NSW GOVERNMENT

NSW Resources Regulator

ARR0001192

# MUSWELLBROOK COAL ANNUAL REHABILITATION REPORT

Sunday 1 January 2023 to Sunday 31 December 2023

# Contents

# Summary table

| DETAIL | |
|---|---|
| **Mine** | Muswellbrook Coal |
| **Reference** | ARR0001192 |
| **Annual report period commencement date** | Sunday 1 January 2023 |
| **Annual report period end date** | Sunday 31 December 2023 |
| **Forward program** | FWP0001125 |
| **Mining leases** | ML 1304 (1992), CCL 713 (1973), ML 1562 (1992) |
| **Lease holder(s)** | Muswellbrook Coal Company Limited |
| **Contact** | Julie Thomas |
| **Date of submission** | Wednesday 21 February 2024 |

# Important

The department may make the information in your report and any supporting information available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your report to be confidential, please communicate this to the department via the message function on this submission within the NSW Resources Regulator Portal.

# Mine details

## Project description

Muswellbrook Coal Company Limited (MCC) operates the Muswellbrook Open Cut Coal Mine (the site), located approximately three kilometres (km) to the north-east of Muswellbrook in the Hunter Valley of New South Wales. MCC is a wholly owned subsidiary of Idemitsu Australia Pty Limited (IA). On 1 September 2003, Development Consent for DA 205/2002 was granted by Muswellbrook Shire Council (MSC) to extend the former MCC No.1 Open Cut. The No.1 Open Cut Extension commenced operations in March 2005 and has a capacity to produce up to 2,000,000 tonnes coal per annum with mining operations approved until end of 2022. Rehabilitation activities will progress past this date. The current mine life at MCC is zero years. Mining operations ceased in 2022, with coal storage, handling and transport ceasing in March 2023.

## Life of mine

0 years

## Current development consents, leases and licences

**Development consents granted under the *Environmental Planning and Assessment Act 1979***

DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002
DA 205/2002

**Authorisations covering the mining area granted under the *Mining Act 1992***

ML 1304 (1992), CCL 713 (1973), ML 1562 (1992)

**Any other approvals, licences, or authorities issued by government agencies that are relevant to the progress of mining operation and rehabilitation activities**

Environmental Protection Licence 656
Water Licences WAL39806, WAL41503 and WAL41521

**Summary of the scope and/or purpose of the new applications or modifications to existing approvals (if applicable)**

During the reporting period a variation to the Environmental Protection Licence (EPL) was approved by the EPA. This variation was to change the scheduled activities on site following the end of mining activities. No other changes were made to the EPL as part of this variation.

# Changes to land ownership and land use

There were no changes to land ownership or land use during the reporting period.

# Surface disturbance and rehabilitation activities during the reporting period

**Surface disturbance and rehabilitation activities that were conducted and an analysis of the progress against the rehabilitation schedule**

Coal mining at MCC was completed in November 2022 and coal haulage from site was completed in March 2023. No further coal mining activities are proposed at MCC. Activities on site during this reporting period have focused on rehabilitation of the site. There was no surface disturbance undertaken during the reporting period. The proposed work was to complete installation of a drop structure and contour drains, application of lime (2t/ha), gypsum (2t/ha) and growth media (green mulch at 150t/ha), and seeding of Open Cut 2. This work was all completed during the reporting period. In addition to the rehabilitation in Open Cut 2, the Coal Handling and Preparation Plant (CHPP) was decommissioned and demolished during the reporting period. A specialised demolition company was engaged to complete this work. 96.53% of the demolition waste was recovered and recycled. Work will continue during the next reporting period to remove any carbonaceous material in this area and to complete the final rehabilitation.

**Rehabilitation planning activities that were conducted, including any specialist studies**

During the reporting period MCC engaged Thiess Rehabilitation (Thiess) to complete the rehabilitation of the Open Cut 1 and CHPP areas. As part of this work Thiess has reviewed the final landform of this area and made some changes to the previous final landform. The revised final landform maintains compliance with the rehabilitation objectives for the site, while allowing for earlier completion of the rehabilitation of the site. During the reporting period MCC continued with a series of studies relating to mine closure. The studies are being undertaken in consultation with Subject Matter Experts (SME's) and they include rehabilitation activities and other activities relating to mine relinquishment. The outcomes of these studies that are applicable to the ongoing rehabilitation of the site will be included in future revisions of the Rehabilitation Management Plan. As part of the mine closure studies and planning for future rehabilitation activities, MCC continued with contamination assessments of the site during the reporting period. The key assessment completed this reporting period was around the CHPP area and this assessment did not identify any significant contamination on site that requires further management. The contamination assessments will be on going as rehabilitation activities progress. The outcomes of these studies that are applicable to the ongoing rehabilitation of the site will be included in future revisions of the Rehabilitation Management Plan.

**Overview of subsidence repair and/or remediation works undertaken**

Subsidence is not expected to impact on areas of rehabilitation. Historical bord and pillar underground mining has been undertaken at the site, which typically results in minimal subsidence therefore the risk of impact to rehabilitation is considered very low. No subsidence repair and/or remediation was required during the reporting period.

**Overview of rehabilitation management and maintenance activities**

Minimal rehabilitation management and maintenance activities were required this reporting period. The activities that did occur included removal of areas of spontaneous combustion in rehabilitation areas and replacing with inert material, and wild dog and rabbit control.

**Details of any rehabilitation actions taken as required by any letters, notices or directions issued by government agencies, including the NSW Resources Regulator**

In June 2022, MCC received a Notice under the Mining Act 1992 section 240 from the Resources Regulator. This notice resulted from a site inspection conducted in March 2022 where concerns were raised about areas of erosion that were identified in a previous inspection in April 2021 and during the 2021 Independent Environmental Audit. The s240 Notice has directed MCC to undertake an assessment of the long-term erosional stability of the approved final landforms as part of the rehabilitation of the mine, using an industry accepted Landform Evolution Model. This assessment was completed during the reporting period and the findings from this assessment are shown below. Both proposed and existing final landforms at the Muswellbrook Coal site have been assessed for their erosional stability using the SIBERIA Landscape Evolution Model. The reconstructed and revegetated Muswellbrook Coal sites (Eastern out of pit emplacement and Open Cut 1 (amphitheatre)) demonstrates that with a reliable vegetation cover that they can be erosionally stable. Modelled erosion rates are < 20 t ha-1 yr-1. Erosion risk for the proposed landforms (Open Cut 1 and Open Cut 2) is high. Using high erodibility site-specific parameters and no vegetation produces a high erosion rate (~100 t ha-1 yr-1) and gullies which grow over time. The inclusion of vegetation greatly reduces erosion rate and gully depth. However, vegetation cannot be relied on to reduce erosion risk.

**Details of any rehabilitation areas that have achieved the final land use**

There are no areas at MCC that have achieved final land use.

**Key production milestones**

| MATERIAL | UNIT | FWP0001125 YEAR 1 | THIS REPORT |
|---|---|---|---|
| **Stripped topsoil** (if applicable) | ($m^3$) | 0 | 0 |
| **Rock/overburden** | ($m^3$) | 0 | 0 |
| **Ore** | (Mt) | 0 | 0 |
| **Reject material**[1] | (Mt) | 0 | 0 |
| **Product** | (Mt) | 0 | 0 |

[1] This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

# Disturbance and rehabilitation statistics

## Current disturbance and rehabilitation progression

| | ELEMENT | UNIT | THIS REPORT |
|---|---|---|---|
| A | **Total surface disturbance footprint** | (ha) | 618 |
| B | **Total active disturbance** | (ha) | 184.87 |
| C | **Land prepared for rehabilitation** | (ha) | 0 |
| D | **Ecosystem and land use establishment** | (ha) | 82.71 |
| E | **Ecosystem and land use development** | (ha) | 350.43 |
| F | **Rehabilitation completion** | (ha) | 0 |

## Rehabilitation key performance indicators (KPIs)

| | ELEMENT | UNIT | THIS REPORT |
|---|---|---|---|
| G | **Total new active disturbance area** | (ha) | NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data |
| H | **New rehabilitation commenced during annual reporting period** | (ha) | NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data |
| I | **Established rehabilitation** | (ha) | 350.43 |
| J | **Annual rehabilitation to disturbance ratio** | % | NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data |
| K | **Rehabilitated land to total mine footprint** | % | 56.7 |

# Progressive achievement of established rehabilitation

| | ELEMENT | UNIT | THIS REPORT |
|---|---|---|---|
| L | **Established rehabilitation - agricultural final land uses** | % | 68.66 |
| M | **Established rehabilitation - native ecosystem final land uses** | % | 31.23 |
| N | **Established rehabilitation - other/non-vegetated final land uses** | % | 0.11 |

# Variation to the rehabilitation schedule

**Identify the components of the most recent forward program that were not achieved**

There were no variations to the rehabilitation schedule during the reporting period. The areas that were proposed to be rehabilitated were completed.

**Key factors that delayed progressive rehabilitation**

There were no delays to the progressive rehabilitation schedule.

**Outline actions that will be included in the forward program and carried out to minimise disturbance and undertake progressive rehabilitation as far as reasonably practical**

MCC has engaged Thiess Rehabilitation to complete the rehabilitation of Open Cut 1 and the old CHPP area. Theiss has committed to the KPI's listed in the Forward Program.

# Rehabilitation monitoring and research findings

## Rehabilitation monitoring

**The rehabilitation monitoring carried out in the annual reporting period**

Based on the results this reporting period, rehabilitation woodland sites are preforming well with species assemblages containing more than the minimum 25% of species being characteristic of the Vegetation Classes and Threatened Ecological Community's (TECs) within the region. All sites also recorded native overstory species that occur in Plant Community Types (PCTs) and associated TECs within the region and are in the recommended species in Table 12 of the RMP. Key characteristic native species have been recorded in rehabilitation woodland sites, that are characteristic of Vegetation Class Coastal Valley Grassy Woodland and regional TECs, such as Central Hunter Grey Box – Ironbark Woodland, Central Hunter Ironbark - Spotted Gum - Grey Box Forest and White Box – Yellow Box – Blakely's Red Gum Grassy Woodland. The observation of the recruitment and regeneration of both long lived and short-lived species from within and outside of the rehabilitation areas, particularly the emergence of canopy and shrub seedlings, is very positive. The occurrence of this critical ecological process is evidence of the long-term sustainability of the rehabilitation. Foliage cover for rehabilitation woodland sites has been analysed and compared against the analogue woodland sites for each of the ecologically dominant layers (native overstorey/native midstorey/ native ground cover) and developing litter cover. Across the rehabilitation woodlands, the median foliage cover for native overstorey, native midstorey and litter was within the 10th and 90th percentile variation range of the analogue woodland sites, however, the native ground cover fell below the 10th percentile variation range of the analogue woodland sites. The total priority and high threat exotic (HTE) cover has been calculated at 8% across rehabilitation woodlands and is below the completion criteria threshold of <15%. Analogue woodland sites have seen a slight increase in mammal, bird and pest species recorded, whereas there is a slight decrease in numbers of mammals and reptiles recorded at rehabilitation woodland sites. Mammals, particularly the larger mammals, appeared to show a preference for utilisation of rehabilitation areas over analogue areas. There has been an overall increase in the average number of bird species recorded within rehabilitation woodland sites. Monitoring indicates good microbat activity, with both common and threatened species recorded at all analogue and woodland sites. Based on the results of this reporting period, rehabilitation pasture sites are generally preforming well. Overall, ground cover was good with all sites above the minimum >50% ground cover required. The median herbage mass yield for rehabilitation pasture sites RP3, RP6, RP7 and RP9 is well above the analogue pastures 10th percentile and the minimum 1,000kg/ha threshold. There was little active erosion occurring within the rehabilitation pasture sites.

# Status of performance against rehabilitation objectives and rehabilitation completion criteria

**The monitoring program that has been implemented**

The rehabilitation monitoring program undertaken this year aligns with the rehabilitation monitoring program included in the Rehabilitation Management Plan. All rehabilitation areas in the Landform Establishment phase are represented in the rehabilitation monitoring program to assess performance against the proposed rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan. This includes assessing the native vegetation and pasture health and diversity, as well as identifying the fauna that is utilising the rehabilitation areas. This includes comparison of results to analogue sites. The monitoring program also identifies if any erosion of concern is present on the rehabilitation areas.

**Are all rehabilitation areas in Landform Establishment phase or higher represented in the monitoring program to assess performance against the rehabilitation objectives and approved or, if not yet approved rehabilitation completion criteria and final landform and rehabilitation plan?**

Yes

**Year rehabilitation areas will be included as part of the monitoring program**

**An appraisal of whether rehabilitation is moving towards achieving the proposed rehabilitation objectives, approved or, if not yet approved, rehabilitation completion criteria and final landform and rehabilitation plan as soon as reasonably practicable.**

Rehabilitation is moving towards achieving the final land use as soon as reasonably practicable. The Rehabilitation Monitoring Report demonstrated that overall, the rehabilitation areas are performing well. When the results were compared to relevant completion criteria, only one assessed item did not reach the target. This was the native ground cover levels at the Woodland rehabilitation sites. The Rehabilitation Monitoring Report identified that targeted weed management may be required to prevent degradation of rehabilitated areas. The Rehabilitation Monitoring Report also identified that rehabilitation woodland areas may require further intervention (weed control or overseeding with competitive native species) to decrease weed cover/exotic grass cover and increase native grass cover to allow them to reach the completion criterion benchmark for native groundcover.

**Appraisal description**

Rehabilitation is moving towards achieving the final land use as soon as reasonably practicable.

**Rehabilitation monitoring program findings**

Based on the results this reporting period, rehabilitation woodland sites are preforming well with species assemblages containing more than the minimum 25% of species being characteristic of the Vegetation Classes and Threatened Ecological Community's (TECs) within the region. All sites also recorded native overstory species that occur in Plant Community Types (PCTs) and associated TECs within the region and are in the recommended species in Table 12 of the RMP. Key characteristic native species have been recorded in rehabilitation woodland sites, that are characteristic of Vegetation Class Coastal Valley Grassy Woodland and regional TECs, such as Central Hunter Grey Box – Ironbark Woodland, Central Hunter Ironbark - Spotted Gum - Grey Box Forest and White Box – Yellow Box – Blakely's Red Gum Grassy Woodland. The observation of the recruitment and regeneration of both long lived and short-lived species from within and outside of the rehabilitation areas, particularly the emergence of canopy and shrub seedlings, is very positive. The occurrence of this critical ecological process is evidence of the long-term sustainability of the rehabilitation. Foliage cover for rehabilitation woodland sites has been analysed and compared against the analogue woodland sites for each of the ecologically dominant layers (native overstorey/native midstorey/ native ground cover) and developing litter cover. Across the rehabilitation woodlands, the median foliage cover for native overstorey, native midstorey and litter was within the 10th and 90th percentile variation range of the analogue woodland sites, however, the native ground cover fell below the 10th percentile variation range of the analogue woodland sites. The total priority and high threat exotic (HTE) cover has been calculated at 8% across rehabilitation woodlands and is below the completion criteria threshold of <15%. Analogue woodland sites have seen a slight increase in mammal, bird and pest species recorded, whereas there is a slight decrease in numbers of mammals and reptiles recorded at rehabilitation woodland sites. Mammals, particularly the larger mammals, appeared to show a preference for utilisation of rehabilitation areas over analogue areas. There has been an overall increase in the average number of bird species recorded within rehabilitation woodland sites. Monitoring indicates good microbat activity, with both common and threatened species recorded at all analogue and woodland sites. Based on the results of this reporting period, rehabilitation pasture sites are generally preforming well. Overall, ground cover was good with all sites above the minimum >50% ground cover required. The median herbage mass yield for rehabilitation pasture sites RP3, RP6, RP7 and RP9 is well above the analogue pastures 10th percentile and the minimum 1,000kg/ha threshold. There was little active erosion occurring within the rehabilitation pasture sites.

**Performance issues and their causes including identification of any knowledge gaps that must be addressed**

# Outcomes of rehabilitation research and trials

| RRT NUMBER | PROJECT/TRIAL NAME | OBJECTIVE OF TRIAL/PROJECT | METHODOLOGY | EXPECTED DATE OF COMPLETION | STATUS | ON TRACK? |
|---|---|---|---|---|---|---|
| RRT0001039 | Landform Evolution Modelling | To assess the long term erosional stability of the approved final landform. | An assessment using an industry accepted Landscape Evolution Model will be used to determine the long-term erosional behaviour of the site. | 21 Feb 2024 | Complete | Yes |

**Outcomes of completed trials and research**

The assessment recommended that water control structures for Open Cut 1 and Open Cut 2 were subject to Landform Evolution Modelling as a part of their design and installation. This recommendation has been added to the rehabilitation process at MCC.

# Attachment 1 – Reporting Definitions

| REPORTING CATEGORY | | DEFINITION |
|---|---|---|
| **A1** | Total disturbance footprint – surface disturbance | 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.<br><br>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).<br><br>Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint. |
| **A2** | Underground Mining Area | Underground mining operations areas/subsidence management areas. |
| **B** | Total active disturbance | 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). |
| **C** | Rehabilitation – land preparation | Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation – decommissioning, landform establishment and growth medium development.<br><br>Refer to the glossary of terms in this document for the definition of these phases of rehabilitation. |

| REPORTING CATEGORY | | DEFINITION |
|---|---|---|
| **D** | Ecosystem and land use establishment | 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.<br>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** | Ecosystem and Land Use Development | Rehabilitation has matured to a level where target revegetation outcomes are on a trajectory towards meeting the final rehabilitation objectives and rehabilitation completion criteria (as verified by monitoring).<br>This phase includes infrastructure areas that are to be retained for an approved post mining land use, following completion of all necessary measures to render the infrastructure fit for this purpose (for example structural integrity). |
| **F** | Rehabilitation Completion | The NSW Resources Regulator has determined in writing that the mining area has achieved the approved rehabilitation objectives and approved rehabilitation completion criteria and final landform and rehabilitation plan following the submission of *Form: ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate and/or notification of mine or petroleum site closure.* |
| **G** | New active disturbance area | The area of any new active disturbance that has been created during the annual reporting period (definition A1 in Table 5). |
| **H** | New rehabilitation commenced during annual reporting period | The sum of any new rehabilitation commenced in the annual reporting period. These areas may be in the rehabilitation land preparation phase or the ecosystem & land use establishment phase (definitions C and D in Table 5). |
| **I** | Established rehabilitation (hectares) | The total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E & F in Table 5). |

| REPORTING CATEGORY | | DEFINITION |
|---|---|---|
| **J** | Annual rehabilitation to disturbance ratio | The rehabilitation to disturbance ratio (H/G) indicates how many hectares of new rehabilitation are undertaken for each hectare of land disturbed during the year. A ratio of 1/1 indicates that the area of new rehabilitation and disturbance in that year are the same. |
| **K** | % Rehabilitated land to total mine footprint | The proportion of the total mine footprint (area of land that has been disturbed by past or present surface disturbance activities) that has established rehabilitation (I/A1 x 100). For open cut mining, the proportion of the total mine footprint verified to be "established rehabilitation" should substantially increase as an operation progresses towards mine closure. |
| **L** | Established rehabilitation for agricultural final land uses (hectares) | The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E & F in Table 5) that have been returned to an agricultural final land use. |
| **M** | Established rehabilitation for native ecosystem final land uses (hectares) | The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or rehabilitation completion phase (definitions E & F in Table 5) that have been returned to native ecosystem final land use. |
| **N** | Established rehabilitation for other/non-vegetated final land uses (hectares) | The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E & F in Table 5) that have been returned to other/non-vegetated final land use. |

# Attachment 2 – Definitions

| WORD | 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 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** | In the context of rehabilitation, an analogue site is a 'reference site' that represents an example of the defining characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and completion criteria for final land use domains. |
| **Annual rehabilitation report and forward program** | As described in the Mining Regulation 2016. |
| **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 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. |

| WORD | DEFINITION |
|---|---|
| **Department** | The Department of Regional NSW. |
| **Disturbance** | See Surface Disturbance. |
| **Disturbance area** | An area that has been disturbed and that requires rehabilitation.<br>This may include areas such as on-licence 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 (i.e. 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 rehabilitation objectives and completion criteria.<br>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, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.<br>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.<br>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. |

| WORD | DEFINITION |
|---|---|
| **Final landform and rehabilitation plan** | As defined in the Mining Regulation 2016. |
| **Final land use** | As defined in the Mining Regulation 2016. |
| **Form and way** | Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website. |
| **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.<br>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 *Biodiversity Conservation Act 2016* and the *Fisheries Management Act 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 (i.e. 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 final landform.<br>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. |

| WORD | DEFINITION |
|---|---|
| **Life of mine** | The timeframe of how long a mine is approved to mine, from commencement to closure. |
| **Mine rehabilitation portal** | Means the NSW Resources Regulator's online portal that lease holders must use (via a registered account) to:<br>■ upload rehabilitation geographical information system (GIS) spatial data<br>■ develop rehabilitation GIS spatial data (using online tracing functions)<br>■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities.<br>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 land** | As defined in the *Mining Act 1992.* |
| **Native vegetation** | Has the same meaning as that term under section 60B of the *Local Land Services Act 2013.* |
| **Overburden** | Material overlying coal or a mineral deposit. |
| **Performance indicator** | An attribute of the biophysical environment (for example 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. |

| WORD | DEFINITION |
|---|---|
| **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:<br>■ active mining<br>■ decommissioning<br>■ landform Establishment<br>■ growth medium development<br>■ ecosystem and land use establishment<br>■ ecosystem and land use development. |
| **Progressive rehabilitation** | The progress of rehabilitation towards achieving the approved rehabilitation completion criteria. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria. |
| **Rehabilitation Completion** | The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of *Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate* application by the lease holder. |
| **Rehabilitation Completion criteria** | As defined in the Mining Regulation 2016. |
| **Rehabilitation cost estimate** | As defined in the Mining Regulation 2016. |
| **Rehabilitation management plan** | As defined in the Mining Regulation 2016. |
| **Rehabilitation objectives** | As defined in the Mining Regulation 2016. |
| **Rehabilitation risk assessment** | As defined in the Mining Regulation 2016. |
| **Rehabilitation schedule** | The defined timeframes for progressive rehabilitation set out in the forward program. |

| WORD | DEFINITION |
|---|---|
| **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:<br>■ the relevant development consent authority<br>■ the local council<br>■ the relevant landholder(s)<br>■ community consultative committee (if required under the development consent) or equivalent consultative group<br>■ affected land holder(s)<br>■ government agencies relevant to the final land use<br>■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities)<br>■ local Aboriginal communities, and<br>■ 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 31000:2009). |
| **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 solid material remaining after the recoverable metals and minerals have been extracted from the mined ore, and any process water[2]. |
| **Waste** | Has the same meaning as that term under the *Protection of the Environment Operations Act 1997*. |

[2] Commonwealth of Australia (DITR), 2007. *Tailings Management*.

# Attachment 3 – Rehabilitation Complaints

| DATE | COMPLAINANT | COMPLAINT DETAILS | RESPONSE DETAILS | STATUS OF RESPONSE | DATE RESPONSE COMPLETED (IF APPLICABLE) |
|---|---|---|---|---|---|

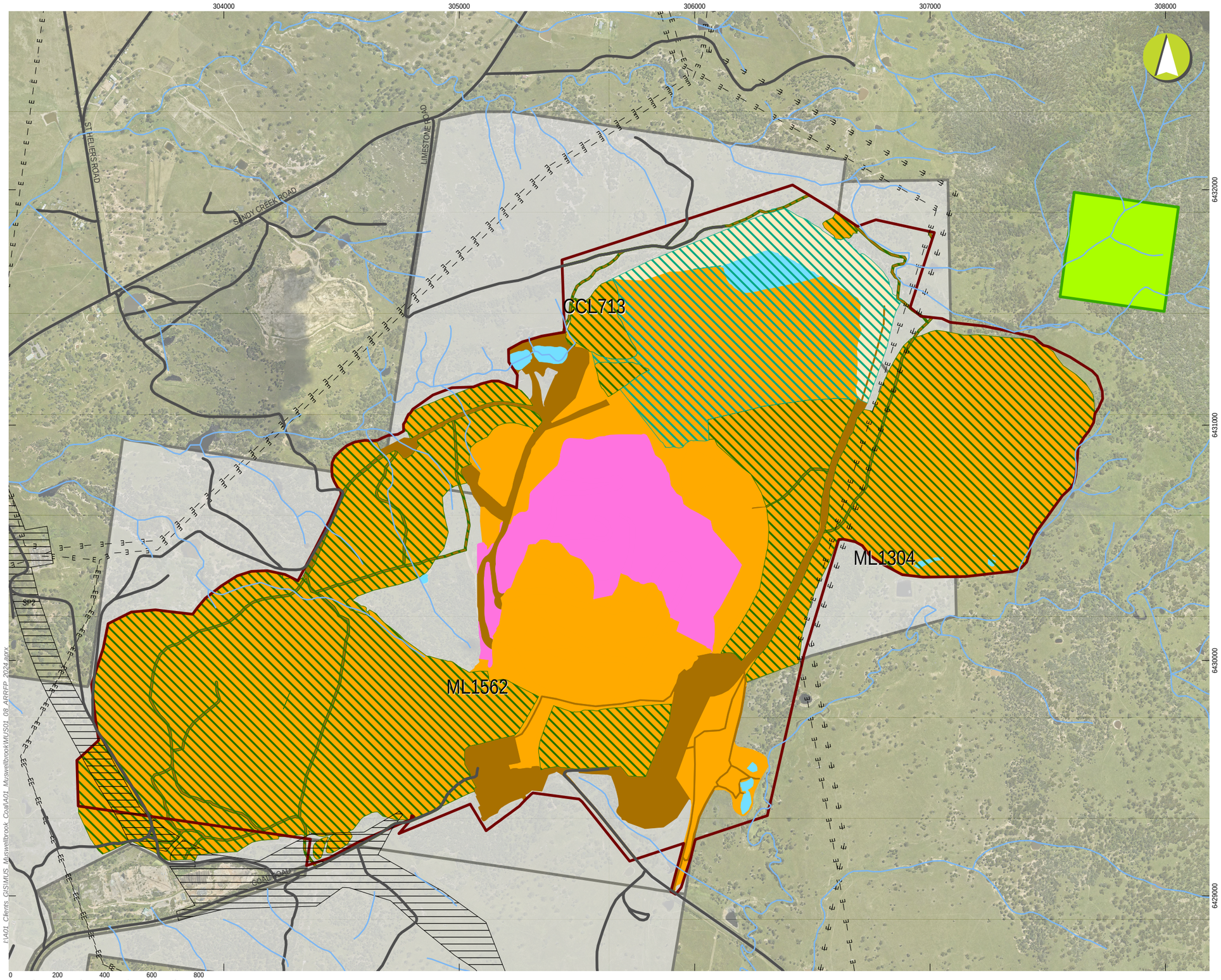
# Attachment 4 – Stakeholder consultation

| DATE | STAKEHOLDER | CONSULTATION ACTIVITIES AND FORMS | MATTERS SUBJECT TO CONSULTATION | ACTIONS TAKEN |
|---|---|---|---|---|
| 2 Dec 2023 | Community Consultative Committee | Meeting | Update on rehabilitation and mine closure activities included in general presentation. | General discussion during the meeting. No action required. |
| 6 Jun 2023 | Community Consultative Committee | Meeting | Update on rehabilitation and mine closure activities included in general presentation. | General discussion during the meeting. No action required. |

# Attachment 5 – Plans

Plan 1A attachment not provided.

Plan 1B attachment not provided.




## LEGEND

- Project Approval Boundary
- Road
- Waterways
- Electricity Transmission Line
- Biodiversity Offset Area

Land Zone

- Bypass Zoning

Current Authorisations

- Coal - Current Titles

Rehabilitation Phase

- Ecosystem and Land Use Development
- Ecosystem and Land Use Establishment

Mining Domain Type

- Infrastructure Area
- Water Management Area
- Overburden Emplacement Area
- Active Mining Area (Open cut void)
- Other

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**Muswellbrook Coal**

# Current Status of Mining and Rehabilitation Plan

## PLAN 1A

| | |
|---|---|
| Mine name | Muswellbrook Coal |
| Plan name | Muswellbrook Coal ARR 2022 |
| Year of anticipated relinquishment | 2050 |
| Data theme submission ID No. | 7101 and 7100 |
| Spatial Reference | GDA 1994 MGA Zone 56 |
| Plan date (date created) | 21/02/2024 |


## LEGEND

- Project Approval Boundary
- Current Landform Contours (5m)
- Road
- Electricity Transmission Line

Land Zone

- Bypass Zoning

Current Authorisations

- Coal - Current Titles

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**Muswellbrook Coal**

# Current Landform Contours

## PLAN 1B

| | |
|---|---|
| Mine name | Muswellbrook Coal |
| Plan name | Muswellbrook Coal ARR 2022 |
| Year of anticipated relinquishment | 2050 |
| Data theme submission ID No. | 7092 |
| Spatial Reference | GDA 1994 MGA Zone 56 |
| Plan date (date created) | 21/02/2024 |