Rehabilitation Risk Assessment

General Rehabilitation Risk Assessment

Hazard	Risks	Risk Controls	Details
Administrative failures	Insufficient skills and experience of rehabilitation personnel.	Only experienced operators will be engaged to conduct rehabilitation activities.	See 6.2.1 for further information
	Lack of clearly defined responsibilities.	Responsibilities and roles for rehabilitation will be defined in a landclearing and rehabilitation guideline that is to be developed and used with inductions.	MEE to develop a guideline for all operators.
	Insufficient funding for or prioritisation of rehabilitation activities	MEE will ensure that sufficient funds are available to conduct rehabilitation activities. Note, a rehabilitation bond is held over the site and will be reviewed annually for the life of the mine.	
Erosion		Slopes to be low angle.	Slopes to be reduced to a maximum of 3H:1V within the void
		Reduce slope lengths.	Slope Lengths shall not exceed 50 metres before being broken by earth banks or similar for batter slopes of 3H:1V.
		Topsoil stockpile management.	Slopes no greater than 18degrees (3H:1V). Stockpile height no greater than 2 metres. No stockpiles to be constructed in areas of concentrated flows. See 6.2.1 for further information

Hazard	Risks	Risk Controls	Details
Wind Erosion		Dust suppression	Water cart to be engaged during mining, hauling and rehabilitation activities. During adverse conditions: • Cease mining or hauling activities in adverse wind conditions: and • Increase water cart frequency.
Bushfire	Harm to rehabilitation areas.	Limit access for deliberately lit fires.	Appropriate fencing is to be repaired and maintained. Locked access gate outside of operating hours.
		Maintain fire breaks.	

Active Mining Phase Rehabilitation Risk Assessment

Hazard	Risks	Risk Controls	Details
Salvage of Biological Resources	Loss of biological resources.	Minimise loss of biological resources through suitable land clearing, salvage, and handling practices.	Areas to be land cleared will be clearly marked to ensure only land to be cleared is disturbed. Land clearing is to be supervised by proponent's staff. Fallen trees are to be salvaged and reused immediately by placing on rehabilitated land. If no suitable rehabilitation areas are available felled trees will be stored in windrows for reuse in future rehabilitation. Topsoil material to be stripped will be used immediately or stored in stockpiles no greater than 2 metres

			in height and be revegetated with temporary grass species or otherwise stabilised as described in the erosion risk controls above.
Weather Conditions	Adverse weather conditions during land clearing.	Land clearing activities will not be undertaken during adverse weather conditions	Land clearing will not be undertaken during periods of prolonged rainfall where damage to soil structure and erosion impacts are greatest. Land clearing will not be undertaken during periods of prolonged drought if there is high wind to prevent excess wind erosion.

Hazard	Risks	Risk Controls	Details
Salvage of Biological Resources	Loss of biological resources	Minimise loss of biological resources through suitable land clearing, salvage and handling practices.	Areas to be land cleared will be clearly marked to ensure only land to be cleared is disturbed. Land clearing is only carried out by experienced staff. Fallen trees are to be salvaged and reused immediately by placing on rehabilitated land. If no suitable rehabilitation areas are available, fallen trees will be stored in windrows for reuse in future rehabilitation. Topsoil material to be stripped will be used immediately or stored in stockpiles no greater than 2 metres in height and be revegetated with temporary grass species or

			otherwise stabilised as described in the erosion risk controls above. See 6.2.1 for further information
		Substrate inadequate to support revegetation or agricultural land capability (e.g. lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties, exposed hostile geochemical materials, and any other factors impeding the effective rooting depth).	Short term planning process Study appropriate gypsum-phillic fauna Study artificial seeding and cover cropping. See proposed trails in Section 9.2
	Limited biological resources available on site.	Importation of topsoil/growth medium material.	If on-site topsoil/growth medium deficit is noted, material may be imported to assist in rehabilitation.
Weather Conditions	Adverse weather conditions during land clearing.	Land clearing activities will not be undertaken during adverse weather conditions.	Land clearing will not be undertaken during periods of prolonged rainfall where damage to soil structure and erosion impacts are greatest. Land clearing will not be undertaken during periods of prolonged drought if there is high wind to prevent excess wind erosion. See 6.2.1 for further information

Decommissioning Phase Rehabilitation Risk Assessment

Hazard	Risks	Risk Controls	Details
Infrastructure	Retained roads and hardstands are not safe and stable.	All roads and hardstand areas to be retained for the final landuse will be reduced in width/size to that suitable for the final landuse.	Roads not required for final landuse are removed. Hardstand areas reduced to a size required for the final landuse.

			Slopes of major tracks are to be <10degrees or have cross drains/banks installed. Where unsuitable soils are present, tracks are to be stabilised with crushed bricks, concrete, gravel or similar

Landform Establishment Phase Rehabilitation Risk Assessment

Hazard	Risks	Risk Controls	Details
Unstable landform	The final landform is unstable.	Continued monitoring of the landform establishment works by suitably qualified person/s.	Slopes to be reduced until all slopes meet the approved final landform. See 6.2.1 for further information
Final landform unsuitable for final landuse.	Final landform does not conform to approved final landform.	Landform to be remediated to approved final landform	Slopes to be reduced until all slopes meet the approved final landform. Survey plan or similar to be prepared to show final slopes meet the approved final landform.

Growth Medium Establishment Phase Rehabilitation Risk Assessment

Hazard	Risks	Risk Controls	Details
Unsuitable physical and structural substrate	Substrate compacted	Substrates to be placed in such a way to maintain soil structure as far as possible	Minimise vehicle movement over the emplaced substrates. Substrates to be lightly ripped to permit water infiltration and air penetration prior to topsoil placement.
Subsoil and topsoil deficit	Insufficient on-site material available for growth medium.	Available topsoils are stockpiled appropriately and reused on the site.	Records to include amounts of subsoil and topsoils stripped, locations and depths re-spread. If on-site topsoil/growth medium deficit is noted, material may be imported to assist in rehabilitation. See 6.2.1 for further information

Ecosystem and Land Use Establishment Phase Rehabilitation Risk Assessment

Hazard	Risks	Risk Controls	Details
Lack of target seed availability and quality	Seeds unable to be sourced for rehabilitation.	Study artificial seed spreading.	See trails in Section 9.2
Damage to seed through revegetation processes	Insufficient germination of seeds to provide groundcover.	Protect seeds from damage during rehabilitation.	Experienced operators to be employed for rehabilitation works. Rehabilitation areas to be protected from vehicular traffic by fencing or similar barriers. Minimise handling of seeds during storage and use.
Weed Infestation	Weed number overwhelm revegetation	Regular inspection and spraying for weeds will be undertaken.	
Inappropriate rehabilitation techniques	Failure of rehabilitation	Ensure approved rehabilitation procedures are followed	Experienced contractors to be employed for rehabilitation works. Rehabilitation to be undertaken in accordance with the Rehabilitation Plan approved by DPIE and this plan. Proponent to supervise rehabilitation works to ensure compliance with any approved plans and best practice techniques are utilised
		Approved plans will be reviewed as required to ensure best practice techniques are employed.	
Adverse weather conditions	Failure of rehabilitation	Revegetation will not be undertaken during periods of drought.	
		Artificial watering to be trailed to enable germination	See trails in Section 9.2
		Rehabilitation works will not be undertaken during wet periods	

Hazard	Risks	Risk Controls	Details
		where soils and seed planting may be damaged	
Inappropriate Seasonal timing of revegetation	Failure of rehabilitation.	Revegetation will preferably be sown during the spring and autumn seasons to avoid hot and dry weather conditions and winter frost.	
Insufficient establishment of target species and limited species diversity	Vegetation community does not become established on final landform affecting final land use and ecosystem.	Sowing of additional seed mix for targeted species or additional species endemic to the pre-disturbance community. Use seed and mulch mix or other application techniques. Soil amelioration works such as addition of fertiliser. Additional weed control activities (mechanical and/or chemical)	See trails in Section 9.2