



**NSW
Resources
Regulator**

FWP0001132

CASTLE MOUNTAIN ZEOLITES FORWARD PROGRAM

Saturday 4 June 2022 to Tuesday 3 June 2025



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Summary

DETAIL

Mine	Castle Mountain Zeolites
Reference	FWP0001132
Forward program commencement date	Saturday 4 June 2022
Forward program end date	Tuesday 3 June 2025
Forward program revision (if applicable)	
Contact	Gordon Atkinson
Mining leases	ML 1395 (1992)
Project location	Castle Mountain Enterprises Pty Ltd
Date of submission	Monday 24 April 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

Development approval DA 59/95 was issued 23 October 1995 in perpetuity by the then Quirindi Shire Council providing Castle Mountain Enterprises Pty Limited consent to extract zeolite rock and to process it by crushing and transporting it in respect to Part Lot 5 and Portion 314, Parish of Quirindi.

The mining and processing of zeolite rock within these parcels of land is contained within the 152.8ha area defined by ML 1395 (Act 1992).

Description of surface disturbance activities

Exploration activities

No exploration activities proposed within ML1395 within the next 3 years.

Construction activities

New and improved mine haul road constructed during Year 1 using overburden rock blasted from 535m bench development.

Further construction and extension to processing plant and shed storage facilities under consideration within current infrastructure disturbance footprint and subject to LGA approval.

Mining schedule

Mining development method and sequencing and general mine features.

Conventional open cut mining methods will continue to be employed by the Mine Operator - Castle Mountain Mining Pty Ltd at the Castle Mountain Zeolites (CMZ) mine together with processing of both zeolite rock and overburden to produce a range of sized zeolite and crushed rock products. Blasting is undertaken on a campaign basis by drill and blast contractors. Mining within the current 1.7ha zeolite mine is typically undertaken by excavator with truck haulage to crushing and screening plant located within the 2.7ha processing plant and stockpile area located approximately 500m east.

During this first 3-year forward program commencing 4 June 2022 a revised mine development and rehabilitation plan was implemented comprising improved haul road access for mine development at the 535m bench elevation as indicated on Plan 2A for Forecast Data - Yr 1. The existing southern "upper slopes" are in the process of being re-profiled ahead of mine development to improve final landform stability following previous slippage issues.

Proposed mine development during Yr 2 and Yr 3 continues westward from Yr 1 following the 535m contour as shown in the forecast disturbance areas included on Plan 2B and Plan 2C. This sequence of mine development provides improved bench access to both the newly exposed upper zeolite seam and the currently mined lower zeolite seam. Zeolite mining of 10,000tpa requiring up to 40,000tpa of OB/rock removal is proposed with 20,000tpa re-processed into crushed rock.

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

The existing overburden emplacement area occupies an area of approximately 0.8ha and contains overburden rock (conglomerate and sandstones) from initial exposure of the lower zeolite seam.

Improved resource utilisation including the crushing and screening of these former overburden materials together with the processing of lower grade zeolite rock has not only increased the use and efficiency of resources but has reduced the area required for longer term "concept life of mine" overburden emplacement to approximately 1.3ha.

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

The processing plant and stockpile area occupies an area of approximately 2.7ha located approximately 500m east of mining operations as shown on Plans 2A, 2B and 2C.

Primary and secondary crushing and screening circuits produce a range of sized zeolite products that typically include 85% less than 40 and 76 micron powders, less than 0.5 and 2.2mm "sand" and a 0.5 to 8mm range of "grits" together with crushed rock materials ranging in size from 20mm to plus 40mm.

Automated bagging facilities and 1tonne "bulka bag" product storage is provided within the processing plant sheds. Processing plant may operate 24 hours per day, 7 days per week subject to market demand. Processing operations make use of "off-peak" power.

Waste disposal and materials handling operations.

Improved resource utilisation including the crushing and screening of former overburden materials ((conglomerate and sandstones) together with the processing of lower grade zeolite

rock has both increased the use and efficiency of resources and most importantly reduced waste.

Waste disposal and materials handling comprise the following.

- Putrescible wastes are collected in designated bins and disposed off-site at the Liverpool Shire Plains Shire Council – Quirindi Waste Management Facility.
- Re-cycling of waste materials and packaging including paper/cardboard, pallets and bulka bags continues to be undertaken.
- In accordance with Condition No 10, Conditions of Consent, DA No. 59/95, the nominated fuel, oil and consumables storage area at CMZ's crushing and production plant facilities is contained and has been provided with a bunded enclosure and overflow storage system to eliminate accession of potential hydrocarbon contamination to groundwater.
- To minimise potential hydrocarbon spillage, re-fueling of mobile plant with diesel is via a "mobile, contained 100litre fuel drum transfer system"
- Spill kits and an adequate supply of zeolite product is available on site for immediate control of any minor hydrocarbon spillages.

Key production milestones

MATERIAL	UNIT	YEAR 1	YEAR 2	YEAR 3
Stripped topsoil (if applicable)	(m ³)	0	0	0
Rock/overburden	(m ³)	0.04	0.04	0.04
Ore	(Mt)	0.01	0.01	0.01
Reject material¹	(Mt)	0.01	0.01	0.01
Product	(Mt)	0.03	0.03	0.03

¹ This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

Three-year rehabilitation forecast

Rehabilitation planning schedule

Rehabilitation planning schedule

During this first 3-year forward program commencing 4 June 2022 a revised mine development and rehabilitation plan was implemented comprising improved haul road access to the 535m bench level and progressive re-profiling of the existing southern "upper slopes" ahead of "western" mine development to improve final landform stability following previous slippage issues.

Over the next 3Yr period but subject to actual mine development, landform rehabilitation is planned over the areas shown on Plans 2A, 2B and 2C being 0.36ha, 0.19ha and 0.15ha respectively.

Revegetation trials to commence as soon as reasonably practicable subject to successful landform rehabilitation outcomes and favorable weather conditions.

Stakeholder consultation

No "outside" stakeholder consultation is planned. The mine owner is the majority landholder. Deed of Grant of Licence in place covering small area of adjoining Lot 3142 in DP1134392 for access and land use.

Rehabilitation studies, risk assessments and/or design work

In developing the Rehabilitation Management Plan (RMP) CMZ has sought both geotechnical advice in regard landform stability and rehabilitation / revegetation advice in the preparation of a rehabilitation repair strategy. Subject to successful landform rehabilitation outcomes over the next 3Yr period revegetation techniques as outlined in the rehabilitation strategy will be implemented initially on a trial basis. Further consultation as required will be undertaken with both the land and rehabilitation specialist and local Landcare nursery.

Rehabilitation research and trials

RRT NUMBER	PROJECT/TRIAL NAME	OBJECTIVE OF TRIAL/PROJECT	METHODOLOGY	EXPECTED DATE OF COMPLETION	STATUS
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Rehabilitation maintenance and corrective actions

To be developed following first annual rehabilitation report for 12 months ending 3 June 2023.

Rehabilitation schedule

The proposed landform rehabilitation over the three areas identified on Plans 2A, 2B and 2C being 0.36ha, 0.19ha and 0.15ha respectively is subject to the proposed mine development including clean-up and reprofiling of the existing southern "upper slopes" where remnant zeolite material is likely to be mined. In addition the mining rate of 10,000tpa of zeolite is subject to ongoing economic and market conditions.

Yr 1 forecast land prepared for rehabilitation of approximately 0.36ha is considered the most likely area to be available for trialing revegetation techniques during this first 3Yr forward program.

Rehabilitation trials and research presented as a "Rehabilitation Repair Strategy" in the RMP yet to be implemented.

Subsidence remediation for underground operations

No underground operations.

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)	6.43	6.92	7.53
B Total active disturbance	(ha)	6.07	6.37	6.83
C Land prepared for rehabilitation	(ha)	0.36	0.55	0.7
D Ecosystem and land use establishment	(ha)	0	0	0

Rehabilitation key performance indicators (KPIs)

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
O Total new active disturbance area	(ha)	0.56	0.5	0.61
P Area proposed for active rehabilitation	(ha)	0.36	0.19	0.15
Q Annual rehabilitation to disturbance ratio		0.64	0.39	0.25

Attachment 1 – Reporting Definitions

REPORTING CATEGORY		DEFINITION
A	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	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>
C	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>
D	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
Active	In the context of rehabilitation, land associated with mining domains is considered ‘active’ for the period following disturbance until the commencement of rehabilitation.
Active mining phase of rehabilitation	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.
Analogue site	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.
Annual rehabilitation report and forward program	As described in the Mining Regulation 2016.
Annual reporting period	As defined in the Mining Regulation 2016.
Closure	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).
Decommissioning	The process of removing mining infrastructure and removing contaminants and hazardous materials.
Decommissioning Phase of Rehabilitation	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
Department	The Department of Regional NSW.
Disturbance	See Surface Disturbance.
Disturbance area	<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>
Domain	<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>
Ecosystem and Land Use Development	<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>
Ecosystem and Land Use Establishment	<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>
Exploration	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

WORD	DEFINITION
Final landform and rehabilitation plan	As defined in the Mining Regulation 2016.
Final land use	As defined in the Mining Regulation 2016.
Form and way	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website.
Growth Medium Development	<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>
Habitat	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).
Indicator	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.
Land	As defined in the <i>Mining Act 1992</i> .
Landform Establishment	<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>
Large mine	As defined in the Mining Regulation 2016.
Lease holder	The holder of a mining lease.

WORD	DEFINITION
Life of mine	The timeframe of how long a mine is approved to mine, from commencement to closure.
Mine rehabilitation portal	<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"> ■ upload rehabilitation geographical information system (GIS) spatial data ■ develop rehabilitation GIS spatial data (using online tracing functions) ■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities. <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>
Mining area	As defined in the <i>Mining Act 1992</i> .
Mining domain	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).
Mining land	As defined in the <i>Mining Act 1992</i> .
Native vegetation	Has the same meaning as that term under section 60B of the <i>Local Land Services Act 2013</i> .
Overburden	Material overlying coal or a mineral deposit.
Performance indicator	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
Phases of rehabilitation	<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"> ■ active mining ■ decommissioning ■ landform Establishment ■ growth medium development ■ ecosystem and land use establishment ■ ecosystem and land use development.
Progressive rehabilitation	<p>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.</p>
Rehabilitation Completion	<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>
Rehabilitation Completion criteria	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation cost estimate	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation management plan	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation objectives	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation risk assessment	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation schedule	<p>The defined timeframes for progressive rehabilitation set out in the forward program.</p>

WORD	DEFINITION
Relevant stakeholders	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"> ■ the relevant development consent authority ■ the local council ■ the relevant landholder(s) ■ community consultative committee (if required under the development consent) or equivalent consultative group ■ affected land holder(s) ■ government agencies relevant to the final land use ■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities) ■ local Aboriginal communities, and ■ any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.
Risk	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2009).
Secretary	The Secretary of the Department.
Security deposit	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).
Surface disturbance	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
Tailings	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 ² .
Waste	Has the same meaning as that term under the <i>Protection of the Environment Operations Act 1997</i> .

² Commonwealth of Australia (DITR), 2007. *Tailings Management*.

Attachment 3 – Plans

Plan 2A_Forecast data_Year1_190423_v1.pdf

Plan 2B_Forecast data_Year2_190423_v1.pdf

Plan 2C_Forecast data_Year3_190423_v1.pdf

Forward Program (LARGE MINE) v2.1