Upper Hunter Mining Dialogue

Final and Temporary Rehabilitation Principles and Commitments

2022 Results and Commentary

REPORT BY MALABAR RESOURCES
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Final and Temporary Rehabilitation Principles and Commitments

Introduction

The nine coal producing companies of the Upper Hunter, through the Upper Hunter Mining Dialogue (the Dialogue), have agreed to this set of principles and commitments regarding final and temporary rehabilitation. The Rehabilitation Principles and Commitments have been developed with advice and guidance from the Dialogue's Joint Environment Working Group, which comprises industry, local and state government, interest groups, and community stakeholders.

The Upper Hunter Mining Dialogue has two goals regarding land management:

- *Goal 1 - To decrease the time that disturbed areas are left without final or temporary cover, recognising that different mining operations are at different points in rehabilitation.*

- *Goal 2 - To achieve a consistent level of best practice, quality, integrated rehabilitation – both within the industry and with future land uses - across the Upper Hunter and to be a responsible steward of the land.*

The primary focus of the Rehabilitation Principles and Commitments is to contribute to Goal 1. Several other projects are underway to progress Goal 1. The industry participants in the UHMD acknowledge the importance of clear goals for rehabilitation developed through consultation with community and regulators, continuing to improve rehabilitation techniques and sharing innovative and successful rehabilitation techniques within the industry. Projects under Goal 2 focus on continuous improvement of rehabilitation practices.

Principles and Commitments

The Upper Hunter coal producers will publicly report against the Principles and Commitments on an annual basis. The reporting will be aggregated by the Upper Hunter Mining Dialogue secretariat and shared with the community. Table 1 sets out the six principles and provides a description of how each will be reported against. Contextual information is also sought from industry regarding variations in their annual reporting, as well as an opportunity to provide commentary on their future rehabilitation targets for the years ahead.

Table 1 – Principles and Commitments

Principle	Reporting
Principle 1 – Include rehabilitation planning in mine planning	*Narrative* – how has this been done in the last period
Planning for rehabilitation should be integrated into the mine planning process and should include allocating adequate and dedicated resources to achieve the planned rehabilitation outcomes.	Rehabilitation at the Maxwell UG Mine was previously managed in accordance with the Mining Operations Plan (MOP). An amendment to the MOP was approved by the Resources Regulator in February 2022 and included: • Reference to the recently approved ML1820 (for ancillary mining activities) and ML1822 (for underground coal mining); • Reference to development consent SSD 9526 that was modified on 19 November (MOD1) and associated activities; • Revised topsoil and overburden numbers; • The installation of a second water pipeline from the mine entry area to the Eastern Void; and • Decommissioning of the Orica Plant located on CL229. Rehabilitation at the Maxwell UG Mine is now managed in accordance with the Rehabilitation Management Plan and the Forward Program. The Rehabilitation Management Plan and Forward program were prepared in August 2022 following an amendment to the *Mining Regulation 2016* under the *Mining Act 1992*. The amendment provided new standard rehabilitation conditions for mining leases which replaces existing mining lease conditions. The Rehabilitation Management Plan details how rehabilitation will be undertaken on site and includes final land use options and describes the implementation, monitoring and measurement of rehabilitation. The Forward Program includes a schedule of mining activities and a summary of the spatial progression of rehabilitation for the next 3 years. The post mining land use goal is to deliver a safe, stable, non-polluting and sustainable post-mining landform that is consistent with the surrounding natural topography and fit for sustaining the intended post-mining land use. As an underground mine, the project would result in minimal changes to existing landforms. Consistent with previous approvals, the vision is to create a landscape with areas capable of productive land use, alongside woodland corridors to support biodiversity. In accordance with the Maxwell UG Mine EIS the design and post-mining land use objectives for the site are as follows: • Provide a landscape that is safe, stable and non-polluting. • Minimise potential environmental impacts and liability arising from mine closure. • Remove any waste or potentially hazardous materials from site. • Minimise the potential impacts of decommissioning. • Develop landforms that return land affected by mining to a condition that is suitable for a range of sustainable land uses. • Create a stable post-mining landform that is compatible with the surrounding landscape, and that is capable of productive land use that achieves the nominated land capability. • Establish vegetation that is self-sustaining, is perpetual and provides a sustainable habitat for local fauna and successive flora species. • Create a post-mining landform that enhances the local and regional habitat corridors as presented in the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* (DMR, 1999). • Develop land uses that benefit the future use of the site for the local community. • Develop a landscape that reduces the requirement for long-term monitoring and management.
Principle 2 – Undertake progressive rehabilitation	*Narrative* – how has this been implemented in the last twelve months
Companies should	In accordance with the Forward Program, no new areas of rehabilitation were completed

Principle	Reporting
undertake rehabilitation progressively, with the objective of ensuring that rehabilitation is as close as possible to active mining.	during the reporting period. No buildings or infrastructure were decommissioned or demolished during the reporting period. Rehabilitation activities focussed on enhancing existing areas of rehabilitation. These activities included: • infill planting in the woodland rehabilitation corridor to increase species diversity; • installation of nest boxes in appropriately sized canopy trees to assist with fauna husbandry; • targeted weed management across the site for High Threat Exotic weed species; • management of pest animal species in consultation with the Local Land Services and near neighbours; and • continued cattle grazing on pastured rehabilitated paddocks.
Principle 3 – Minimise time that disturbed areas are left without vegetation	*Narrative* – how has this been implemented in the last twelve months
Companies should actively seek to minimise the time that land is left without cover during mining. This should include: ▪ *Taking steps to ensure that rehabilitation is commenced within 12 months of land becoming available for rehabilitation* ▪ *Utilising methods of temporary rehabilitation[1], such as aerial seeding of over burden and other disturbed areas where permanent rehabilitation has not commenced.*	All areas of rehabilitation are within the ecosystem and land use establishment phase. This phase incorporates revegetated lands and habitat augmentation, focusing on species selection, presence and growth, together with weed and pest animal management. Whilst the rehabilitation is progressing, no areas of rehabilitation have been formally signed off as meeting the land use objectives and completion criteria. Two tree planting programs were undertaken during the reporting period. The programs targeted a total of 22 hectares of existing mine rehabilitation within the conceptual woodland corridor. Ground preparation works for optimal tree propagation were undertaken and included: • slashing of grass to safely define the work area as well as improve the success of spraying activities to prevent competition to tree growth; • single deep rip lines (minimum 500 mm deep) to break up the surface to allow tube stock to be planted and establish. The rip lines also help capture water, reduce erosion and improve soil moisture levels; and • spraying of rip lines with glyphosate to reduce competition for growth from grass species. Tree and shrub species consistent with the Spotted Gum Ironbark Woodland, Red Gum Woodland and Yellow Box Woodland vegetation communities were planted. A total of 18,000 plants were installed using a growth promoting compound and immediately watered in with a minimum of one litre per plant. Follow-up watering was minimal after installation due to wet conditions in Autumn; the Spring planting campaign required less follow up water due to intermittent rainfall throughout the warmer months. The culling of kangaroos was undertaken during the reporting period to reduce grazing pressure and minimise the impact to native groundcover species from the digging of day beds under trees and shrubs in rehabilitation areas. Programs were targeted prior to planting activities on rehabilitated land. Weed management activities were undertaken during the reporting period in summer, autumn, winter and spring. Primary areas of focus were: • offsets and conservation areas; • areas adjacent to private land; • areas of rehabilitation • tree planting areas; • areas of high infestations of weeds of national significance; and • areas identified for weed control in the Ecological Monitoring Report for 2020.
Principle 4 – Prioritise areas of rehabilitation	*Narrative* – how has this been implemented in the last twelve months

[1] Temporary rehabilitation describes reshaping, revegetation and other rehabilitation techniques that are used for purposes other than final rehabilitation. This includes such initiatives as seeding overburden emplacement areas to reduce erosion, which are only temporary.

Principle	Reporting
and temporary cover to reduce impacts	
Companies should prioritise rehabilitation and temporary cover in those areas where leaving land exposed will have the most impact. The following areas should be considered to have priority: ▪ *Areas that have the greatest impact on visual amenity, such as areas that face townships, residences, or the highway* ▪ *Areas that have the potential to generate dust leaving the site* ▪ *Areas that are important for biodiversity, such as rehabilitation adjoining or providing connectivity to remnant vegetation.*	As above
Principle 5 – Meet target for rehabilitation progress identified in the Forward Program	*Quantitative* – report MOP target and actual rehabilitation *Narrative* – explanation of performance
Each company should meet the annual target for rehabilitation quantity (area) set in the Forward Program for each of its mines.	There were no new areas of rehabilitation completed during the reporting period, in accordance with the Forward Program. Rehabilitation activities focussed on enhancing existing areas of rehabilitation including, infill planting of 18,000 trees, weed control management and pest control.
Principle 6 – Set quality targets for rehabilitation in the Rehabilitation Management Plan and Forward Program and implement a monitoring program to measure performance	*Narrative* – summary of quality targets for the various rehabilitation types; and summary of monitoring program scope and status.

Principle	Reporting
Each company should include quality targets for the various types of rehabilitation in the Rehabilitation Management Plan and/or Forward Program for each of its mines. A monitoring program to measure the performance of rehabilitation areas against the quality targets should be implemented at each of its mines.	During the reporting period the following measures were implemented to improve biodiversity at the Maxwell UG Mine: • regular walkover inspections of rehabilitation; • tubestock infill planting within woodland vegetation communities; • culling of kangaroos prior to infill planting to reduce grazing pressure on tubestock; • continuation of the grazing trial on mine pasture rehabilitation; • implementation of a targeted weed management program; and • installation of nest boxes to improve fauna habitat in the woodland vegetation communities. Ecological monitoring was undertaken during October to December 2022. Monitoring consisted of biometric vegetation sampling, Biodiversity Assessment Methodology (BAM) for remnant woodland reference sites and woodland rehabilitation areas, fauna monitoring, assessment of pest animals, topsoil assessment of monitoring sites, and comparison against the Ecosystem and land use establishment phase performance indicators and completion criteria. The Rehabilitation Management Plan defines rehabilitation into primary and secondary domains, the primary domains are based on land management units with unique operational and functional purposes whereas the secondary domains are defined on land management units with a similar post mining land use objective. The rehabilitation phases within each domain show the progress towards the post mining land use goals. All areas of existing pasture and woodland rehabilitation are currently within the ecosystem and land use establishment phase. All further rehabilitation activities will focus on enhancing the rehabilitation to meet the relevant phase objectives and completion Criteria. **Biometric Vegetation Sampling** Biometric vegetation sampling was undertaken on eleven reference and woodland rehabilitation sites. Sites were representative of Ironbark-Spotted Gum-Grey Box Woodland, Narrow-leaved Ironbark Woodland, Yellow Box-Grey Gum Woodland and Forest Red Gum Woodland. Results showed the reference sites were in good condition and naturally self-sustaining with no direct impact from past mining activities or recent site changes. The reference sites show no evidence of die back or disease, with weed management practices during the previous reporting period having a positive impact with generally low weed cover present. General enhancement of these areas will likely continue to occur naturally with the additional application of weed control when required. The woodland rehabilitation sites showed varying results, as most sites are in early ecosystem establishment phase. These sites recorded lower values in comparison to the reference sites when assessing the number of trees with hollows, total length of fallen logs, regeneration of canopy species and native overstorey, midstory and ground covers. All of these units will increase in time as trees and other native vegetation mature with the application of required management actions such as weed control and enhancement plantings. Percentage foliage cover of mid-storey species was similar to or exceeded the reference sites on rehabilitation sites and is progressing well towards the targets. Improvements are required in the Southern Offset area with weed management of exotic grasses and replanting of canopy species to provide protection and resilience for successional lower stratum species. Of the 139 plant species that were recorded during surveys, 95 were local native species. **Biodiversity Assessment Methodology (BAM) Sampling** The BAM vegetation sampling was adopted during the 2021 ecological monitoring program to comply with the Biodiversity Management Plan. The BAM provides a direct comparison of sampling results based on attributes such as foliage cover, stem size, tree regeneration, length of logs and litter cover against a Plant Community Type benchmark database providing an Integrity score. The BAM sampling was undertaken at four woodland reference sites and seven woodland rehabilitation sites. Results indicate that the woodland reference sites had an integrity score from between 69 and 74 indicating that these sites are achieving the benchmark conditions for the target Plant Community Type. The woodland rehabilitation sites scores resulted in two groupings, three sites scoring <12 due to low native cover in all stratum; these results are expected

Principle	Reporting
	given the woodland rehabilitation areas are at early phase of ecosystem succession. The second grouping scored between 19 and 45 primarily due to development of a moderate canopy cover; these sites are generally progressing well towards the target vegetation type however will need time to further develop an appropriate canopy, shrub and ground cover layer. Improvements to these ecosystems will establish in time, with the addition of weed management programs, an increase in fauna habitats and planting or seeding of native vegetation cover within the canopy, shrub and groundcover layers. **Fauna Monitoring** Fauna monitoring occurred at six sites (four reference sites and two rehabilitation sites) to determine the occurrence of terrestrial vertebrate animals, including bird, mammal, reptile and amphibian species. There were 53 fauna species recorded during the 2022 monitoring program, including 30 bird species, fourteen mammal species, five reptile species and four amphibian species. A total of three threatened species were recorded, being the speckled warbler (Chthonicola sagittata), the squirrel glider (Petaurus norfolcensis) and the eastern bentwing-bat (Miniopterus schreibersii oceanensis). Comparison of the average number of fauna species data, recorded at each site from 2013 to 2022, indicates a general increase trend of fauna species at the reference sites from 25 to 36 species. **Nest Box Installation** Twenty nest boxes had previously been installed during 2021 in woodland rehabilitation areas. Monitoring of nest boxes occurred as part of the ecological monitoring program in Spring 2022. The monitoring results indicate that there has been no usage of the nest boxes, likely due to the boxes being installed less than 12 months earlier. The nest boxes were observed to be installed correctly and located in an appropriate habitat. A further 20 nest boxes (for parrots, gliders and treecreepers) were installed in woodland rehabilitation in August 2022. These boxes will continue to be monitored for use and at some stage may be included in the ecological monitoring program. **Cattle Grazing** Cattle grazing commenced on rehabilitation at the Southern Tip in 2018. Grazing continued throughout the reporting period. Cattle were strategically rotated between three paddocks of which two were located on mine rehabilitation. The cattle will be sold to market during the next reporting period and the paddocks will be rested and monitored for new vegetation growth and diversity. Results so far are demonstrating that Maxwell can create a post mining landscape that is compatible with the surrounding landscape and capable of sustaining productive land use. . **Pest Animals** The predominate pest species observed at site were kangaroos, they were noted to be over grazing rehabilitation areas and creating nesting beds under established trees and shrubs. During the reporting period a kangaroo cull was undertaken in the southern offset area. Large numbers of kangaroos have the potential to impact regenerating flora species and establishment of new rehabilitation areas. A reduction in kangaroo numbers will be targeted prior to the Autumn and Spring tree planting campaigns, during the next reporting period. Feral pigs also have an impact of rehabilitation lands. During the reporting period a total of nineteen pigs were trapped and shot on site. All feral pig sightings and control efforts are recorded in the FeralScan database—a third party pest animal recording and management tool administered by the Centre for Invasive Species Solutions and supported by NSW Local Land Services (amongst others). **Soil Assessment** Topsoil samples at twenty-five monitoring sites were analysed in accordance with the RMP, with results compared to DPI standards for the North Coast of NSW and the

Principle	Reporting
	Environmental Analysis Laboratory. The results of topsoil samples from reference sites show that the soils pH, Electrical Conductivity (EC), and plant growth limiting factors are in line with indicative guidelines, other analytes such as exchangeable calcium, magnesium and potassium are lower than guidelines and the carbon-nitrogen ratio and sulphur were generally higher than the guidelines. The pasture rehabilitation topsoil analysis indicates that results are generally in line with indicative guidelines. The calcium-magnesium ratio is low and the carbon-nitrogen ratio is high however, these results will not restrict the growth of vegetation. The vegetation at these sites is in good condition. The woodland rehabilitation sites topsoil analyses were in line with indicative guidelines, with no significant issues to be addressed. However, the addition of mulch in areas of bare ground would act to improve the organic matter in those locations. **Closure Criteria** The regeneration of species from all structural layers was recorded at the Southern Offset and two locations within the woodland rehabilitation corridor monitored during the reporting period. Invasive weeds remain moderate to high in the Southern Offset Area and the Northern rehabilitation areas, including woodland rehabilitation. An intensive weed control program was established focussing on mine rehabilitation during the reporting period. Work will continue in these areas during the next reporting period. Woodland rehabilitation monitoring site results indicate that the ground cover including foliage coverage is trending towards the closure criteria. However, development of ground cover for erosion protection and native tree and shrub establishment in one section of the Great North Tip are not meeting completion criteria. The native groundcover, tree and shrub species require further management to assist with establishment. The diversity of canopy and mid-storey species, particularly at the Southern Offset area and Northern rehabilitation area were not meeting the completion criteria targets mainly due to pest animals impacting on planting campaigns and weed infestations. To remediate this issue, further development of a canopy and mid-storey cover through infill planting, and appropriate weed control will occur during the next reporting period. Pasture rehabilitation sites monitored during the reporting period are show the overall groundcover has established well with a suitable mix of perennial grasses, forbs and legume species. Ecological monitoring demonstrated good cover of perennial grass species in the Eastern rehabilitation area. All pasture rehabilitation sites are trending towards meeting the closure criteria for post mining land use for sustainable grazing.

Contextual information

This section provides an opportunity for each company to provide some commentary or contextual information regarding their reported results. Such information could include advice on: - *Any material changes to the site (i.e., expansions, acquisitions, or divested assets); or* - *Why any figures may have changed since the last reporting period?*	N/A

Future rehabilitation priorities

This section provides an opportunity for each company to provide details on rehabilitation activities at their site or sites for the upcoming year.	As outlined in the 2022 Annual Review, the following activities will occur during the next reporting period: • two tree planting programs consisting of approximately 21,000 tube stock to be planted on existing mine rehabilitation within the conceptual woodland corridor; • a weed control program focussing on High Threat Exotic weed species; • a kangaroo cull on rehabilitation areas to reduce the impact on grazing on vegetation; • continued wild dog and fox controls in association with the Local Land Services; • baiting of rabbits near the Great North Tip and along the main access road; and • where practicable, fallen timber and hollow resources should be reintroduced into woodland rehabilitation areas where there is a low abundance of habitat features.