



GLENCORE

Senate Inquiry visit
to Mangoola Mine

Coal Assets Australia
14 March 2018

Presentation Outline and Agenda for the Day

Presentation

- Glencore Coal in Australia
- Our Approach to Rehabilitation
- Overview of Mangoola operations and rehabilitation processes

Visit

- Field visit of Mangoola mine and rehabilitation



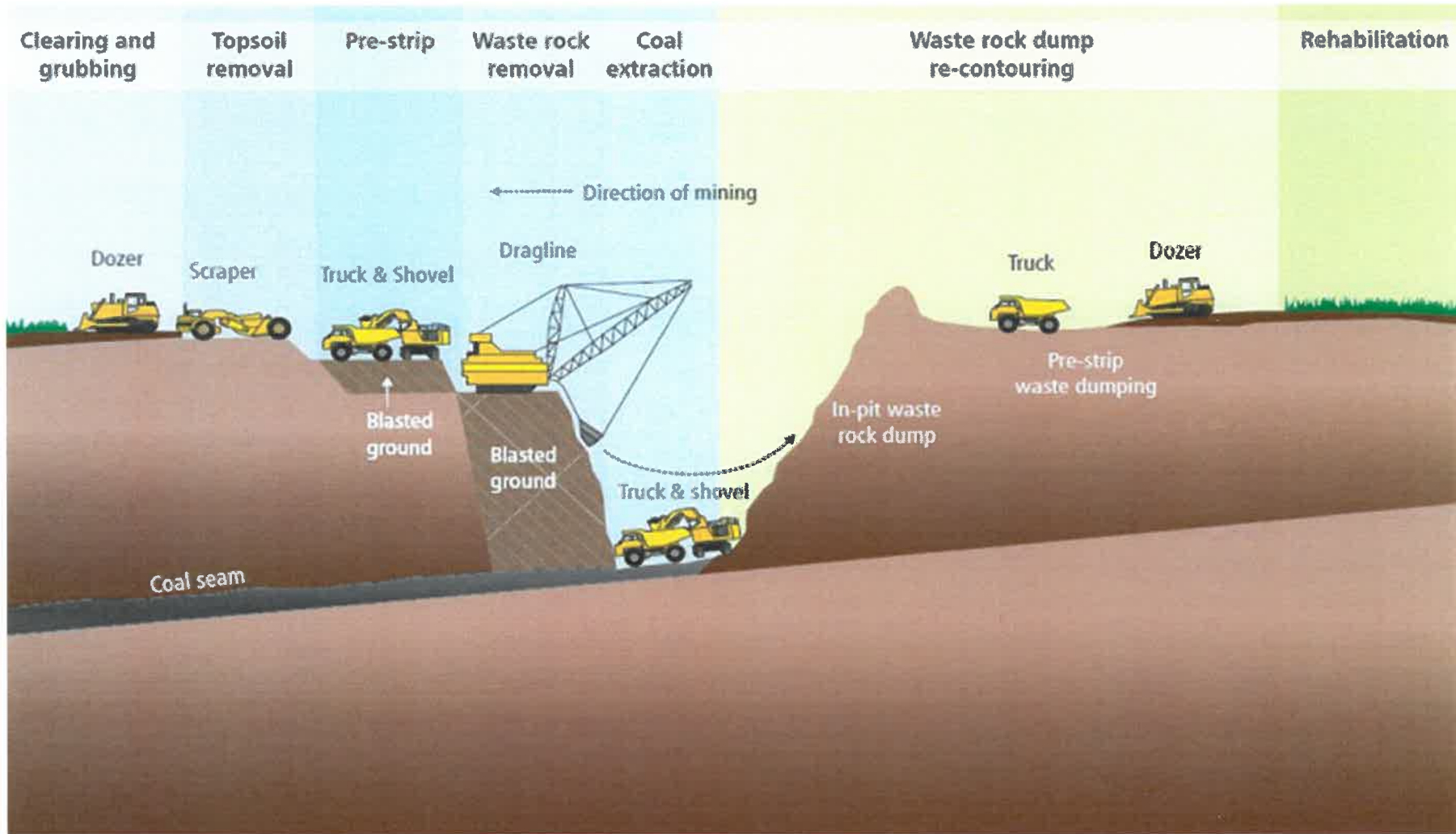
Pasture rehabilitation at Liddell open cut mine

Coal: overview

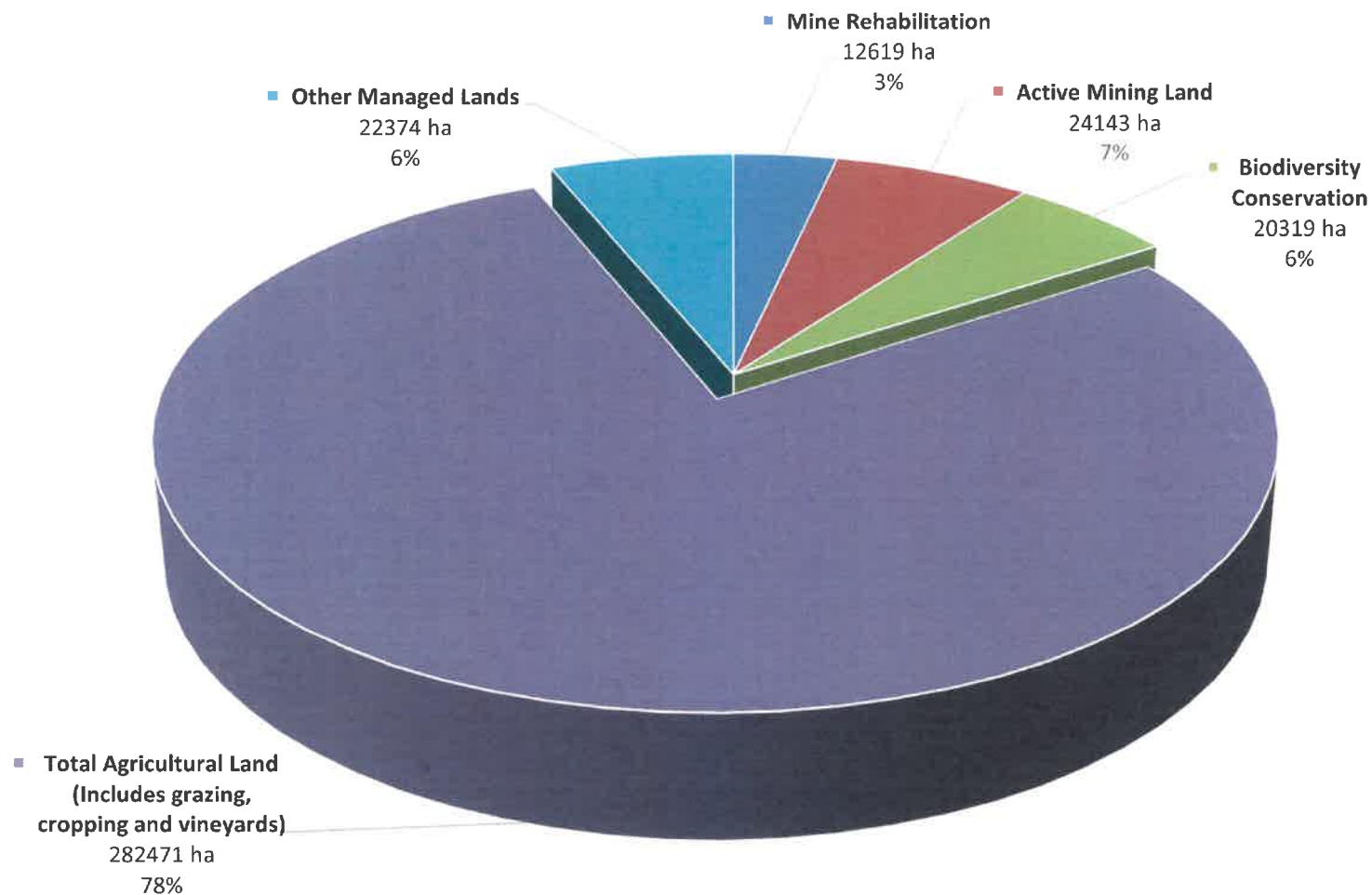
In 2017 we contributed \$7.2 billion to the economy and employed more than 7,600 people



Open Cut Coal Mining and Rehabilitation Process



Glencore Coal Australia – Land use



Rehabilitation Drivers

- Strong internal focus and expectations in all areas of sustainable development but in particular rehabilitation
- We recognise the increasing community and government expectations
- Progressive rehabilitation makes good business sense
- Reduces other impacts such as air quality and water management
- Reduction of liability at the cessation of mining
- Demonstration of sustainable post mining land use
- Ability to obtain future approvals



Cattle grazing trial at Liddell mine

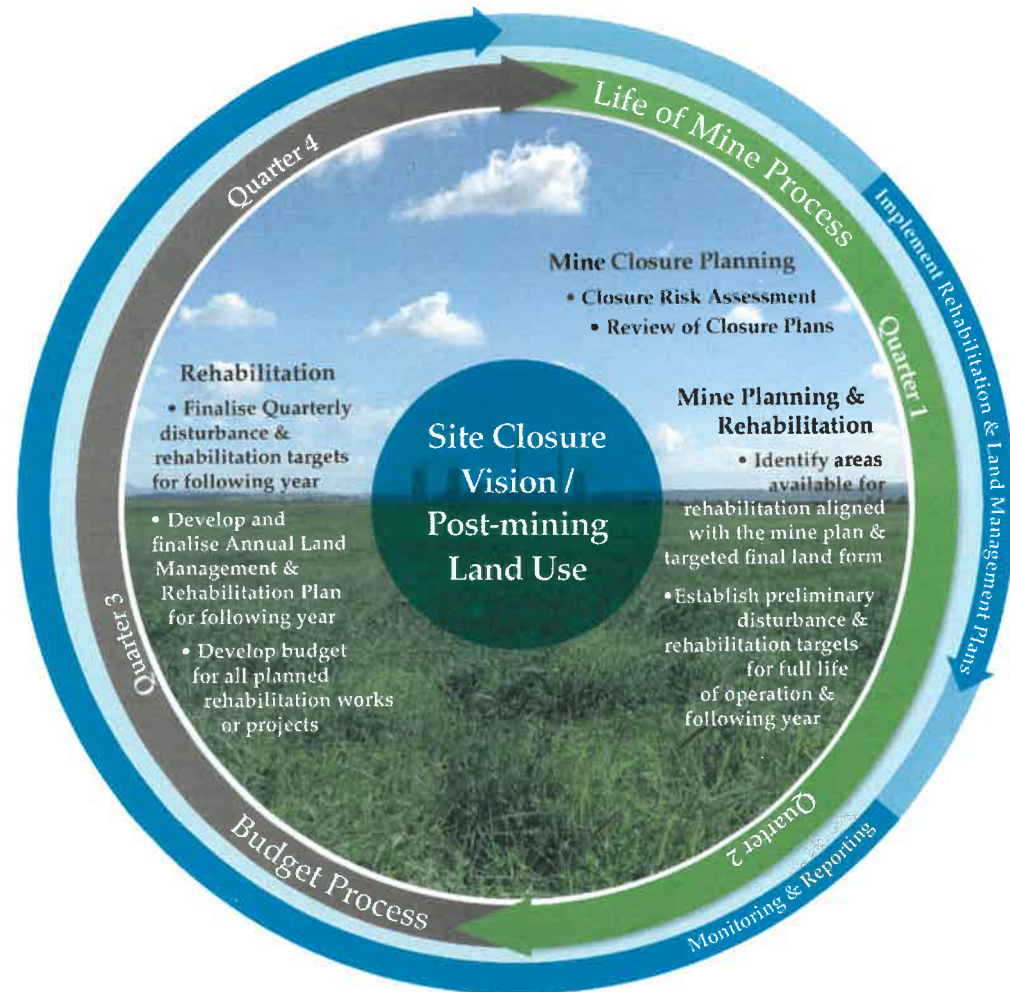


Rehabilitation at Westside mine

Our Approach

- **Systematic**- underpinned by robust system documents
- **Planned**- Life of Mine and annual planning process
- **Integrated**- into business planning and day to day mining operations
- **Budgeted**- equipment, \$, people
- **Performance Monitoring**- monthly tracking, use of GIS, routine inspections, KPI's, site rehabilitation monitoring programs

Integrating Rehabilitation into Business Planning



Multidisciplinary Skills - Rehabilitation Success

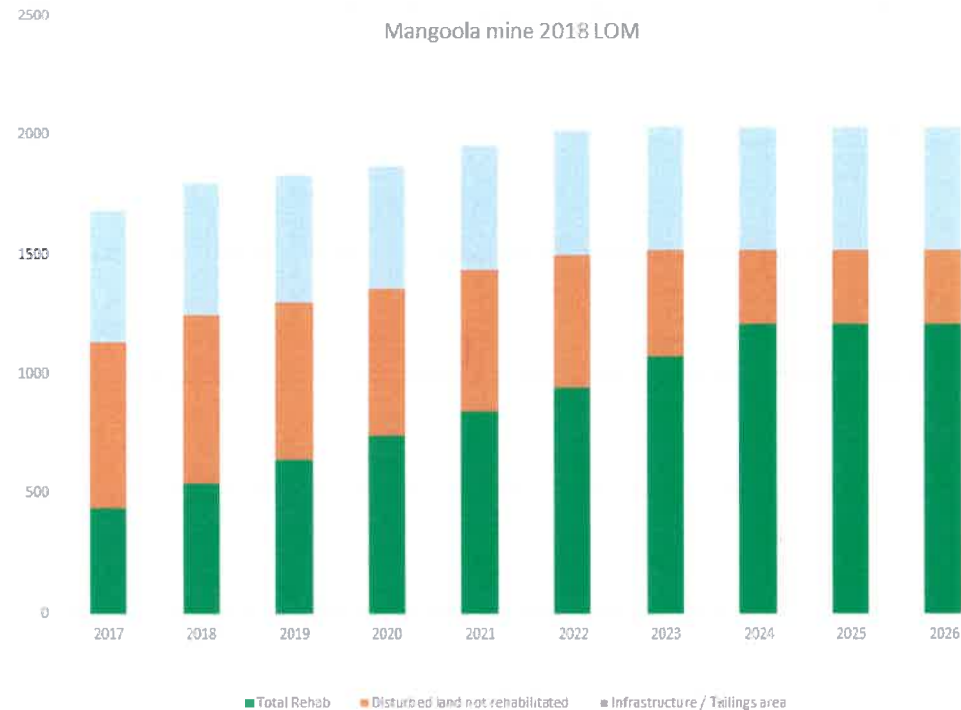
- Mine rehabilitation technically complex
- Internal skills coupled with external specialists
- Skills linked to final land use



- Soil Scientists
- Ecologists
- Botanists
- Mining Engineers
- Civil Engineers
- Surveyors
- Operators
- Weed sprayers
- Horticulturalists
- Agronomists
- Vertebrate pest control

Annual Rehabilitation & Land Management Plan

- In relation to land disturbance and rehabilitation the ARLMP includes:
 - Final landform plan, including location of any final voids
 - Quarterly targets for the next budget year
 - Annual target estimates through to the end of the mine life to show progressive reduction in disturbed land



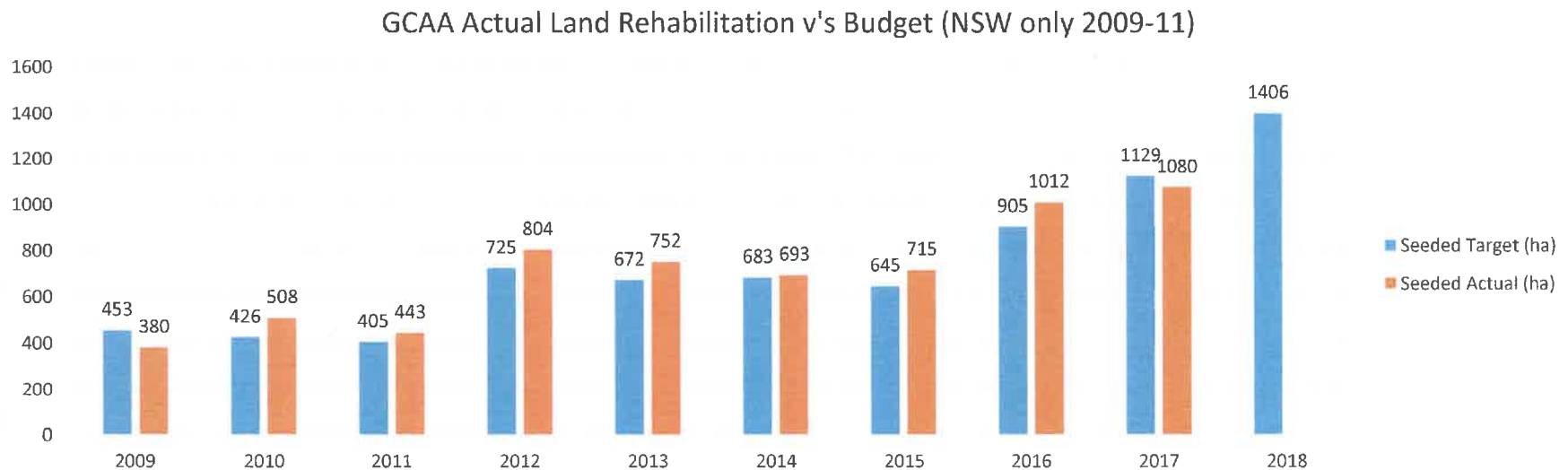
Assessing Rehabilitation Performance

GCAA Target Rehabilitation Run Rate 2018



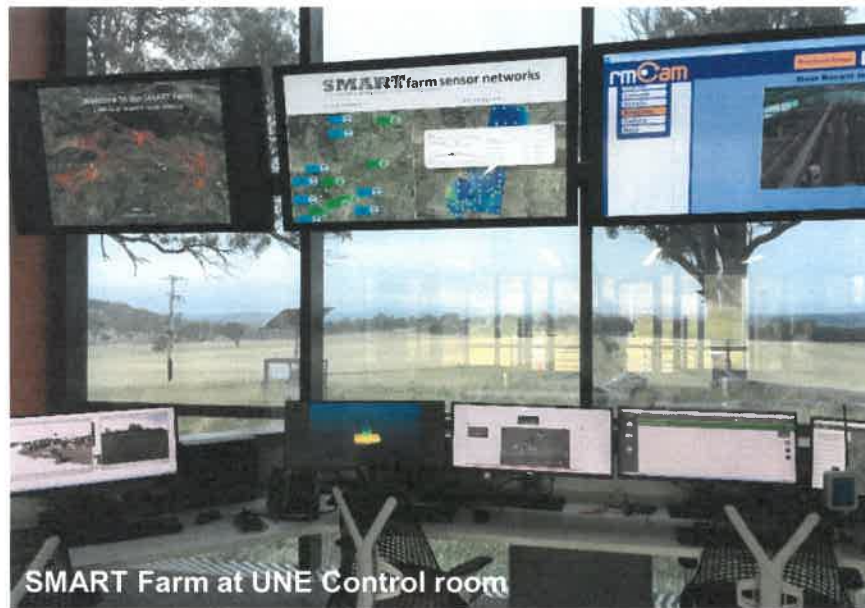
Summary of Performance

- Observed improvements resulting from improved rehabilitation planning and focus:
 - Greater co-operation between mining departments
 - Changes to dumping schedules and materials placement to bring rehabilitation forward
 - Greater awareness of the importance of rehabilitation across our business
 - Improved outcomes on the ground, establishment of more challenging rehabilitation targets and adoption of more progressive rehabilitation design principles



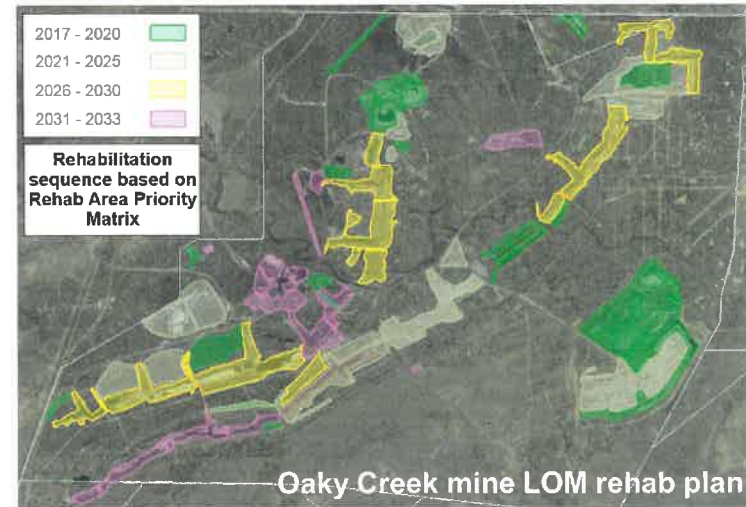
Benchmarking

- Looking outside of our industry
- Participation in domestic and international forums
- Engagement with academics and experts



Challenges and Opportunities

- Given the age of some of our operations and the changing expectations on rehabilitation requirements we do still have some challenges to address some legacy issues at some of our Queensland sites
- We are developing plans for each of our operations to progressively rehabilitate the site in a timely fashion
- These plans have been incorporated into the sites Life of Mine Plans which are reviewed on an annual basis
- Contemporary mines have a much greater focus on progressive rehabilitation



Focus Going Forward

- Develop further cost effective process to allow Glencore sites to assess critical processes associated with safety, stability and sustainability of rehabilitation over large areas
- Increase our ability to identify conditions (quality) and change over time to inform targeted intervention (eg. repairs and maintenance, modify practices) as required
- Produce summary reports for each site to show how rehabilitation is trajecting towards completion criteria year on year and identifying areas for intervention
- These activities will support further applications for Certification of Mine Rehabilitation and provide confidence in the quality of rehabilitation



Rehabilitation Scorecard – Rolleston Mine

Rehabilitation – Mt Owen Mine



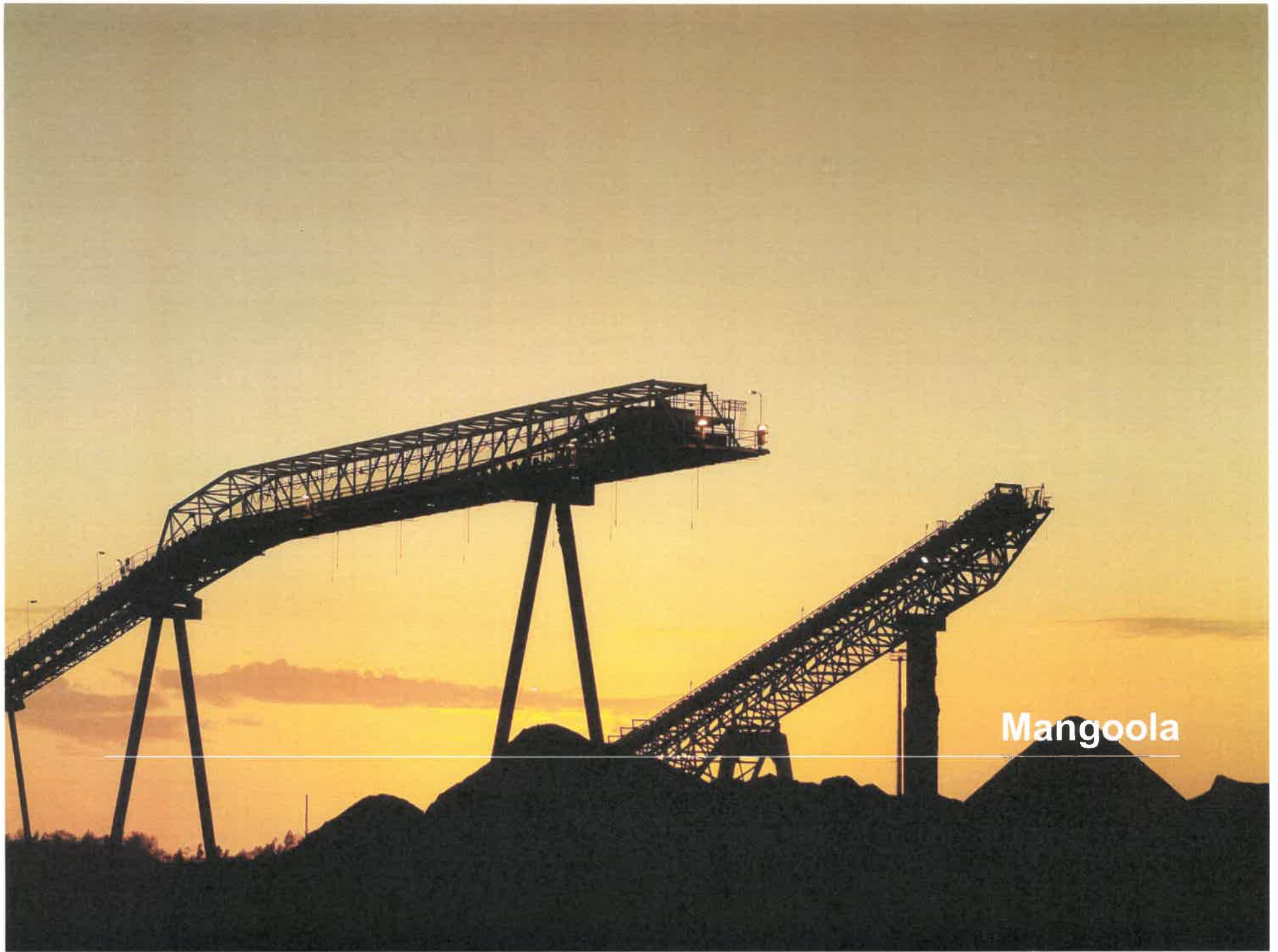
Rehabilitation – Newlands Mine



Rehabilitation at Mangoola mine

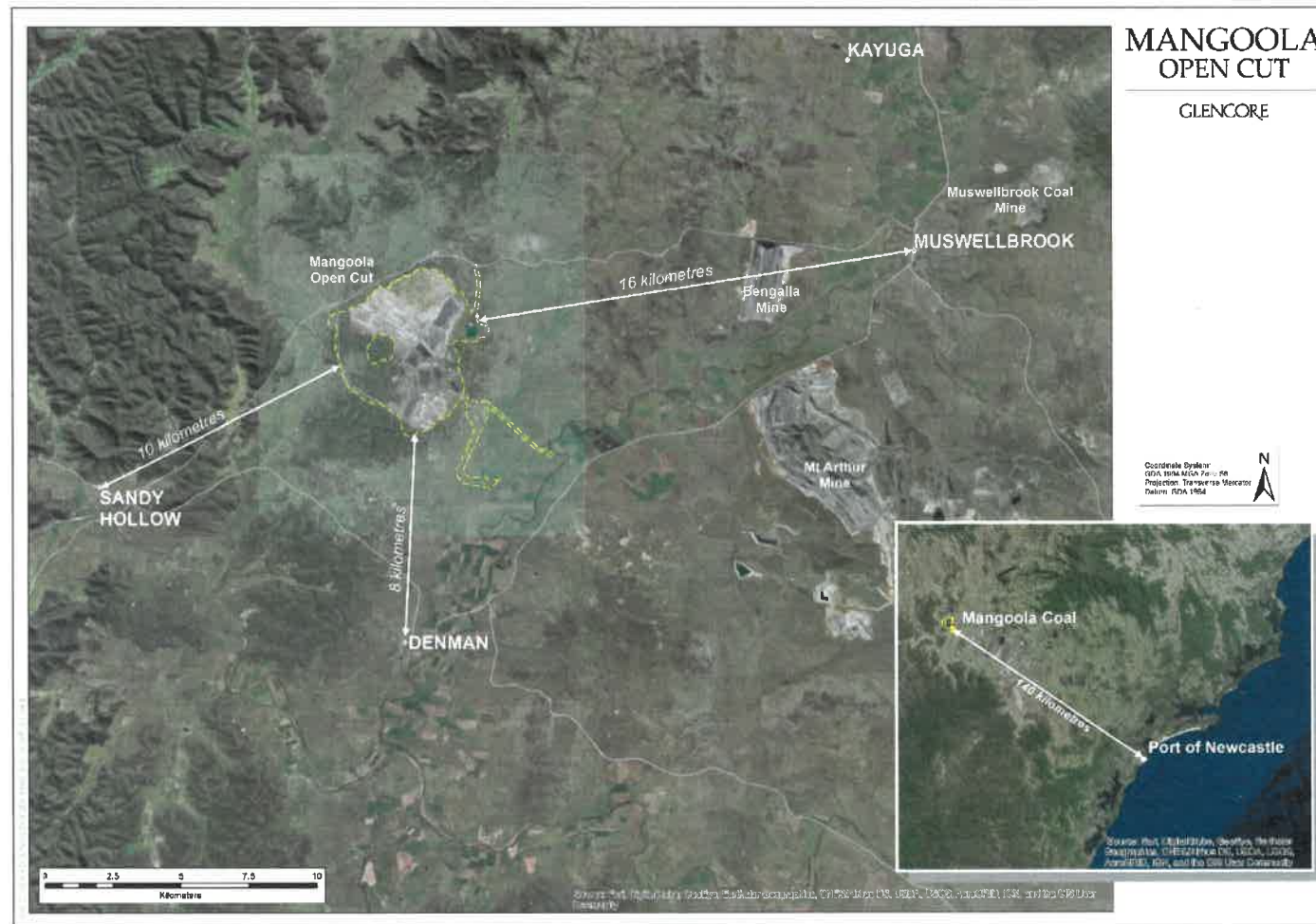


The public view from Ridgeland's Road of progressive rehabilitation at Mangoola mine

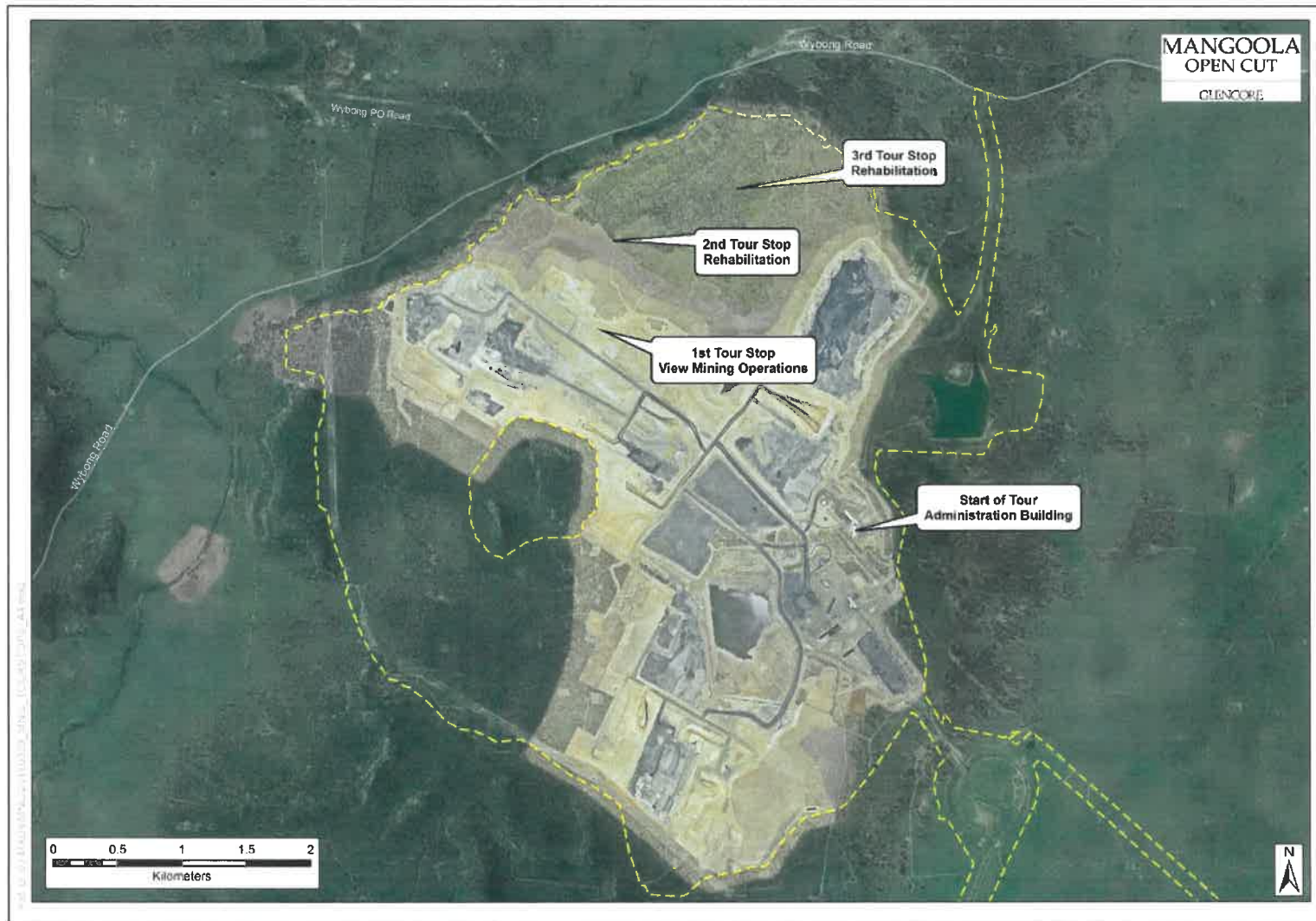


Mangoola

Mangoola Overview



The Tour



Mining Operations



Earning Our Licence to Operate

- Committed to Sustainable Development
 - Consultation is continually undertaken to seek feedback- CCC, face to face meetings, phone calls, emails
 - Allowing people to view our on ground performance is key to obtaining our Social License to Operate
 - We minimise our impacts on the environment and the community- Noise, Air Quality, Blasting, Water, Biodiversity, Rehabilitation, Visual Amenity
- We support the communities in which we operate through funding, partnering and volunteering in the community
- We seek out local people when recruiting



Denman Men's Shed Nest box
partner program



Denman Recreation Centre
\$3.4 million through Mangoola VPA



Sound Attenuated Machinery
to reduce noise emissions
from machinery

Pre and Post Mining Land Use

- Environmental Assessment studies carried out to determine the nature and quality of the existing landscape
- Post mining land use agreed to through the approval process encompassing community and government consultation; with approval containing detail on the Performance Criteria to achieve final land use
- Mining lease and *Mining Act 1992* specifies security deposit requirements
- In NSW, mining operations and certain mining purposes must be carried out in accordance with a Mining Operations Plan (MOP)
- GCAA ARLMP process ensures planning is in place to meet statutory requirements

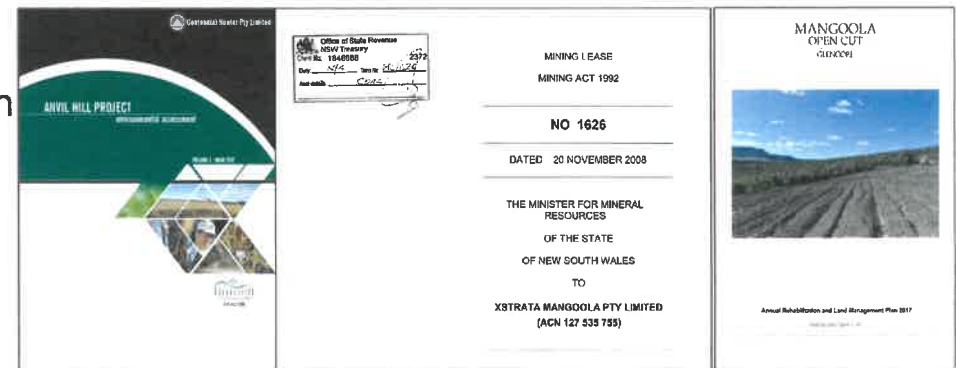
REHABILITATION

Rehabilitation Objectives

58. The Proponent must rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. The rehabilitation must comply with the objectives in Table 12, and be consistent with the conceptual rehabilitation plans in Appendix 5.

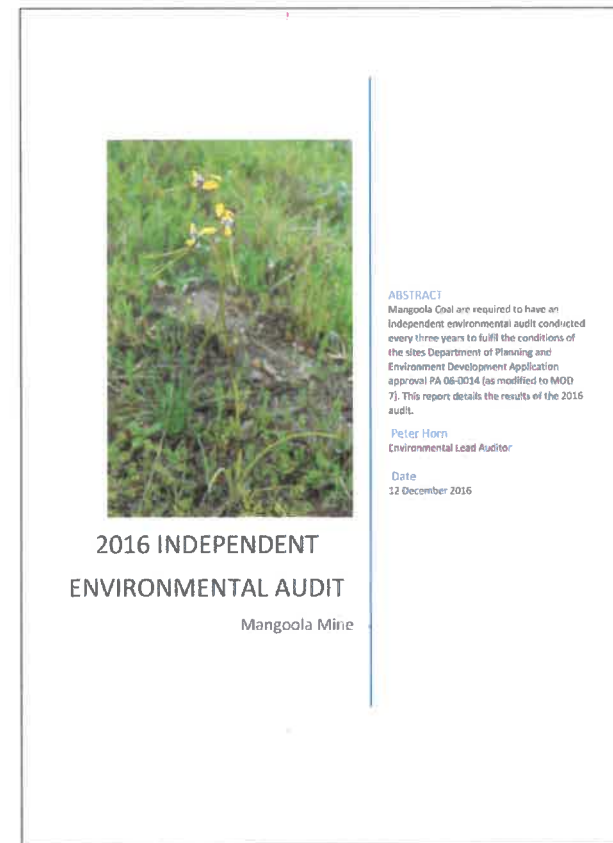
Table 12: Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	<ul style="list-style-type: none"> • Safe, stable and non-polluting • Final landform designed to incorporate natural micro-relief and natural drainage lines • Restore self-sustaining ecosystems, including establishing: <ul style="list-style-type: none"> ○ appropriate native woodland species; and ○ at least 700 hectares of native grassland, in the final rehabilitated landscape
Final voids	<ul style="list-style-type: none"> • Designed as long term groundwater sinks and to maximise groundwater flows across back-filled pits to the final void • Minimise to the greatest extent practicable: <ul style="list-style-type: none"> ○ the size and depth of final voids ○ the drainage catchment of final voids ○ any high wall instability risk ○ risk of flood interaction for all flood events up to and including the Probable Maximum Flood
Anvil Creek realignment	<ul style="list-style-type: none"> • Restore self-sustaining ecological and hydrological function of the creek
Surface infrastructure	<ul style="list-style-type: none"> • To be decommissioned and removed, unless the Executive Director Mineral Resources agrees otherwise
Community	<ul style="list-style-type: none"> • Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure



Compliance and Assurance

- **Extensive internal and external assurance us undertaken on rehabilitation. These include:**
 - Performance against targets in each site's ARLMP is reviewed monthly
 - Annual rehabilitation walkover inspection
 - Bi-annual flora and fauna monitoring and reporting (meeting targets, Species diversity/abundance)
 - Independent Compliance Audits
 - Inspections by Government departments – DPE, DRG, EPA
 - Public Reporting – website, Annual Review
 - Security Deposits
 - CCC Visits
 - Incident Reporting



Environmental management of the Mangoola Coal Mine has been very good through the audit period with a reduction in complaints, excellent quality rehabilitation and a reduction in the number of non-compliances since the previous Independent Environmental Audit.

There is some room for improvement in some areas, though these are considered generally minor and readily addressed.

Sharing our Learnings – our community and beyond

- We are proud to showcase our operations
- We have increased our tours of the mine and rehabilitation areas
- Over 600 people view our operations per year:
 - Government regulators
 - Elected Representatives
 - Rehab specialists – domestic and international
 - Rehab students (Uni)
 - School groups
 - General community members
 - Near neighbours
 - Journalists and media
 - Other mining companies

Singleton Argus

At Glencore's Mangoola mine rehabilitation is a top priority

By Louise Nichols

Mine rehabilitation may sound like one of those boring topics up there with say the state of our national accounts however, in both cases they will have an impact on all of us

More than 60,000 mines have been abandoned across Australia, according to a report that states extensive work has been rehabilitation as managed as the mining boom ends.

The Australia Institute reported abandoned operations by miners, and there were few reliable statistics on the state of Australia's mines and there was evidence that only a handful had ever been fully rehabilitated.

State governments agree with only data to measure capacity of mines that had been fully rehabilitated and rehabilitated in the past 10 years — the New Abandoned Mines in New South Wales.

Some of the abandoned mines date back to gold-rush days and the 1930s. Some produce thousands of tons "tailings", such as bauxite dams and old mine shafts.

The Australia Institute said it was difficult to obtain large statistics on the number of operating mines across the country, citing the figure between 400 and 2,000.

The institute said it was easier to get data on mines that had suspended operations to ease on-going rehabilitation.

"There is a serious problem of abandoned mines, not a solution limited to distant history," the report said.

"As the miners of the largest mines enter their twilight years, mine operators need to be paid to the ongoing phenomenon of mine abandonment in Australia."



Looking across to Mangoola Mine showing cleared land adjacent to mine about to undergo rehab. Also pictured is rehabilitated land. In the background is Arndell Hill.

WHAT'S HAPPENING IN SINGLETON



NEWS 15

Mining report finds 60,000 abandoned sites, lack of rehabilitation and unreliable data

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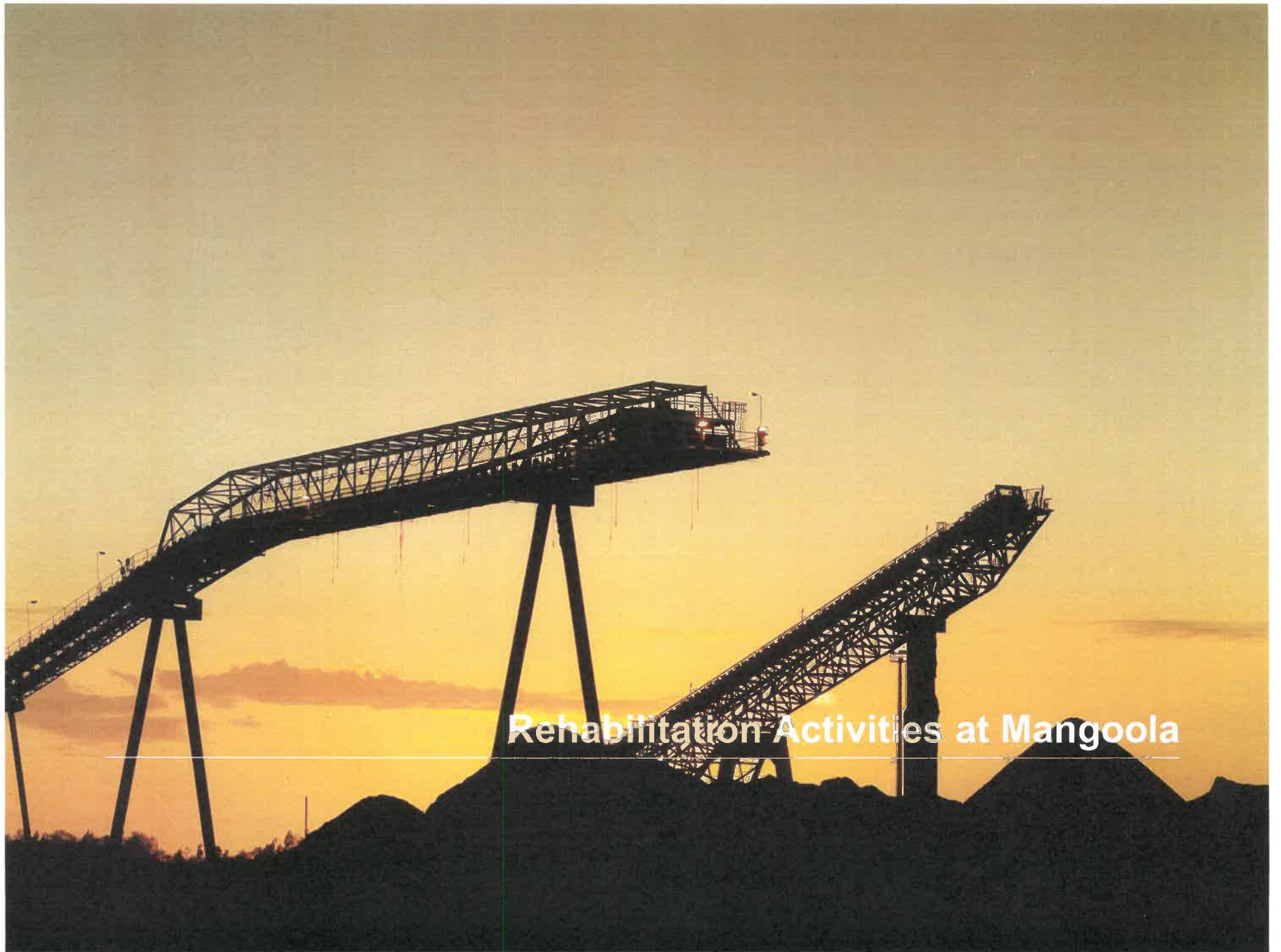
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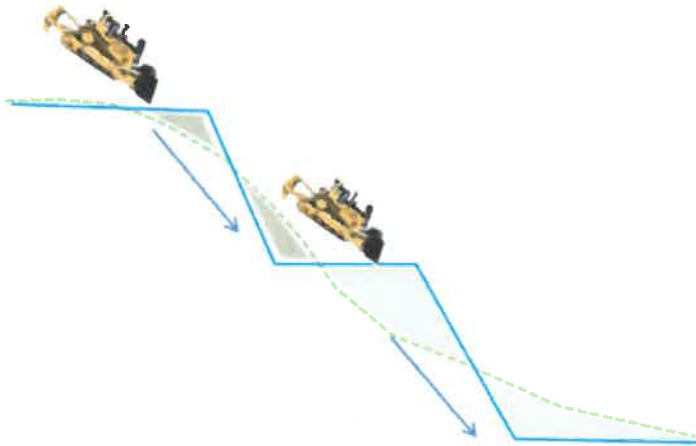
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Rehabilitation Activities at Mangoola

Creating Final Landform

- GPS guided Dozers used to create final landform to DTM design
- Several small lifts



Topsoil Management

- Includes mulched vegetation
- Limits on height and storage time to maintain natural seed bank and biological functioning
- Strip and direct placement is preferred
- Cover crop
- Weed management
- Placed in landform- 100mm topsoil thickness including mulch
- Valuable resource – topsoil balance to be maintained



Gypsum and ripping

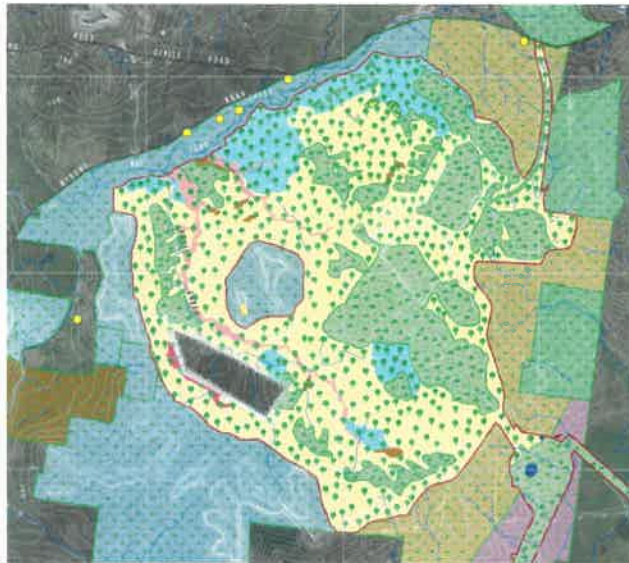
- Ripping on contours for erosion control – avoid preferential flow paths
- No fertilisers used – native flora intolerance
- Gypsum to breakup clay particles and increase nutrient intake



Stag tree habitat installation



Seeding and Planting - Determining Vegetation Communities



Legend		Vegetation Communities:	
Mangoola Project Area	Contour Line	Forest Redgum Riparian Woodland	Grassland
Aboriginal Cultural Heritage Offset Area	Drainage line	Ironbark Woodland Complex	Paperbark Woodland
Habitat Enhancement Offset Area	Historic Heritage Site	Sheltered Grey Gum Woodland	Slaty Box Woodland
Sustainable Agriculture Offset Area	Final Void	Spotted Gum Open Forest	Weeping Myall Woodland
Northern Corridor	Secondary Domain:		
Western Corridor	C - Rehabilitation - Grassland		
Road	E - Rehabilitation - Woodland		
Railway	F - Rehabilitation - Forest		
	J - Conservation and Biodiversity Offset Area		

- Agreed at project approval stage
- Based on surrounding local ecological communities

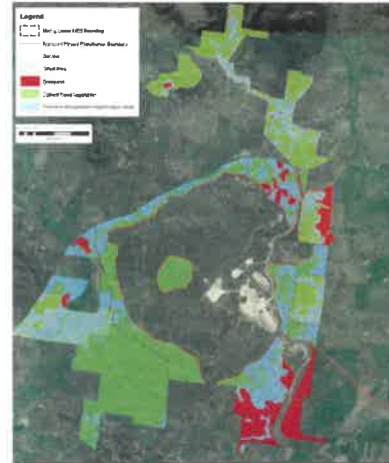
Seeding

- Hand seeding to achieve fine detail in targeted vegetation communities



Ecological initiatives and Biodiversity Offset areas

- 3,033ha of Biodiversity Offsets designed to link to surrounding land and rehabilitation areas
- 1400 nest boxes installed since 2011
- Translocation program in place



Rehabilitation area maintenance

Ongoing rehabilitation works include:

- Selective weed management - early in process to help natives compete
- Erosion monitoring and control
- Access track maintenance
- Flora and fauna surveys
- Infill planting of targeted flora species
- Vegetation thinning





End