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Forward Program

Escott Zeolite Mine

Zeolite Australia Pty Ltd

Werris Creek NSW 2341

Prepared by:

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SLR Project No.: 630.30206.00000

18 August 2023

Revision: 01

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	18 August 2023	Stephen Shoesmith	Andrew O'Brien	Stephen Shoesmith

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Zeolite Australia Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Summary

Mine	Escott Zeolite Mine
Reference	<portal generated=""></portal>
Forward program commencement date	1 January 2023
Forward program end date	31 December 2025
Forward program revision (if applicable)	N/A
Contact	Gerard Stephen
Mining Leases	ML 1356
Project Location	Werris Creek NSW
Date of Submission	18 August 2023

1.0 Forward Program

1.1 Three Year Forecast – Surface Disturbance Activities

1.1.1 **Project Description**

Escott Zeolite Mine (Zeolite) is an open cut zeolite mine owned and operated by Zeolite Australia Pty Limited (ZAPL). Zeolite comprises Mining Lease (ML) 1356, and is located approximately 1.5km South of Werris Creek and 11km North-Northwest of Quirindi New South Wales, within an area defined as the Gunnedah Coalfield. Zeolite currently operates under the conditions and commitments of ML 1356 and EPL 6378. Zeolite is approved to produce up to 30,000 T of Zeolite annually.

ZAPL is currently undertaking mine optimisation planning activities, which may include infrastructure upgrades and conducting mining operations in additional areas. These works are acknowledged but have not been included within the Forward Program. ZAPL will notify the Resources Regulator within 10 days of making an application for development consents (Obligation: Notify of development applications Schedule 8A. Clause 20).

1.1.2 Exploration Activities

There are no exploration activities currently planned to be undertaken during the forward program.

1.1.3 Construction Activities

There are no construction activities currently planned to be undertaken during the forward program.

1.1.4 Mining Schedule

1.1.4.1 Mining Development Method and Sequencing and General Mine Features

There are several new disturbance areas proposed during the forward program, with mining activities to be undertaken within the current and expanded disturbance footprint.

Key mining activities to be undertaken during the Forward Program include:

- Continued open cut mining in the Main Pit North with Zeolite to be extracted at a rate • of 15.000 tonnes (YR 1), 17.500 tonnes (YR 2), and 20.000 (YR 3) tonnes.
- Commencement of pre strips areas and mining to the south and west of the Main Pit • North and associated with the overburden dump to the east:
- Progressive rehabilitation activities across the Forward Program is not available. Opportunities to advance rehabilitation will be investigated as part of future Forward Programs.

1.1.4.2 Areas Identified for Emplacements, the Sequencing of Emplacements, **Construction and Management**

Emplacement of overburden at the eastern emplacement will be prioritised across the Forward Program. Opportunities for backfilling and inpit dumping is limited across the next three years. Opportunities to advance emplacement rehabilitation will be investigated as part of future Forward Programs.

1.1.4.3 **Processing Infrastructure Activities and the Location of Tailings Facilities and Schedule for Emplacement**

There is no rejects or tailings produced at Zeolite.

1.1.4.4 Waste Disposal and Materials Handling

Non mining wastes will continue to be stored in designated areas and managed in accordance with the site waste Management Plan. Licensed contractors are engaged to transport waste to designated licensed waste facilities.

1.1.4.5 **Production**

The material production schedule for the next three years is provided in Table 1

Material	Unit	Year 1	Year 2	Year 3
Stripped topsoil (if applicable)	m ³	1044	389	510
Rock/overburden (waste rock)	m ³	15,000	10,000	5,000
Ore	Mt	0.02*	0.02*	0.02*
Reject material	Mt	0	0	0
Product	Mt	0.02*	0.02*	0.02*
*Rounded Total generated by the Resources Regulator Portal				

Table 1: **Key Production Milestones**

1.2 Three Year Rehabilitation Forecast

1.2.1 **Rehabilitation Planning**

ZAPL is currently undertaking mine optimisation planning activities, which may include infrastructure upgrades and conducting mining operating is additional areas. Notwithstanding, these activities would be subject to modifications and/or approvals and have not been discussed in detail within this Forward Program. Key planning works being undertaken across the forward program for approved activities include:

Implementation of the Rehabilitation Management Plan •

- Planning and executing rehabilitation maintenance activities
- Planning for landform and drainage design works
- Implementation of the actions identified within the Rehabilitation Risk Assessment.

1.2.2 Stakeholder Engagement

Consultation with stakeholders over the next three years will focus on submission of the Annual Rehabilitation Report.

Consultation will be undertaken with Council, Agencies and other stakeholders with regard to the mine optimisation planning activities, which may include infrastructure upgrades and conducting mining operations in additional areas.

1.2.3 Rehabilitation Studies, Risk Assessments and / or Design Work

An inaugural risk assessment workshop was undertaken on 18 May 2022. The workshop was used to identify the key issues that presented a risk to achieving satisfactory rehabilitation at Zeolite. The risk assessment for this RMP was performed in conjunction with ZAPL and SLR, detailing the potential rehabilitation risks for this specific site. An update to the rehabilitation risk assessment was undertaken in August 2023 as part of updates to the Forward Program and Rehabilitation Objectives. Risk Assessment actions will be implemented across the Forward Program. Key actions include:

- Revision to Site Rehabilitation Procedures
- Review of the site Topsoil balance
- Development of closure planning processes

1.2.4 Rehabilitation Research and Trials

There are no rehabilitation research and trials proposed to be implemented during the Forward Program.

1.2.5 Rehabilitation Maintenance and Corrective Actions

Rehabilitation objectives and criteria were established as part of developing the RMP in 2022. Commencement of the site rehabilitation monitoring program will be in 2023.

Maintenance and corrective actions identified during the 2023 monitoring will be consolidated into an Action Plan and progressively actioned across the Forward Program.

1.2.6 Rehabilitation Schedule

Progressive rehabilitation activities across the Forward Program is not available. Opportunities to advance rehabilitation will be investigated as part of future Forward Programs.

During the Forward Program, rehabilitation maintenance activities will be undertaken on rehabilitation areas within ML1356 completed prior to 2018.

Opportunities to advance emplacement rehabilitation will be investigated as part of future Forward Programs.

1.2.7 Subsidence Remediation for Underground Operations

Subsidence Remediation is not applicable. Zeolite is an open cut mine.

1.3 Progressive Mining and Rehabilitation Statistics

1.3.1 Three Yearly Forecast Cumulative Disturbance and Rehabilitation Progression

The three yearly forecast for cumulative disturbance and rehabilitation progression is provided in **Table 2**.

Table 2: Predicted Cumulative Disturbance and Rehabilitation Progression

Year	1	2	3
TOTAL DISTURBANCE FOOTPRINT – SURFACE DISTURBANCE (hectares) (A)	5.39	5.78	6.29
TOTAL ACTIVE DISTURBANCE (hectares) (B)	3.69	4.08	4.59
TOTAL NEW AREA OF LAND PROPOSED FOR ACTIVE REHABILITATION (ha) (hectares) (P)	0	0	0

*Note: Definitions for each key performance indicator are provided in Table 4.

1.3.2 Rehabilitation Key Performance Indicators (KPIs)

Table 3: Progressive Rehabilitation Key Performance Indicators

Year	1	2	3
TOTAL NEW ACTIVE DISTURBANCE AREA DURING REPORTING PERIOD (hectares) (O)*	1.04	0.39	0.51
TOTAL NEW AREA OF LAND PROPOSED FOR ACTIVE REHABILITATION DURING THE REPORTING PERIOD (hectares) (P)*	0	0	0
ANNUAL REHABILITATION TO DISTURBANCE RATIO (Q)*	0	0	0

Table 4: Progressive Rehabilitation KPI Categories

Reporting category	Definition
А	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.
	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).
	Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.
В	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).
С	Includes the sum of all disturbed land within a mining lease that has commenced any, or all, of the following phases of rehabilitation – decommissioning, landform establishment and growth medium development.
	Refer to the glossary for the definition of these phases of rehabilitation.

Reporting category	Definition
D	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. 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.
E	Rehabilitation has matured to a level where target revegetation outcomes are on a trajectory towards meeting the approved rehabilitation objectives and rehabilitation completion criteria (as verified by monitoring). This phase includes infrastructure areas that are to be retained for an approved final land use, following completion of all necessary measures to render the infrastructure fit for this purpose (for example structural integrity).
0	The area of any new active disturbance that will be created during the next three years, as defined under definition A1 (definition A1 Table 8).
Р	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 and Land Use Establishment" (definitions C and D in Table 8).
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.

1.3.3 Rehabilitation Cost Estimate

A Rehabilitation Cost Estimate for Zeolite has been submitted to the Resources Regulator Portal (https://nswresourcesregulator.service-now.com/regulator).

1.3.4 Submission of Plan 2 Electronic Copy (PDF)

The Forward Program (Plan 2) detailed surface disturbance activities for the next three years was submitted to the mine rehabilitation portal. The rehabilitation in year 1 is provided in **Figure 1**, the rehabilitation in year 2 is provided in **Figure 2** and the rehabilitation in year 3 is provided in **Figure 3**.



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ZEOLITE MINE REHABILITATION MANAGEMENT

MINING AND REHABILITATION YEAR 1 - 2023

Plan 2A

LEGEND



Current Authorisation - ML1356

Disturbance



Overburden Emplacement Area Active Mining Area (Open cut void)



Water Management Area

Forcast Area

Forecast Disturbance

Rehabilitation Phase

Ecosystem and Land Use Development

NSW SS Basemap: Max Basemap: Maxar Project Approval Boundary: © State Government of NSW and Department of Regional New South Wales 2019 High resolution imagery: Zeolite Mine - Stewart Surveys (2023)

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Drawn by:	JH	



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ZEOLITE MINE REHABILITATION MANAGEMENT

MINING AND REHABILITATION YEAR 2 - 2024

Plan 2B

LEGEND



Current Authorisation - ML1356

Disturbance



Overburden Emplacement Area Active Mining Area (Open cut void)



Water Management Area

Forcast Area

Forecast Disturbance

Rehabilitation Phase

Ecosystem and Land Use Development

NSW SS Basemap: Max Basemap: Maxar Project Approval Boundary: © State Government of NSW and Department of Regional New South Wales 2019 High resolution imagery: Zeolite Mine - Stewart Surveys (2023)

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ZEOLITE MINE REHABILITATION MANAGEMENT

MINING AND REHABILITATION YEAR 2 - 2024

Plan 2B

LEGEND



Current Authorisation - ML1356

Disturbance



Overburden Emplacement Area Active Mining Area (Open cut void)



Water Management Area

Forcast Area

Forecast Disturbance

Rehabilitation Phase

Ecosystem and Land Use Development

NSW SS Basemap: Max Basemap: Maxar Project Approval Boundary: © State Government of NSW and Department of Regional New South Wales 2019 High resolution imagery: Zeolite Mine - Stewart Surveys (2023)

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Drawn by:	JH	

2.0 Definitions

Table 5: Glossary

Term	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 land clearing, 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	An area of land and/or water that is a 'reference site' that represents an example of the defining values and characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use.	
	An analogue site is a selected location surrounding or within a proposed/existing mine site. The location is usually an undisturbed area or a self-sustaining vegetation community that demonstrates the existing environment without any impact of disturbance (i.e. acts as a baseline for the surrounding undisturbed environment). Characteristics of analogue sites	
	can be assessed to develop the rehabilitation objectives and rehabilitation completion criteria for final land use domains.	
Annual rehabilitation report	As defined in the <i>Mining Regulation 2016.</i>	
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 (for large mines only) 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.	
Department	Department of Regional NSW.	
Disturbance	See Surface Disturbance.	
Disturbance area	An area that has been disturbed and that requires rehabilitation.	
	This may include areas such as 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 (e.g. managed to minimise dust generation and/or erosion).	
Domain	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.	
Ecosystem and land use development	This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved or, if not yet approved, the proposed:	
	rehabilitation objectives, and	
	rehabilitation completion criteria, and	
	 for large mines – final landform and rehabilitation plan. 	

Term	Definition		
	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, increasing habitat complexity, and the development of a productive, self-sustaining soil profile. This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.		
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 (as per the approved final landform and rehabilitation plan for large mines). 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.		
Exploration	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.		
Final landform and rehabilitation plan	As defined in the <i>Mining Regulation 2016.</i>		
Final land use	As defined in the Mining Regulation 2016.		
Final land use domain	A land management unit with a final land use. A mining lease may have one final land use (e.g. returning the entire mining lease to native vegetation) or several final land use units (e.g. a mix of pasture areas and native ecosystems). Each final land use unit represents a separate final land use domain.		
Form and way	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website.		
Forward program	As defined in the Mining Regulation 2016.		
Growth medium 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) to ensure achievement of the approved or, if not yet approved, the proposed:		
	rehabilitation objectives		
	rehabilitation completion criteria		
	 for large mines – final landform and rehabilitation plan. 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. 		
Habitat	Has the same meaning as that term under the <i>Biodiversity Conservation Act</i> 2016 and the <i>Fisheries Management Act</i> 1994 (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 (defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.		
Land	As defined in the Mining Act 1992.		
Landform establishment	This phase of rehabilitation consists of the processes and activities required to construct the approved final landform (as per the development consent 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 such as tailings, and prepare a substrate with the desired physical and chemical characteristics (e.g. rock raking or ameliorating sodic materials).		
Large mine	As defined in the Mining Regulation 2016.		
Lease holder	The holder of a mining lease.		
Life of mine	The timeframe of how long a mine is approved to mine, from commencement to closure.		

Term	Definition		
Mine rehabilitation portal	Means the NSW Resources Regulator's online portal that lease holders must use (via a registered account) to:		
	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.		
	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.		
Mining area	As defined in the Mining Act 1992.		
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 lease	As defined in the Mining Act 1992.		
Native vegetation	Has the same meaning as that term under the Local Land Services Act 2013.		
Overburden	Material overlying coal or a mineral deposit.		
Performance indicator	An attribute of the biophysical environment (e.g. 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.		
Phases of rehabilitation	The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are:		
	active mining		
	decommissioning		
	Iandform establishment		
	growth medium development		
	ecosystem and land use establishment		
	ecosystem and land use development		
	rehabilitation completion (sign-off).		
Progressive rehabilitation	The progress of rehabilitation towards achieving the approved or, if not yet approved, the proposed:		
	rehabilitation objectives		
	rehabilitation completion criteria		
	• for large mines – final landform and rehabilitation plan.		
	This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.		
Rehabilitation	As defined in the <i>Mining Act 1992.</i>		
Rehabilitation completion	The final phase of rehabilitation when 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		
	• for large mines – as 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.		



Term	Definition	
Rehabilitation completion criteria	Rehabilitation completion criteria set out the criteria the achievement of which will demonstrate the achievement of the rehabilitation objectives.	
Rehabilitation cost estimate	As defined in the <i>Mining Regulation 2016.</i>	
Rehabilitation management plan	As defined in the <i>Mining Regulation 2016.</i>	
Rehabilitation objectives	Means the rehabilitation objectives required to achieve the final land use for the mining area.	
Rehabilitation outcomes	Means the final land use for the mining area as stated in the approved rehabilitation objectives, the approved rehabilitation completion criteria and (for large mines) the approved final landform and rehabilitation plan.	
Rehabilitation risk assessment	As defined in the <i>Mining Regulation 2016.</i>	
Rehabilitation schedule	The defined timeframes for progressive rehabilitation set out in the forward program.	
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: a) the relevant development consent authority b) the local council c) the relevant landholder(s) d) community consultative committee (if required under the development consent) or equivalent consultative group e) affected landholder(s) f) government agencies relevant to the final land use g) affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities) h) local Aboriginal communities i) 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 31000:2018).	
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 (typically silt-sized, in the range from 0.001 to 0.6 mm) solid materials remaining after the recoverable metals and minerals have been extracted from mined ore, together with the water used in the recovery process. ⁵	
Waste	Has the same meaning as that term under the <i>Protection of the Environment Operations Act</i> 1997.	



Appendix A Symbology Guidance

Forward Program

Escott Zeolite Mine

Zeolite Australia Pty Ltd

SLR Project No.: 630.30206.00000

18 August 2023



Mine Rehabilitation Portal Spatial Data Themes	Display Field (Unique Values)	Symbology Guidance
Rehabilitation	RehabPha (Rehabilitation Phase)	Decommissioning
		Landform Establishment
		Growth Media Development
		Ecosystem and Land Use Establishment
		Ecosystem and Land Use Development
		Relinquishment (Rehabilitated)
		Beneficiation Facility
		Infrastructure Area
		Other
	MineDomT (Mining	Overburden Emplacement Area
Disturbance	Domain Type)	Tailings Storage Facility
		Underground Mining Area (SMP)
		Active Mining Area (Open cut void)
		Water Management Area
Current Landform Contours	N/A	 Current Landform Contours
	ForcstA (Forecast Area)	Forecast Disturbance
Forecast Data Yr 1, Yr 2 and Yr 3		Forecast Land Prepared for Rehabilitation
		Ecosystem and Land Use Establishment
Final Landform Contours	N/A	Final Landform Contours
Project Approval Boundary	N/A	Project Approval Boundary
Current Authorisations	N/A	MINERALS - CURRENT TITLES
		COAL - CURRENT TITLES
		PETROLEUM-CSG - CURRENT TITLES



Making Sustainability Happen