

Advanced Energy



Wilpinjong Coal Mine – Industry Presentation

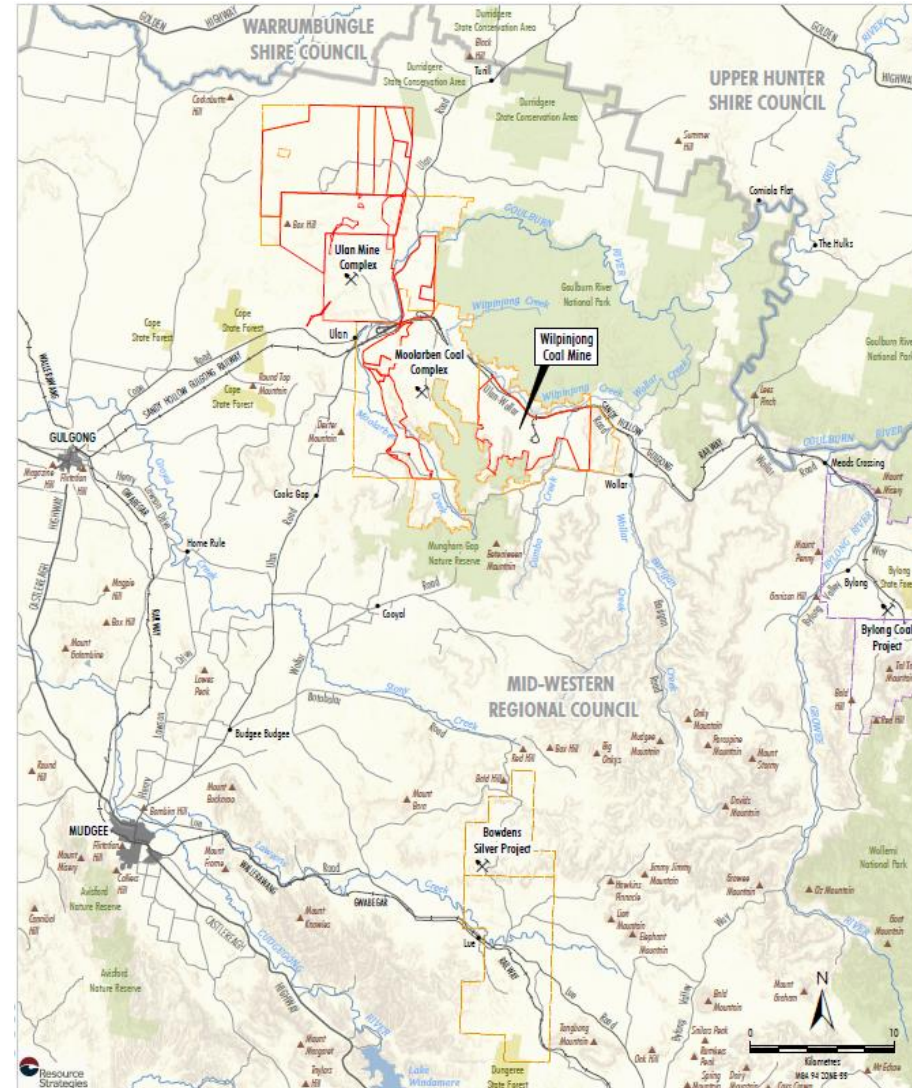
***Karin Fogarty
Environment Advisor***

Peabody
ENERGY

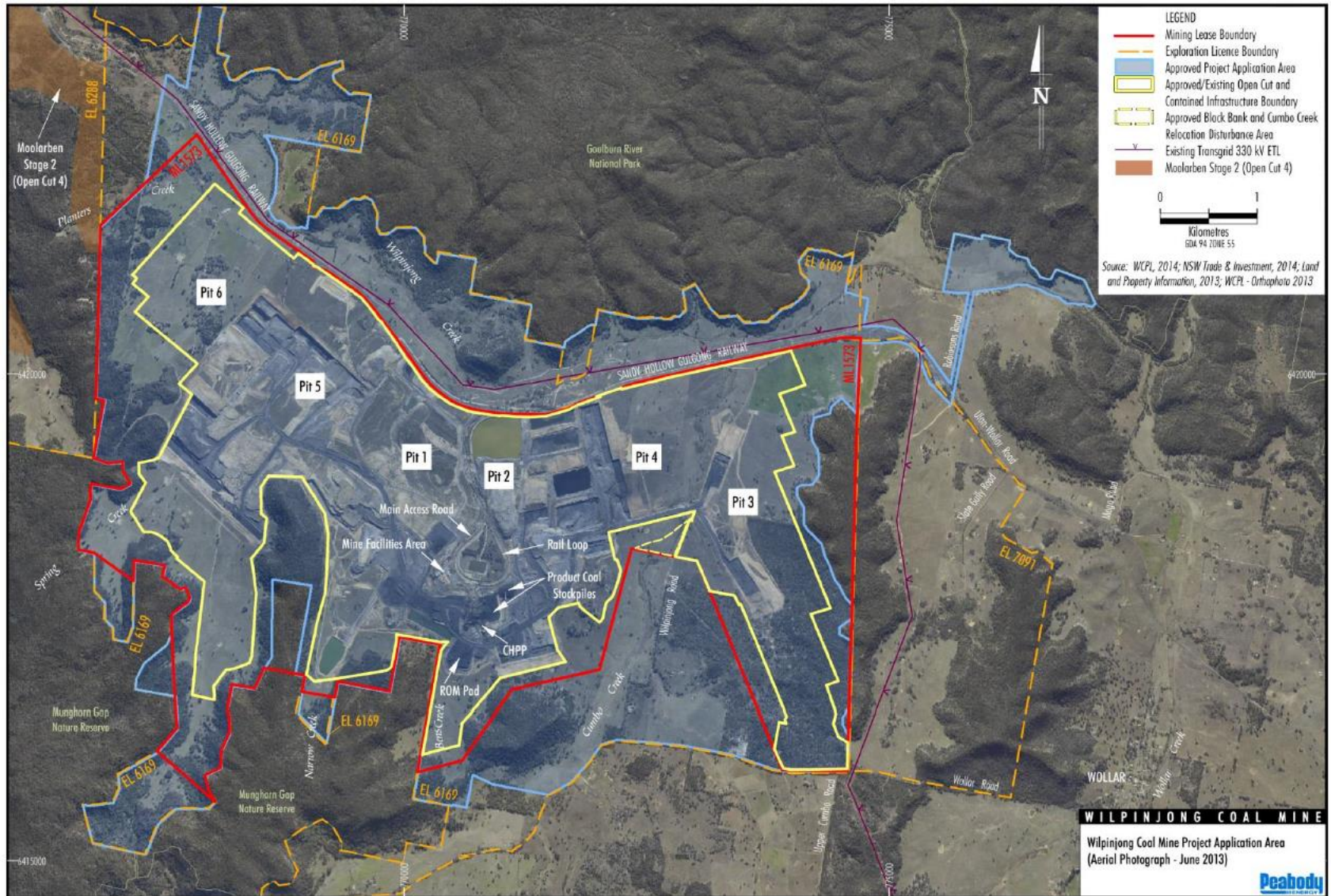
- *History*
- *Operation*
- *Wilpinjong movie*
- *Current Post Mine Land Use*
- *Rehabilitation Status*
- *Landform Design*
- *Integrated Mine Planning - Wilpinjong Approach*
- *Rehabilitation Success*
- *Rehabilitation Trials*
- *Rehabilitation Challenges*

History

- Mining commenced 2006
- Produces thermal coal for export and domestic markets.
- Truck and shovel operation
- Average strip ratio for the life of mine approximately 2:1
- One of the lowest cost coal mining operations in Australia.
- Approved for:
 - ROM 16Mtpa
 - Railings 12.5Mtpa
- 24 hour a day operation
- Employs approximately 530 people



Operation

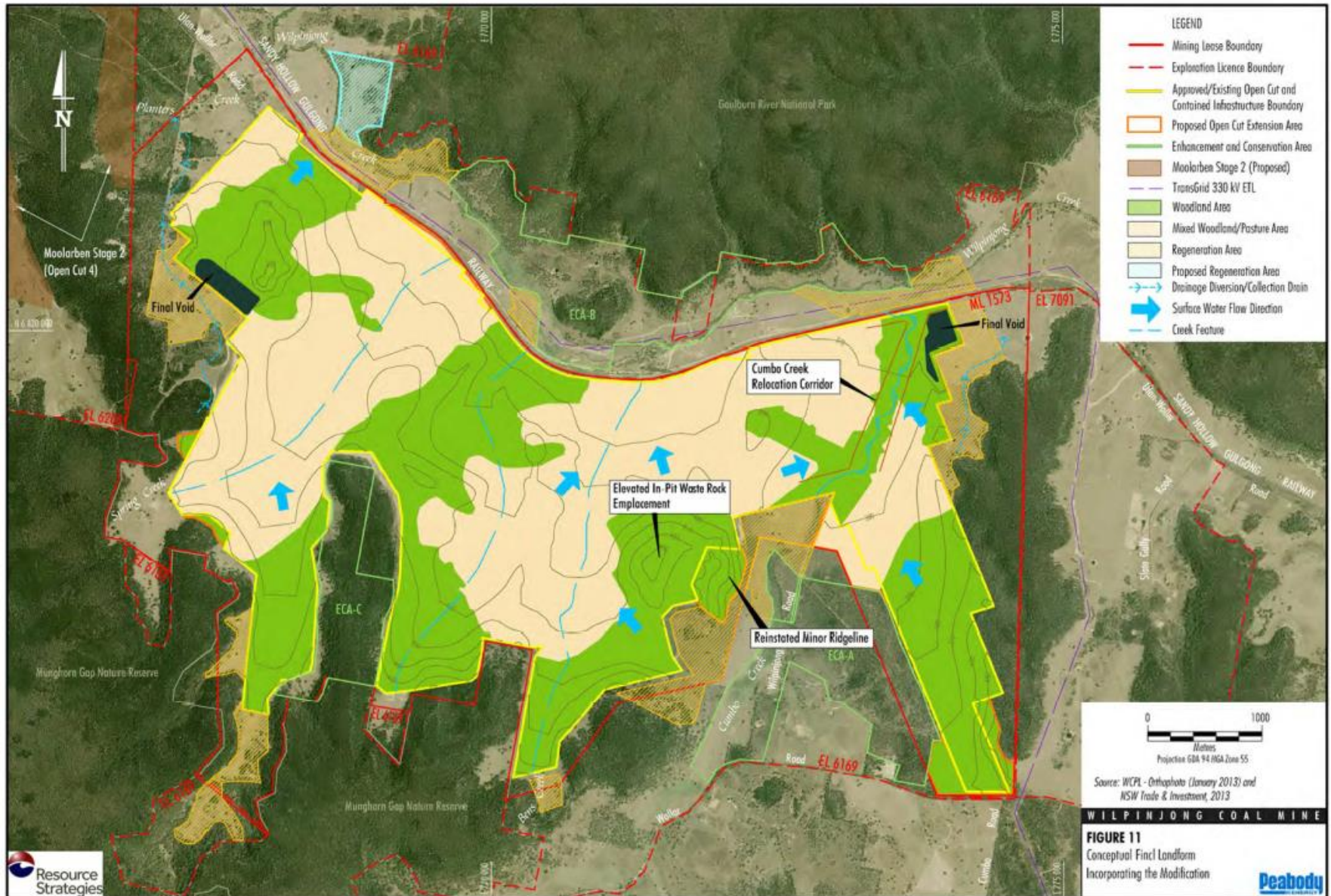


WILPINJONG AERIAL OVERVIEW



Wilpinjong

Post-Mining Land Use



Rehabilitation –Status

Shallow/low strip ratio mine



Rehabilitation Status

Total cumulative = 375ha



Rehabilitation Status



Rehabilitation Status



Rehabilitation Status



Rehabilitation Status



Rehabilitation Status



Landform Design – Drainage lines



1.3 Project scope of work

The scope of work for the project comprises:

1. Determine the ecological, geomorphic and hydraulic characteristics of original drainage corridors and nearby creeks e.g. Cumbo and Wilpinjong Creek.
2. Understand the post rehabilitated mining landform characteristics including topography, stratigraphy and long term settlement and surface / groundwater interactions.
3. Determine acceptable ecological, geomorphic and hydraulic parameters for post mining drainage lines to transfer runoff from upstream of disturbed areas, through the rehabilitated landform to downstream of disturbed areas.
4. Develop designs for the main waterways which flow through the rehabilitated landform



PROPOSAL:

Wilpinjong Coal Mine: Final Landform Drainage System Design

For Peabody Energy

September 2016

Integrated Mine Planning - Wilpinjong Approach



PEABODY ENERGY
LANDFORM DESIGN, REHABILITATION IMPLEMENTATION
AND INSPECTION FORM
 WI-ENV-FRM-0045 Landform Design, Rehabilitation Implementation and Inspection Form
 30 January 2017

Process	Criteria	Verification of Activity			Records/Comments
		Name and Position	Signature	Date	
2.5 Landform Design Signoff	List any inconsistencies/non-conformance between above requirements and discuss with Manager – Environment and Community	Superintendent – Technical Services			
STOP Section 2.1 – 2.5 Manager Technical Services Signoff Required _____ Manager – Mine Manager Signoff Required _____ Manager – Environment and Community Signoff Required _____					
2.6 Install inert (FSL) design/layer to mine equipment	Ensure approved inert (FSL) layer is uploaded to appropriate mine equipment including OCE vehicles	Superintendent – Technical Services			File name:
2.7 Inert Layer (FSL), Construction Material used	Conduct a visual inspection & make comment to ensure the inert layer is constructed using appropriate material. i.e. non-reject/carbonaceous material	Environmental Advisor			Date of Inspection: Inert Layer Description: Photos (file location):

Integrated Mine Planning - Wilpinjong Approach



WCPL Rehabilitation RACI

Work Processes	WCPL Team members										Quarter		
	Manager - Tech Service	Superintendent - Tech Service	Senior Mine Engineer	Senior Surveyor	Manager - Env & Community	Environmental Advisor	Manager - Mine Manager	Superintendent - Production	OST Supervisor	OST Team members		Manager - Development and Approvals	General Manager
APPROVALS													
Project Approval (PA05-0021) - s75	C				C		I				R	A	On-going
Mining Operations Plan	R	I	C	C	R		I					A	On-going
Biodiversity Management Plan					A	R						I	On-going
Waste Mangement Plan	C				A	R	C					I	On-going
Bushfire Management Plan					C	R					A	I	On-going
Mining Lease	C				C		I				R	A	As-required
High Risk Activity (Tailings dams only)	R	I	I		R	C	A					I	As-required
EIS/Mod 5 - Conceptual Final Landform Design, Post-Mine land-use	R	I	R		C						A	I	On-going
Providing adequate resources for approval process and associated compliance	R				R		R				R	A	On-going
Uploading commitments and compliance obligations into	I				A		I				I	I	On-going
PLANNING													
Long Range Plan (4-5 years)													
Develop 5 year rehabilitation Sequencing Plan	A	I	R	I	C	I	C					I	Q3 previous year
Develop 5 year Budget Mining (financial)	R	C	R		I	C					A	R	Q3 previous year
Short Range Plan (1-3 years)													
Develop yearly targets	A	R	R		C	I	C					I	Q4 previous year/Q1 next year
Complete landform design for yearly rehabilitation (inc ESC)	A	R	R		C	C	C	I					Q3/Q4 previous year
Develop yearly rehabilitation schedule	A	R	R	I	I	I	C					I	Q3 previous year
Develop yearly cost budget (internal - operational + ARO)	C				R	R	R				A	C	Q3 previous year
Develop cost budget (external - RCE during MOP)	R		C	C	R	R	R				A	R	Q3 previous year
Resources determination - contractors or OST	I				C	C	R				A	I	Q3 previous year
Complete risk assessment/management	C	C	C	C	A	R	C		C	C	C	C	Q1
Identify annual re-work program	I				A	R	I		I			I	Q3 previous year
Develop R & D programs	I	I			A	R	I		I	I		I	Q4 previous year/Q1 next year
IMPLEMENTATION													
Contractor management (including engagement)					C		A		R	I			On-going
Installation of layer design into mine equipment		A	R										On-going
Construct FSL-3 as per design requirement							A	R					On-going
Pick up of as-built FSL-3m & confirm against design	A	C	R	R	I	C							On-going
Capture observations of spontaneous combustion and/or burial of hot material, tyre burial, demolition material, hydrocarbon contamination etc	C	R			R	A							On-going
Identify topsoil source and quantity required	A	R	R		I	I	C		C	I			On-going
Topsoil sampling (quality)					A	R							On-going
Determine and order species selection (seeds/tubestock) & amelioration etc					A	R							On-going
Establish photo points					A	R							On-going
Undertake inspections during FSL construction					A	R	I		C				On-going

Rehabilitation – Success

Operational Support Team (OST)

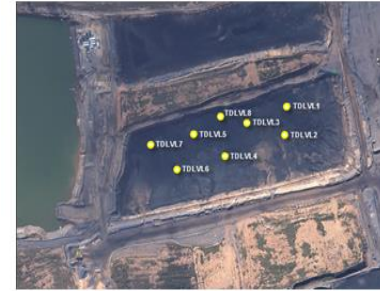
- Own resources - both people & machinery
- Utilising skills & passion from site personnel which leads to ownership and interest across site.
- Ability to respond to favourable conditions
- Knowledge retention



Rehabilitation – Success

Tailings Dam Capping & Rehabilitation

- To date 3 fully capped and rehabilitated & additional capped
- Dedicated supervisor with specific dozer crew



Results of soil sampling indicated deficiency in nutrients (P,K, Ca, B, Cu, Zn, Cl) as well as organic matter



Rehabilitation – Green manure



Species	Rates (kg/ha)
Chicory	4kg
Cowpea	12kg
Sorghum	6kg
Cowpea	12kg
Jap Millet	6kg
Cowpea	12kg
Sorghum	6kg
Cowpea	12kg
Sudan Grass	10kg
Oates	60kg
Clovers	15kg

Rehabilitation – Green manure



Rehabilitation – Microbes

What are they?

- **Bacteria and fungi**

Benefits of Microbes?

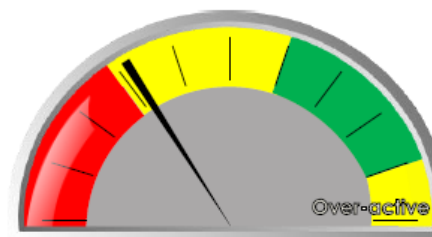
- **Break down the organic matter**
- **Recycle nutrients to their mineral forms for plant availability**
- **Create humus (improve structure, soil moisture, soils cation exchange capacity)**
- **Nitrogen fixing**
- **Produce substances that produce plant growth**
- **Control pests and diseases**



MICROBE ACTIVITY WISE

Customer name	AgVita Analytical Services	Date received	14-12-16
Client name	Michael Ruffels	Agent	Microbiology Laboratories A
Sample name	Wijp Area 1	Advisor	
Crop	Pasture, n.o.c.	Authorised by	Dr Maria Manjarrez
Date sampled	12:00:00 AM	Analysis no.	1349-1-MAWS

Microbial Activity Indicator



Data

	Yours	Guide			
Microbial Activity Indicator	35.2	80.0			
<table border="0"> <tr> <td>Poor</td> <td>Fair</td> <td>Good</td> </tr> </table>			Poor	Fair	Good
Poor	Fair	Good			

	Yours	Guide
Soil Basal Respiration (7-28 day)	507.9	1690.0
Soil Microbial Biomass Carbon	142.0	464.0

Comments

The microbial activity in your sample was fair. This could occur if microbial activity in your soil has been depleted due to an extended bare fallow, practices that deplete soil carbon (C) and/or nitrogen (N) or an extended dry period. It could be increased by adopting management practices that encourage microbial activity. If your soil is low in carbon consider the addition of organic based soil conditioners. If your soil is low in nitrogen consider the addition of N fertiliser. It is very important to take the C:N ratio of your soil into account when adding any fertilisers high in C or N. In most farmed soils it is good practice to aim for a C:N ratio of less than 20:1 (12:1 is optimal for most soils, but may not be practicable for some production systems). Avoid the addition of large amounts of high C fertiliser to soils low in N, and the addition of large amounts of high N fertiliser to soils low in C, as these practices can further deplete Total C and Total N, and microbial activity.

- Growing seasons (non favourable)
- Rehabilitation methodology not a one size fits all
- Pre-existing environment
- Mining schedule – dynamic changes
- Community expectations
- Administrative goal focus





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