



**NSW  
Resources  
Regulator**

FWP0001215

# **ENDEAVOR MINE FORWARD PROGRAM**

Sunday 12 March 2023 to Wednesday 11 March 2026



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# Summary

DETAIL	
Mine	Endeavor Mine
Reference	FWP0001215
Forward program commencement date	Sunday 12 March 2023
Forward program end date	Wednesday 11 March 2026
Forward program revision (if applicable)	
Contact	James Armstrong
Mining leases	ML 158 (1973), ML 161 (1973), ML 160 (1973), ML 930 (1973), ML 159 (1973)
Project location	COBAR OPERATIONS PTY LTD
Date of submission	Friday 18 August 2023

# Important

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

# Three-year forecast – surface disturbance activities

## Project description

The Endeavor Mine (EM) site ('the site') is an underground lead-zinc mine owned by Cobar Operations Pty Ltd (COPL) located in central west New South Wales (NSW) approximately 47 kilometres (km) north of Cobar. Development consent was granted by Cobar Shire Council in February 1976 for an underground mining operation. MLs 158, 159, 160 and 161 were granted in March and August 1976 and ML930 was granted in 1979. Full scale production at the Elura Mine commenced in 1982. In December 2019 mining operations were suspended and on 1 January 2020 the Mine entered a period of care and maintenance. During this stage the Mine will continue to maintain the operation in a state of readiness to enable mining to resume. Under this arrangement Endeavor will continue to meet safety and environmental regulations on site to enable the reopening of the Mine for future operations.

## Description of surface disturbance activities

### Exploration activities

Geological and resource quality data will be provided by exploration activities in the Endeavor Underground area for modeling and planning purposes. Geological data will be used to identify potential ore bodies and resource quality data will be used to determine the economic viability of the ore. The data will be used to create 3D models and inform future exploration and mining activities.

### Construction activities

Currently, no construction activities are planned for the mine. It may be necessary to revisit DA consents for a refrigeration plant or other associated infrastructure as part of a pre-feasibility study. In the event that this changes, a new forward program will be developed and submitted to the department for approval.

### Mining schedule

Mining development method and sequencing and general mine features.

Endeavor has not current mining development. The mine will remain in care and maintenance for the period of this forward program. As part of the pre-feasibility study a mining production schedule will be developed and if production is feasible a revised forward program will be submitted to the regulator for approval

Areas identified for emplacements, the sequencing of emplacements, construction, and management.

Due to the absence of production at Endeavor mine, ROM is not being used. In the next three years, no new emplacements are planned

Processing infrastructure activities and the location of tailings facilities and schedule for emplacement

Endeavor are not actively depositing any tailing into CTD TSF or Sector 5 TSF and do not plan to do so within the next three years.

Waste disposal and materials handling operations.

Endeavor generates minimal waste and this is managed and taken offsite by a licensed contractor. The waste is then recycled, reused or disposed of in an appropriate manner. Endeavor is committed to reducing and managing its environmental impacts and to preserving the natural environment. We are continually looking for ways to minimize our environmental footprint.

## Key production milestones

MATERIAL	UNIT	YEAR 1	YEAR 2	YEAR 3
<b>Stripped topsoil</b> (if applicable)	(m <sup>3</sup> )	0	0	0
<b>Rock/overburden</b>	(m <sup>3</sup> )	0	0	0
<b>Ore</b>	(Mt)	0	0	0
<b>Reject material<sup>1</sup></b>	(Mt)	0	0	0
<b>Product</b>	(Mt)	0	0	0

<sup>1</sup> This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

# Three-year rehabilitation forecast

## Rehabilitation planning schedule

### Rehabilitation planning schedule

Endeavor will undertake over the next three year the following works;

- Continue with the Hardpan capping study conducted by UQ
- Stabilize top soil erosion

### Stakeholder consultation

Consultation with landowners, residents, stakeholders, and regulatory bodies associated with Endeavor Mine has been consistent and open through personal contact, meetings and other communications. A future community program is being planned by Endeavor in conjunction with the possible pre-feasibility study completed by PolyMetals. The RMP is currently on public display on the CBH website and has received very little feedback.

### Rehabilitation studies, risk assessments and/or design work

The main study being undertaken for the site is the hardpan trial by the University of Queensland. Further minor studies may commence over the course of the year looking at capping material for rehabilitation of the outside of the tailing dam. The University of Queensland is running the trial to assess the effectiveness of using hardpan for rehabilitating tailing dams. This study will inform future rehabilitation efforts. A final report is expected to be released within three years. The study will focus on the performance of the hardpan in terms of tailing retention and capping strength. The results of the trial will be used to develop best practices for rehabilitation of tailing dams. The research team will also assess the economic benefits of hardpan for tailing dam rehabilitation within the RCE.

## Rehabilitation research and trials

RRT NUMBER	PROJECT/TRIAL NAME	OBJECTIVE OF TRIAL/PROJECT	METHODOLOGY	EXPECTED DATE OF COMPLETION	STATUS
RRT0001102	<b>Testing Tailings Hard</b>	To establish the optimal conditions for redeveloping a hardpan	Following the initial investigation in December 2020 of the extent of natural hardpanning versus age, including physical and biological factors, a series of four trials was established. Two plots of disturbed tailings were covered with waste rock and one of the uncovered plots and one of the covered plots were irrigated with acidic mine water, while the other two were subjected to rainfall only. The plots were sampled for physical and biological testing in December 2020, April 2021 and March 2	31 Dec 2023	Ongoing

## Rehabilitation maintenance and corrective actions

Throughout the Forward Program, an ongoing rehabilitation monitoring program will be in place. In the program, performance indicators from Endeavor's RMP will be used to assess changes over time and mine footprint using methodologies that can provide quantitative data.

These include;

- Spatial Data capture using UAV's or other forms of Remote Sensing
- Landscape Function Analysis
- Soil, Water and Air quality testing
- Subsidence Monitoring

## Rehabilitation schedule

This forward program will involve rehabilitation of several areas outlined in the spatial data. Further Endeavor will continue with several pest and weed programs, such as the feral goat program and weed spraying. The program will also involve the investigation and replanting of native species in the new rehabilitation area. Fencing will also be reviewed in relation to rehabilitation success. Monitoring and maintenance of the area will be an ongoing responsibility to ensure previous rehabilitation efforts succeed. In addition, maintenance will be undertaken on mine leases outside of the mining disturbance area as part of environmental stewardship.

## Subsidence remediation for underground operations

Mt Elura was created as a mitigation area for further movement to the previous subsidence at Endeavor. This will continue to be monitored for movement using qualified surveyors. As no mining is being undertaken there and voids were reviewed and filled prior to closure and maintenance there is very little risk of any future slips or movement in this area.



## Progressive mining and rehabilitation statistics

### Three-yearly forecast cumulative disturbance and rehabilitation progression

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
A Total surface disturbance footprint	(ha)	0	0	0
B Total active disturbance	(ha)	-1.36	-2.17	-6.27
P Total new area of land proposed for active rehabilitation	(ha)	1.36	2.17	6.27

### Rehabilitation key performance indicators (KPIs)

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
O Total new active disturbance area	(ha)			
P Total new area of land proposed for active rehabilitation during the reporting period	(ha)	1.36	0.82	4.1
Q Annual rehabilitation to disturbance ratio				

# Attachment 1 – Reporting Definitions

REPORTING CATEGORY		DEFINITION
<b>A</b>	Total disturbance footprint – surface disturbance	<p>All areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to surface disturbance activities.</p> <p>The total disturbance footprint is the sum of the total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem and land use establishment, ecosystem and land use development and rehabilitation completion (see definitions below).</p> <p>Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.</p>
<b>B</b>	Total active disturbance	<p>Includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).</p>
<b>C</b>	Rehabilitation – land preparation	<p>Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation– decommissioning, landform establishment and growth medium development.</p> <p>Refer to the glossary of terms in this document for the definition of these phases of rehabilitation.</p>
<b>D</b>	Ecosystem and land use establishment	<p>Includes the area which has been seeded/planted with the target vegetation species for the intended final land use. However, vegetation has not matured to a stage where it can be demonstrated that it will be sustainable for the long term and or require only a maintenance regime consistent with target reference/analogue sites.</p> <p>Typically, rehabilitation areas would be in this phase for at least two years (and usually more) before rehabilitation can be classified as being in the ecosystem and land use development phase. This phase does not apply to infrastructure areas that are being retained as part of final land use for the site.</p>

REPORTING CATEGORY	DEFINITION
O	The area of any new active disturbance that will be created during the next three years, as defined under definition A1 (definition A1 Table 5).
P	The sum of any new rehabilitation to be commenced in the next three years. These areas may be in the phases “Rehabilitation - Land Preparation” or the “Ecosystem & Land Use Establishment” (definitions C & D in Table 5).
Q	The rehabilitation to disturbance ratio (S / R) indicates how many hectares of new rehabilitation are undertaken for each hectare of land disturbed during the three years. A ratio of 1/1 indicates that the area of new rehabilitation and disturbance in that period are the same.

## Attachment 2 – Definitions

WORD	DEFINITION
<b>Active</b>	In the context of rehabilitation, land associated with mining domains is considered ‘active’ for the period following disturbance until the commencement of rehabilitation.
<b>Active mining phase of rehabilitation</b>	In the context of rehabilitation, the active mining phase of rehabilitation constitutes the rehabilitation activities undertaken during mining operations such as salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes such as selective handling of waste rock and management of tailings emplacements.
<b>Analogue site</b>	In the context of rehabilitation, an analogue site is a ‘reference site’ that represents an example of the defining characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and completion criteria for final land use domains.
<b>Annual rehabilitation report and forward program</b>	As described in the Mining Regulation 2016.
<b>Annual reporting period</b>	As defined in the Mining Regulation 2016.
<b>Closure</b>	A whole-of-mine-life process, which typically culminates in the relinquishment of the mining lease. It includes decommissioning and rehabilitation to achieve the approved final land use(s).
<b>Decommissioning</b>	The process of removing mining infrastructure and removing contaminants and hazardous materials.
<b>Decommissioning Phase of Rehabilitation</b>	Activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the rehabilitation management plan 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 use(s) following lease relinquishment.

WORD	DEFINITION
<b>Department</b>	The Department of Regional NSW.
<b>Disturbance</b>	See Surface Disturbance.
<b>Disturbance area</b>	<p>An area that has been disturbed and that requires rehabilitation.</p> <p>This may include areas such as on-licence exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped), and areas requiring rehabilitation that are temporarily stabilised (i.e. managed to minimise dust generation and/or erosion).</p>
<b>Domain</b>	<p>An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use.</p>
<b>Ecosystem and Land Use Development</b>	<p>This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved rehabilitation objectives and completion criteria.</p> <p>For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.</p> <p>This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.</p>
<b>Ecosystem and Land Use Establishment</b>	<p>This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform.</p> <p>For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.</p>
<b>Exploration</b>	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

WORD	DEFINITION
<b>Final landform and rehabilitation plan</b>	As defined in the Mining Regulation 2016.
<b>Final land use</b>	As defined in the Mining Regulation 2016.
<b>Form and way</b>	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website.
<b>Growth Medium Development</b>	<p>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).</p> <p>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.</p>
<b>Habitat</b>	Has the same meaning as that term under the <i>Biodiversity Conservation Act 2016</i> and the <i>Fisheries Management Act 1994</i> (as relevant).
<b>Indicator</b>	An attribute of the biophysical environment (e.g. pH, topsoil depth, biomass) that can be used to approximate the progression of a biophysical process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion (i.e. defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.
<b>Land</b>	As defined in the <i>Mining Act 1992</i> .
<b>Landform Establishment</b>	<p>This phase of rehabilitation consists of the processes and activities required to construct the final landform.</p> <p>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 such as tailings, and prepare a substrate with the desired physical and chemical characteristics (e.g. rock raking or ameliorating sodic materials).</p>
<b>Large mine</b>	As defined in the Mining Regulation 2016.
<b>Lease holder</b>	The holder of a mining lease.

WORD	DEFINITION
<b>Life of mine</b>	The timeframe of how long a mine is approved to mine, from commencement to closure.
<b>Mine rehabilitation portal</b>	<p>Means the NSW Resources Regulator's online portal that lease holders must use (via a registered account) to:</p> <ul style="list-style-type: none"> <li>■ upload rehabilitation geographical information system (GIS) spatial data</li> <li>■ develop rehabilitation GIS spatial data (using online tracing functions)</li> <li>■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities.</li> </ul> <p>Data submitted to the mine rehabilitation portal is collated in a centralised geodatabase for use by the NSW Resources Regulator to regulate rehabilitation performance of lease holders.</p>
<b>Mining area</b>	As defined in the <i>Mining Act 1992</i> .
<b>Mining domain</b>	A land management unit with a discrete operational function (e.g. overburden emplacement), and therefore similar geophysical characteristics, that will require specific rehabilitation treatments to achieve the final land use(s).
<b>Mining land</b>	As defined in the <i>Mining Act 1992</i> .
<b>Native vegetation</b>	Has the same meaning as that term under section 60B of the <i>Local Land Services Act 2013</i> .
<b>Overburden</b>	Material overlying coal or a mineral deposit.
<b>Performance indicator</b>	An attribute of the biophysical environment (for example pH, slope, topsoil depth, biomass) that can be used to demonstrate achievement of a rehabilitation objective. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion, that is, a defined end point. It may be aligned to an established protocol and used to evaluate changes in a system.

WORD	DEFINITION
<b>Phases of rehabilitation</b>	<p>The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are:</p> <ul style="list-style-type: none"> <li>■ active mining</li> <li>■ decommissioning</li> <li>■ landform Establishment</li> <li>■ growth medium development</li> <li>■ ecosystem and land use establishment</li> <li>■ ecosystem and land use development.</li> </ul>
<b>Progressive rehabilitation</b>	The progress of rehabilitation towards achieving the approved rehabilitation completion criteria. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.
<b>Rehabilitation Completion</b>	<p>The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of <i>Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate</i> application by the lease holder.</p>
<b>Rehabilitation Completion criteria</b>	As defined in the Mining Regulation 2016.
<b>Rehabilitation cost estimate</b>	As defined in the Mining Regulation 2016.
<b>Rehabilitation management plan</b>	As defined in the Mining Regulation 2016.
<b>Rehabilitation objectives</b>	As defined in the Mining Regulation 2016.
<b>Rehabilitation risk assessment</b>	As defined in the Mining Regulation 2016.
<b>Rehabilitation schedule</b>	The defined timeframes for progressive rehabilitation set out in the forward program.



WORD	DEFINITION
<b>Relevant stakeholders</b>	Means any persons or bodies who may be affected by the mining operations, including rehabilitation, carried out on the lease land, and includes: <ul style="list-style-type: none"> <li>■ the relevant development consent authority</li> <li>■ the local council</li> <li>■ the relevant landholder(s)</li> <li>■ community consultative committee (if required under the development consent) or equivalent consultative group</li> <li>■ affected land holder(s)</li> <li>■ government agencies relevant to the final land use</li> <li>■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities)</li> <li>■ local Aboriginal communities, and</li> <li>■ any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.</li> </ul>
<b>Risk</b>	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2009).
<b>Secretary</b>	The Secretary of the Department.
<b>Security deposit</b>	An amount that a mining lease holder is required to provide and maintain under a mining lease condition, to secure funding for the fulfilment of obligations under the lease (including obligations that may arise in the future).
<b>Surface disturbance</b>	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
<b>Tailings</b>	A combination of the fine-grained solid material remaining after the recoverable metals and minerals have been extracted from the mined ore, and any process water <sup>2</sup> .
<b>Waste</b>	Has the same meaning as that term under the <i>Protection of the Environment Operations Act 1997</i> .

<sup>2</sup> Commonwealth of Australia (DITR), 2007. *Tailings Management*.

## Attachment 3 – Plans

Endeavor 2A.pdf

Endeavor 2B.pdf

Endeavor 2C.pdf

Forward Program (LARGE MINE) v2.1