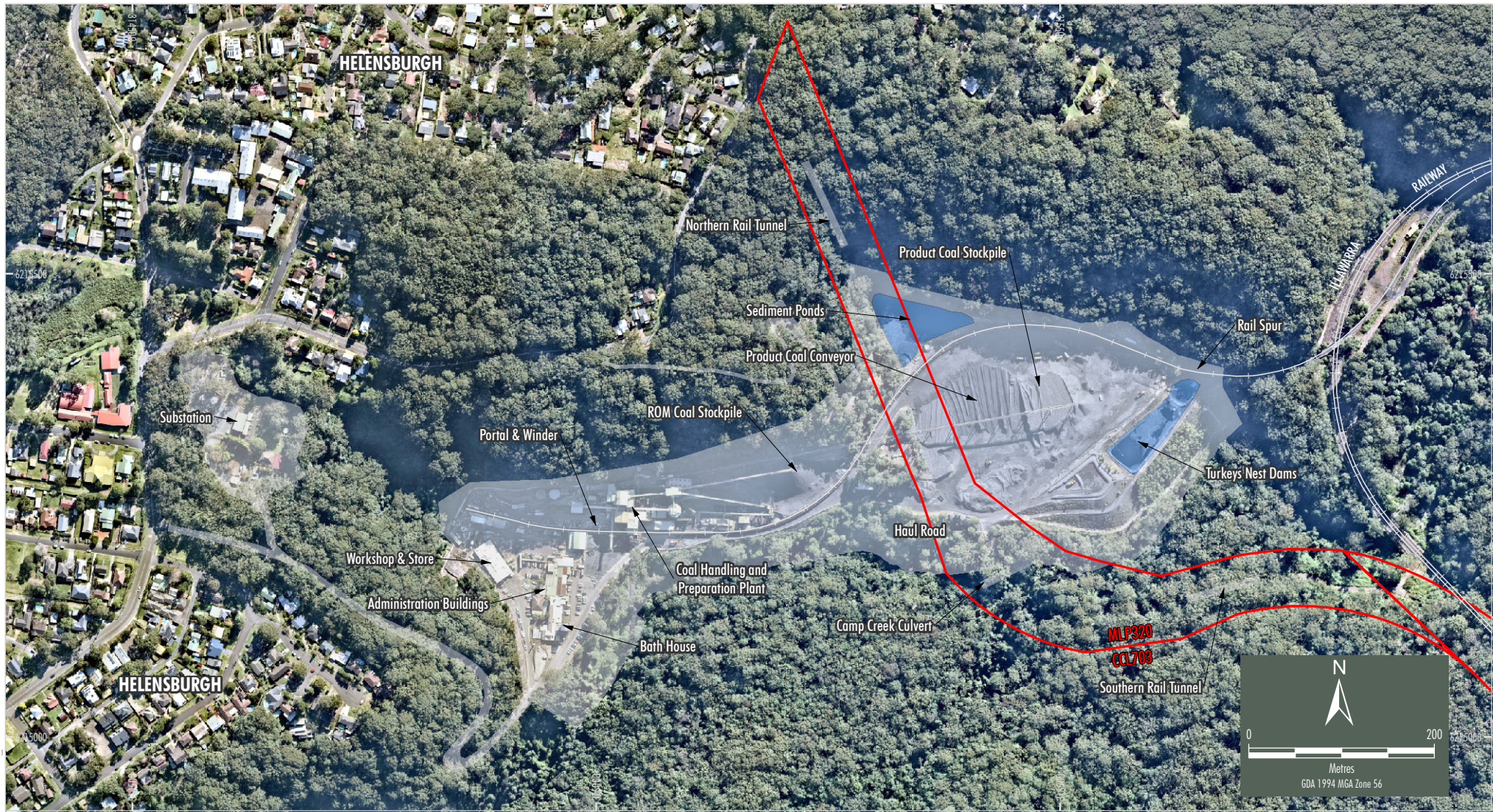


- LEGEND**
- Mining Lease Boundary
  - Railway
  - Project Underground Mining Area  
Longwalls 20-27 and 301-317
  - Mining Domain
  - Underground Mining Area (SMP)
  - Infrastructure Area
  - Water Management Area

Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2021)

**Peabody**  
METROPOLITAN COAL  
Mining Domains for the  
Underground Mining Area

**Figure 7**



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- LEGEND**
- Mining Lease Boundary
  - Railway
  - Mining Domains Infrastructure Area
  - Water Management Area

Source: NSW Spatial Services (2020)  
 Orthophoto: Nearmap (2021)

**Figure 8**

### 3 REHABILITATION RISK ASSESSMENT

The key risks associated with rehabilitation have been identified and assessed in a risk assessment undertaken in December 2021 in accordance with Clause 7, Schedule 8A of the *Mining Regulation 2016*, and in consideration of *Minerals Industry Safety and Health Risk Management Guideline MDG 1010* and the *Joint Australian and New Zealand Standard AS/NZS 31000:2009 Risk Management – Principles and Guidelines*. A copy of the Rehabilitation Risk Assessment is provided in Attachment A.

The risk assessment builds upon the existing MOPs and previous documents regarding mine site rehabilitation and closure, including:

- Metropolitan Coal Stream Remediation Plan;
- Metropolitan Coal Rehabilitation Strategy; and
- Conservation Management Plan.

The method used for the risk assessment encompassed the following key steps:

- identifying the related risks, including what could happen, when and where;
- analysing the risks using a qualitative risk approach (i.e. identifying existing controls, determining specific consequences/likelihoods and then determining the residual level of risk);
- making decisions based on the outcomes of the risk assessment about which of the risks need controls or the implementation of a mitigation strategy; and
- establishing controls to mitigate/treat the risks identified as part of the process.

A total of 58 risks were identified and considered during the risk assessment. Of these risks, 47 were ranked as low, 11 were ranked as low to medium. No risks were ranked as medium or high.

Note, some risks were duplicated during different rehabilitation phases. For example, potential weather impacts was ranked as a low risk during ecosystem establishment and also during ecosystem and land use development.

The following 11 risks were ranked as low to medium:

- Insufficient skills and experience of rehabilitation personal resulting in rehabilitation being inadequate for sign off from NSW Resources Regulator and relinquishment unsuccessful.
- Lack of clearly defined responsibilities resulting in rehabilitation being inadequate for sign off from NSW Resources Regulator and relinquishment unsuccessful.
- Insufficient funding for or prioritisation of rehabilitation activities resulting in rehabilitation being inadequate for sign off from NSW Resources Regulator, relinquishment unsuccessful and issues with other approvals due to lack of regulator confidence.
- Unauthorised access to underground workings, habitation of structures, underground workings by members of the public resulting in harm to person(s).
- Land contamination sites not successfully identified or remediated causing impacts to the environment resulting in rehabilitation inadequate for sign off from NSW Resources Regulator and relinquishment delayed.

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- Lack of resources for rehabilitation resulting in rehabilitation being inadequate for sign off from NSW Resources Regulator, unsuccessful relinquishment and issues with other approvals due to lack of regulator confidence.
- Weed infestation associated with both introduction and control (or lack thereof) resulting in failed establishment of rehabilitation leading to additional works being required to meet completion criteria.
- Lack of structural integrity of buildings and infrastructure to be retained in final land use resulting in collapse/failure of infrastructure to be retained.
- Damage from fauna resulting in failed rehabilitation establishment leading to additional works being required to meet completion criteria.
- Lack of resources for rehabilitation maintenance resulting in inadequate rehabilitation establishment for sign off from NSW Resources Regulator, unsuccessful relinquishment and issues with other approvals due to lack of regulator confidence.
- Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.

Relevant controls for each risk identified during the risk assessment are provided in Attachment A.

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## 4 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

The overall objective for the final rehabilitated landform is to establish a safe, stable and non-polluting landform that is compatible with the surrounding landscape and fit for the intended post-mining land use.

In accordance with Clause 12, Schedule 8A of the *Mining Regulation 2016*, the Rehabilitation Objectives have been submitted to the NSW Resources Regulator for approval. Following approval of the rehabilitation objectives, the RMP will be amended to include the approved Rehabilitation Objectives.

### 4.1 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

The rehabilitation objectives are considered to be broader objectives that cover specific aspects of rehabilitation. To complement these objectives, Metropolitan Coal has developed performance indicators and completion criteria for each domain and rehabilitation phase based on the SMART principle. The objectives, indicators and completion criteria for each of the final land use and mining domains during the rehabilitation phases are specified in Table 8.

In accordance with Clause 12, Schedule 8A of the *Mining Regulation 2016*, the Metropolitan Coal Mine Rehabilitation Objectives and Rehabilitation Completion Criteria have been submitted to the NSW Resources Regulator for approval. Following approval of the Rehabilitation Objectives and Rehabilitation Completion Criteria, this RMP will be amended to substitute the proposed version (Table 8) with the version approved by the NSW Resources Regulator in accordance with clause 11, Schedule 8A of the *Mining Regulation 2016*.

The proposed objectives, indicators and completion criteria for each of the final land use and mining domains during the rehabilitation phases are specified in Table 8.

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**Table 8:  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria**

Final Land Use Domain	Mining Domains	Rehabilitation Objectives	Indicator	Rehabilitation Completion Criteria	Justification or Validation Method
Domain A: Native Ecosystem	Domain 1: Infrastructure Area  Domain 3: Water Management Area	<ul style="list-style-type: none"> <li>All infrastructure removed that is not required post-closure.</li> </ul>	Removal of infrastructure.	All redundant infrastructure has been removed.	Record of activities and statement of completion provided. Photographic record of decommissioned sites.
			Removal of all services.	All redundant services have been disconnected and removed.	
		<ul style="list-style-type: none"> <li>All hazardous materials and contaminated materials removed.</li> </ul>	Removal of contaminants.	Removal of contaminated sediments has been completed. Removal of contaminated sediments verified in contamination report.	Copy of assessment undertaken made available. Record of activities and statement of completion provided.
		<ul style="list-style-type: none"> <li>Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation in accordance with the EPL water quality criteria.</li> <li>Water quality non-polluting and appropriate for conservation end land use.</li> </ul>	Management of water discharges.	All water discharged from site meets relevant quality as specified by the Environment Protection Licence (EPL) 767, until relinquishment of the EPL.	Water quality monitoring. EPL 767 relinquished by the NSW Environment Protection Authority. Record of activities and statement of completion provided.
			Dewater Water Management Areas.	All Water Management Areas that are not required at post-closure have been completely dewatered.	Photographic Record Record of pumping activities. Record of activities and statement of completion provided.
		<ul style="list-style-type: none"> <li>Establishment of a low maintenance geotechnically stable landform.</li> <li>Disturbed land will be re-contoured to a landform compatible with the surrounding natural landscape.</li> </ul>	Reshape Water Management Areas.	Reshaping of Water Management Areas to a landform compatible with the surrounding natural landscape has been completed.	Photographic record. Record of activities and statement of completion provided. Rehabilitation monitoring. Final landform inspections.
			Reshape Stockpiled Material Areas.	Reshaping of Stockpiled Material Areas to a landform compatible with the surrounding natural landscape has been completed.	
			Contaminated sites.	Contaminated sites have been remediated such that there are no impacts on the surrounding environment.	
			Landform stability.	No slumping evident.	
			Slope gradients.	No greater than 1:1.92 (40 degrees or 84%).	
			Drainage designs.	Drainage controls and pathways effectively manage surface water runoff on the surrounding environment.	
			Landform drainage.	Reinstatement of natural drainage patterns (where possible).	
		<ul style="list-style-type: none"> <li>Ventilation shafts and mine portal sealed to ensure site is safe and does not pose a hazard to the community.</li> </ul>	Sealing of ventilation shafts and mine portal.	Underground mine portals and ventilation shafts sealed in accordance with MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams).	Rehabilitation monitoring. Final landform inspections. Photographic record.
					Seal certified by suitable engineer and statement of completion provided. Photographic record of decommissioned sites.

**Table 8:  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria (Continued)**

Final Land Use Domain	Mining Domains	Rehabilitation Objectives	Indicator	Rehabilitation Completion Criteria	Justification or Validation Method
<b>Domain A:</b> Native Ecosystem <b>(continued)</b>	<b>Domain 1:</b> Infrastructure Area  <b>Domain 3:</b> Water Management Area <b>(continued)</b>	<ul style="list-style-type: none"> <li>Native Ecosystem established consistent with revegetation strategy and analogue vegetation communities.</li> </ul>	Topsoil characterisation.	Topsoil characterisation of the final landform surface (to identify appropriate soil ameliorants and application rates) has been completed.	Record of activities and statement of completion provided.
			Topsoil depth.	Topsoil has been applied at a minimum of approximately 100 mm thickness in all areas and/or otherwise been achieved with the addition of humus/compost material to form a topsoil/composite mix.	
			Application of ameliorants.	Application of appropriate soil ameliorants applied (at specified rate) has been completed.	
			pH.	Soil pH (H <sub>2</sub> O) range: pH 5.5 – 11.	
			EC.	Soil EC (H <sub>2</sub> O) ≤1200 µS/cm.	
		<ul style="list-style-type: none"> <li>Reduce the risk of damage to rehabilitated areas.</li> </ul>	Bushfire management.	Appropriate bushfire hazard controls (where required) have been implemented on advice from the NSW Rural Fire Service.	Record of activities and statement of completion provided.
			Pest control.	Pest controls (e.g. fencing, culling and baiting) successfully implemented.	Photographic record.
			Vandalism.	Appropriate vandalism controls (e.g. site security, signage and fencing) have been implemented.	
		<ul style="list-style-type: none"> <li>The vegetation composition of the rehabilitation is recognisable as the target vegetation community.</li> </ul>	Vegetation community composition.	Rehabilitated native ecosystem species are characteristic of the target flora species when compared to analogue sites. Flora species suitable for revegetation works at the Surface Facilities Area include: <ul style="list-style-type: none"> <li>Blackbutt (<i>Eucalyptus pilularis</i>);</li> <li>Bangalay (<i>Eucalyptus botryoides</i>);</li> <li>Turpentine (<i>Syncaria glomulifera</i>);</li> <li>Forest Oak (<i>Allocasuarina torulosa</i>);</li> <li>Sweet Pittosporum (<i>Pittosporum undulatum</i>);</li> <li>Cabbage Palm (<i>Livistona australis</i>);</li> <li>Maiden's Wattle (<i>Acacia maidenii</i>);</li> <li>Scentless Rosewood (<i>Synoum glandulosum</i>);</li> <li>Spiny-headed Matt-rush (<i>Lomandra longifolia</i>);</li> <li>Sift Bracken (<i>Calochlaena dubia</i>);</li> <li>Trailing Guinea Flower (<i>Hibbertia denatata</i>); and</li> <li>Kidney Weed (<i>Dichondra repens</i>).</li> </ul>	Photographic record. Rehabilitation monitoring. Independent ecological reports.
			Vegetation community structure.	Cover, abundance and height range of native plant growth forms are characteristic of, or trending towards, the target vegetation community type(s).	
		<ul style="list-style-type: none"> <li>The vegetation structure of the rehabilitation is recognisable as, or is trending towards the target vegetation community.</li> </ul>	Vegetation cover.	A self-sustaining vegetative cover comprised primarily of endemic species and communities has established on rehabilitated landforms.	Photographic record. Rehabilitation monitoring. Independent soil reports.
			Ground cover.	Sufficient ground cover has established to prevent soil erosion and minimise the spread of weeds and exotic species.	
			Fauna movement.	Suitable habitat for fauna movement have been incorporated into the final landform.	
			Nutrient cycling.	Litter cover is within the 10 <sup>th</sup> to 90 <sup>th</sup> percentile variation range of reference sites/data (i.e. adjacent forested area).	
			Soil health.	Total organic carbon is within the 10 <sup>th</sup> to 90 <sup>th</sup> percentile variation range of reference sites/data (i.e. adjacent forested area). Total microbial biomass is within the 10 <sup>th</sup> to 90 <sup>th</sup> percentile variation range of reference sites/data (i.e. adjacent forested area). The ratio of fungus bacteria (fungal:bacterial) biomass is within the 10 <sup>th</sup> to 90 <sup>th</sup> percentile variation range of reference sites/data (i.e. adjacent forested area).	
			Plant regeneration.	Second generation individuals of trees are within the 10 <sup>th</sup> to 90 <sup>th</sup> percentile variation range of reference sites/data (i.e. adjacent forested area).	
			Exotic species.	Foliage cover of high threat exotic weeds is within the 10 <sup>th</sup> to 90 <sup>th</sup> percentile variation range of reference sites/data (i.e. adjacent forested area).	
<ul style="list-style-type: none"> <li>Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustaining.</li> </ul>	Vegetation cover.	A self-sustaining vegetative cover comprised primarily of endemic species and communities has established on rehabilitated landforms.	Photographic record. Rehabilitation monitoring. Independent ecological reports		
	Ground cover.	Sufficient ground cover has established to prevent soil erosion and minimise the spread of weeds and exotic species.			

**Table 8:  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria (Continued)**

Final Land Use Domain	Mining Domains	Rehabilitation Objectives	Indicator	Rehabilitation Completion Criteria	Justification or Validation Method
<b>Domain A:</b> Native Ecosystem	<b>Domain 5:</b> Underground Mining Area (SMP)	<ul style="list-style-type: none"> <li>Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.</li> </ul>	Subsidence cracking.	No subsidence surface cracks remaining that present a risk to the environment, safety and the final land use objectives.	Subsidence inspections as per relevant Extraction Plan(s). Record of activities and statement of completion provided. Photographic record.
		<ul style="list-style-type: none"> <li>For cliffs within the Underground Mining Area, ensure that there is no safety hazard beyond that existing prior to mining.</li> </ul>	Cliff instabilities.	Less than 3% of the total length of cliffs (and associated overhangs) within the Underground Mining Area have experienced mining-induced rock fall. Appropriate management measures in place.	Visual inspection in accordance with the Land Management Plan. Photographic record. Managed in accordance with the Land Management Plan.
<b>Domain F:</b> Water Management Areas	<b>Domain 5:</b> Underground Mining Area (SMP)	<ul style="list-style-type: none"> <li>Restore surface flow and pool holding capacity for pools on the Eastern Tributary and Waratah Rivulet as soon as reasonably practicable.</li> </ul>	Pools on the Eastern Tributary and Waratah Rivulet impacted by subsidence.	Data analysis indicates that there is not a statistically significant change in pool water level recession rates after stream remediation, compared to pool water level recession rates prior to the triggering of stream remediation. Note: Data contingencies are described in the Stream Remediation Plan.	Inspections in accordance with the Water Management Plan. Managed in accordance with the Stream Remediation Plan.
<b>Domain G:</b> Water Storage (Excluding Final Void)	<b>Domain 5:</b> Underground Mining Area (SMP)	<ul style="list-style-type: none"> <li>Negligible reduction of water quality in the Woronora Reservoir.</li> </ul>	Subsidence impacts effecting water quality in the Woronora Reservoir.	Water quality data analysis confirms that changes in the quality of water in the Woronora Reservoir are not significantly different post-mining compared to pre-mining concentrations.	Monitoring and management in accordance with the Water Management Plan.
		<ul style="list-style-type: none"> <li>Negligible leakage of water from the Woronora Reservoir.</li> </ul>	Subsidence impacts effecting the hydraulic gradient to the Woronora Reservoir.	Groundwater pressures/levels data indicates that the hydraulic gradient to the Woronora Reservoir at full supply is not statistically different from baseline levels.	Monitoring and management in accordance with the Water Management Plan.
<b>Domain I:</b> Infrastructure	<b>Domain 1:</b> Infrastructure Area	<ul style="list-style-type: none"> <li>All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.</li> </ul>	Structural integrity of the infrastructure.	Infrastructure retained on site have been inspected and declared structurally sound by a structural engineer and do not present a hazard to public safety.	Record of activities and statement of completion provided.
			Removal of hazards.	All potential hazards (e.g. electrical and mechanical) have been effectively isolated and secured.	
			Condition (e.g. structural, other hazards) of structure.	Formal acceptance from the subsequent landowner that infrastructure is in a condition that is suitable for the intended final land use in accordance with formal agreement.	Formal acceptance from landowner.
			Permits and approval documents issued.	Where applicable, necessary approvals are in place where buildings and infrastructure are to be retained as part of final land use.	Copy of any relevant approvals.
		Damage to access tracks have been repaired and stabilised.	Repairs complete.	Supported by "as constructed" final landform plan.	
<ul style="list-style-type: none"> <li>All hazardous materials and contaminated materials removed.</li> </ul>	Removal of wastes.	All wastes generated during decommissioning have been classified in accordance with the Environment Protection Authority's <i>Waste Classification Guidelines</i> , and have been disposed and/or removed from site.	Record of activities and statement of completion provided. Photographic record of decommissioned sites.		

## 4.2 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA – STAKEHOLDER CONSULTATION

As described in Section 2.2, extensive consultation was undertaken during the preparation of the Metropolitan Coal Rehabilitation Strategy (Metropolitan Coal, 2011), the Metropolitan Coal Rehabilitation Management Plan (Metropolitan Coal, 2019) and previous MOPs.

This consultation is considered relevant to the preparation of this RMP as the overarching final land use, rehabilitation procedures and monitoring have remained generally consistent.

In accordance with the NSW Resources Regulator's *Form and Way: Rehabilitation Management Plan for Large Mines*, additional consultation will be undertaken with the NSW Resources Regulator, CCC, WCC and WaterNSW prior to the Rehabilitation Completion Criteria being finalised and submitted for approval. This RMP and the Rehabilitation Completion Criteria described in Section 4.1 will be amended to reflect the outcomes of this consultation.

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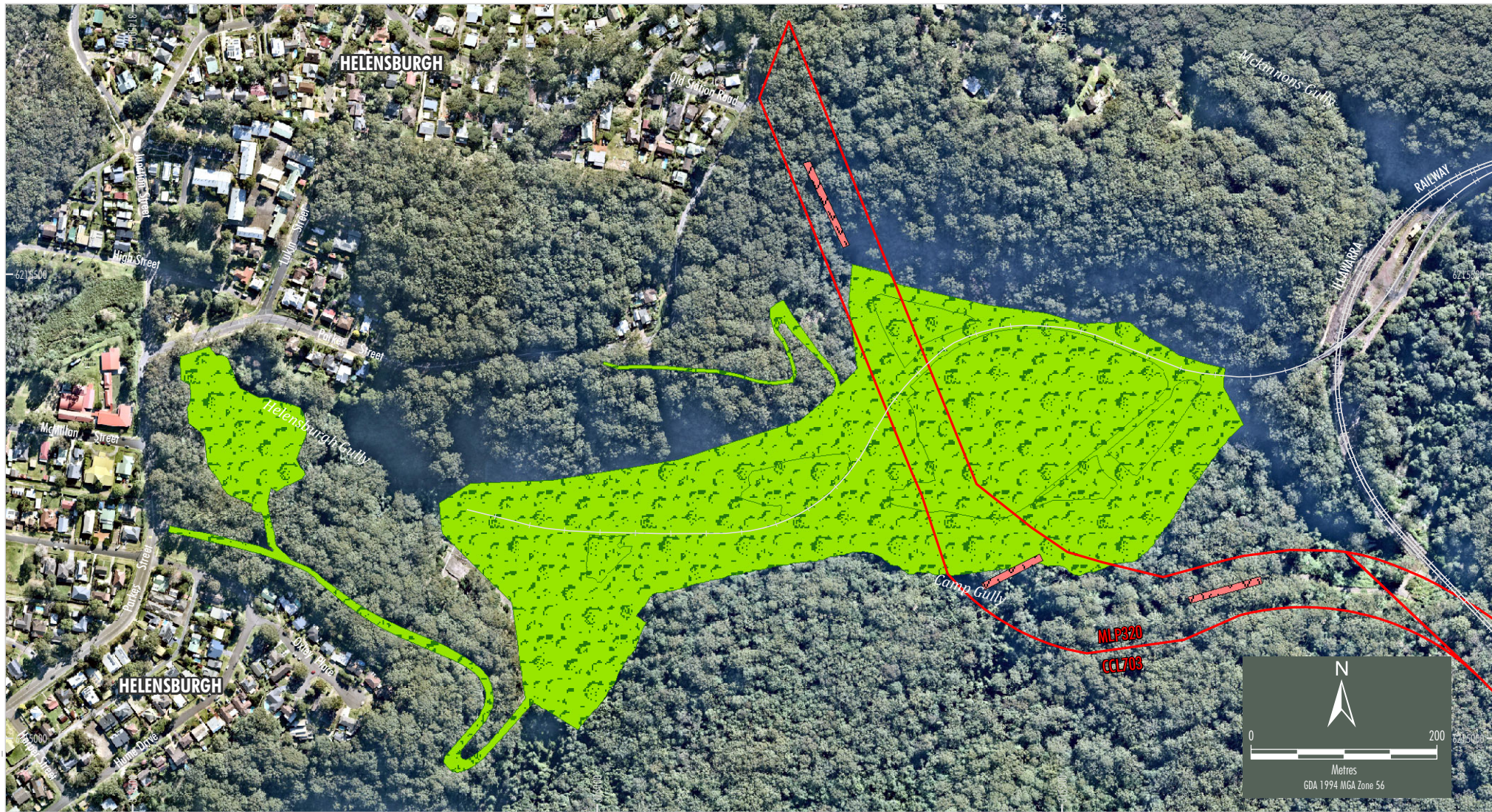
## 5 FINAL LANDFORM AND REHABILITATION PLAN

### 5.1 FINAL LANDFORM AND REHABILITATION PLAN – ELECTRONIC COPY

A Final Landform and Rehabilitation Plan has been prepared to show the proposed final land use (Plans 1A and 1B) and final landform (Plan 2) at the end of the mine life. These plans are generally in accordance with the details of the EA, and subsequent assessments.

In accordance with Clause 12, Schedule 8A of the *Mining Regulation 2016*, the Metropolitan Coal Mine Final Land Use and Rehabilitation Plan has been submitted to the NSW Resources Regulator for approval. Following approval of the Final Land Use and Rehabilitation Plan, the RMP will be amended to substitute the proposed version (Plans 1A, 1B and 2) with the version approved by the NSW Resources Regulator in accordance with Clause 11, Schedule 8A of the *Mining Regulation 2016*.

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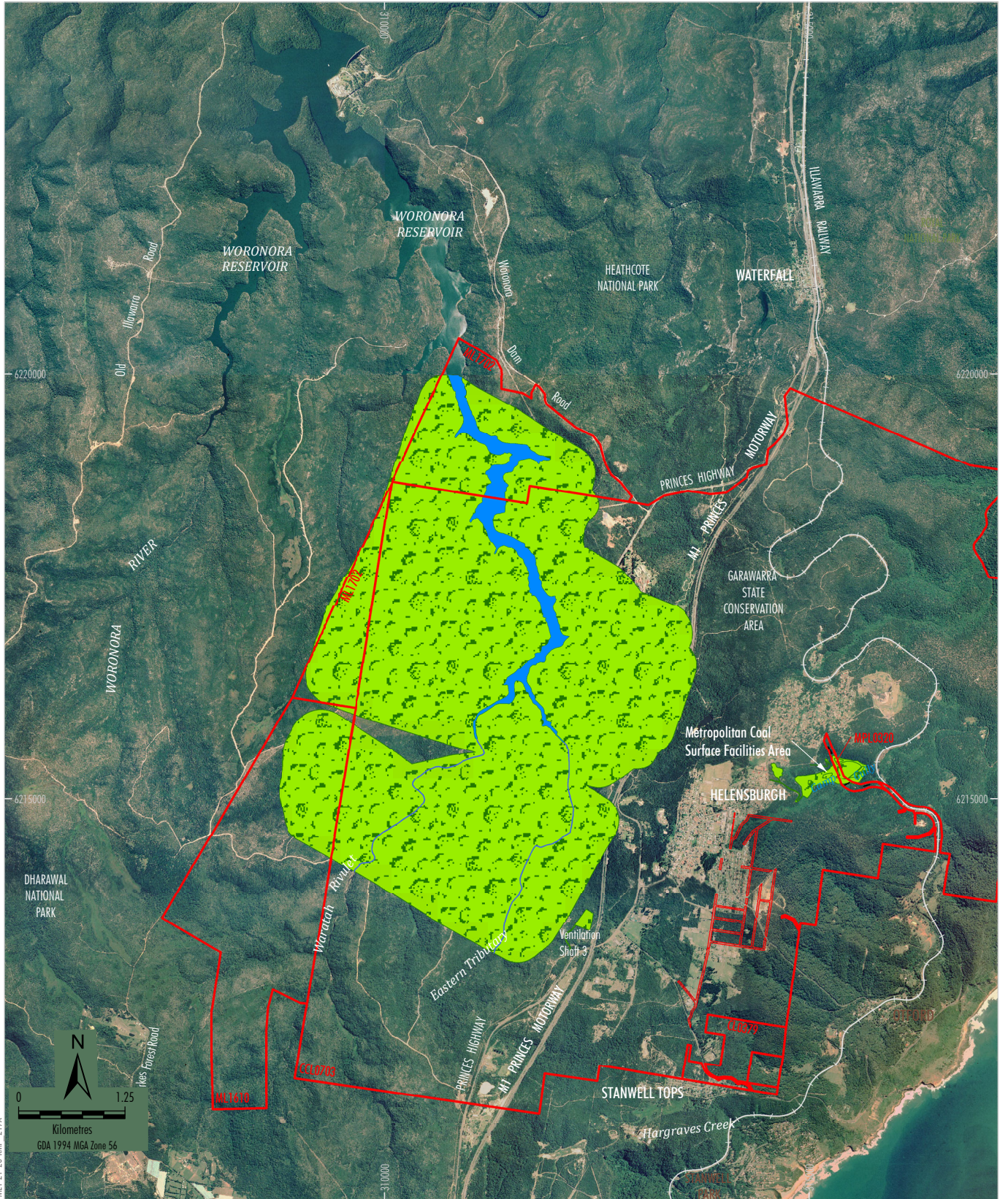
- LEGEND**
- Mining Lease Boundary
  - Rail
  - Final Land Use Domain
  - Infrastructure
  - Native Ecosystem

Source: NSW Spatial Services (2020)  
 Orthophoto: Neamap (2021)

**Peabody**  
 METROPOLITAN COAL

Final Land Use Domains  
 and Landform Features at the  
 Surface Facilities Area

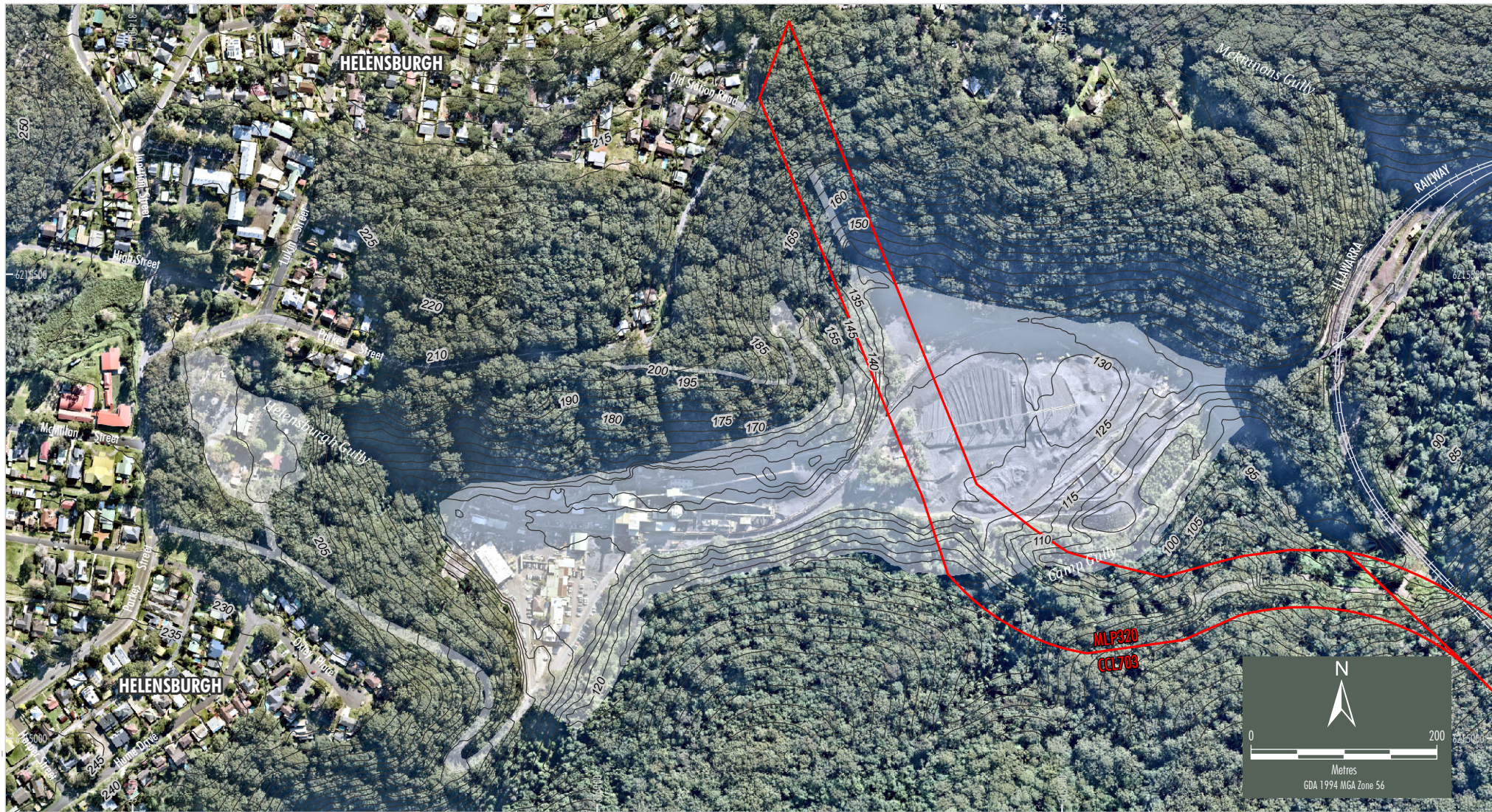
**Plan 1A**



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2021)

- LEGEND**
- Mining Lease Boundary
  - Railway
  - Final Land Use Domain
  - Infrastructure
  - Native Ecosystem
  - Water Management Areas
  - Water Storage (Excluding Final Void)

**Peabody**  
 METROPOLITAN COAL  
 Final Land Use Domains  
 and Landform Features of the  
 Underground Mining Area



MET-21-28 RMP - 21.0A

LEGEND  
 — Final Landform Contours (5 m Intervals)

**Peabody**  
 METROPOLITAN COAL  
 Final Landform Contours

Source: NSW Spatial Services (2020)  
 Orthophoto: Neamap (2021)



## 6 REHABILITATION IMPLEMENTATION

### 6.1 LIFE OF MINE REHABILITATION SCHEDULE

Areas that are disturbed by the Metropolitan Coal Mine are progressively rehabilitated in accordance Condition 3, Schedule 6 of Project Approval (08\_0149). Under Project Approval (08\_0149), operations at the Metropolitan Coal Mine are approved up to 22 June 2032.

As discussed in Section 1.1.3, disturbance areas at the Metropolitan Coal Surface Facilities Area are minimal and have remained relatively unchanged for many years. The Surface Facilities Area is an active operation area that is required for the entire mine life. Therefore, minimal rehabilitation activities are expected to occur prior to mine closure.

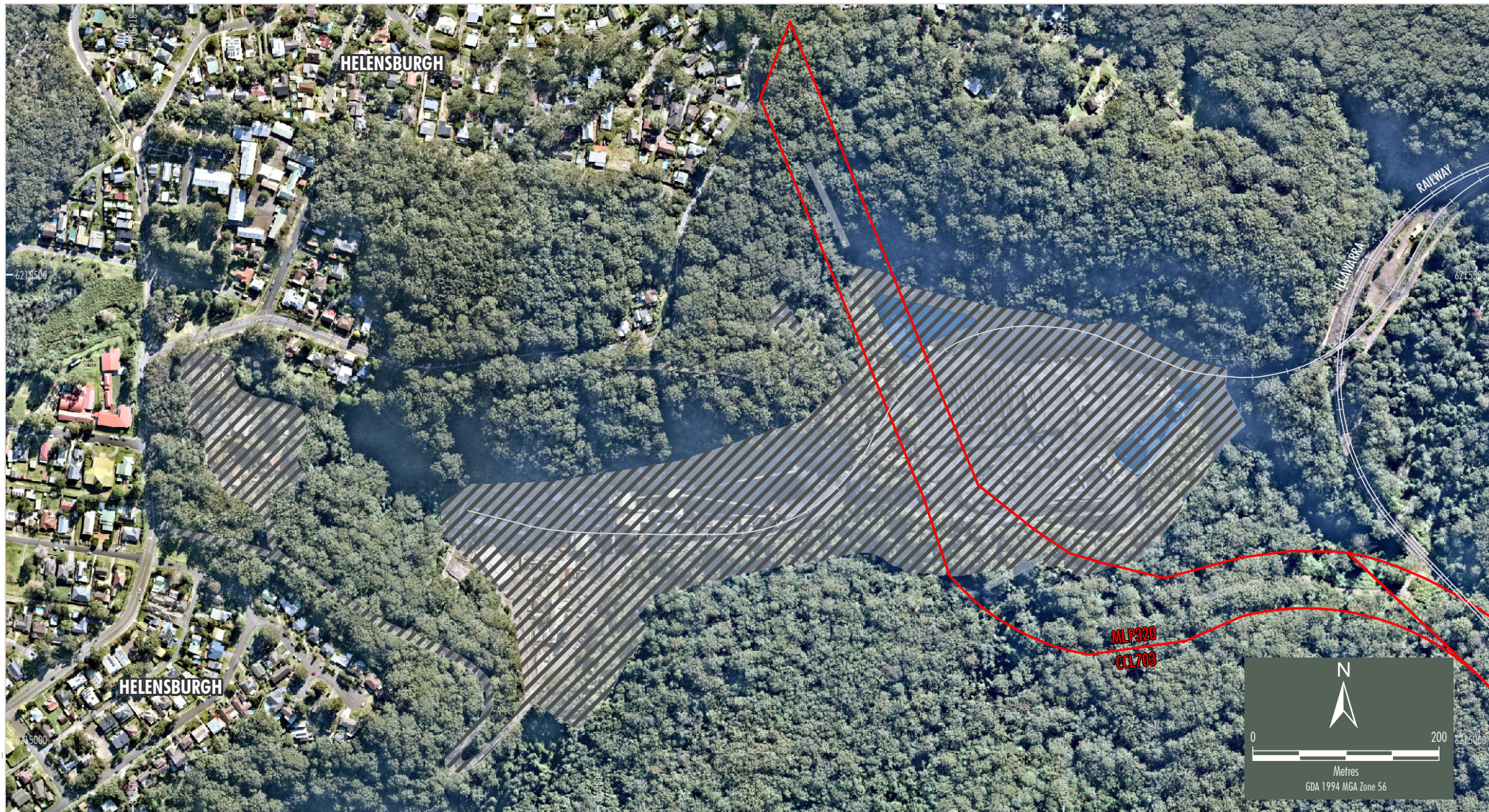
Rehabilitation activities of disturbance at the Underground Mining Area are also expected to be minimal until the cessation of mining activities as the majority of disturbance pertains to the installation and ongoing maintenance and environmental monitoring sites. Rehabilitation of subsidence impacts of the Underground Mining Area will continue to be undertaken on a case-by-case basis during mining operations.

In previously rehabilitated areas, ongoing maintenance activities will include controlling weeds and pests and application of maintenance fertilisers as required. The requirement of these activities are based on the rehabilitation monitoring program (Section 8) and opportunistic inspections of rehabilitated areas.

Plans 3A to 3E outline the proposed rehabilitation schedule over the life of the Metropolitan Coal Mine, from the commencement of this RMP (i.e. 1 August 2022) until achievement of the rehabilitation completion criteria and relinquishment of the MLs.

In developing the rehabilitation schedule, several assumptions were made to ensure that rehabilitation is undertaken progressively and as soon as reasonably practicable, including:

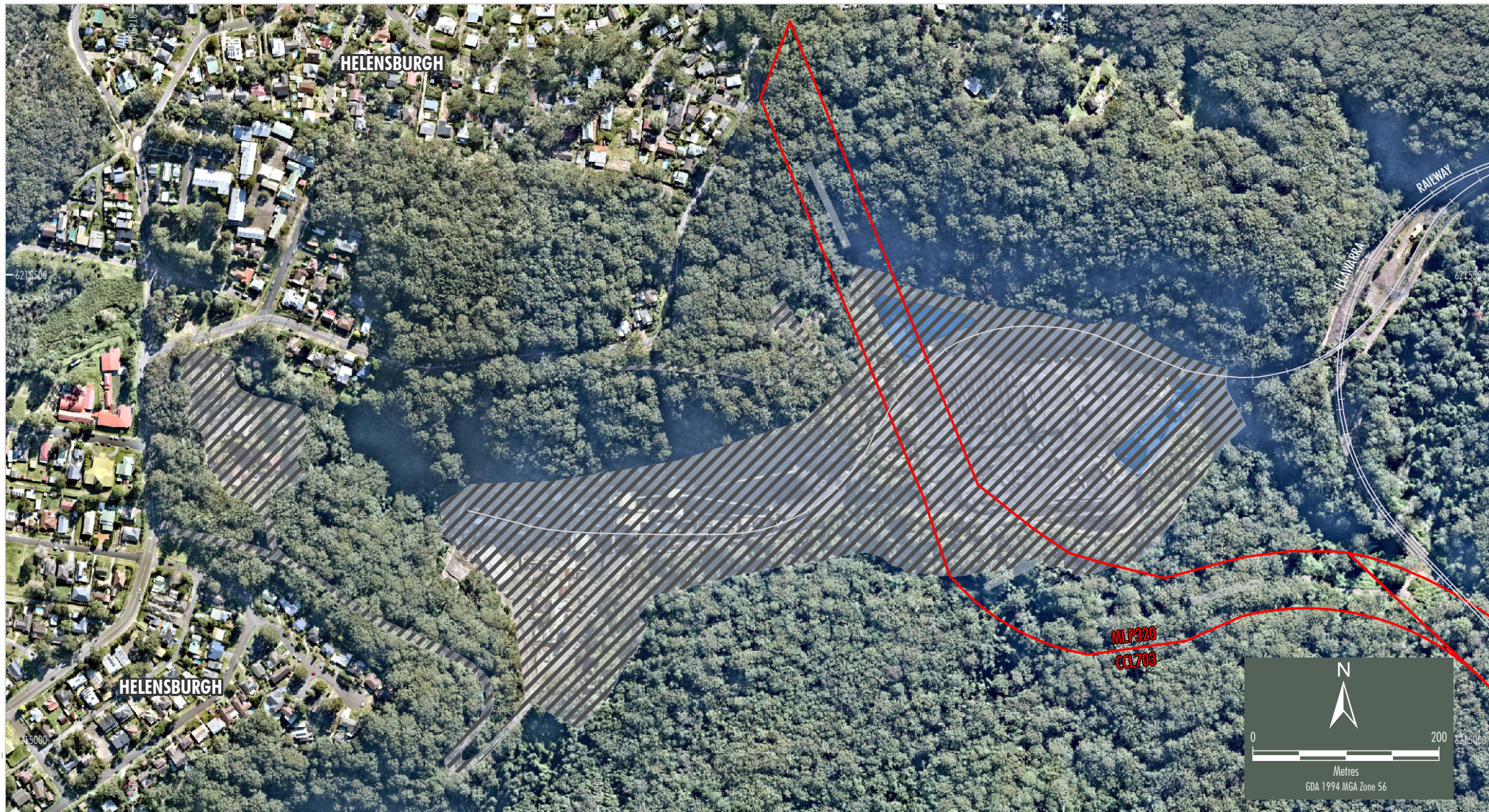
- Mining infrastructure (e.g. CHPP, offices, access tracks, etc.) will be required for the life of the mine. As such, rehabilitation of the majority of surface disturbance areas will occur following mine closure.
- Rehabilitation of infrastructure outside of the Surface Facilities Area (i.e. Ventilation shaft 3 and monitoring equipment) will occur following mine closure.
- There are no extreme weather events that would prohibit landform establishment or rehabilitation progression (e.g. severe and prolonged dry or wet periods).
- Rehabilitation of subsidence impacts in underground mining areas are undertaken on a case-by-case basis.



1/NET-21-28 RMP - 212A

- LEGEND**
- Mining Lease Boundary
  - Railway
  - Mining Domains
  - Infrastructure Area
  - Water Management Area
  - Rehabilitation Phase
  - Active Mining

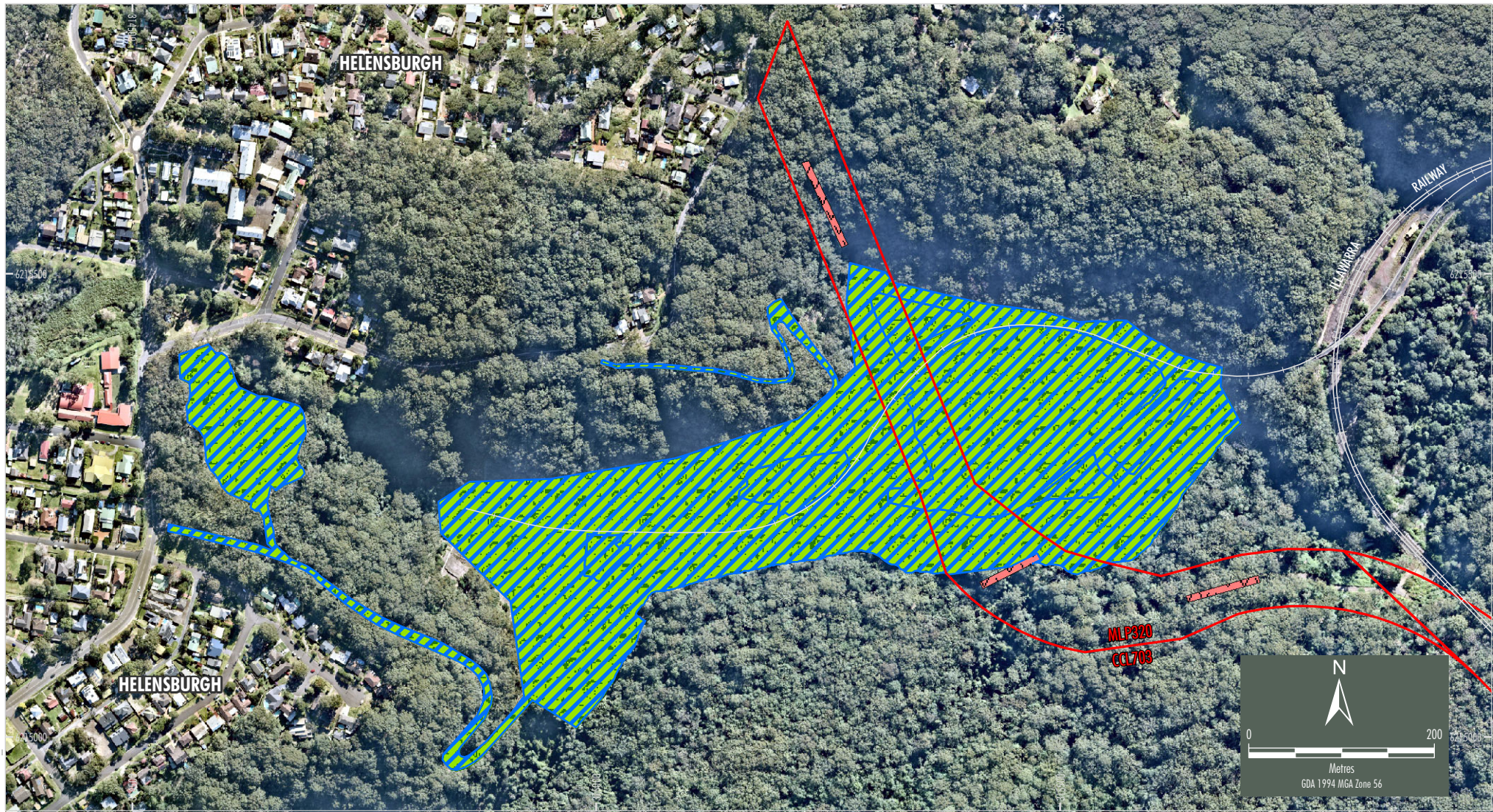
Source: NSW Spatial Services (2020)  
 Orthophoto: Nearmap (2021)



1/NET-21-28 RMP - 213A

- LEGEND**
- Mining Lease Boundary
  - Railway
  - Mining Domains
  - Infrastructure Area
  - Water Management Area
  - Rehabilitation Phase
  - Active Mining

Source: NSW Spatial Services (2020)  
 Orthophoto: Nearmap (2021)



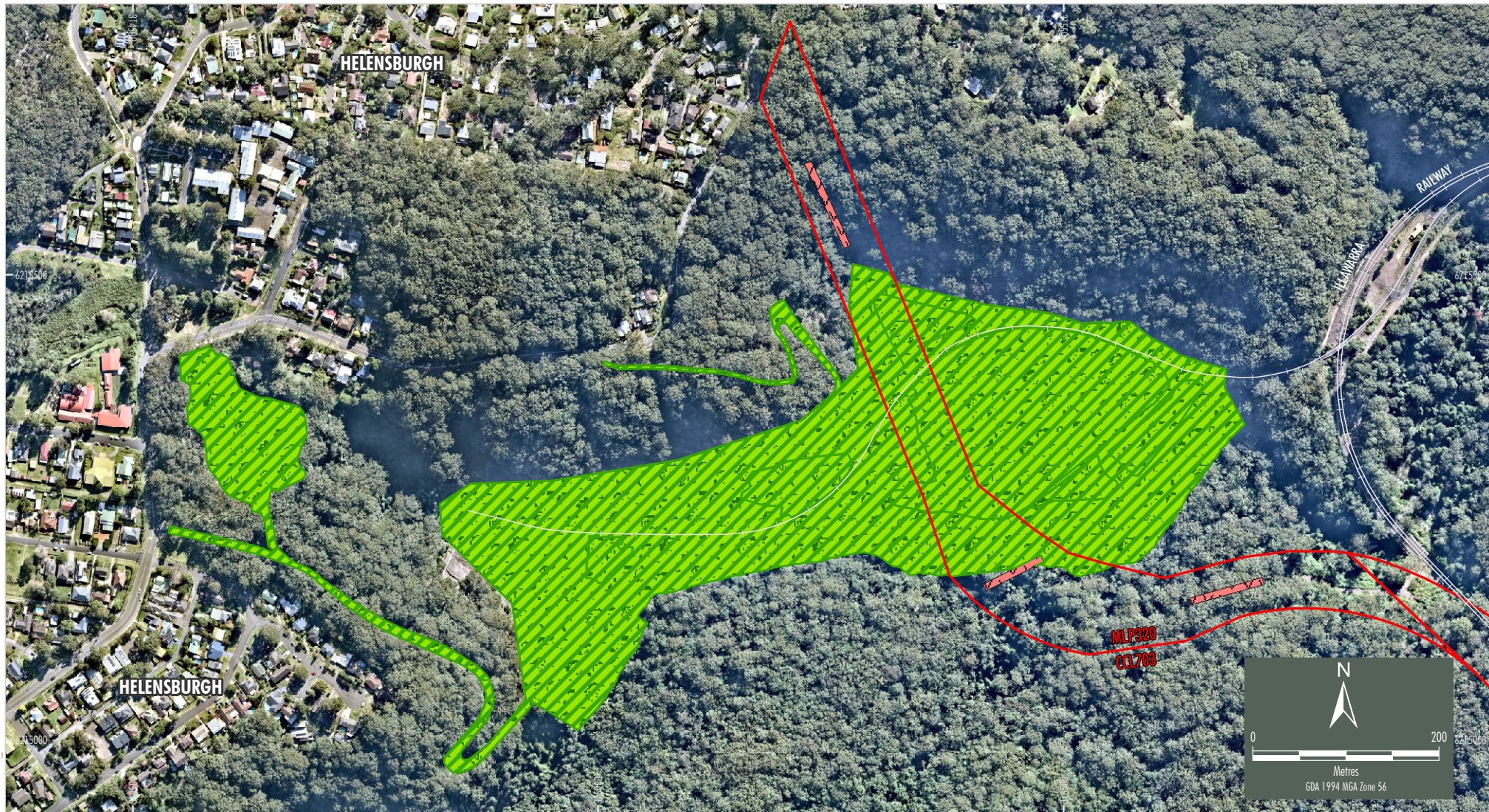
MET-21-28 RMP - 214A

- LEGEND**
- Mining Lease Boundary
  - Railway
  - Final Land Use Domain
  - Infrastructure
  - Native Ecosystem
  - Rehabilitation Phase
  - Decommissioning

Source: NSW Spatial Services (2020)  
 Orthophoto: Nearnmap (2021)

**Peabody**  
 METROPOLITAN COAL  
 Life of Mine Rehabilitation Schedule -  
 Year 10 (2032)

**Plan 3C**



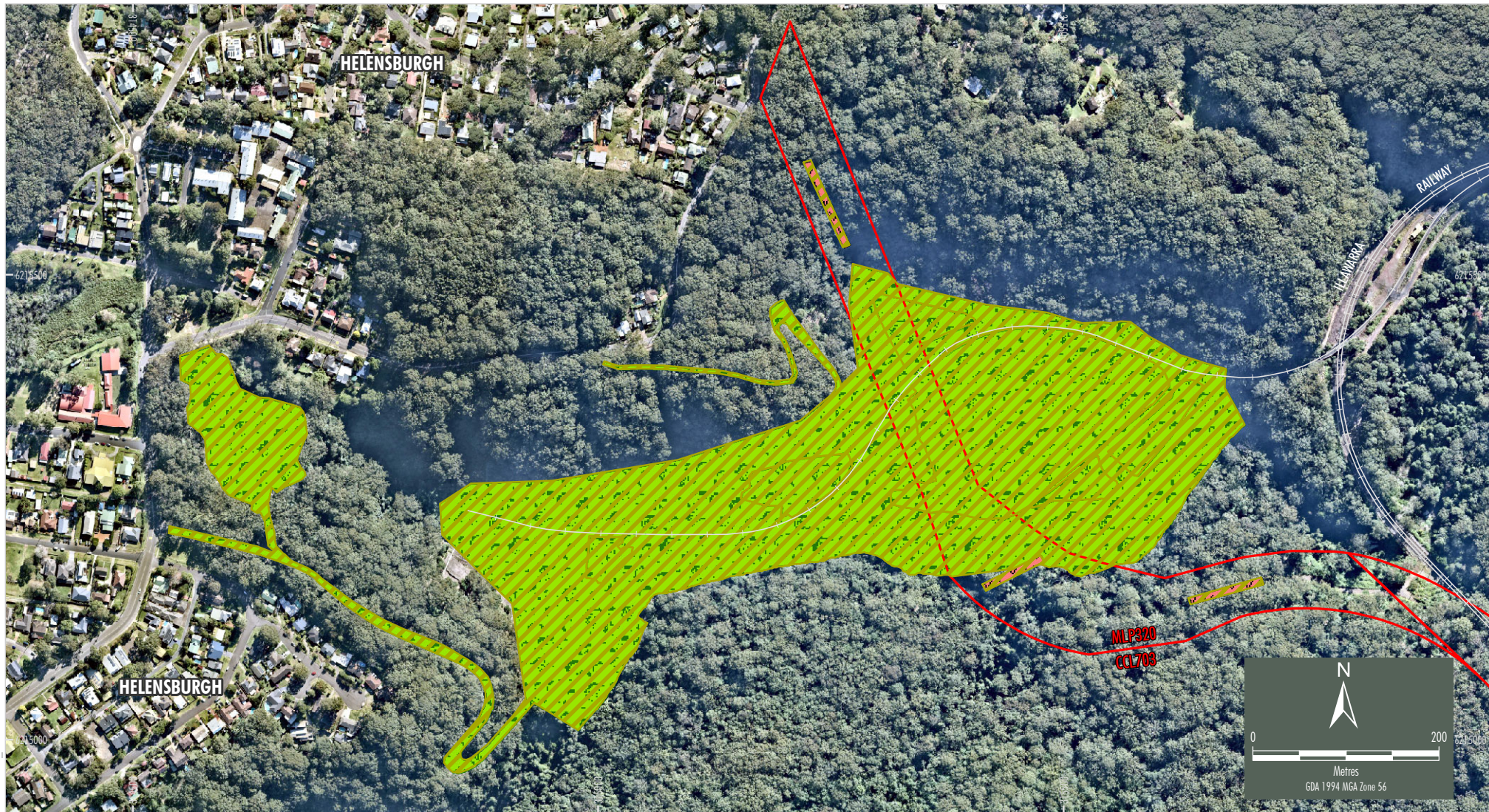
/MET-21-28 RMP-215A

- LEGEND**
- Mining Lease Boundary
  - Railway
  - Final Land Use Domain
  - Infrastructure
  - Native Ecosystem
  - Rehabilitation Phase
  - Ecosystem and Land Use Development








Source: NSW Spatial Services (2020)  
 Orthophoto: Nearmap (2021)

**Peabody**  
 METROPOLITAN COAL  
 Life of Mine Rehabilitation Schedule -  
 Year 15 (2037)

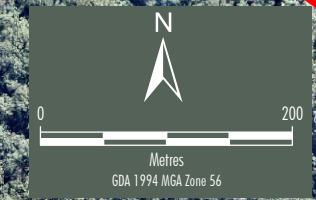
**Plan 3D**



1/NET-21-28 RMP - 21.6A

- LEGEND**
-  Mining Lease Boundary
  -  Railway
  -  Final Land Use Domain
  -  Infrastructure
  -  Native Ecosystem
  -  Rehabilitation Phase
  -  Rehabilitation Completion (Sign-off)

Source: NSW Spatial Services (2020)  
 Orthophoto: Nearmap (2021)



**Peabody**  
 METROPOLITAN COAL  
 Life of Mine Rehabilitation Schedule -  
 Year 20 (2042)

## 6.2 PHASES OF REHABILITATION AND GENERAL METHODOLOGIES

The rehabilitation methodologies described in this section have been developed in consideration of the key risks identified at the Metropolitan Coal Mine from the 2021 *Rehabilitation Risk Assessment* (Section 3). The methodologies are linked to the risk reduction strategies/actions developed to adequately control the individual risk items as described in Section 3 and Attachment A.

The final land use objectives are achieved through a series of rehabilitation phases as defined in the Form and Way guideline and detailed below:

- **Active** – The Form and Way guideline states in the context of rehabilitation, land associated with mining domains is considered ‘active’ for the period following disturbance until the commencement of rehabilitation.
- **Phase 1: Decommissioning** – Removal of infrastructure associated with mining activities including preparation plants, hard stand areas, buildings, contaminated materials and hazardous materials. This phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or ‘fit for purpose’ built infrastructure to be retained for future uses following lease relinquishment.
- **Phase 2: Landform Establishment** – This phase of rehabilitation consists of the processes and activities required to construct the approved final landform (as per the project approval and, for large mines, the approved Final Landform and Rehabilitation Plan). In addition to profiling the surface of rehabilitation areas to the approved final landform profile, this phase may include works to construct surface water drainage features, encapsulate problematic materials and prepare a substrate with the desired physical and chemical characteristics (that is, rock raking or ameliorating sodic materials). The landform design and construction part of this phase incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology.
- **Phase 3: Growing Media Development** – This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short-lived pioneer species). This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion. Additional characterisation of materials (e.g. subsoils, topsoils and organic additives) is usually required in this phase to cross check data from the earlier phases.
- **Phase 4: Ecosystem and Land Use Establishment** – This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform. For vegetated land uses, this rehabilitation phase includes establishing the desired vegetation community (e.g. seeding or tube stocking) and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.
- **Phase 5: Ecosystem and Land Use Development** – This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving rehabilitation objectives, completion criteria and the Final Landform and Rehabilitation Plan. Completion criteria for this phase will include components of floristic structure, nutrient cycling recruitment and recovery, community structure and function which are the key elements of a sustainable landscape.

- **Phase 6: Rehabilitation Competition** – This final phase of rehabilitation occurs where a rehabilitation area has achieved the final land use for the mining area as stated in the approved rehabilitation objectives and the approved rehabilitation completion criteria and spatially depicted in the approved Final Landform and Rehabilitation Plan. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that rehabilitation has achieved the final land use following submission of the relevant application by the lease holder.

The phases listed above, and methodologies (where relevant) are discussed in more detail in the following sub-sections.

### 6.2.1 Active Mining Phase

#### a) *Soils and Materials*

Due to the extensive history of the Metropolitan Coal Mine, existing topsoil resources and materials at the Surface Facilities Area are limited and will need to be externally sourced to ensure sufficient volumes of topsoil are available prior to the commencement of rehabilitation activities.

For new disturbances in areas outside of the Surface Facilities Area (e.g. exploration sites), recovered topsoil and subsoil would be stockpiled for later use in rehabilitation. Any long-term soil stockpiles would be managed to ensure long-term viability through implementation of the following management practices:

- soil stockpiles to be located outside of active operational areas;
- construction of stockpiles with a “rough” surface condition to reduce erosion hazard, improve drainage and promote revegetation;
- stockpiles which are inactive for extended periods to be vegetated to maintain soil structure, organic matter and microbial activity;
- silt fences to be installed around soil stockpiles to control potential loss of soil where necessary; and
- soil stockpiles to be aerated to establish aerobic conditions, prior to soil use in rehabilitation.

#### b) *Flora and Fauna*

In accordance with Project Approval (08\_0149) Condition 6, Schedule 3, the Metropolitan Coal Biodiversity Management Plan (BMP) has been prepared as a component of the Metropolitan Coal Extraction Plan(s) to manage the potential environmental consequences of the Extraction Plan(s) on aquatic and terrestrial flora and fauna, with a specific focus on swamps.

The Metropolitan Coal BMP provides detailed baseline data and assessment of the potential environmental consequences of the Extraction Plan in relation to the following biodiversity aspects:

- upland swamps, including swamp geomorphology and vegetation;
- riparian zone;
- aquatic biota and their habitats; and
- terrestrial fauna and their habitats.

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An overview of the key management strategies for the Metropolitan Coal Mine is provided below.

### ***Vegetation Management***

Potential management measures for impacts on vegetation include the implementation of weed control measures (e.g. mechanical removal or the application of approved herbicides), the planting of endemic plant species and brush matting, should monitoring indicate the need.

Any active planting program will utilise flora species characteristic of the particular vegetation community in that area and will utilise seed collected from the Woronora Special Area. Consultation will be undertaken with DPE and BCD for any proposed revegetation works associated with subsidence impacts (e.g. impacts to riparian vegetation).

To date, brush matting has been successfully used at stream remediation sites in conjunction with locally collected vegetative material to encourage the regeneration of native vegetation.

### ***Vegetation Clearance/Habitat Disturbance***

Vegetation clearance activities may be required for ongoing surface exploration activities, the upgrade and extension of surface infrastructure, access tracks, environmental monitoring and management activities, stream restoration activities and other mine-related surface activities.

The environmental management of vegetation clearance sites will include:

- Detailed site inspections to identify the specific flora characteristics of the areas proposed to be disturbed.
- Identification of areas in which specific surface works involving vegetation clearance are avoided or limited (e.g. within swamps, EECs and areas where threatened flora species are present).
- Final site selection and works design to minimise the amount of vegetation clearance required.
- Identification of management measures to minimise impacts on flora, prior to, during and/or following the completion of the surface works including natural regeneration and/or rehabilitation measures.

### ***Weed Management***

Weed management are implemented to limit the spread and colonisation of noxious and environmental weeds, where weeds are found to occur in areas subject to mine-related surface activities.

Weed management includes:

- Limiting activities that cause soil disturbance.
- The inspection of vehicles and mechanical equipment brought to the site to avoid importation of foreign material and organic matter.
- Inspections of mine-related surface disturbance areas to identify areas requiring weed management measures to be implemented.

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- Implementation of weed management measures (e.g. mechanical removal and application of approved herbicides in authorised areas). Prior to the use of any chemical controls, the chemicals are to be approved by the relevant landholder and the Material Safety Data Sheet for the chemical obtained prior to spraying. The implementation of measures that favour the restoration of native vegetation (where appropriate) is also considered an effective method of weed management.
- Follow-up inspections to assess the effectiveness of the weed management measures implemented and the requirement for any additional management measures.
- Consultation with WaterNSW and other relevant land holders in relation to weed management activities.

### **Introduced Pests**

Vegetation clearance associated with the Metropolitan Coal Mine (e.g. for access tracks) has the potential to increase the occurrence of vertebrate pest species. In accordance with the Metropolitan Coal Construction Management Plan, surface construction works will occupy only small areas of the surface. This will involve minimal clearance and disturbed areas are allowed to naturally regenerate from the soil seed bank when no longer needed. Active planting may be undertaken in areas where natural regeneration is not considered to be progressing.

Management measures for introduced pests includes:

- Maintenance of a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna. Employees and contractors will not be permitted to take domestic pets into the Woronora Special Area.
- Reporting sightings of vertebrate pest species to WaterNSW, and the BCD for inclusion in the Atlas of NSW Wildlife in order for the distribution and abundance of the vertebrate pests to be better understood. This is particularly relevant to Feral Deer.
- Subject to consultation with WaterNSW, implementation of pest control measures where observations indicate the need (e.g. the control of Feral Cats and Foxes, or the destruction of rabbit burrows).
- The inclusion of general vertebrate pest awareness in Metropolitan Coal inductions, particularly for staff and contractors accessing the Woronora Special Area.
- Ongoing consultation with WaterNSW and the BCD in relation to the management of vertebrate pest species.

### *Infection of Native Plants by *Phytophthora cinnamomic**

Measures for the management of *P. cinnamomi* have been developed in consideration of *Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia* (Commonwealth Department of the Environment and Heritage, 2006). Management measures that are implemented to minimise the potential for the introduction or spread of *P. cinnamomi* include:

- restricting the movement of vehicles to formed tracks and pre-existing roads, where practicable;
- limiting activities that cause soil disturbance; and
- encouraging natural regeneration in areas requiring revegetation.

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Measures that are implemented in the event infestation areas are identified include:

- limiting access to infestation areas;
- limiting access to un-infested areas following entry to infested sites;
- development of hygiene protocols (e.g. clean footwear, equipment, vehicles and/or hygiene stations) to access known infestation areas; and
- the inclusion of *P. cinnamomi* general awareness and procedure information in Metropolitan Coal personnel and contractor inductions, particularly for those requiring access to identified infestation areas.

#### *Amphibian Chytrid Fungus*

Personnel conducting amphibian surveys in the Waratah Rivulet and Woronora River catchments, including movement between these two catchments, are required to observe the following hygiene protocols in accordance with the *Hygiene Protocols for the Control of Disease in Frogs* (National Parks and Wildlife Service [NPWS], 2001):

- The thorough cleaning and disinfecting of footwear.
- The thorough cleaning and disinfecting of equipment (such as nets, callipers, headlamps and waders).
- Restricting the movement of vehicles to formed tracks and pre-existing roads, where practicable.
- In the event the amphibian *Chytrid* fungus is known to be present at a site, that site would be the last site surveyed/sampled, where practicable.

#### **c) Rock/Overburden Emplacement**

Since the Metropolitan Coal Mine is wholly an underground operation, overburden management operations are not applicable.

Waste rock produced from the drift construction was utilised for construction and remediation activities at the approved upgrades of the surface facilities.

Other waste rock material generated by underground mining operations, if any, that cannot be utilised on-site for construction and development activities and transported off-site in accordance with the Metropolitan Coal Traffic Management Plan (TMP) (e.g. to developments in the Illawarra region for beneficial re-use as engineered fill material).

#### **d) Waste Management**

All waste management at Metropolitan Coal Mine is undertaken in accordance with the Metropolitan Coal Waste Management Plan (WstMP). All coarse reject and tailings is transported off-site by a waste management contractor.

In accordance with the WstMP, the following waste disposal activities are undertaken:

- waste streams are identified and the quantities generated are monitored;
- waste management measures are identified to minimise waste generation; and

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- waste generated is appropriately stored, handled and disposed of.

Coarse washery reject material may be transported to developments in the Illawarra region for beneficial re-use as engineered fill material. The transportation of coal reject/waste material from the mine is in accordance with the TMP, as approved by DPE. The intent of the TMP is to minimise the traffic impacts of the Metropolitan Coal Mine on the residential areas and schools within Helensburgh.

All domestic waste and general recyclable products are collected weekly by an appropriately licensed contractor. Waste batteries and scrap metals are stockpiled in a designated area and recycled by a scrap metal contractor. Waste oil is collected by a licensed contractor for recycling. Used tyres are periodically collected by the tyre supplier, for recycling or disposal. No on-site rubbish disposal or landfill is currently undertaken at the Metropolitan Coal Mine.

### **e) Geology and Geochemistry**

Metropolitan Coal is located within the Southern Coalfield, within the southern part of the Sydney Basin, which is infilled with sedimentary rocks of Permian age (<270 million years ago) and of Triassic age (<225 million years ago).

Three formally named coal seams of the Illawarra Coal Measures are present in the Southern Coalfield, namely the Bulli, Balgownie and Wongawilli Seams. Immediately overlying the Bulli Coal unit of the Illawarra Coal Measures are sandstones and claystones of the Narrabeen Group. The Narrabeen Group contains the Newport Formation (sometimes referred to as the Gosford Formation), the Bald Hill Claystone (also referred to as Chocolate Shale and formed as a result of laterite weathering Gerringong Volcanics), the Bulgo Sandstone, the Stanwell Park Claystone/Shale, the Scarborough Sandstone, the Wombarra Shale and the Coal Cliff Sandstone. At the top of the sequence in the area of interest is the Hawkesbury Sandstone.

During the life of the Metropolitan Coal Mine, mine exploration activities including in-seam and surface-to-seam drilling would continue to be undertaken ahead of the underground mining operation to investigate geological structures, coal quality and seam morphology as inputs to detailed mine planning and engineering studies. Surface-to-seam exploration activities would generally require only small surface disturbance areas and would involve the use of surface drilling rigs and supporting equipment above the Metropolitan Coal Mine Underground Mining Area and surrounds.

Geological investigations would be undertaken progressively over the life of the Metropolitan Coal Mine. The key components of the geological investigation program would include:

- long in-seam exploration boreholes to identify any geological anomalies in advance of longwall mining;
- mapping of geological structures intersected by underground workings;
- surface mapping (ground-truthing) of geological characteristics; and
- further analysis of geomorphic expressions.

The above activities would focus on the identification of potential conduits (e.g. faults, dykes, joint seams) and include extrapolation from areas external to the Underground Mining Area.

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**f) Materials Prone to Spontaneous Combustion**

Spontaneous combustion is oxidation at exposed coal surfaces which occurs at, or near ambient temperature, producing heat energy. Material at Metropolitan Coal Mine is not conducive to spontaneous combustion and there have been no reported heating incidents within stockpiles, pads or reject emplacement areas. The risk to rehabilitation as a direct results of possible spontaneous combustion events is considered low.

Notwithstanding the above, stockpiles and surrounding areas are regularly watered and coal is not stored on-site for significant periods.

A number of hazard prevention and mitigation measures are currently in-place for the Metropolitan Coal Mine. These measures are documented in existing Metropolitan Coal Mine management plans (e.g. Underground Emergency Management Plan, Surface Emergency Management Plan, Contractor Management Plan, Underground Transport Management Plan, Stockpile Management Plan, and Fire and Explosion Control Management Plan).

**g) Material Prone to Generating Acid Mine Drainage**

The pH and acid producing potential analysis undertaken during the EA of coal reject samples at Metropolitan Coal Mine indicated that four fine reject samples and two of the coarse reject samples were non-acid forming. This analysis concluded that acid mine drainage is not an issue at the Metropolitan Coal Mine.

**h) Reject and Tailings Disposal**

Coal reject is produced in two streams at the CHPP (i.e. coarse and fine rejects). Approximately 17% of the ROM coal processed in the CHPP is separated to the coal reject stream.

As the capacity for on-site disposal in the Surface Facilities Area is largely constrained, CHPP coal reject material has historically been transported by rail and truck to the PKCT, emplaced in unused workings, or transported to off-site locations for beneficial re-use in accordance with Project Approval (08\_0149).

**i) Erosion and Sediment Control**

Temporary erosion and sediment controls (e.g. silt fences and sediment control structures) may be required to be installed prior to the commencement of surface disturbance activities. Erosion and sediment control measures are designed in general accordance with applicable erosion and sediment control principles and guidelines (e.g. *Managing Urban Stormwater: Soils and Construction, Volume 2E Mines and Quarries* [Department of Environment and Climate Change, 2008]) in accordance with the Metropolitan Coal Construction Management Plan. Erosion and sediment controls will remain in place until such time as ground disturbed by the works has been stabilised.

Erosion and sediment control strategies for the Metropolitan Coal Mine are documented in the Construction Management Plan and other relevant environmental management plans, including the BMP, Water Management Plan (WMP) and Surface Water Management Plan. The primary objectives of these erosion control measures include:

- control soil erosion and sediment generation from areas disturbed by construction activities; and
- maintain water quality (primarily in terms of total suspended solids content) in watercourses.

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Specific mitigation measures to control soil erosion and sediment migration include:

- minimising surface disturbance and restricting access to disturbed areas;
- rehabilitation and revegetation of mine infrastructure areas if no longer required;
- minimising compaction during soil excavation and movement;
- use of erosion control features (e.g. silt fences and temporary sediment traps, diversion banks, channels, and rip-rap structures) to minimise sediment migration, divert surface water around disturbed areas and to control runoff velocity;
- use of sediment control retention storages to contain runoff from disturbed areas, including geofabric/straw bale filters; and
- regular inspections of erosion and sediment control structures conducted by the Site Supervisor for structural integrity and effectiveness, and maintenance as necessary.

An overview of key management strategies is provided below.

### ***Stream Bank Erosion***

Visual inspections (along Waratah Rivulet and the Eastern Tributary) are conducted to identify any areas subject to excessive erosion and sedimentation. Where visual observations indicate the potential for excessive erosion or sediment migration, specific mitigation measures are employed. Potential management measures include:

- filling of cracks and minor erosion holes in the bed or banks of watercourses;
- installation of sediment fences downslope of subsidence-induced erosion areas;
- stabilisation of erosion areas using rock or other appropriate materials;
- stabilisation of banks subject to soil slumping; and
- implementation of vegetation management measures.

To date, limited erosion and sedimentation has been identified. Sediment controls (coir logs and sandbags) have been used at previous stream remediation sites Pools A and F for erosion control.

There is potential for the riparian areas that have been subject to increased ponding as a result of subsidence to result in stream bank erosion. The potential for excessive erosion and sedimentation are monitored at these locations. However, it is anticipated that a new stream bank is established that is colonised in due course by native vegetation adapted to the new conditions.

### ***Swamp Remediation Measures***

In the event remediation measures are proposed to be implemented in an upland swamp, Metropolitan Coal will prepare a swamp remediation plan for the swamp in consultation with the DPE, BCD, WaterNSW, DPI - Fisheries and NSW Resources Regulator.

Potential remediation measures for impacts on upland swamps that could be used or are being investigated, include:

- installation of coir log dams (i.e. erosion control structures) at any knick points in a swamp;

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- use of surface water spreading techniques, involving long lengths of coir logs and hessian ‘sausages’ linked together across a swamp contour such that water flow builds up behind them and slowly seeps through the water spreaders to maintain swamp moisture; and
- injection grouting of rock substrate where fracturing has occurred.

A summary of these techniques is provided in the Metropolitan Coal BMP. Installation of the erosion control works can be undertaken promptly as the need arises and installed within a few weeks.

#### ***j) Ongoing Management of Biological Resources for Use in Rehabilitation***

It is anticipated that the majority of surface disturbance areas required by the Metropolitan Coal Mine are of a size that revegetation of the disturbed area would occur naturally from adjacent native vegetation. In other disturbance areas, measures may need to be implemented to encourage natural regeneration (e.g. placing stockpiled vegetative material over cleared areas).

Active revegetation of native vegetation (e.g. planting and/or direct seeding) are implemented in the event natural regeneration is not considered to be progressing satisfactorily.

The selection of species for active planting and/or direct seeding are determined in consideration of the site characteristics (e.g. slope, elevation and soil) and vegetation communities at, or in the vicinity of, the disturbance area. Active revegetation will utilise endemic plant species. Specifically, any active revegetation in the Woronora Special Area will utilise seed collected from the Woronora Special Area.

Active revegetation will include the seeding and/or planting of upper, mid and lower storey native species. Metropolitan Coal will consult with WaterNSW and the NSW Resources Regulator prior to the conduct of any active revegetation in the Woronora Special Area.

The overriding objective of both natural regeneration and active revegetation is to establish self-sustaining vegetation appropriate to the landforms.

Due to Metropolitan Coal Mine’s long standing operations, biological resources (i.e. seedbanks, topsoil stockpiles or salvage habitat structures) are sourced externally prior to commencement of rehabilitation activities.

#### ***k) Mine Subsidence***

Metropolitan Coal is committed to remediation of subsidence impacts at the earliest opportunity which are influenced by a number of factors. These include the subsidence regime, stream flow conditions, and status of current remediation works.

Various strategies and management measures for mine subsidence are detailed below.

#### ***Surface Tension Cracks***

Visual inspections for surface tension cracks are conducted by Metropolitan Coal and its contractors as part of routine works conducted in the catchment in accordance with the Metropolitan Coal Land Management Plan (LMP).

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Metropolitan Coal will use the subsidence impact monitoring results to assess the potential environmental consequences of the recorded subsidence impact, including the nature and extent of impacts on flora and fauna habitats and evidence of impacts on terrestrial fauna (e.g. observed fauna mortality). The implementation of management measures are considered with regard to the specific circumstances of the subsidence impact (e.g. the location, nature and extent of the impact) and the assessment of the environmental consequence.

Potential management measures include the permanent filling of the surface tension crack. Consistent with the Metropolitan Coal LMP, WaterNSW are consulted in the event Metropolitan Coal propose to in-fill any surface tension cracks in the Woronora Special Area.

### **Stream Remediation Plan**

In accordance with Condition 1, Schedule 6 of the Project Approval (08\_0149), Metropolitan Coal is required to achieve the rehabilitation objective: *Restore surface flow and pool holding capacity as soon as reasonably practicable* for:

- Waratah Rivulet, between the downstream edge of Flat Rock Swamp and the full supply level of the Woronora Reservoir; and
- Eastern Tributary, between the full supply level of the Woronora Reservoir and the maingate of Longwall 26.

A Stream Remediation Plan has been developed to manage the stream remediation activities. Key components of the Stream Remediation Plan include:

- Monitoring of stream water levels.
- Restore surface flow and pool holding capacity.
- Monitoring of aquatic biota response to stream remediation works.
- Erosion and sediment controls.
- Waste management.

Stream remediation activities will not occur during periods when subsidence is more than 20 millimetres (mm)/per month. More than one remedial effort may be required at an individual pool/rock bar given that additional impacts may be associated with successive longwalls. That is, additional stream remediation activities may need to be conducted following further subsidence following mining of the subsequent longwall.

### **Cliff Falls**

Cliff and overhang sites COH1, COH2, COH3, COH4, COH5, COH6, COH6A, COH7, COH8, COH9, COH10, COH11, COH12, COH13, COH14, COH15, COH16, and COH17 are monitored to record evidence of potential subsidence impacts in accordance with the Metropolitan Coal LMP. The monitoring results are used to assess the potential environmental consequences of the recorded subsidence impact and identify management measures, where appropriate.

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In relation to impacts on aquatic or terrestrial flora, fauna, or their habitats, potential management measures include:

- the implementation of erosion and sediment control measures (e.g. the installation of sediment fences downslope of erosion areas, the stabilisation of erosion areas using rock or other appropriate materials); and
- stabilisation techniques (e.g. installation of artificial rock support, installation of standing supports, or scaling/dislodgement/removal of remaining loose rock).

The implementation of management measures are considered with regard to the specific circumstances of the subsidence impact (e.g. the location, nature and extent of the impact) and the assessment of the environmental consequences in accordance with the Metropolitan Coal LMP.

#### ***l) Management of Potential Cultural and Heritage Issues***

The Metropolitan Coal Mine Heritage Management Plan outlines the management of potential environmental consequences of the proposed secondary workings described in the Extraction Plan(s) on heritage sites or value. The Heritage Management Plan describes the management and mitigation measures for Aboriginal and Non-Aboriginal Heritage or values.

Known Aboriginal and Non-Aboriginal Heritage sites within the Metropolitan Coal Mine area and surrounds are fully described within the EA. In accordance with the assessment recommendations, a Conservation Management Plan was developed. The Metropolitan Coal Mine Conservation Management Plan (Pearson, 2009) provides a statement of heritage significance and addresses the development of relevant conservation policies and strategies for the Metropolitan Coal Mine Surface Facilities Area.

This Conservation Management Plan is referred to by site managers for guidance and direction when considering:

- a new use or uses for the place;
- changes to the built form and landscape;
- new services, facilities, and associated amenities;
- maintenance and repairs to heritage buildings and landscape elements;
- actions or works including demolition, alteration, adaptation or extension of a heritage building; and
- introduction of a new building near a heritage building.

#### ***m) Exploration Activities***

Previous exploration has defined the resource in the Underground Mining Area to the extent necessary to enable mine planning to be undertaken with a reasonable level of confidence.

Metropolitan Coal will continue to conduct exploration activities, which will occur via both surface to seam boreholes and underground in conjunction with pre-extraction gas drainage. On average, Metropolitan Coal proposes to drill one to two boreholes each year until mining operations cease.

Further seismic exploration may occur utilising existing fire trails where possible.

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## 6.2.2 Decommissioning

Decommissioning works are anticipated to be undertaken as soon as reasonably practicable in accordance with Condition 3, Schedule 6 of the Project Approval (08\_0149). Further detail regarding decommissioning activities is located in the Metropolitan Coal Mine Annual Rehabilitation Report and Forward Program.

### a) Site Security

Site security measures are implemented for the duration of mine operations. These measures are maintained during closure, decommissioning and demolition activities to prevent unauthorised access and to ensure public safety. Security measures include:

- fencing and signposting of the site;
- security patrols;
- all personnel, contractors and visitors are required to undertake a relevant site induction and sign in and out of the site; and
- all visitors are required to be accompanied by a site representative at all times.

### b) Infrastructure to be Removed or Demolished

Following cessation of mining operations, all infrastructure at the Metropolitan Coal Mine, except for those items listed in Section 2.2 and below, will be decommissioned and removed from site. The initial rehabilitation of the decommissioned site will be undertaken as soon as reasonably practicable to avoid dust emissions.

Infrastructure to be removed includes:

- administration buildings;
- CHPP and associated infrastructure;
- workshop and stores;
- substation;
- bath house;
- car park;
- rail infrastructure;
- access and haul roads;
- Ventilation Shafts 1, 2, and 3;
- Coarse coal reject stockpile infrastructure;
- product coal stockpile infrastructure; and
- ROM coal stockpile.

In accordance with Condition 1, Schedule 6 of the Project Approval (08\_0149), the key rehabilitation objectives for the decommissioned infrastructure areas are to repair/restore these areas to pre-mining conditions or equivalent.

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### c) **Buildings, Structures and Fixed Plant to be Retained**

As described in Section 2.2, due to the historical significance of mining activities at the Metropolitan Coal Mine, and in line with the outcomes of consultation with relevant stakeholders and specialists, the preferred final land use for the Surface Facilities Area includes the retention of some items of mining heritage, the re-establishment of a stable landform and rehabilitation to a Native Ecosystem.

The heritage items which will be retained are located underground (i.e. a tunnel or are located within Shaft No. 2) and fall outside of the surface disturbance footprint of the Surface Facilities Area. The heritage items include the following:

- the No. 4 Tunnel (Illawarra Railway);
- the No. 5 Tunnel (Illawarra Railway);
- the Underground Pit Pony Stables; and
- Camp Creek Culvert.

To ensure that infrastructure retained is fit for the intended final land use, a structural assessment is to be prepared by the suitably qualified and experienced person. The assessment will:

- determine the integrity of the structure; and
- identify the associated risks to public safety, the environment and any potential modes of failure.

As the drift access and portal will be sealed, the Underground Pit Pony Stables will be inaccessible following mine closure. Prior to the drift access and portal being sealed, details of the Underground Pit Pony Stables will be photographed and logged.

### d) **Management of Carbonaceous Material**

Management of carbonaceous materials are undertaken in accordance with the WstMP.

Carbonaceous materials such as oils are stored in waste oil drums located adjacent to the Fuel and Consumables Storage Facility and outside the CHPP building. A licensed contractor collects the waste oil and transports it to a licensed recycling facility. All flammable liquids such as oils and any materials contaminated with flammable liquids are stored and handled in accordance with Australian Standard (AS) 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*.

Waste streams are kept separate where practicable to improve waste handling and classification, minimise costs associated with disposal and improve environmental outcomes. For example:

- hazardous waste will not be mixed with non-hazardous waste;
- where practicable, recyclable waste are separated out from other waste; and
- waste with lower disposal costs are identified and kept separate from other waste types to reduce costs where practicable (e.g. the collection of recyclable material typically has lower costs than material required to be disposed of at landfill).

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**e) Management of Contaminated Material**

Where there is the potential that contamination may have occurred as a result of site activities (e.g. refuelling areas, workshops, etc.), investigations will be undertaken to determine the presence and extent of any contamination. Where identified, contaminated material will be bioremediated on-site or disposed of off-site at an authorised waste facility.

If applicable, a suitably qualified contamination expert will be engaged to verify that any contamination has been adequately managed.

In addition, Metropolitan Coal has prepared the following plans/procedures to respond to any unexpected spills/contamination incidents:

- Pollution Incident Response Management Plan;
- Surface Spill Response Procedure; and
- Spill Trigger Action Response Plan.

**f) Hazardous Materials Management**

All remaining hydrocarbons such as diesel and lubricants and other hazardous materials will be either utilised or disposed of at an authorised facility. Storage tanks will be removed and, depending on their condition, either sold or disposed of at an authorised facility.

Dangerous goods remaining on-site at the end of the mining operations will be disposed of off-site in accordance with the regulatory arrangements in force at the time.

**g) Underground Infrastructure**

The drift access and portal will be sealed to restrict access in accordance with the NSW Resources Regulator's requirements (*MDG6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams* [Department of Trade and Investment, Regional Infrastructure and Services – Mine Safety Operations, 2012]).

Ventilation infrastructure, including fans and vents, will be removed as part of the final land use. Post-mining, ventilation shafts will be backfilled and sealed in accordance with the NSW Resources Regulator requirements (*MDG6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams* [Department of Trade and Investment, Regional Infrastructure and Services – Mine Safety Operations, 2012]). A detailed plan for rehabilitating the ventilation shafts will be prepared, and the sealing/capping procedure determined in consultation with the relevant authorities and other stakeholders.

**6.2.3 Landform Establishment**

The following subsection details the key characteristics of landform establishment at the Metropolitan Coal Mine in accordance with the design of the Final Landform and Rehabilitation Plan (Section 5).

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**a) Water Management Infrastructure**

Following cessation of mining operations, all built Water Management Areas at the Metropolitan Coal Mine, will be decommissioned. Current built Water Management Areas include:

- sediment ponds; and
- the Turkeys Nest Dam.

The decommissioning of water management infrastructure at the Metropolitan Coal Mine will be further refined during future mine closure planning and include:

- Drainage and desilting of structures.
- Reshaping, topsoiling and seeding of structures.

**b) Final Landform Construction: General Requirements**

The closure concept and rehabilitation strategy for Infrastructure Areas and Water Management Areas involve the reshaping of the disturbed landform to maximise stability and reduce erosion, spreading of soil substrates where required, revegetation and ongoing monitoring and management.

Final landforms are to be consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post-mining landscape. Final landforms are to ensure that there is no safety hazard and to restore structures to that existing prior to mining and to incorporate principles consistent with the surrounding environment.

General rehabilitation principles are applied to reduce the risk of erosion on rehabilitated slopes (e.g. erosion and sediment controls that allow stabilisation of vegetative cover to become established that is generally consistent with the surrounding topography).

**c) Final Landform Construction: Reject Emplacement Areas and Tailings Dams**

No rejects or tailings materials generated at the Metropolitan Coal Mine are stored on-site.

**d) Final Landform Construction: Final Voids, Highwalls and Low Walls**

Metropolitan Coal Mine is an underground mining operation and therefore, final voids, highwalls and low walls are not applicable to rehabilitation activities.

**6.2.4 Growth Medium Development**

As described in Section 6.2.1, growth medium (e.g. topsoil and vegetation substrate) are externally sourced prior to commencement of rehabilitation activities. Sufficient resources are prepared for suitable establishment of native ecosystem areas.

Management strategies of rehabilitation areas are undertaken in accordance with specific Metropolitan Coal Mine Plan(s) as discussed in Sections 6.2.1 and 6.2.2. This includes but is not limited to:

- weed management;
- introduced pest management;

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- erosion and sediment controls;
- bushfire management;
- waste management;
- water management; and
- management of heritage items.

### 6.2.5 Ecosystem and Land Use Establishment

The primary objective of both natural regeneration and active revegetation works following completion of mining activities is to establish a self-sustaining vegetative cover appropriate to the landforms being revegetated.

As discussed in Section 6.2.1, the selection of species for active planting and/or direct seeding are determined in consideration of the site characteristics and the surrounding native vegetation (i.e. analogue sites).

Revegetation of remnant communities are done using provenance species. The vegetation surrounding the Surface Facilities Area is characterised by a tall forest supporting a canopy of Blackbutt (*Eucalyptus pilularis*), Bangalay (*Eucalyptus botryoides*) and Turpentine (*Syncarpia glomulifera*) with a sub-canopy of smaller trees and a range of shrubs and groundcover species. Species selection for revegetation works can be drawn from the vegetation community description and diagnostic species listings (NPWS, 2002), and from floristic surveys in areas adjacent to the Surface Facilities Area.

Any active planting program will utilise flora species characteristic of the particular vegetation community in that area and will utilise seed collected from the Woronora Special Area. Consultation are undertaken with the DPE and BCD for any proposed revegetation works associated with subsidence impacts (e.g. impacts to riparian vegetation).

The physical characteristics of the Surface Facilities Area are important when considering revegetation processes. These physical characteristics place constraints on what is possible to achieve in a rehabilitation program for the Surface Facilities Area (Commonwealth Department of Industry, Tourism and Resources, 2006). Some of these physical characteristics include the climate, size and soil/rock types, topography, watercourses and surrounding vegetation. These physical constraints are considered during the development of detailed rehabilitation plans in relation to landform design and revegetation.

#### **Bushfire**

Metropolitan Coal has a Bushfire Risk Management Plan (Building Code & Bushfire Hazard Solutions Pty Limited, 2010) which provides details of bushfire mitigation measures and future planning considerations designed to better manage vegetation fuel loads and other bushfire mitigation matters, and as a consequence increase the bushfire safety measures for Metropolitan Coal Mine staff, site contractors, fixed assets and the surrounding general public.

Since the development of the Bushfire Risk Management Plan, in 2012 Metropolitan Coal commissioned a Bushfire Audit and Recommendation Report to review the Bushfire Risk Management Plan recommendations and report on its application and effectiveness to date and were considered necessary provide further recommendations.

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In addition, Metropolitan Coal has developed a Bushfire Preparedness Plan for works conducted within the Woronora Special Area.

More broadly, Metropolitan Coal has developed an Emergency Management Plan as part of the mines Health and Safety Management System as required under section 45 of the *Coal Mine Health and Safety Act (2002)* and content required by section 47 of the Act and Clauses 45 and 131-133 of the *CMH&S Regulations (2006)*.

### 6.2.6 Ecosystem and Land Use Development

At the ecosystem and land use development phase, rehabilitation monitoring results would be used to confirm rehabilitation areas are on a trajectory towards a self-sustaining ecosystem and meeting the rehabilitation completion criteria. Monitoring results would also be used to determine the recommendations and requirements for maintenance and/or contingency measures (e.g. supplementary plantings, weed control and erosion repair) to improve rehabilitation performance. The rehabilitation monitoring program implemented at the Metropolitan Coal Mine is described in Section 8. Contingency measures are described further in Section 10.

It is expected that at this phase, the need for maintenance/intervention would be no greater than that required for the surrounding lands whether it be for infrastructure areas or for existing remnant vegetation areas.

Notwithstanding the above, potential rehabilitation maintenance requirements include (but are not necessarily limited to):

- Weed and feral animal control of rehabilitation.
- Erosion control works.
- Re-seeding/planting of rehabilitation areas that may have failed.
- Maintenance fertilising.
- Repair of fence lines, access tracks and other general related land management activities.

The requirement of these rehabilitation maintenance activities are based on the monitoring program and opportunistic inspections of rehabilitated areas.

## 6.3 REHABILITATION OF AREAS AFFECTED BY SUBSIDENCE

All areas affected by subsidence at the Metropolitan Coal Mine are covered by an associated Extraction Plan(s). Where relevant, these Extraction Plans describe the proposed subsidence remediation processes that would be undertaken if required.

A summary of subsidence management and/or remediation measures are provided below, including an outline of the relevant Extraction Plans and the Subsidence Monitoring Program.

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### **Mine Subsidence**

In accordance with Condition 4, Schedule 6 and Condition 12, Schedule 2 of the Project Approval (08\_0149), rehabilitation and remediation measures for impacts to other natural or built surface features resulting from subsidence are described in the detailed management plans prepared for the Metropolitan Coal Extraction Plan.

The overriding objective for subsidence management is to minimise the potential for, or extent of, the predicted subsidence impacts. The key issues relating to subsidence impacts on rehabilitation, surface water and groundwater resources, land resources and agricultural activities, biodiversity, built features, heritage sites and values and public safety are described in detail in the relevant Extraction Plan(s). The Extraction Plans also detail relevant monitoring and management measures that are undertaken relevant to each identified impact. Metropolitan Coal has also prepared a Subsidence Monitoring Program to validate subsidence predictions and analyse the effects and impacts of subsidence and any ensuing environmental consequences.

As required by the Extraction Plans, remediation of subsidence impacts or environmental consequences detected by subsidence monitoring are conducted where required in consideration of the unmitigated impact (including potential risks to safety and the potential for self-healing or long-term degradation) and the potential impacts of the remediation (including site accessibility).

A number of potential management measures are available to mitigate/remediate subsidence impacts on land in general resulting from underground mining operations. Remediation of subsidence impacts may be required in stream pools, rock bars and other natural or built features.

It is anticipated that remediation activities would generally follow mining in a downstream direction, however as indicated previously, additional remediation measures may be required in some areas.

The specific timing of stream remediation activities will also be influenced by practical considerations, such as the amount of stream flow. Generally, the volume of stream flow is required to be such that surface flow over the respective rock bar is absent.

The rehabilitation objective for Waratah Rivulet (between the downstream edge of Flat Rock Swamp and the full supply level of the Woronora Reservoir) and the Eastern Tributary (between the full supply level of the Woronora Reservoir and the maingate of Longwall 26), viz. *Restore surface flow and pool holding capacity as soon as reasonably practicable*, is addressed in the Metropolitan Coal Stream Remediation Plan.

Metropolitan Coal will assess the progress of the stream remediation measures in achieving the rehabilitation objective for Waratah Rivulet and the Eastern Tributary against the performance indicators detailed in the Stream Remediation Plan: The rehabilitation objective are considered to have been met if surface flow and pool holding capacity has been restored in the impacted pool.

The Metropolitan Coal Stream Remediation Plan details the stream remediation measures to be implemented for the Metropolitan Coal Mine. In summary, the Stream Remediation Plan:

- describes the vegetation and Aboriginal heritage management measures that are implemented at a stream remediation site prior to the commencement of remediation activities;
- describes the fracture characterisation and stream remediation that are conducted on the Waratah Rivulet and Eastern Tributary;

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- provides a description of the stream grouting techniques that are used;
- outlines the site layout of stream remediation activities at each rock bar; and
- details the environmental management measures that are implemented during the conduct of the stream remediation activities.

Subsidence monitoring and remediation undertaken each year are reported in the Annual Review.

## 7 REHABILITATION QUALITY ASSURANCE PROCESS

A Rehabilitation Quality Assurance Process will be implemented which details rehabilitation, key actions and/or processes nominated for each phase throughout the life of the operations to ensure that:

- Rehabilitation is implemented in accordance with the nominated methodologies.
- Identified risks to rehabilitation are adequately addressed before proceeding to the next phase of rehabilitation.

The Rehabilitation Quality Assurance Process will be integrated into day-to-day operations at the Metropolitan Coal Mine as outlined in Table 10. Rehabilitation validation monitoring is undertaken as described in Section 8.

**Table 10:  
Rehabilitation Quality Assurance Processes**

<b>Rehabilitation Quality Assurance Processes</b>	<b>Responsibility</b>	<b>Documenting and Recording Process</b>
<b><i>Land Clearance</i></b>		
Maximise opportunities for salvage of biological and habitat resources.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Undertake pre-clearance surveys and due diligence assessments.	Environment and Community Superintendent	Aboriginal Heritage Information Management System (AHIMS)
Minimise the extent of clearing and disturbed land to the greatest extent practicable at any given time.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Minimise ground disturbance during exploration activities.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
<b><i>Active Mining and Production</i></b>		
Develop and maintain a topsoil database with details of stockpile sizes, treatments and future topsoil requirements.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Specialist advice on effective managing and mitigation of potential interference to rehabilitation establishment or downstream pollution as a result of exposure to adverse geochemical material.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
<b><i>Decommissioning</i></b>		
Develop and maintain a register of contaminated sites and bioremediation areas.	Environment and Community Superintendent	Survey Database
Erosion and sediment control practices in accordance with the Construction Management Plan.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Environmental monitoring programs regularly undertaken and improved.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program

**Table 10:  
Rehabilitation Quality Assurance Processes (Continued)**

Rehabilitation Quality Assurance Processes	Responsibility	Documenting and Recording Process
<b><i>Decommissioning (Continued)</i></b>		
Prior to demolition activities, ensure appropriate heritage approvals and/or management measures are in place (e.g. archival recording, restoration of building etc.).	Environment and Community Superintendent	Conservation Management Plan
Remove electrical services to any infrastructure scheduled for demolition prior to commencement of works.	Project Manager	Work Order
Remove telecommunications, water supply and other services where practical.	Project Manager	Work Order
Where services are buried and retrieval may lead to further disturbance, infrastructure to be left <i>in situ</i> , provided this does not compromise the Final Land Use.	Project Manager	Work Order
Location of services to be left <i>in situ</i> will be surveyed and marked on-site plan to ensure they are readily identifiable for future land holders.	Mine Surveyor	Survey Database
Prior to demolition, infrastructure would be evaluated for potential hazardous substances (e.g. asbestos, radiation sources etc.) and appropriate strategies developed to protect employees, the public and the environment.	Project Manager	Contractor inspection report and management strategy
All buildings, fixed plant and other infrastructure not to be retained as part of the Final Land Use will be demolished and removed. Demolition will be carried out in accordance with AS 2601-2001: <i>The Demolition of Structures</i> (or its latest version).	Project Manager	Photographs and Contractor demolition reports
Where infrastructure is approved to remain as part of the Final Land Use, a structural assessment will be prepared by a suitably qualified person to determine the structural integrity of the structure and identify the associated short and long-term risks to public safety and the environment.	Environment and Community Superintendent	Engineering assessment report
Any hazardous materials will be removed.	Environment and Community Superintendent	Photographs
Potentially contaminated areas will be assessed and remediation undertaken as required.	Environment and Community Superintendent	Contractor assessment report and remediation plan
Decommissioning and removal of underground infrastructure.	Technical Services Manager	Annual Rehabilitation Report and Forward Program
Seal all mine openings, boreholes, gas wells etc.	Technical Services Manager	Annual Rehabilitation Report and Forward Program

**Table 10:  
Rehabilitation Quality Assurance Processes (Continued)**

<b>Rehabilitation Quality Assurance Processes</b>	<b>Responsibility</b>	<b>Documenting and Recording Process</b>
<b><i>Final Landform Establishment</i></b>		
Final landform design will consider the surrounding landforms, suitable drainage, erosion and sediment control structures, geochemical constraints and geotechnical issues.	Environment and Community Superintendent	This RMP
Subsidence monitoring of affected areas will continue until it is demonstrated that all measurable subsidence has ceased.	Technical Services Manager	Subsidence Monitoring Program
Subsidence monitoring pegs will either be removed or cut-off below ground level once monitoring is complete and approval to remove the pegs has been granted.	Technical Services Manager	Subsidence Monitoring Program
Rehabilitation of subsidence affected areas will be undertaken in accordance with the relevant Extraction Plan(s).	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
<b><i>Growth Medium Development</i></b>		
Restore soil structure by ripping in parallel with contours.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Rehabilitation methodologies to be developed to achieve nominated Rehabilitation Objectives and Completion Criteria in consideration of site-specific constraints.	Environment and Community Superintendent	This RMP
Erosion and sediment control practices in accordance with the Construction Management Plan.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Schedule and undertake revegetation activities according to weather and climatic conditions.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Avoid compaction of rehabilitation substrate.	Environment and Community Superintendent	
Use structures such as tree hollows, logs and other woody debris, rock material to augment the habitat value of rehabilitation.	Environment and Community Superintendent	Photographs and Rehabilitation Monitoring
<b><i>Ecosystem and Land Use Establishment</i></b>		
Preference locally sourced seed materials for revegetation activities (where available).	Environment and Community Superintendent	Order records and Invoicing
Consider implementing techniques such as brush matting where disturbed areas are directly adjacent to mature ecosystems to stabilise the site while natural recruitment occurs.	Environment and Community Superintendent	This RMP
If revegetation is delayed due to unsuitable seasonal conditions, undertake temporary stabilisation measures (e.g. sterile cover crops, erosion and sediment controls) to avoid erosion and further land degradation.	Environment and Community Superintendent	Construction Management Plan This RMP

**Table 10:  
Rehabilitation Quality Assurance Processes (Continued)**

<b>Rehabilitation Quality Assurance Processes</b>	<b>Responsibility</b>	<b>Documenting and Recording Process</b>
<b><i>Ecosystem and Land Use Establishment (Continued)</i></b>		
Spread seed as soon as possible following ripping. If delayed, assess whether re-ripping is required.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Undertake bushfire management activities.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Use appropriate earthmoving equipment.	Environment and Community Superintendent	This RMP
Engage suitably qualified contractors to undertake all works.	Environment and Community Superintendent	Tender process and experience
Record seed germination and seeding success rates to assess against target densities.	Environment and Community Superintendent	Results of seed germination testing. Certificates for all seed collected or supplied by an external contractor are obtained
Maximise the number of target species within the first round of revegetation activities to facilitate species richness.	Environment and Community Superintendent	Rehabilitation Monitoring
Augment habitat to encourage initial colonisation of target fauna species (e.g. nest boxes, salvaged hollows, den sites, habitat ponds, etc.)	Environment and Community Superintendent	Rehabilitation Monitoring
Conduct regular site inspections (at least quarterly) to assess revegetation establishment and site conditions until vegetation has become well established and the site can be considered stable.	Environment and Community Superintendent	Rehabilitation Monitoring
Implement a long-term monitoring program to evaluate trajectory of rehabilitation against Rehabilitation Objectives and Completion Criteria.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Develop a Rehabilitation Management and Maintenance Program based on the needs identified in the rehabilitation monitoring program. The objective of this program is to facilitate progress towards the Rehabilitation Objectives and Completion Criteria.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
<b><i>Ecosystem and Land Use Development</i></b>		
Continue Rehabilitation Management and Maintenance Program.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Continue rehabilitation monitoring programs.	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program
Actively manage rehabilitated lands in accordance with the Final Land Use(s).	Environment and Community Superintendent	Annual Rehabilitation Report and Forward Program

## 8 REHABILITATION MONITORING PROGRAM

### 8.1 ANALOGUE SITE BASELINE MONITORING

The final land use of the Surface Facilities Area involves the development of a self-sustaining Native Ecosystem reflective of the vegetation surrounding and adjacent to the Surface Facilities Area. As described in Section 6.2.5, this vegetation is characterised by a tall forest supporting a canopy of Blackbutt (*Eucalyptus pilularis*), Bangalay (*Eucalyptus botryoides*) and Turpentine (*Syncarpia glomulifera*) with a sub-canopy of smaller trees and a range of shrubs and groundcover species.

Analogue monitoring sites will be established in areas adjacent to the Surface Facilities Area prior to rehabilitation of the Surface Facilities Area occurring. Where relevant, the performance indicators and completion criteria discussed in Section 4 will be amended to reflect the outcomes of the monitoring results collected from these analogue sites.

### 8.2 REHABILITATION ESTABLISHMENT MONITORING

The Rehabilitation Management Plan – Surface Disturbance Register (Metropolitan Coal, 2019) will be used to monitor the performance of the measures implemented to rehabilitate surface disturbance areas.

Once a surface disturbance area is no longer being utilised, monitoring will be conducted to assess:

- where appropriate, whether equipment/infrastructure items have been removed;
- whether the area is tidy or rubbish removal is required;
- whether erosion and sediment controls are required and if so, the effectiveness of those installed;
- the presence of weeds and the need for the implementation of weed control measures;
- where appropriate, whether vegetation is re-establishing naturally or whether active revegetation is required; and
- if active revegetation is conducted, whether vegetation is establishing.

The frequency of monitoring of surface disturbance areas subject to rehabilitation will be largely driven by the status of the site. For example, sites that are identified as requiring the implementation of further rehabilitation measures (e.g. weed control or erosion and sediment control) will be inspected on a more frequent basis to assess whether the measures have been effective. The dates on which individual site inspections are conducted will be recorded in the Surface Disturbance Register, along with the findings of the site inspection.

Rehabilitation establishment monitoring is also undertaken in the Underground Mining Area relevant to stream and swamp remediation as a result of subsidence impacts. Details on the monitoring program requirements and timing are provided in the following sections.

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### 8.2.1 Stream Remediation Monitoring

Stream remediation monitoring is implemented in areas associated with subsidence impacts associated with stream pools and rock bars. Stream remediation measures will be implemented, as appropriate, to comply with the relevant statutory requirements and the rehabilitation objectives. The specific timing of stream remediation activities will be influenced by practical considerations. For example, the catchment may be closed due to rainfall/bushfires or stream remediation activities are unable to be conducted as a result of high stream flows.

The Metropolitan Coal Stream Remediation Plan describes the proposed stream remediation activities on the Waratah Rivulet and Eastern Tributary. In summary, the monitoring program is consistent with the Metropolitan Coal WMP and includes:

- photographic surveys of the Waratah Rivulet (from Pool P to the full supply level of the Woronora Reservoir) and Eastern Tributary (from the full supply level of the Woronora Reservoir to the maingate of Longwall 26);
- monitoring of rainfall and climate data;
- surface water flow monitoring at gauging stations;
- monitoring of Waratah Rivulet, Eastern Tributary and Woronora River pool water levels;
- monitoring of stream remediation measures and environmental controls; and
- monitoring of water quality upstream and downstream of the stream remediation works.

Daily surface water quality will be monitored at two sites upstream and at two sites downstream of the remediation works. Field-based parameters will include pH, electrical conductivity (EC), turbidity and total organic carbon (TOC). pH, EC and turbidity will be sampled in the field using hand-held meters. TOC will be sampled in the field and analysed within approximately 4 hours of sampling.

Should field samples indicate values at the downstream sites outside the previously recorded (i.e. prior to the stream remediation activities commencing) water quality data have occurred, samples will be collected and sent for laboratory testing.

Laboratory-based parameters will include pH, EC, turbidity, Oxidation Reduction Potential, TOC, dissolved organic carbon, major ions (calcium [Ca], magnesium [Mg], sodium [Na], potassium [K], chloride [Cl], sulphate [SO<sub>4</sub>] and bicarbonate [HCO<sub>3</sub>]) and trace metals (aluminium [Al], iron [Fe] and manganese [Mn]). Samples collected for laboratory cation, anion and metal analysis will be field filtered.

Field based water quality results obtained during the conduct of grout injection activities will be compared to previously recorded (i.e. prior to the stream remediation activities commencing) water quality data immediately upon receipt of the results. Where monitoring results at the downstream sites indicate values outside (i.e. higher or lower) than the previously recorded water quality data, the values will be compared to the results (for the same sampling time) for the upstream sites. If any field test result of a downstream site is above (outside) previously recorded values and is also above (outside) values obtained from testing at an upstream site on that day, drilling and injection activities will cease and the water quality samples will be sent to the laboratory for analysis.

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In the event laboratory testing confirms the downstream results are outside previously recorded water quality data and the results for the upstream sites, an investigation will be triggered and drilling and injection activities will immediately cease. WaterNSW will be notified immediately via the Incident Number 1800 061 069.

### 8.2.2 Swamp Remediation

In the event remediation measures are proposed to be implemented in an upland swamp, Metropolitan Coal will prepare a swamp remediation plan for the swamp in consultation with the DPE, BCD, WaterNSW, DPI - Fisheries and NSW Resources Regulator. Potential remediation measures for impacts on upland swamps that could be used or are being investigated, include:

- installation of coir log dams (i.e. erosion control structures) at any knick points in a swamp;
- use of surface water spreading techniques, involving long lengths of coir logs and hessian 'sausages' linked together across a swamp contour such that water flow builds up behind them and slowly seeps through the water spreaders to maintain swamp moisture; and
- injection grouting of rock substrate where fracturing has occurred.

### 8.3 MEASURING PERFORMANCE AGAINST REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

The results of rehabilitation monitoring are compared against the completion criteria described in Section 4.1 to track rehabilitation progress. Outcomes of the rehabilitation monitoring are provided in subsequent Annual Reviews, and the Annual Rehabilitation Report and Forward Program.

Summaries of the monitoring results and performance against rehabilitation objectives and completion criteria are included in this section when this RMP is updated or revised.

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## 9 REHABILITATION RESEARCH, MODELLING AND TRIALS

### 9.1 CURRENT REHABILITATION RESEARCH, MODELLING AND TRIALS

As described in Section 1.1.3, disturbance areas at the Metropolitan Coal Surface Facilities Area are minimal and have remained relatively unchanged for many years. The Surface Facilities Area is an active operations area which are required for the entire mine life. As such, there has been limited opportunity to conduct rehabilitation to date.

As a result of previous mining, the water levels in pools upstream of Flat Rock Crossing (i.e. Pools A to G) and immediately downstream of Flat Rock Crossing (Pools G1) have been impacted by mine subsidence. Impacts to pools are managed in accordance with the Stream Remediation Plan.

The principal management measure that is used to restore surface flow and pool holding capacity is the injection of polyurethane (PUR) grouting products into the fracture network. The injection of PUR grout reduces the permeability of the overall rock mass by filling voids and thereby reducing sub-surface flow pathways.

Stream remediation activities have been conducted at Pools A, F and G. The rock bars at Pools A and F are considered to largely control the pools located upstream of these rock bars. As a result, Metropolitan Coal anticipates that the restoration of surface flow and pool holding capacity at Pools A and F will restore the surface flow and pool holding capacity of pools between Flat Rock Swamp and Pool F. Metropolitan Coal considers the pool remediation efforts to have largely been successful but continues to monitor the performance of these works.

In 2021, Hydro Engineering & Consulting (2021) assessed the success of pool remediation measures undertaken by Metropolitan Coal and if subsidence impacts had otherwise diminished in pools on the Waratah Rivulet. Hydro Engineering & Consulting (2021) found that for Pools G1 and N, water level recession behaviour was consistent with pre-impact behaviour, and for Pools B, C, E, F and G, water levels during low flow conditions were consistent with the water levels of similar, un-impacted pools. For Pool A, recorded water levels during low flow conditions were not consistent with the water levels of similar, un-impacted pools. Further assessment of the PUR remediation success will continue in accordance with the Stream Remediation Plan and reported in the Annual Rehabilitation Report.

### 9.2 FUTURE REHABILITATION RESEARCH, MODELLING AND TRIALS

Prior to mine closure, Metropolitan Coal is proposing to complete further minor revegetation works over the batters of the coal rejects area at the Surface Facilities Area. The revegetation over this material will be trialled during future Forward Programs. A monitoring program to assess the success of this proposed revegetation will be established to determine if the vegetation structure and composition is recognisable as the target vegetation community and the landform remains stable.

Metropolitan Coal will continue to review the success of pool remediation measures and determine if subsidence impacts had otherwise diminished in pools on the Eastern Tributary in accordance with the Stream Remediation Plan. The plan will be reviewed, and updated where necessary, to incorporate the outcomes of future stream remediation.

Metropolitan Coal will continue to review the need to establish rehabilitation trials, research and modelling at the Metropolitan Coal Mine as part of the Annual Rehabilitation Reports and Forward Programs.

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## 10 INTERVENTION AND ADAPTIVE MANAGEMENT

As described in Section 3, the Rehabilitation Risk Assessment identified a total of 58 risks. Of these risks, 47 were ranked as low and 11 were ranked as low to medium. No risks were ranked as medium or high.

Metropolitan Coal have prepared a Trigger Action Response Plan (TARP) for rehabilitation to identify appropriate response measures in the event rehabilitation outcomes are not achieved (Table 10).

A revision of the TARP are undertaken as a result any revisions to the rehabilitation monitoring program to allow for the development of appropriate criteria and triggers. A revised TARP are provided in consecutive RMP amendments as soon as the data is available from the respective programs.

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**Table 11:  
Rehabilitation Trigger Action Response Plan**

Rehabilitation Risk	Consequence/Hazard	TARP Code	Contingency Reponses
Vegetation	Poor establishment, excessive weeds, low species composition, mono-culture.	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Vegetation monitoring does not identify an increase in the extent of vegetation cover.</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Check and validate the data to ensure correct/accurate.</li> <li>Review management actions undertaken during previous 12 months (applicable to relevant management period) to determine if actions have contributed to the lower than expected score.</li> <li>Review previous monitoring scores and climatic conditions to establish whether external factors could be contributing to the lower than expected score.</li> <li>Develop remedial actions to address declining biodiversity values.</li> <li>Expand monitoring program to include additional treatment and reference sites.</li> </ul>
		<b>Responsible Persons</b>	Environment & Community Superintendent
	Native tree and shrub seed not available to complete revegetation.  Native pasture seed not available to complete revegetation.	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Insufficient or inadequate seed resource available to undertake revegetation.</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Review available seed resource.</li> <li>Source additional seed from reputable local provider.</li> </ul>
		<b>Responsible Persons</b>	Environment & Community Superintendent.

**Table 11:  
Rehabilitation Trigger Action Response Plan (Continued)**

Rehabilitation Risk	Consequence/Hazard	TARP Code	Contingency Reponses
Discharges to Environment	Pollution of downstream watercourses. Impacts to other water users.	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Water runoff from rehabilitation areas exceeds EPL water quality limits.</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Refer to WMP (for appropriate actions and responses).</li> </ul>
		<b>Responsible Persons</b>	Environment & Community Superintendent
Decommissioning	Decommissioning has not removed all redundant services, infrastructure, carbonaceous material, wastes hazardous materials, sealing of mine and ventilation shafts etc. post-mine closure. Unauthorised access to underground workings.	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Removal of all redundant services, infrastructure, carbonaceous material, wastes hazardous materials, sealing of mine and ventilation shafts etc. post-mine closure has not been completed.</li> <li>Identification of possible contaminants at mine closure and either removal or treatment has not been carried out.</li> <li>Dewatering and removal of possible contaminants from selected water management areas post-mine closure has not been carried out.</li> <li>The site at post-mine closure presents an immediate risk to the environment and public safety.</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Undertake a review of the closure strategies to ensure the site at post closure does not present an immediate risk to the environment and public safety (e.g. ensure all underground portals sealed, appropriate signage/fencing of the site, etc.).</li> <li>Refer to asset register and ensure all items have been removed (except where they are to be retained as part of the final land use).</li> <li>Ensure all decommissioning activities are undertaken appropriately and by suitably qualified contractors.</li> </ul>
		<b>Responsible Persons</b>	Environment & Community Superintendent.
Stream Remediation	Flows in pools and holding capacity not restored following stream remediation	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Stream remediation works not fully complete.</li> <li>Surface flow and pool holding capacity have not been effectively fully restored.</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Complete stream remediation works as per Stream Remediation Plan.</li> <li>Complete investigation and develop plan for further remediation.</li> </ul>
		<b>Responsible Persons</b>	Environment & Community Superintendent.

## 11 REVIEW, REVISION AND IMPLEMENTATION

In accordance with Clause 11, Schedule 8A of the *Mining Regulation 2016*, Metropolitan Coal will amend this RMP in the following circumstances:

- to substitute the proposed version of the rehabilitation objectives and rehabilitation completion criteria (Section 4) or Final Landform and Rehabilitation Plan (Section 5) with the version approved by the Secretary—within 30 days after the document is approved;
- as a consequence of an amendment made to the rehabilitation objectives and rehabilitation completion criteria (Section 4) or Final Landform and Rehabilitation Plan (Section 5) – within 30 days after the amendment is made;
- to reflect any changes to the risk control measures in the RMP that are identified in a rehabilitation risk assessment – as soon as practicable after the rehabilitation risk assessment is conducted; and
- whenever directed in writing to do so by the Secretary – in accordance with the direction.

Metropolitan Coal will ensure that the RMP remains current and relevant to ensure it defines the rehabilitation outcomes to be achieved in relation to the mining area and sets out the strategy to achieve those outcomes. This outcome is achieved by ensuring that the effectiveness of the rehabilitation risk assessment and controls adopted in the life of mine progressive rehabilitation schedule and rehabilitation phases are routinely evaluated throughout the life cycle of the Metropolitan Coal Mine.

Whenever any foreseeable hazard is identified that presents a risk to achieving the rehabilitation objectives and rehabilitation completion criteria, or the Final Landform and Rehabilitation Plan, Metropolitan Coal will update the rehabilitation risk assessment and RMP.

If necessary, Metropolitan Coal will update this RMP to include more detailed mine closure activities as rehabilitation progresses. The review and updating of this RMP will include any additional stakeholder consultation. The results of any environmental performance monitoring undertaken during the Forward Program term will also contribute to refining future RMPs.

The rehabilitation principles and targets described in this RMP will continue to be tracked via Metropolitan Coal's internal review and tracking systems and the reporting and auditing mechanisms.

In accordance with Condition 4, Schedule 7 of Project Approval (08\_0149), the RMP may also be reviewed and, if necessary, revised, following the submission of the following:

- Annual Review;
- incident report;
- audit;
- updated or additional Management Plans prepared; or
- any modification to the conditions of the Development Consent.

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**Implementation of this RMP**

A general overview of the responsibility of Metropolitan Coal personnel in regard to the monitoring, review and implementation of this RMP is provided in Table 12.

**Table 12:  
Site Environmental and Mining Management Relevant to Implementation of this RMP**

<b>Management Team Member(s)</b>	<b>Role and Responsibility</b>
General Manager	<ul style="list-style-type: none"> <li>• Ensure adequate resource are available to Metropolitan Coal personnel to facilitate the completion of responsibilities under this RMP.</li> <li>• Ensure the safety of Metropolitan Coal employees and the public in relation to Metropolitan Coal operations.</li> <li>• Approve and instruct implementation of remediation/corrective action/compensation, if necessary.</li> </ul>
Mining Engineering Manager (Underground Mine Manager)	<ul style="list-style-type: none"> <li>• Ensure the safety of Metropolitan Coal employees and the public in relation to Metropolitan Coal operations.</li> <li>• Ensure adequate resource are available for the implementation of remediation/corrective actions.</li> </ul>
Technical Services Manager	<ul style="list-style-type: none"> <li>• Liaise with relevant stakeholders regarding subsidence impact management and related public safety hazards.</li> </ul>
Manager: Environment and Community	<ul style="list-style-type: none"> <li>• Liaise with relevant stakeholders regarding environmental management.</li> <li>• Ensure monitoring and reporting required in accordance with the RMP are carried out within specific timeframes, are adequately checked and processed and are prepared to the required standard.</li> <li>• Ensure that any Incident Reports are lodged in accordance with regulatory requirements with all available information.</li> <li>• Ensure that reviews of the RMP and other plans are conducted.</li> </ul>

## 12 REFERENCES

- Building Code & Bushfire Hazard Solutions Pty Limited (2010) *Bushfire Risk and Management Plan, 2010*.
- Commonwealth Department of Industry, Tourism and Resources (2006) *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion*.
- Department of Environment and Climate Change (2008) *Managing Urban Stormwater: Soils and Construction, Volume 2E Mines and Quarries*.
- Department of Environment and Heritage (2006) *Management of *Phytophthora cinnamomi* for Biodiversity Conservation in Australia*.
- Department of Trade and Investment, Regional Infrastructure and Services – Mine Safety Operations (2012) *MDG6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams*.
- Hydro Engineering & Consulting (2021) *Metropolitan Coal Waratah Rivulet Pool Impact Assessment*.
- Metropolitan Coal Pty Ltd (2011) *Metropolitan Coal Vegetation Management Plan*.
- Metropolitan Coal Pty Ltd (2019) *Metropolitan Coal Rehabilitation Management Plan*.
- New South Wales Department of Planning (2007) *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects*.
- New South Wales Resources Regulator (2021) *Form and Way – Rehabilitation Management Plan for Large Mines*.
- National Parks and Wildlife Service (2001) *Threatened Species National Parks and Wildlife Service (2001) Threatened Species*.
- National Parks and Wildlife Service Conservation Assessment and Data Unit (2002) *Native Vegetation of the Illawarra Escarpment and Coastal Plain*.
- Pearson (2009) *Metropolitan Colliery Conservation Management Plan*.

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ATTACHMENT A  
METROPOLITAN COAL MINE REHABILITATION RISK ASSESSMENT

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Title / ID number	ME- Rehabilitation Management Plan		
Site	Metropolitan	Date	01-Dec-21
Purpose and objectives	<p>Metropolitan Coal is currently in the process of developing a Rehabilitation Management Plan (RMP) as part of the updated mine lease conditions for mine closure planning. The RMP builds on previously developed documents regarding mine site rehabilitation and closure including:</p> <ul style="list-style-type: none"> <li>- Metropolitan Coal Rehabilitation Management Plan</li> <li>- Metropolitan Coal Stream Remediation Plan</li> <li>- Metropolitan Coal Rehabilitation Strategy</li> <li>- Conservation Management Plan</li> </ul> <p>This risk assessment has been carried out with the focus on identifying risks to the environment, public safety and Peabody that will assist with the development of the Rehabilitation Management Plan to the satisfaction of the Resources Regulator. The RMP will be prepared in consultation with the Department of Regional NSW - Resources Regulator in order to create a safe, stable, post-mining landform before relinquishment to the state.</p>		
Scope / context	<p>The scope of this risk assessment is to fulfil the requirements of the NSW Resources Regulator for the preparation of a Rehabilitation Management Plan.</p> <p><b>The assessment has focused on the risk to the following items:</b></p> <ul style="list-style-type: none"> <li>- Landform stability</li> <li>- Active rehabilitation</li> <li>- Vegetation &amp; fauna</li> <li>- Site security, public safety and vandalism</li> <li>- Soil management</li> <li>- Surface and groundwater</li> <li>- Heritage</li> </ul>		
Activity			
Assumptions	<p>Due to the focus on the risk to a successful rehabilitation outcome, only risks associated with the rehabilitation and closure of site have been considered.</p> <p>The following assumptions and limitations were applied to this risk assessment:</p> <ul style="list-style-type: none"> <li>- Site to be rehabilitated consistent with existing site Rehabilitation Cost Estimate approved by RR (ie: structures demolished, some heritage items retained, site revegetated with native vegetation)</li> <li>- Existing mine controls remain in place during active decommissioning phase</li> </ul>		
Reference / related documents <i>(including Change Management number reference if applicable)</i>	<p>Related Documents Include;</p> <ul style="list-style-type: none"> <li>- AS NZS ISO 31000-2009 Risk management - Principles and guidelines</li> <li>- MDG1010 - Risk Management Handbook for the Mining Industry. Dated. May 1997</li> <li>- Metropolitan Coal Rehabilitation Management Plan</li> <li>- Metropolitan Coal Stream Remediation Plan</li> <li>- Metropolitan Coal Rehabilitation Strategy</li> <li>- Conservation Management Plan</li> </ul>		

Approved by:	Name	Signature	Date
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Participants - ME- Rehabilitation Management Plan					
Name	Title	Company	Experience (years / detail)	Consensus (Qld)	Signature and date
James Hannigan	Mine Manager	Peabody	23 years	N/A	
Stephen Love	Environment and Community Superintendent	Peabody	11 Years	N/A	
Jon Degotardi	Technical Services Manager	Peabody	20 Years	N/A	
Shane Kornek	Senior Geotechnical Engineer	Peabody	21 years	N/A	
Kane Organ	Environment and Community Coordinator	Peabody	3 years	N/A	
Patric Illingworth	Environmental Project Manager	Resource Strategies	1 year	N/A	
Lance Ostenfeld	CHPP Superintendent	Peabody	8 years	N/A	

ID	ID	Mine Closure / Rehabilitation Aspect	Risk Source	Potential Events / Consequences	Consequence Category	Existing / Proposed Risk Treatment / Control	Action	Person Responsible for Action	Ranking With Controls				Is Risk ALARP with Controls?
									Consequence	Likelihood	Risk Level	Risk Level	
1	1	General	Insufficient skills and experience of rehabilitation personnel.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful.	Finance / Reputation (ranked on Finance)	Rehabilitation Management Plan & Strategy. Monitoring programs. RCE outlines rehabilitation methodology Regulator consultation and/or audits. Experienced rehabilitation specialist input to rehabilitation plan and works			10	2	20	Low - Med	Y
1	2	General	Lack of clearly defined responsibilities.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful.	Finance / Reputation (ranked on Finance)	Experienced contractors to be utilised. Rehabilitation Management Plan to clearly define roles and responsibilities for rehabilitation onsite. Monitoring programs. Regulator consultation and/or audits.			10	2	20	Low - Med	Y
1	3	General	Insufficient funding for or prioritisation of rehabilitation activities.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful. Lack of regulator confidence resulting in issues with other approvals.	Finance / Reputation (ranked on Finance)	Internal ARO (Asset Requirement Obligations) calculator. RCE. Internal budgeting to include rehabilitation activities - five year forecast. Regulator consultation and/or audits. Rehabilitation Management Plan Stream Remediation Plan LOM forecast			10	3	30	Low - Med	Y
2	1	Active Mining Phase of Rehabilitation	Adverse geochemical/ chemical composition of materials such as processing wastes, subsoils and topsoils and imported cover materials. Spontaneous combustion and propensity for sustained burn of CWR	Poor quality rehabilitation outcomes if imported topsoil was below standard. Poor quality runoff from rehabilitated surfaces effecting water quality.	Environmental	On site material not prone to AMD, spon com or geochemical issues. Imported material (if required) would be checked for quality. Monitoring program Guidelines for site soil establishment	Investigate propensity of insitu CWR onsite to sustain burn	Environment department	5	2	10	Low	Y
2	2	Active Mining Phase of Rehabilitation	Adverse surface and groundwater quality and quantity (underground and operations).	Impact to receiving environment.	Environmental	Water Management Plan. Stream Remediation Plan. Monitoring programs.			2	3	6	Low	Y
2	3	Active Mining Phase of Rehabilitation	Biological resource salvage and maintenance (e.g. subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) through clearing salvage, and handling practices.	Insufficient/inadequate biological resources to rehabilitate requiring importation of additional resources.	Financial	Minimal clearing expected. Biological resources to be stockpiled during any clearing for future reuse.			2	1	2	Low	Y
2	4	Active Mining Phase of Rehabilitation	Limited pre-existing biological resources for salvage (e.g. topsoil, weeds).	Poor quality rehabilitation outcomes if imported topsoil, vegetative material and seedbank was below standard. Poor quality runoff from rehabilitated surfaces effecting water quality.	Environmental	Imported biological resources to be sourced from appropriate suppliers (ie no weed seed, clean etc)			2	1	2	Low	Y
2	5	Active Mining Phase of Rehabilitation	Clearing in adverse seasonal and weather conditions when salvaging biological resources.	Poor quality rehabilitation outcomes if imported topsoil, vegetative material and seedbank was below standard. Poor quality runoff from rehabilitated surfaces effecting water quality.	Environmental	Minimal clearing expected. Erosion and sediment control to be implemented. Clearing will not occur during adverse weather. Adverse Weather TARP			2	3	6	Low	Y
3	1	Decommissioning Phase of Rehabilitation	Impacts on European/ historic heritage items.	Discrepancy between commitments and expectations. Damage to heritage items.	Financial	Conservation Management Plan. Rehabilitation Strategy. Ongoing consultation with stakeholders. Condition reports of items	Ongoing Consultation	Environment department	10	1	10	Low	Y
3	2	Decommissioning Phase of Rehabilitation	Impacts on Aboriginal heritage items.	Damage to heritage items.	Reputation	Heritage Management Plan. No Aboriginal heritage items have been identified on or near Metropolitan Surface Facilities Area	Ongoing Consultation	Environment department	10	1	10	Low	Y
3	3	Decommissioning Phase of Rehabilitation	Contamination resulting from associated activities (e.g. storage and use of hydrocarbons/chemicals, drilling fluids, spillage of dirty or produced saline water, brine, sewage, etc)	Discharge to environment/watercourses. Land contamination. Land remediation costs.	Environmental	Existing site spill kits and controls Dirty water controls Mechanical Engineering Plan requirements			2	3	6	Low	Y

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3	4	Decommissioning Phase of Rehabilitation	Generation of waste products from demolition process (e.g. conveyors, electrical substations, compressors, services [pipes/cables], stores, laydown areas, etc.).	Inappropriate management of waste products.	Environmental	Experienced contractors for demolition works. Waste management processes implemented and reviewed. Inspections of demolition works after completion in conjunction with RR. Waste Management Plan			2	3	6	Low	Y
3	5	Decommissioning Phase of Rehabilitation	Access to underground workings, habitation of structures, underground workings etc. by native fauna (e.g. bats).	Harm to native fauna.	Environmental	All underground mine portals and ventilation shafts to be sealed in accordance with MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams). Temporary barricading of portals			2	2	4	Low	Y
3	6	Decommissioning Phase of Rehabilitation	Unauthorised access to underground workings, habitation of structures, underground workings etc. by members of the public (e.g. squatters).	Harm to persons.	People	All underground mine portals and ventilation shafts to be sealed in accordance with MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams). Temporary barricading of portals Site security and fencing			10	2	20	Low - Med	Y
3	7	Decommissioning Phase of Rehabilitation	Failure to remove all infrastructure that is not to be retained post-closure (e.g. services, infrastructure, roads, carparks, hardstand areas, concrete footings).	Sign off not received from RR and relinquishment delayed.	Compliance / Financial	Site inspections, review of infrastructure, identification of likely contaminated areas. Internal ARO (Asset Requirement Obligations) calculator.	Investigate if transformers underground need to be removed	Environment department	5	2	10	Low	Y
3	8	Decommissioning Phase of Rehabilitation	Failure to remove all hazardous materials (e.g. carbonaceous material on the surface, hazardous wastes, other wastes).	Sign off not received from RR and relinquishment delayed.	Compliance / Financial	Site inspections, review of infrastructure, identification of likely contaminated areas. Internal ARO (Asset Requirement Obligations) calculator. Asbestos Register Waste tracking			5	2	10	Low	Y
3	9	Decommissioning Phase of Rehabilitation	Land contamination sites not successfully identified or remediated resulting in impacts to the environment.	Sign off not received from RR and relinquishment delayed.	Compliance / Financial	Site inspections, review of infrastructure, identification of likely contaminated areas. Internal ARO (Asset Requirement Obligations) calculator.			5	4	20	Low - Med	Y
3	10	Decommissioning Phase of Rehabilitation	Ventilation shafts not sealed adequately.	Harm to persons or native fauna due to gas escape from workings	People	All underground mine portals and ventilation shafts to be sealed in accordance with MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams). Portal seal certified by structural engineer			5	1	5	Low	Y
3	11	Decommissioning Phase of Rehabilitation	Groundwater accumulation in former underground workings (e.g. potential for fill and spill or impacts on regional groundwater users).	Contamination of surface water system with seep from underground workings.	Environmental	No connective cracking to surface minimises risk of groundwater accumulation and seep. All underground mine portals and ventilation shafts to be sealed in accordance with MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams). Portal seal certified by structural engineer <del>Shaft seals to be built below Camp Creek valley floor.</del>			10	1	10	Low	Y
4	1	Landform Establishment Phase of Rehabilitation	Use of inappropriate rehabilitation machinery and equipment.	Landform failure. Unable to achieve completion criteria. Damage to existing vegetation/rehabilitation.	Finance / Reputation (ranked on Finance)	Experienced rehabilitation contractors. QA/QC Processes. Rehabilitation Management Plan. Monitoring programs. Regulator consultation and/or audits. Draw on experience from other Peabody site rehab works			2	2	4	Low	Y
4	2	Landform Establishment Phase of Rehabilitation	Failure of borehole seals. Unknown boreholes	Resealing of boreholes Oxygen ingress to underground workings.	People	No connective cracking to surface minimises risk of groundwater accumulation and seep. All underground mine portals and ventilation shafts to be sealed in accordance with MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams). Portal seal certified by structural engineer	Review historical borehole locations for any possible connections to workings	Environment department	2	3	6	Low	Y

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									Consequence	Likelihood	Risk Level	Risk Level	
4	3	Landform Establishment Phase of Rehabilitation	Final landform instability (e.g. steep slopes, erosion etc.) affecting final land use capability.	Landform failure. Inability to meet final landform criteria. Failure of drift behind seal to surface (sinkhole) Failure to provide access to nearby asset owners (TransportNSW)	Financial	Annual monitoring, erosion and sediment control inspections, LiDAR monitoring. Ongoing maintenance.  Slopes to be designed in consideration of stability of landscape material (CWR) in consultation with Geotech specialist. Current site footprint has remained relatively stable for decades. Revegetation works to help stabilise material Consultation with TransportNSW and potential sale of southern Lot (culvert over Camp Creek)			5	2	10	Low	Y
4	4	Landform Establishment Phase of Rehabilitation	Adoption of inappropriate or inadequate rehabilitation techniques, including equipment fleet.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful. Lack of regulator confidence resulting in issues with other approvals.	Finance / Reputation (ranked on Finance)	Experienced Rehabilitation Contractors Regulator consultation and/or audits. Rehabilitation Management Plan.			5	2	10	Low	Y
4	5	Landform Establishment Phase of Rehabilitation	Landform aspect not suitable for intended target plant species.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful. Lack of regulator confidence resulting in issues with other approvals.	Finance / Reputation (ranked on Finance)	Consultation with flora specialist on land requirements for target species Regulator consultation and/or audits. Rehabilitation Management Plan. Trial of target species currently underway			5	2	10	Low	Y
4	6	Landform Establishment Phase of Rehabilitation	Diversion of surface water runoff away from catchment areas.	Reduced flow in creeks.	Environmental	Surface Facilities Water Management Plan. Site Water Management System. Surface water monitoring program. Final landform designed to meet appropriate standards and minimise catchment areas. Entire surface facilities areas located within single catchment			2	1	2	Low	Y
4	7	Landform Establishment Phase of Rehabilitation	Water availability, on and off site.	Insufficient water available to support landform establishment.	Financial	Consideration of water requirements when designing final landforms. Species selection for site conditions. Undertake establishment during appropriate seasons. Potable water supply and Camp Creek extraction license available.			5	2	10	Low	Y
4	8	Landform Establishment Phase of Rehabilitation	Unstable landform due to erosion and/or mass movement issues associated with inappropriate design and/or quality assurance during landform construction	Landform failure. Inability to meet final landform criteria.	Financial	Slopes to be designed in consideration of stability of landscape material (CWR) in consultation with Geotech specialist. Current site footprint has remained relatively stable for decades.			5	2	10	Low	Y
5	1	Growth Medium Development Phase of Rehabilitation	Use of inappropriate rehabilitation machinery and equipment.	Landform failure. Unable to achieve completion criteria. Damage to existing vegetation/rehabilitation.	Finance / Reputation (ranked on Finance)	Experienced rehabilitation contractors. QA/QC Processes. Rehabilitation Management Plan. Monitoring programs. Regulator consultation and/or audits.			5	2	10	Low	Y
5	2	Growth Medium Development Phase of Rehabilitation	Soil compaction from mining activities.	Insufficient/inadequate topsoil resources to rehabilitate requiring importation of additional resources.	Financial	Ripping to be carried out to break up compaction as required. Incorporation of soil ameliorants and organic matter.			5	2	10	Low	Y
5	3	Growth Medium Development Phase of Rehabilitation	Subsoil and topsoil deficit for rehabilitation activities.	Insufficient/inadequate topsoil resources to rehabilitate requiring importation of additional resources.	Financial	Topsoil to be imported if required. Hydromulching provides surface growth medium/mulch layer			5	2	10	Low	Y
5	4	Growth Medium Development Phase of Rehabilitation	Substrate inadequate to support revegetation (e.g. lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties, exposed hostile geochemical materials, and any other factors impeding the effective rooting depth).	Insufficient/inadequate topsoil resources to rehabilitate requiring importation of additional resources.	Financial	Ripping to be carried out to break up compaction as required. Incorporation of soil ameliorants and organic matter. Good native plant growth observed on recently revegetated CWR batters.			5	2	10	Low	Y
6	1	Ecosystem and Land Use Establishment Phase of Rehabilitation	Lack of availability and quality of seed resources, including genetic integrity.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Reputable supplier. Monitoring program to assess revegetation progress			5	2	10	Low	Y

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									Consequence	Likelihood	Risk Level	Risk Level	
6	2	Ecosystem and Land Use Establishment Phase of Rehabilitation	Ant and insect predation of seed.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Reputable supplier. Monitoring program to assess revegetation progress			5	2	10	Low	Y
6	3	Ecosystem and Land Use Establishment Phase of Rehabilitation	Damage to seed through revegetation process.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Reputable supplier. Monitoring program to assess revegetation progress			5	2	10	Low	Y
6	4	Ecosystem and Land Use Establishment Phase of Rehabilitation	Use of inappropriate rehabilitation machinery and equipment.	Landform failure. Unable to achieve completion criteria. Damage to existing vegetation/rehabilitation.	Finance / Reputation (ranked on Finance)	Experienced rehabilitation contractors. QA/QC Processes. Rehabilitation Management Plan. Monitoring programs. Regulator consultation and/or audits.			5	2	10	Low	Y
6	5	Ecosystem and Land Use Establishment Phase of Rehabilitation	Lack of resources for rehabilitation maintenance.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful. Lack of regulator confidence resulting in issues with other approvals.	Finance / Reputation (ranked on Finance)	Internal ARO (Asset Requirement Obligations) calculator. RCE. Internal budgeting to include rehabilitation activities - five year forecast. Regulator consultation and/or audits. Rehabilitation Management Plan. LOM forecast			10	3	30	Low - Med	Y
6	6	Ecosystem and Land Use Establishment Phase of Rehabilitation	Weed infestation associated with both introduction and control (or lack thereof).	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Completion criteria Monitoring program and Weed management program to be implemented			5	3	15	Low - Med	Y
6	7	Ecosystem and Land Use Establishment Phase of Rehabilitation	Lack of structural integrity of buildings and infrastructure to be retained in final land use.	Collapse/failure of infrastructure to be retained (e.g. heritage items)	People	Structural integrity of structures to be assessed prior to decision to retain/demolish. Consultation with stakeholders. Conservation Management Plan Secure any retained items			10	2	20	Low - Med	Y
6	8	Ecosystem and Land Use Establishment Phase of Rehabilitation	Damage from fauna	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Pest controls (fencing, culling, baiting etc) to be implemented as required.			5	3	15	Low - Med	Y
6	9	Ecosystem and Land Use Establishment Phase of Rehabilitation	Lack of infrastructure to support intended final land use (e.g. fences, watering facilities, etc.). Note: Intended final land uses is native vegetation, minimal infrastructure required.	Rehabilitation fails to meet completion criteria, resulting in additional works being required.	Environmental	Water infrastructure built and managed to applicable design standards. Surface water monitoring. Erosion and sediment controls. Consideration in final landform design.			2	2	4	Low	Y
6	10	Ecosystem and Land Use Establishment Phase of Rehabilitation	Adoption of inappropriate or inadequate rehabilitation techniques, including equipment fleet.	Landform failure. Unable to achieve completion criteria. Damage to existing vegetation/rehabilitation.	Finance / Reputation (ranked on Finance)	Experienced rehabilitation contractors. QA/QC Processes. Rehabilitation Management Plan. Monitoring programs. Regulator consultation and/or audits.			5	2	10	Low	Y
6	11	Ecosystem and Land Use Establishment Phase of Rehabilitation	Inappropriate revegetation species mix for targeted final land use.	Rehabilitation fails to meet completion criteria, resulting in additional works being required.	Financial	Revegetation species and target communities defined Rehabilitation Strategy. Progressive review of rehabilitation as undertaken. Reputable seed provider.			5	2	10	Low	Y
6	12	Ecosystem and Land Use Establishment Phase of Rehabilitation	Weather and climatic influences (e.g. drought, intense rainfall events, bushfire, etc.).	Weather conditions are not appropriate for establishing rehabilitation, resulting in overall delays. Weather conditions result in damage to rehabilitation, resulting in additional works being required to	Financial	Undertake establishment during appropriate seasons. Site well serviced by fire hydrant ring			2	3	6	Low	Y
6	13	Ecosystem and Land Use Establishment Phase of Rehabilitation	Insects and plant disease.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Reputable supplier. Monitoring program to assess revegetation progress. Implement controls as required			5	2	10	Low	Y
6	14	Ecosystem and Land Use Establishment Phase of Rehabilitation	Insufficient establishment of target species and limited species diversity.	Rehabilitation fails to meet completion criteria, resulting in additional works being required.	Financial	Revegetation species and target communities defined Rehabilitation Strategy. Progressive review of rehabilitation as undertaken. Reputable seed provider.			5	2	10	Low	Y

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									Consequence	Likelihood	Risk Level	Risk Level	
6	15	Ecosystem and Land Use Establishment Phase of Rehabilitation	Erosion and failure of drainage and water management	Erosion of landform.	Environmental	Dams to be decommissioned Surface water monitoring. Erosion and sediment controls. Slopes to be designed in consideration of stability of landscape material (CWR) in consultation with Geotech specialist. Current site footprint has remained relatively stable for decades.			5	2	10	Low	Y
6	16	Ecosystem and Land Use Establishment Phase of Rehabilitation	Poor seed viability, seed dormancy.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Revegetation species and target communities defined Rehabilitation Strategy. Progressive review of rehabilitation as undertaken. Reputable seed provider.			5	2	10	Low	Y
6	17	Ecosystem and Land Use Establishment Phase of Rehabilitation	Availability of areas for revegetation in optimal seasonal conditions.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Site revegetation program to consider optimal timing for good revegetation performance			5	2	10	Low	Y
6	18	Ecosystem and Land Use Establishment Phase of Rehabilitation	Poor quality tubestock.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Revegetation species and target communities defined Rehabilitation Strategy. Progressive review of rehabilitation as undertaken. Reputable provider.			5	2	10	Low	Y
7	1	Ecosystem and Land Use Development of Rehabilitation	Weather and climatic influences (e.g. drought, intense rainfall events, bushfire, etc.).	Weather conditions are not appropriate for establishing rehabilitation, resulting in overall delays. Weather conditions result in damage to rehabilitation, resulting in additional works being required to	Financial	Water infrastructure built and managed to applicable design standards. Surface water monitoring. Erosion and sediment controls. Site well serviced by fire hydrant ring.			5	2	10	Low	Y
7	2	Ecosystem and Land Use Development of Rehabilitation	Damage to rehabilitation (e.g. fauna and vandalism)	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Site security. Monitoring program. Signage and fencing.			2	3	6	Low	Y
7	3	Ecosystem and Land Use Development of Rehabilitation	Inadvertent or unauthorised access by mining equipment and vehicles.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Site security. Monitoring program. Signage and fencing. Consultation with TransportNSW for thoroughfare to rail network			2	3	6	Low	Y
7	4	Ecosystem and Land Use Development of Rehabilitation	Insects and plant disease.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Reputable supplier. Monitoring program to assess revegetation progress. Implement controls as required			5	2	10	Low	Y
7	5	Ecosystem and Land Use Development of Rehabilitation	Lack of resources for rehabilitation maintenance.	Rehabilitation inadequate, sign off not received from RR and relinquishment not successful. Lack of regulator confidence resulting in issues with other approvals.	Finance / Reputation (ranked on Finance)	Internal ARO (Asset Requirement Obligations) calculator. RCE. Internal budgeting to include rehabilitation activities - five year forecast. Regulator consultation and/or audits. Rehabilitation Management Plan.			10	3	30	Low - Med	Y
7	6	Ecosystem and Land Use Development of Rehabilitation	Re-disturbance of established rehabilitation areas.	Rehabilitation fails to be established, resulting in additional works being required to meet completion criteria.	Financial	Site security. Monitoring program. Signage and fencing.			2	3	6	Low	Y
8	1	Mine Subsidence Affected Areas	Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.	Cracking presents a risk to the environment, safety and/or the final land use objectives.	Environmental / People / Financial (ranked on Financial)	Stream Remediation Plan. No connective cracking Ongoing monitoring program to confirm cessation of subsidence			10	2	20	Low - Med	Y
8	2	Mine Subsidence Affected Areas	Watercourses subject to subsidence impacts are not hydraulically and geomorphologically stable.	Effects vegetation along previous alignment. Changes to sediment load.	Environmental	Stream Remediation Plan. No connective cracking. Subsidence movements stabilised 3-6 months post mining. Vegetation monitoring program has found no significant effects on riparian vegetation to date			5	2	10	Low	Y
8	3	Mine Subsidence Affected Areas	Riparian vegetation that is the same or better than prior to commencement of mining is not able to be established along watercourses subject to subsidence impacts.	Rehabilitation fails to meet completion criteria, resulting in additional works being required.	Financial	Biodiversity Management Plan. No riparian vegetation impacts requiring remediation have been detected to date.			5	2	10	Low	Y

Likelihood	Likelihood description	Probability	Consequence					
			Low (1)	Minor (2)	Moderate (5)	Significant (10)	Major (25)	Catastrophic (50)
5 - Very Likely	Likely to occur repeatedly – Expected in the work team	10% - 100%	5	10	25	50	125	250
4 - Likely	Probably will occur several times - Expected at this location	1% - 10%	4	8	20	40	100	200
3 - Possible	Could occur intermittently - Expected within Peabody	0.1% - 1%	3	6	15	30	75	150
2 - Unlikely	Could occur but hardly ever - Expected within the mining industry	0.01% - 0.1%	2	4	10	20	50	100
1 - Rare	Improbable or unrealistic - Not expected in the mining industry but seen in other industries	< 0.01%	1	2	5	10	25	50

Consequence Category	P	Consequence descriptions					
		Low	Minor	Moderate	Significant	Major	Catastrophic
Harm to People	P	Near miss, near hit, no medical treatment, report only (RO)	Slightly injured, first aid treatment (FAI)	Medical treatment (MTI), disabling reversible impairment, restricted work (RW) or lost time (LT)	Serious bodily injury or permanent impairment, permanent partial disability (PPD)	Single fatality incident. Total and permanent disability (TPD). Major irreversible health effects	Multiple fatality incident. Major injury / disease among multiple employees
Environmental	E	Negligible or reversible environmental impact Nil to minor remediation (typically a shift) No breach of regulations or requirement to report to regulators	Minor reversible environmental impact, minor remediation (typically < 5 days) Non-compliances and breaches of regulation that may result in a citation (NOV) May require reporting to the regulators	Incident resulting in moderate reversible onsite and/or off-site impact causing short term effect. Moderate remediation required (typically a month) Non-compliances and breaches of regulation that may result in prosecution or citation or punitive fine. Requirement or obligation to report to the regulators	Incident resulting in significant onsite or off-site environmental impact causing medium to long term environmental harm Significant remediation required (typically less than 12 months) Significant legal issues, non-compliances and breaches of regulation that results in a prosecution or citation or fine Moderate litigation issues involving many weeks of senior management time	A major incident resulting in regional environmental impact causing long term environmental harm Major long term remediation required (greater than 12 months) Major litigation or prosecution resulting in long term interruption to operations or loss of licence at a site	Incident resulting in catastrophic widespread regional environmental harm causing disastrous effect Major long term remediation required (over multiple years) Major litigation or prosecution. Loss of License to operate at Multiple sites
Finance (higher of cost or NPV)	F	<\$10,000	\$10,000 - \$100,000	\$100,000 - \$1 mil	\$1 mil - \$20 mil	\$20 mil-\$100 mil	>\$100 mil
Impact on reputation	R	Minor impact, no public concern; Market cap impact < \$20 M (<\$0.07 per share)	Local media or public concern; Market cap impact \$20 M - \$30 M (\$0.07 - \$0.12 per share)	Regional media or public concern. Local criticism; Market cap impact \$30 M - \$100 M (\$0.12 - \$0.40 per share)	National adverse media or public criticism; Market cap impact \$100 M - \$250 M (\$0.40 - \$1.00 per share)	International adverse media or public criticism. International public concern; Market cap impact \$250 M - \$500 M (\$1.00 - \$1.85 per share)	Significant international public or media criticism or condemnation; Market cap impact > \$500 M (> \$1.85 per share)
Law / Compliance / regulatory	C	Minor, one-off violations of law, regulation, permit or policy, minimal fines, penalties or costs	Recurring or systemic minor violations of law, regulation, permit or policy	Violations of law, regulation, permit or policy with moderate fines or penalties, Moderate Litigation, MSHA imminent danger order or similar	Significant violation of law or permit with material fines, penalties or costs. Serious dispute with strategic customer. Major Litigation	Material Litigation. Serious investigation by SEC, DOJ or foreign equivalent. Code of Conduct violations	Criminal investigation or proceedings involving officers or directors. Litigation with allegations of executive fraud or misappropriation
Strategic risk	SR	Event does not have a meaningful impact to Strategic Outlook	Event does not have meaningful impact to Strategic Outlook, but may require further monitoring	Event may have a material impact on near-term outlook for a region or mine	Event has a material impact on strategic outlook for a region or basin that may require a change to operations to mitigate risk	Event causes mines in a region or basin to cease current operations	Event or threat such that BTU would cease to exist as an ongoing concern in coal operations

Risk Score	Notification	Level	Action (H&S)
<11	Crew / team	Same level	Develop a plan (formal or informal) with crew or continue with established plan (SOP etc.) that ensures the task can be completed safely. Team should remain aware for changing conditions.
11 to 30	Supervisor	+1	Develop a formal safe action plan with supervisor and others within the crew (SOP) that identifies all known hazards and details what controls need to be in place and how the task should be performed to ensure it can be completed safely.
31 to 50	Area manager or site GM	+2	Conduct a formalized risk review of existing work process and controls. Explore additional control options that eliminate, substitute or reduce the risk. Monitor controls for effectiveness during the task.
51 - 100	BU Mgt	+3	Controls should be reviewed to ensure risk is as low as reasonably practicable (ALARP), critical controls must be identified and monitored for effectiveness. If risk is not at ALARP, additional controls must be identified and a plan developed for implementation.
101 to 199	ELT	+4	Controls should be added / improved and an additional risk assessment completed for activity to proceed.
200 or greater	CEO	+5	Controls should be added / improved and an additional risk assessment completed for activity to proceed.