CENTENNIAL

REHABILITATION MANAGEMENT PLAN FOR LARGE MINES

Angus Place

29 November 2023

SUMMARY TABLE

Summary Table	
Name of Mine	Angus Place
Rehabilitation Management Plan Commencement Date	1 August 2022
Rehabilitation Management Plan Revision Dates and Version Numbers	1.1
Mining Leases (Lease number(s) and expiry date(s))	Mining Lease (ML) 1424 Expiry date 18 August 2024 ML1326 Expiry date 18 August 2024 ML1699 Expiry date 26 June 2035 ML1720 Expiry date 23 November 2036 Mining Purposes Lease 314 Expiry date 3 August 2035 CCL 704 Expiry date 14 January 2023 ML 1853 Granted 25 May 2023
Name of Lease Holder(s)	Angus Place Pty Limited
Date of Submission	29 November 2023

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1 INTRODUCTION TO MINING PROJECT

Angus Place Colliery (Angus Place) is an existing underground coal mining operation located approximately 5 kilometres (km) north of the village of Lidsdale, 8 km northeast of the township of Wallerawang and approximately 15 km northwest of the city of Lithgow in the Blue Mountains region of New South Wales (NSW). It is bordered by Springvale Colliery to the south, Ivanhoe Colliery to the northwest and the Wolgan Valley and the Newnes Plateau to the north and east respectively. The regional locality of Angus Place is shown on **Figure 1**. The site layout has been shown on **Figure 2.**

This Rehabilitation Management Plan (RMP) has been prepared in accordance with the Mining Exploration and Geoscience – Resources Regulator's (RR) *Form and Way: Rehabilitation Management Plan for Large Mines* (RR, 2021) and associated guidelines (refer **Section 1.3**).

1.1 History of Operations

Newcom Colliery commenced operations in 1949, producing coal for domestic supply using bord and pillar mining techniques. Angus Place commenced longwall mining in 1979, after being developed as an extension of the Newcom Mine. Angus Place was established at its current locality after Development Consent was granted by the then Blaxland Shire Council.

Angus Place was approved as a Major Project under the now repealed Section 75J Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 13 September 2006 (MP 06_0021). MP 06_0021 has since been declared a State Significant Development (SSD) under Clause 6 of Schedule 2 of the NSW *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*. Accordingly, the approval is now referred to as MP 06_0021. MP 06_0021 has been modified on six occasions as discussed in **Section 1.2.1**.

Following the completion of secondary extraction within Longwall 900W on 15 February 2015, care and maintenance commenced at Angus Place on 28 March 2015. Some equipment has been removed from the underground workings and the surface infrastructure has been placed on an appropriate maintenance strategy to enable a reopening when the Springvale reserves have been extracted or if market conditions improve.

Kerosene Vale is located adjacent to the Angus Place to Wallerawang Power Station Haul Road. The site represents the former Newcom Colliery mine entries and surface facilities area. The Kerosene Vale Stockpile Site provides for stockpiling up to 500,000 tonnes of coal. Approximately 7 ha of previously disturbed land associated with the original Newcom Colliery Pit Top has been rehabilitated. The remaining rehabilitation requirements relate to the area currently being used for coal stockpiling and underground mine entries.

The Vale of Clwydd No. 2 Colliery is a former mining operation which is located to the west of Wolgan Road, approximately 1 km north of the Angus Place Pit Top. The mine began development in 1926 and ceased operations in 1930. The site has been partially rehabilitated however there are still remnants of various derelict mine buildings present at the site.

Commonwealth Colliery is a former mining operation located approximately 3 km south west of the site. Commonwealth Colliery operations commenced in 1940 and ceased in the 1950's. The disturbed areas of the site have been partially rehabilitated to grassland and pine forest.

1.2 Current Development Consents, Leases and Licences

1.2.1 Development Consents Granted Under EP&A Act and EPBC Act

Angus Place

One development consent is applicable to Angus Place, which was approved by the former Department of Planning (now Department of Planning and Environment (DPE)), pursuant to a Part 3A application in accordance with the EP&A Act. MP 06_0021 was granted on 13 September 2006 and allowed for the expansion of the mining area south of the existing operations within mining lease (ML) 1424 and consolidated coal lease (CCL) 704 and an increase of the production limit to 3.5 million tonnes per annum. The mine plan involves extraction of the 900 district panels, which are oriented in an east-west direction.

In 2010 Angus Place submitted an application to the DPE requesting modification of MP 06_0021 (Mod 1), pursuant to Section 75W of the EP&A Act. Angus Place proposed to extend its operations through the development and extraction of two additional longwall panels (Longwalls 900W and 910). The project was approved on 29 August 2011.

In September 2012 Angus Place submitted a second application to modify MP 06_0021 (Mod 2) to DPE. This modification was approved in April 2013 and involved:

- Development of underground roadways from the eastern extent of Longwall 910 to the proposed Ventilation Facility (APC-VS2);
- Development of underground roadways eastwards of the Ventilation Facility to undertake trial mining;
- Construction and operation of a Ventilation Facility (APC-VS2);
- Construction of a new access track from Sunnyside Ridge Road to the Ventilation Facility;
- Establishment of a 66kV/11kV electrical substation;
- Construction and operation of a switchyard facility and security fencing;
- 66kV trenched electrical power supply from existing powerline to the proposed substation; and
- 11kV trenched electrical power supply from the proposed substation to the proposed Vent Facility.

An application to modify MP 06_0021 (Mod 3) was submitted to DPE in October 2013 seeking approval to extend the length of Longwalls 980 and 900W by 43.4 m and 104.8 m, respectively, and increase the maximum extraction height of Longwalls 980, 900W and 910 from 3.25 m to 3.425 m. This modification was approved in December 2013.

Angus Place submitted an application to modify MP 06_0021 (Mod 4) to DPE in May 2014. Mod 4 was approved in November 2014 providing development of first workings associated with Longwalls 1001 & 1003.

In May 2018, Angus Place submitted a further application to the former DPE for MP 06_0021 (Mod 5) for the Angus Place Water Treatment Project. Mod 5 was approved in September 2018 increasing mine water discharges through Licenced Discharge Point (LDP) 001 on Environment Protection Licence (EPL) 467. Mod 5 increased discharge from 2 ML/day until the 31 December 2019 to 10 ML/day, treated to a salinity of 350 µS/cm. Discharge through LDP001 ceased in December 2019.

In November 2020, Angus Place submitted an application to the DPE for MP 06_0021 (Mod 6). Mod 6 was approved in March 2021 allowing a new Angus Place Water Transfer System for 2.6 ML/day of mine water to be independently transferred via a pipeline connection to Pond D at Mount Piper Power Station. Mod 6 also approved the construction and operation of a water softening plant at the Angus Place Pit Top facility (not currently proposed).

In November 2022, Angus Place had its application to the DPE for MP -6_0021 (Mod 7) approved. Mod 7 sought to align the consent conditions already pertaining to Rehabilitation Management Plans with those of the Rehabilitation Reforms under the Mining Act 1992. Consent Conditions amended in Mod 7 also require Angus Place to develop a separate Rehabilitation Strategy, for approval by the DPE.

MP 06_0021 will expire on 18 August 2024. The Angus Place West Project (SSD-26254212) Environmental Impact Statement (EIS) is being prepared for continuation of operations. This application is seeking approved for the development of bord and pillar mining in two new mining areas and continued operation of the Angus Place Colliery pit top.

Angus Place also operates in accordance with a federal approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) granted by the former Department of Sustainability, Environment, Water, Population and Communities (now Department of Agriculture, Water and the Environment (DAWE)). Approval EPBC 2011/5952 was granted on 17 April 2012 and allows Angus Place to extract coal from Longwalls 910 and 900W.

Additional detail regarding Angus Place Development Consent and EPBC Approval is provided in **Table 1-1.**

Table 1-1 Development Consents and EPBC Approval

Approval	Details	Date of Issue	Expiry
MP 06_0021	Angus Place Proposed Mining and Coal Transport – Expand the mining area and increase the production limit to 3.5 Mtpa.	13 September 2006	18 August 2024
	Mod 1 – Expanding the previously approved operations through the development and extraction of two additional longwall panels (Longwalls 900W and 910) and increased production limit to 4 Mtpa.	29 August 2011	
	Mod 2 – The development of underground roadways, the construction and operation of a Ventilation Facility and supporting infrastructure, and the development of roadways eastwards of the facility to undertake trial mining.	22 April 2013	
	Mod 3 – Extending the length of Longwalls 980 and 900W, and an increase to the maximum extraction height of Longwalls 980, 900W and 910.	9 December 2013	
	Mod 4 – Continued development of first workings associated with Longwalls 1001 and 1003.	27 October 2014	
	Mod 5 – Increase to mine water discharges through LDP 001.	14 September 2018	
	Mod 6 – Inclusion of the Angus Place water transfer system and the construction and operation of a water softening plant.	19 March 2021	
	Mod 7 – Alignment of Consent Conditions with Rehabilitation Reforms under the Mining Act 1992	25 November 2022	
EPBC 2011/5952	Mining of Longwalls 910 and 900W.	17 April 2012	19 March 2032

CENTENNIAL REHABILITATION MANAGEMENT PLAN

ANGUS PLACE

FIGURE 1
REGIONAL LOCALITY

LEGEND

Project Approval Boundary

0 2.5 5 km

Coordinate System:	GDA2020
Scale:	1:130,000 at A3
Project Number:	630.30294
Date:	28-Jul-2022
Drawn by:	AS

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H:\Projects-SLR\630-SrvNTL\630-NTL\630.30294.00000 Centennial Coal Rehabilitation Management\06 SLR Data\01 CADGIS\GIS\200 - Angus Place\Angus Place Figure 1 - Regional Locality.mxd

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ANGUS PLACE

FIGURE 2
SITE LAYOUT

LEGEND

- Pit Top
- Power Station
- Existing Workings
- Exploration Licence
- Mining Lease
- Project Approval Boundary

0 1 2 Kilometres

Coordinate System:	GDA2020
Scale:	1:70,000 at A3
Project Number:	630.30294
Date:	28-Jul-2022
Drawn by:	AS

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EL6007
ML1389
ML1556
EL8618
CCL749
ML1607
ML1488
ML1455
EL8619
ML1635
CCL702
EL7517
ML1638
ML1627
CCL712
EL7621
ML1301
EL6294
EL5899
ML1352
CCL756
ML1569
CCL770
Mt Piper Power Station
ML1319
ML1578
ML1520
ML1448
Western Coal Services Pit Top
ML564
ML204
CCL733
ML1637
EL7415
ML1303
Lidsdale Siding
Former Wallerawang Power Station
Springvale Pit Top
ML1323
ML1424
MP06_0021
EL6856
Angus Place Pit Top
CCL704
EL6293
ML1699
ML1720
EL8188
ML1670
ML1588
ML1354
ML1326
EL6974
ML1353
ML1537
ML1727
ML1583
CCL705

H:\Projects-SLR\630-SrvNTL\630-NTL\630.30294.00000 Centennial Coal Rehabilitation Managemen\06 SLR Data\01 CADGIS\GIS\200 - Angus Place\Angus Place Figure 2 - Site Layout.mxd

1.2.2 Authorisations

The Angus Place holding includes CCL 704, ML 1424, ML 1699, ML1720, and part of ML 1326. CCL 704 and ML 1424 are held by Centennial Angus Place Pty Ltd (after being transferred from Powercoal Pty Ltd in 2003). ML 1326 and ML 1720 are held by Centennial Springvale Pty Limited.

Angus Place has four approved Exploration Licenses administered by the Resources Regulator (RR). Exploration License (EL) 6856 covers an area of approximately 9,022 hectares and is applicable to majority of the colliery holding across the Gardens of Stone State Conservation Area. EL 8188 covers an area of approximately 835 hectares to the east of ML 1424, while EL 6293 covers an area of approximately 485 hectares of land surrounding the Wolgan Road. EL 7415 covers an area of 169.6 ha to the east of Lidsdale.

On 2 June 2015 Centennial Springvale Pty Ltd submitted a Mining Lease Application (MLA) to RR for MLA 498 which is associated with water management structures at the Angus Place Pit Top and the former Kerosene Vale site. The locality of the Angus Place holding and relevant mining tenements has been shown on **Figure 2**. Additional details relating to Angus Place mining tenements have been provided in **Table 1-2**.

Table 1-2 Mining Tenements

Lease	Date of Issue	Expiry
CCL 704	2 January 1990	14 January 2023
ML 1424	9 February 1998	18 August 2024
ML 1326	28 September 1993	18 August 2024
ML 1699	26 June 2014	26 June 2035
ML 1720	23 November 2015	23 November 2036
ML 1853	25 May 2023	TBC
EL 6856	8 August 2007	8 August 2017*
EL 6293	17 September 2004	16 September 2019*
EL 7415	2 November 2016	20 October 2019*
EL 8188	16 October 2013	16 October 2022

MLA 498 was submitted 2 June 2015.

* Renewal is being sought for EL 6856, EL 6293 and EL 7145.

1.2.3 Other Government Agency Issued Approvals

Secondary Extraction Approvals

In June 2005, Angus Place submitted a Subsidence Management Plan (SMP) Application to RR seeking approval for first workings and secondary extraction within Longwalls 930 – 980. Approval for Longwall 930 only was granted on 9 December 2005 (Reference Number 04/1675). Subsequently, SMP variations were submitted and approved for panels 940 – 980 in following years.

Angus Place submitted the *Longwalls 900W and 910 Integrated SMP/Extraction Plan* to RR and the DPE in November 2013. This application was submitted to satisfy the requirement of an SMP Application and the requirement of an Extraction Plan (required by MP 06_0021). Angus Place received approval of the Extraction Plan from the DPE on 31 March 2014 (Reference Number 12/15868), and SMP Approval for Longwalls 900W and 910 was received from RR on 8 April 2014 (Reference OUT14/10918). Angus Place completed secondary extraction within Longwall 900W on 15 February 2015. Approved secondary extraction of Longwall 910 has not been completed.

Additional detail pertaining to the SMP/Extraction Plan Approvals and SMP Variations at Angus Place is provided in **Table 1-3.**

Table 1-3 SMP Approvals and Variations

Reference Number	Approval	Details	Expiry
04/1675	SMP Approval (Original)	SMP Approval for Longwall 930.	26 December 2013
	SMP Approval (2006 Variation)	Revisions to the installation position of Longwalls 940 and 950, revisions to the take-off positions of Longwall 940 to 980 and variation to the gateroad pillar widths.	
	SMP Approval (2008 Variation)	Variation of chain pillar dimensions for the 960 Panel and a minor increase in the width of Longwall 960.	
	SMP Approval (2009 Variation)	Variation of the chain pillar width of the 970 and 980 Panels, increase in the width of Longwall 970 and a decrease in the width of Longwall 980.	
	SMP Approval (2010 Variation)	Minor variation to the chain pillar lengths for the 970 and 980 Panels.	
	SMP Approval (2013 Variation)	Minor variation to increase the extraction height to 3.425 m in Longwall 980 from 10C/T to 2C/T.	
	SMP Approval (2013 Variation)	SMP term extension	
	SMP Approval (2013 Variation)	Variation to extend Longwall 980 by 43.41 m into the barrier pillar towards the west at an extraction height of up 3.425 m.	
OUT14/10918	SMP Approval (Original)	SMP Approval for Longwalls 900W and 910	31 March 2021

1.2.4 Licences and Permits

Environment Protection Licence 3607

Angus Place currently operates under EPL 467, issued under the *Protection of the Environment Operations Act 1997* (POEO Act). The licence has an anniversary date of 1 January. Angus Place will continue to operate in accordance with EPL 467. Details regarding the EPL are included in **Table 1-4**.

Table 1-4 Licences

Licence	Date of Issue	Expiry
EPL 467	23 February 2000	Renewed Annually

Angus Place currently holds five water access licences as outlined in **Table 1-5**. Additionally, Angus Place holds licences for groundwater monitoring bores under Section 115 of the NSW *Water Act 1912*. Centennial will continue to liaisewith the Natural Resources Access Regulator (NRAR) with regard to the sites future licencing requirements.

Table 1-5 Licences

Licence	Date of Issue	Expiry
Water Licence 10WA118750 (WAL36449)	1 May 2014	Perpetuity
Water Licence 10WA118748 (WAL36445)	1 May 2014	Perpetuity
Water Licence WAL37340	9 October 2015	Perpetuity
Water Licence WAL37343	9 October 2015	Perpetuity
Water Licence WAL41881	14 May 2018	Perpetuity
Monitoring Bore 10BL601829	4 September 2007	Perpetuity
Monitoring Bore 10BL603236	28 August 2009	Perpetuity
Monitoring Bore 10BL603802	3 March 2010	Perpetuity
Monitoring Bore 10BL604512	17 February 2011	Perpetuity
Monitoring Bore 10BL604709	22 June 2011	Perpetuity
Monitoring Bore 10BL605132	18 April 2012	Perpetuity

Occupation Permit

The former Newnes State Forest (now Gardens of Stone State Conservation Area (SCA)) is located above the majority of the Angus Place underground workings. Angus Place has established a Level 3 Occupation Permit with the Forestry Corporation of NSW (FCNSW) to operate under the forest and to build infrastructure and other surface facilities. The permit allows for infrastructure construction and ongoing maintenance on the surface to support below ground operations, including ventilation, dewatering and electricity supply infrastructure. Details of the Level 3 Occupation Permit have been provided in **Table 1-6**.

The Gardens of Stone SCA was formally proclaimed on 6 May 2022. The SCA encompasses the Newnes Plateau (as Newnes State Forest), Ben Bullen State Forest, Wolgan State Forest as well as other crown lands. Centennial is committed to work collaboratively with NPWS to achieve the objectives for the SCA.

Section 95 Certificate

Angus Place was granted a Section 95 Certificate under the NSW *National Parks and Wildlife Act 1974* by the former Office of Environment and Heritage (OEH) now the Biodiversity and Conservation Division (BCD) allowing for the hand removal of weeds within Narrow Swamp located over Longwall 920 and 940. A Section 95(2) Certificate was deemed necessary as the weed removal activities are occurring in an EEC. This Section 95(2) Certificate was renewed on 25 November 2015. This swamp is classified as the Newnes Plateau Shrub Swamp Endangered Ecological Community (EEC) under the NSW *Biodiversity Conservation Act 2016* (BC Act).

Additional details for the Section 95 Certificate has been provided in **Table 1-6**. Angus Place will continue to obtain relevant licences for proposed activities.

Table 1-6 Occupation Permits and Section 95 Certificates

Licence	Date of Issue	Expiry
Level 3 Occupation Permit - Access and Land Use Arrangement	1 February 2013	1 February 2022 (renewed annually)
Section 95(2) Certificate (Document No. C0000085)	25 November 2013	30 June 2024

1.3 Applicable Guidelines

In addition to the regulatory requirements identified above, this RMP has been prepared with consideration given to the following guidelines, standards and policies:

- *Form and way: Rehabilitation Management Plan (large mines)*;
- *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines*;
- *Guideline: Rehabilitation risk assessment*;
- *Guideline: Rehabilitation objectives and rehabilitation completion criteria*;
- *Planning for Integrated Mine Closure Toolkit* (ICMM, 2008);
- *Mining Amendment (Standard Condition of Mining Leases – Rehabilitation) Regulation 2021*;
- *Strategic Framework for Mine Closure* (ANZMEC 2000);
- *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion, Mine Rehabilitation (Commonwealth Department of Industry, Tourism and Resources)*;
- Best Practice Environmental Management in the Mining Industry Series;
- Enduring Value (Mineral Council of Australia 2015); and
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP).

1.4 Land Ownership and Land Use

The Angus Place Colliery approval boundary lies within the Parishes of Cox, Clwydd, Cook, Marrangaroo and Lidsdale within the County of Cook. The area is encompassed by the Lithgow Local Government Area (LGA). All land overlying Angus Place mining activities is Crown Land, previously managed by the Forestry Corporation of NSW (FCNSW) as part of a forestry enterprise, now the Gardens of Stone SCA. The Pit Top and surface facilities are located on land owned by Centennial Fassifern Pty Limited and allocated to Angus Place. Land ownership is shown on **Figure 3**, with a Schedule of Lands located within the holding presented in **Appendix A**.

Historic Land Use

Historical land use in the area has involved mostly coal mining, steel manufacturing and other industrial enterprises, and agricultural land uses. The area around Angus Place Colliery has been subject to extensive mining operations in the past, with a number of active or completed mines in the vicinity.

Wallerawang is the closest retail and commercial centre, located approximately 6 km south-west of the Pit Top. The Wallerawang Power Station and the Mount Piper Power Station, owned and operated by Energy Australia (formerly Delta Electricity), are located to the south of the Pit Top. However, it is noted that the Wallerawang Power Station was closed by Energy Australia in March 2015 due to decreasing demand for energy.

The Lidsdale Siding Coal Loading Facility at Wallerawang has been used as a coal storage and rail loading facility since 1974 to distribute coal by rail from Centennial Coal's western region mines to ports on the NSW coast. Lidsdale village is located to the south of the site and provides a Rural Fire Service (RFS), park amenities and a church.

Current Land Use

Land use within the Angus Place holding predominantly consists of historical and existing mining operations and commercial forestry in the former Newnes State Forest. The Newnes State Forest comprised approximately 25,000 ha of pine plantation and native hardwood forest that was selectively logged under the FCNSW tenure and management. In addition to the timber industry, the Newnes State Forest supported a number of recreational land uses including recreation activities consisting of motorcycle riding, four wheel driving, bushwalking, camping, mountain bike riding, canyoning, photography, bird watching and other recreational and adventure activities.

The former Newnes State Forest has now been designated as the Gardens of Stone SCA and will be used to protect heritage values, ecology and to promote eco-tourism.

A small portion of land along the western boundary of the colliery holding is cleared and is used for agriculture. There is no intensive cropping in the area. Biodiversity offsets occur along the Coxs River within the lease area. Current land use has been shown on **Figure 4**. Vegetation mapping has been illustrated on **Figure 5**.

Future Land Use

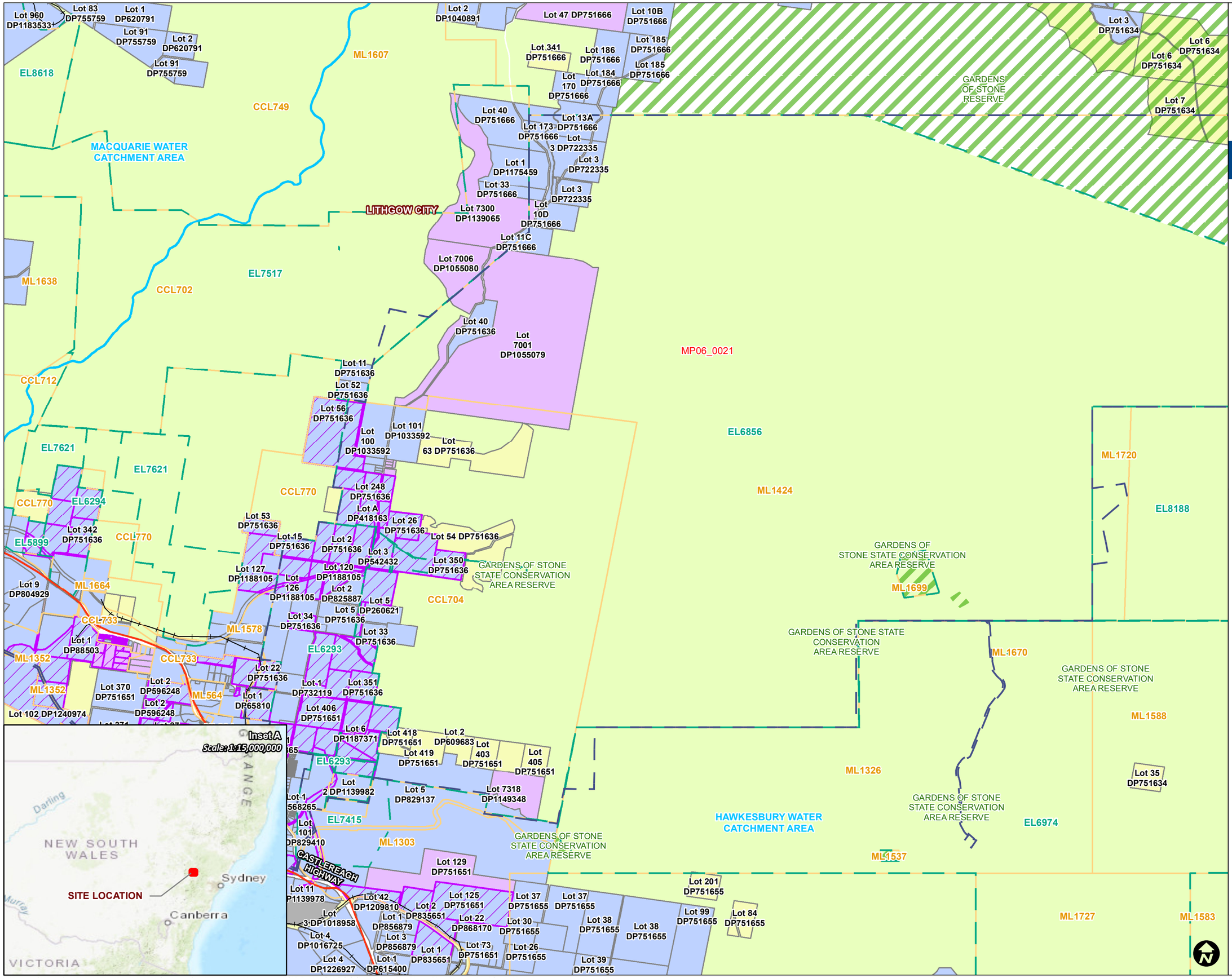
Following the cessation of mining operations at Angus Place, the Pit Top and all rehabilitated areas on the Newnes Plateau will be rehabilitated to woodland commensurate with the adjacent remnant vegetation. The final land use for these areas will be 'environmental protection works' which is consistent with the surrounding land use of forestry within the former Newnes State Forest. Additionally, the final land use aligns with the current *Lithgow Local Environmental Plan* (LEP) *2014* and the *Lithgow Land Use Strategy 2010 – 2030*.

The water management structures at the Angus Place Pit Top will be retained in the post-mining landform to provide water resources for any fauna habiting the Pit Top. The zoning of this land changed to RU1 Rural Production, under the provisions of the LEP 2014, which aligns with the final land use.

CENTENNIAL REHABILITATION MANAGEMENT PLAN

ANGUS PLACE

FIGURE 3
LAND OWNERSHIP



LEGEND

- Railway
- Major Road
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- State Heritage Register Curtilage (3)
- Reserve
- State Conservation Area
- Water Catchment Area
- Centennial Owned Land

Land Ownership

- Crown
- Freehold
- Local Government Authority
- NSW Government
- Unknown

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
NSW LPI Land Status Cadastre & Ownership

0 1 2 Kilometres

Coordinate System:	GDA2020
Scale:	1:55,000 at A3
Project Number:	630.30294
Date:	28-Jul-2022
Drawn by:	AS
Annual Reporting Period:	2021

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CENTENNIAL REHABILITATION MANAGEMENT PLAN

ANGUS PLACE

CURRENT LAND USE AND LANDFORM CONTOURS

LEGEND

- Railway
- Major Road
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- State Heritage Register Curtilage
- NPWS Reserve
- Property Boundaries
- Water Catchment Area

Land Use

- 1.1.0 Nature conservation
- 1.2.0 Managed resource protection
- 1.3.0 Other minimal use
- 2.1.0 Grazing native vegetation
- 2.2.0 Production native forestry
- 3.1.0 Plantation forests
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 5.2.0 Intensive animal production
- 5.3.0 Manufacturing and industrial
- 5.4.0 Residential and farm infrastructure
- 5.5.0 Services
- 5.6.0 Utilities
- 5.7.0 Transport and communication
- 5.8.0 Mining
- 5.9.0 Waste treatment and disposal
- 6.1.0 Lake
- 6.2.0 Reservoir/dam
- 6.3.0 River
- 6.5.0 Marsh/wetland

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
ESRI Basemap world imagery 2022
NSW LPI Land Status Cadastre & Ownership
NSW DPE Landuse 2017

0 1 2 Kilometres

Coordinate System:	GDA2020 MGA Zone 56
Scale:	1:65,000 at A3
Project Number:	N/A
Date:	28/03/2023
Drawn by:	D.MacBain
Annual Reporting Period:	2022
Submission ID's:	4339 - Current Landform Contours 4271 - Project Approval Boundary

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Inset A
Scale: 1:65,000

ANGUS PLACE

T:\MineRehab\AngusPlace\Figures\GIS Base Figures\Angus Place - Current Land Use and Landform Contours December 2022.aprx

CENTENNIAL REHABILITATION MANAGEMENT PLAN

ANGUS PLACE

FIGURE 5
VEGETATION COMMUNITIES

LEGEND

- Railway
- Major Road
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- State Heritage Register Curtilage
- State Forest
- Property Boundaries
- Water Catchment Area

PCT Mapping

- Baeckea linifolia - Grevillea acanthifolia subsp. acanthifolia shrub/sedge swamp on sandstone, Sydney Basin Bioregion
- Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands
- Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin
- Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin Bioregion
- Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion
- Cleared and Severely Disturbed Lands
- Derived grassland of the South Eastern Highlands Bioregion and South East Corner Bioregion
- Dwarf Casuarina heathland of the upper Blue Mountains
- Mountain Grey Gum - Narrow-leaved Peppermint grassy woodland on shales of the Southern Highlands, southern Sydney Basin
- Narrow-leaved Peppermint - Silvertop Ash - Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion
- Red Box - Grey Gum - stringybark woodland on talus slopes of the western Blue Mountains, Sydney Basin Bioregion
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands (Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands)
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
- River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion
- Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
- Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion
- Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion
- Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands
- Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin
- Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin Bioregion
- Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin
- Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin Bioregion
- Tableland swamp meadow on impeded drainage sites of the western Sydney Basin Bioregion and South Eastern Highlands Bioregion
- Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands Bioregion
- Tussock grass - sedgeland fen - rushland - reedland wetland in impeded creeks in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion
- Unclassified

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
NSW LPI Land Status Cadastre & Ownership
PCT Mapping by Centennial

0 1 2 Kilometres

Coordinate System:	GDA2020
Scale:	1:85,000 at A3
Project Number:	630.30294
Date:	27-Jul-2022
Drawn by:	AS
Annual Reporting Period:	2021

CENTENNIAL

H:\Projects-SLR\630-SrvNTL\630-NTL\630.30294.00000 Centennial Coal Rehabilitation Managemen\06 SLR Data\01 CADGIS\GIS\200 - Angus Place\Angus Place Figure 5 - Vegetation Communities.mxd

2 PART 2 – FINAL LAND USE

2.1 Regulatory Requirements for Rehabilitation

The regulatory requirements specific to post-mining land use, rehabilitation and closure at Angus Place are summarised in Table 2-1.

Table 2-1 Regulatory Requirements for Rehabilitation

Section / Condition	Requirement	Domain	Timing	Section Addressed
MP 06_0021 (Mod 7)				
Schedule 2, Condition 1	The Proponent shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.	All domains within consent boundary	Ongoing	Sections 4.1 and 6
Schedule 3, Condition 3C	The Proponent shall prepare and implement Extraction Plan/s for the second workings in Longwalls 910 and 900W to the satisfaction of the Director-General. Each Extraction Plan must: g) include the following to the satisfaction of the Executive Director Mineral Resources: appropriate revisions to the Rehabilitation Management Plan required under condition 37;	Longwalls 910 and 900W Extraction Plan Area	Complete	Section 1.2
Schedule 3, Condition 24B	By the end of December 2016, the Applicant shall, to the satisfaction of the Director-General: a) provide an area that is suitable in its vegetation types and extent to satisfactorily offset the residual impacts of clearing approximately 15 hectares of native vegetation associated with the construction and use of the Mod – 2 ventilation facilities and their supporting surface infrastructure and access tracks/roads, including the residual impacts on Persoonia hindii; and b) make suitable arrangements to manage, protect and provide long-term security for this area, consistent with the relevant NSW Offsets policy. In determining a suitable residual offset, the Director-General will have regard to the outcomes of the Persoonia hindii Management and Research Program, particularly the success of translocation and/or regeneration, and the Proponent's success in implementing the Rehabilitation Management Plan	All domains within consent boundary	Complete	Western Region Biodiversity Offset Strategy
Schedule 3, Condition 36	The Proponent shall prepare a Mine Closure Strategy for the project, to the satisfaction of the Director-General. The Strategy shall be prepared in consultation with Council, DRE, SCA and EPA, and be submitted to the Director-General at least 3 years prior to the cessation of mining. The Plan must: a) define the objectives and criteria for mine closure; b) investigate options for the future use of the site, including the Pit Top and surface	All domains within consent boundary	To be completed at mine closure	Not applicable

Section / Condition	Requirement	Domain	Timing	Section Addressed
	facilities area; c) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local employment levels; d) define a strategy for the ongoing management of water flow into the underground mine workings; e) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project; and f) describe how the performance of these measures would be monitored over time.			
Schedule 3, Condition 36A	The Applicant must rehabilitate the site as soon as reasonably practicable after the disturbance occurs.	All domains within consent boundary	Ongoing	Part 6 of this RMP
Schedule 3, Condition 36B	The Applicant must rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the development under the Mining Act 1992. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the documents listed in condition 2 of Schedule 2, and consistent with the rehabilitation outcome documents approved under the mining lease(s).	All domains within consent boundary	Ongoing	This RMP, Appendix C
Schedule 3, Condition 36C	The Applicant must prepare a Rehabilitation Strategy for the development, to the satisfaction of the Secretary. The Rehabilitation Strategy must: (a) be prepared by a suitably qualified and experienced person(s) whose appointment has been endorsed by the Secretary; (b) be prepared in consultation with Resources Regulator, BCD, DPE Water, WaterNSW, NSW National Parks and Wildlife Service, Council and the CCC; (c) be submitted to the Secretary for approval within 6 months of the date of determination of 06_0021 MOD 7, or as otherwise agreed by the Secretary; (d) describe the strategic rehabilitation outcomes for the site, including mine closure, final landform, post-mining land use/s and water management; (e) align with the strategic rehabilitation and mine closure objectives and address the principles of the Strategic Framework for Mine Closure (ANZMEC and MCA, 2000), or its latest version; (f) describe how rehabilitation will be integrated with the mine planning process, including a plan to address premature or temporary mine closure;	All domains within consent boundary	Ongoing – Draft Rehabilitation Strategy undergoing Stake-holder Consultation at time of this RMP Revision	Not applicable – Refer to Rehabilitation Strategy

Section / Condition	Requirement	Domain	Timing	Section Addressed
	(g) include details of: (i) target vegetation communities and species to be established within the proposed revegetation areas; (ii) a post-mining land use strategy to investigate and facilitate post-mining beneficial land uses for the site and/or infrastructure; and (iii) stakeholder engagement plan to guide rehabilitation and mine closure planning processes and outcomes. (h) investigate opportunities to refine and improve the final landform over time. Note: The Rehabilitation Strategy must address all land impacted by the mine, whether prior to or following the date of this consent.			
Schedule 3, Condition 36D	The Applicant must implement the approved Rehabilitation Strategy.	All domains within consent boundary	Ongoing – Draft Rehabilitation Strategy undergoing Stake-holder Consultation at time of this RMP Revision	Not applicable – Refer to Rehabilitation Strategy
Schedule 3, Condition 37	The Applicant must prepare and implement a Rehabilitation Management Plan for the project, in accordance with the conditions imposed on the mining lease(s) associated with the project under the Mining Act 1992.	All domains within consent boundary	Complete	This RMP
Mod 1	For broader areas of disturbance, such as treatment of larger subsidence areas, erosion and sediment control should be integrated into landform and rehabilitation design.	Longwalls 910 and 900W Area	Complete	Longwalls 900W and 910 Extraction Plan
	Cleared topsoil and subsoil will be selectively managed and reused in the rehabilitation of the borehole site, which will be undertaken as soon as practical upon completion of the works.	All domains within consent boundary	Complete	Section 6
	Rehabilitation of native vegetation will be integrated with undisturbed native vegetation to provide consolidated areas and wildlife corridors where possible.	All domains within consent boundary	Complete	Section 6
	The site will be rehabilitated to an agreed final land use compatible with the surrounding land fabric and land use requirements.	All domains within consent boundary	Complete	Section 2.3

Section / Condition	Requirement	Domain	Timing	Section Addressed
	The rehabilitated site will be stable with permanent landforms with soils, hydrology and ecosystems having maintenance needs no greater than those of the surrounding land.	All domains within consent boundary	Complete	Section 6
Mod 1 Statement of Commitment 1	A Rehabilitation Strategy as set out in Appendix 7.6 and revised in relation to the measures identified for the rehabilitation of areas of construction for the dewatering bore at Longwall 910 and its associated infrastructure that have been withdrawn from the proposals of the EA will be developed for approval by the Director-General I&I NSW prior to commencement of Longwalls 910 and 900 west and within 12 months of the date of approval.	Longwalls 910 and 900W Area	Complete	Longwalls 910 and 900W Rehabilitation Management Plan
Mod 2	The cuttings (or blind bore tailings) would be used to backfill the shaft when decommissioned and would be stored at the shaft spoil emplacement area.	Ventilation Facility Project Area	Mine closure	Section 6
	During rehabilitation at the end of mine life, the shafts and bores will be fully backfilled with impermeable material placed at the level of any aquifer horizons intersected, and for 2m above and below the aquifer interval, to ensure no leakage occurs.	Ventilation Facility Project Area	Mine closure	Section 6
	At mine closure the infrastructure components of the project would be fully rehabilitated. This would involve the removal of any physical items prior to the re-establishment of vegetation. At the substation site, there is currently a pine plantation and there is potential for this area to be planted with endemic species and returned to native forest.	Ventilation Facility Project Area	Mine closure	Section 6
	Opportunities to enhance the area currently supporting a pine plantation will be investigated, following rehabilitation of the substation site.	Ventilation Facility Project Area	Not yet triggered	Section 6
	Soil will be re-spread directly onto reshaped areas where practical. Where topsoil resources allow, topsoil will be spread to a nominal depth of 100mm on all re-graded land.	Ventilation Facility Project Area	Ongoing	Section 6
	The primary objective of the rehabilitation of infrastructure areas would be revegetation to stabilise all re-topsoiled batters, road verges, drains, banks, and cleared areas. All revegetation works would be scheduled to commence as soon as practicable and where access permits.	Ventilation Facility Project Area	Ongoing	Section 6
	Rehabilitation of any public access area affected by subsidence from the proposed underground roadways would be undertaken upon identification.	Ventilation Facility Project Area	Ongoing	Section 1.2

Section / Condition	Requirement	Domain	Timing	Section Addressed
	Exploration drilling undertaken within mining lease areas are appropriately rehabilitated once activities are complete.	Ventilation Facility Project Area	Not yet triggered	Section 4.4
	At mine closure the infrastructure components of the project would be fully rehabilitated. Whilst the timescale for this is currently unknown, as it is partly dependant on the viability results of the trial mining, these areas would be returned to forest use and therefore recreational amenity restored with respect to the project.	Ventilation Facility Project Area	Mine closure	Section 4.4
Mod 2 Statement of Commitment 7	Rehabilitation will be implemented in accordance with the existing Rehabilitation Strategy.	Ventilation Facility Project Area	Ongoing	Section 6
Appendix 7.6 of Mod 1 EA – Angus Place Colliery Rehabilitation Strategy	Angus Place Colliery is required, where necessary, to return any land disturbed due to exploration or mining activities, to a capacity which was present pre-mining. The current approved MOP for Angus Place Colliery sets out specific rehabilitation objectives. These objectives are listed as follows: • Rehabilitation and the outcomes will be consistent with the Environmental Assessment which formed the basis for any approvals; • Rehabilitation will be based on mine closure criteria and outcomes developed through stakeholder consultation; • Compliance with the relevant regulatory requirements and that regulatory consensus is attained on the successful closure and rehabilitation of the site; • Rehabilitation of native vegetation will be integrated with undisturbed native vegetation to provide consolidated areas and wildlife corridors where possible; • The site will be rehabilitated to an agreed final land use compatible with the surrounding land fabric and land use requirements; • The rehabilitation process will address limitations of land capability that may arise as a consequence of mining; • The rehabilitation will be sustainable in terms of selected final land use; • The rehabilitated site will be stable with permanent landforms with soils, hydrology and ecosystems having maintenance needs no greater than those of the surrounding land; • Waste substances that have the potential to affect land use or result in pollution will be secured and safely contained; • The rehabilitated site will not present a	All domains within consent boundary	Ongoing	Sections 2.3 and 6

Section / Condition	Requirement	Domain	Timing	Section Addressed
	hazard to persons, stock or native fauna; • The site will be clean and tidy and any remaining structures will be left in a condition that provides for the safety of the public; and • Mine closure works are completed as quickly and cost effective as possible whilst providing that the above objectives are achieved.			
Appendix 7.6 of Mod 1 EA – Angus Place Colliery Rehabilitation Strategy	Within the Project Area there are several infrastructure items that need to be constructed as part of the proposed mine extension works. The key items to be constructed are access tracks, powerlines, a bore for dewatering, and extension of the Delta Water Transfer Scheme. Should there be any impact from mining, rehabilitation works will be required to be undertaken. Further, at mine closure these infrastructure areas will also be required to be fully rehabilitated. This will firstly involve removing any physical items from these areas prior to the re-establishment of vegetation.	All domains within consent boundary	Ongoing	Sections 2.3 and 6
Appendix 7.6 of Mod 1 EA – Angus Place Colliery Rehabilitation Strategy	Surface Water Drainage Use of contour banks and diversion drains to direct water into stable areas or sediment control basins. All landforms will be free draining except where specific structures (ie LDP003) have been constructed for the storage of water as required for sediment and erosion control or some post mining landuse.	All domains within consent boundary	Ongoing	Sections 2.3 and 6
SSD 5579 (SCS) Schedule 3 Condition 45	The Applicant shall progressively rehabilitate the site, including the Kerosene Vale Stockpile Area as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies must be employed where areas prone to dust generation are not subject to active operations but cannot yet be permanently rehabilitated. Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in the future	Kerosene Vale	Ongoing	Section 6
Western Coal Services Project EIS Pages 40-42	The final land use for Kerosene Vale will be revegetation to a forest ecosystem compatible with the surrounding vegetation communities.	Kerosene Vale	Ongoing	Section 6
	The overland conveyors represent mine infrastructure and will be dismantled on completion. This will see the land returned to its previous land use – predominantly, improved pasture.	Infrastructure	Mine closure	Section 4.4

Section / Condition	Requirement	Domain	Timing	Section Addressed
	The private haul roads will remain as roads to be used in the public or private road network.	Infrastructure	Mine closure	Section 4.4
Western Coal Services Project EIS Page 56	Provide a stable final landform, with overall slopes no greater than 1:3 (V:H), by re-contouring shaping open cut spoil or in situ material;	Kerosene Vale	In progress	Noted
	Maintain the current drainage system by directing dirty water towards the current pollution control pond and LDP;	Kerosene Vale	In progress	Noted
	Top-dress the profile with suitable growing media, either generated from any future open cut workings or from existing material around the old mine entries;	Kerosene Vale	In progress	Noted
	Remove and/or remediate remaining identified contamination;	Kerosene Vale	In progress	Section 6
	Undertake soil testing and characterisation to determine soil additives and fertiliser requirements;	Kerosene Vale	In progress	Section 6
	Progressively revegetate the site using direct sowing and/or tubestock planting – using species endemic to the surrounding vegetation communities;	Kerosene Vale	In progress	Section 6
	Establish a rehabilitation monitoring program and report the results each year in the AEMR	Kerosene Vale	In progress	Section 8
	Produce a vegetation community comparable with the surrounding vegetation systems, which represent the lower slopes of the Newnes State Forest to the east. On final closure of the site, all mine entries will be sealed in accordance with DRE Guideline MDG 6001.	Kerosene Vale	In progress	Sections 4.2 and 6
CCL 704, ML 1326, ML 1424, ML 1699, ML 1720, ML1853				
Standard Conditions	See Mining Regulation 2016, Schedule 8A, Part 2 NOTE TO HOLDERS: The prescribed standard conditions in the Mining Regulation 2016, Schedule 8A, Part 2 apply in addition to the conditions in this Schedule 2 (but have not been replicated in this mining lease). The conditions imposed by the Mining Regulation 2016 prevail to the extent of any inconsistency with the conditions in this Schedule 2.	All domains within approval boundary	Ongoing	This document Specific sections of Schedule 8A Part 2 referring to rehabilitation are address below within this table.
EL 6293, EL 8188, EL 6856, EL 7415				
EL 6293, Condition 1	After consideration of the environmental impact as required by Section 111 of the *Environmental Planning and Assessment*	All domains within lease	In progress	Section 6

Section / Condition	Requirement	Domain	Timing	Section Addressed
	Act 1979, it has been determined that the type of exploration activities listed in Category 1 and in certain circumstances Category 2 may be conducted on the licence area provided that: Full rehabilitation in accordance with departmental guidelines/standards is carried out after completion of the exploration activities.			
EL 6293, Condition 9 (a)	Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General so that: There is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion. The state of the land is compatible with the surrounding land and land use requirements. The landform, soils, hydrology and flora require no greater maintenance than that in the surrounding land. In cases where revegetation is required and native vegetation has been removed or damaged, the original species must be re-established. If the original vegetation was not native, any re-established vegetation must be appropriate to the area, and at an acceptable density. The land does not pose a threat to public safety.	All domains within lease	In progress	Sections 4.2 and 6
EL 6293, Condition 9 (b)	Any topsoil that is removed must be stored and maintained manner acceptable to the Director General.	All domains within lease	In progress	Section 6
EL 8188, Condition 25	The licence holder must ensure that all topsoil removed in the course of prospecting operations is stockpiled for later use in rehabilitating those operations.	All domains within lease	In progress	Section 6
EL 6293, Condition 23	Temporary Access Tracks must be ripped topsoiled, rehabilitated and appropriately revegetated as soon as possible after they are no longer required for prospecting operations.	All domains within lease	In progress	Section 6
EL 6856, Condition 16 (g)	As soon as possible after they are no longer required for prospecting operations temporary access tracks must be rehabilitated to the satisfaction of the department.	All domains within lease	In progress	Section 6
EL 6856, Condition 23 (vi)	If the licence holder drills any exploratory drill holes he must satisfy the Department that during and after the activity: vi) Once any drill hole ceases to be used the land and its immediate vicinity is to be rehabilitated to its former condition.	All domains within lease	In progress	Section 6
EL 6856,	Land disturbed must be rehabilitated to a	All domains	In progress	Section 6

Section / Condition	Requirement	Domain	Timing	Section Addressed
Condition 27 (a)	stable and permanent form suitable for a subsequent land use acceptable to the Department so that: i) There is no adverse environmental effect outside the disturbed area and the land is properly drained and protected from soil erosion; ii) The state of the land is compatible with the surrounding land and land use requirements; iii) The landforms, soils, hydrology and flora require no greater maintenance than that in or on the surrounding land; iv) In cases where native vegetation has been removed or damaged, and where vegetation is required, species endemic to the area must be re-established. If the previous vegetation was not native, any re-established vegetation must be appropriate to the area or to the satisfaction of the landholder. Any re-established vegetation must be at an acceptable density and diversity; and v) The land does not pose a threat to public safety.	within lease		
EL 6856, Condition 27 (b)	Any topsoil that is temporarily removed from an area of prospecting operations must be stored, maintained and returned as soon as possible in a manner acceptable to the Department	All domains within lease	In progress	Section 6
EL 6856, Condition 27 (c)	Any shafts, drill holes and excavations, that remain abandoned from previous mining or exploration, which are opened up or used by the licence holder must be filled in or otherwise rehabilitated to a standard Acceptable to the Department.	All domains within lease	In progress	Section 6
EL 6856, Condition 27 (d)	All rehabilitation of disturbed areas should be completed before the expiry of the licence or immediately following the termination of the licence.	All domains within lease	In progress	Section 6
EL 8188, Condition 37 EL 7415 Condition 35	All disturbance resulting from prospecting operations carried out under this exploration licence must be rehabilitated by the licence holder to the satisfaction of the Minister.	All domains within lease	In progress	Section 6
EL 8188, Condition 38 EL 7415 Condition 36	In rehabilitating the disturbance resulting from prospecting operations, the licence holder must ensure that: a) All machinery, buildings and other infrastructure is removed from the area; b) The area is left in a clean, tidy and stable condition; c) There is no adverse environmental effect outside the disturbed area;	All domains within lease	In progress	Section 6

Section / Condition	Requirement	Domain	Timing	Section Addressed
	d) The land is properly drained and protected from soil erosion; e) The land is not a potential source of pollution; f) The land is compatible with the surrounding land and land use requirements; g) The landforms, soils, hydrology and flora require no greater maintenance than that in, or on, the surrounding land; h) The land does not pose a threat to public safety; and i) In cases where vegetation has been removed or damaged: i) Where the previous vegetation was native, species used for revegetation are endemic to the area; or ii) Where the previous vegetation was not native, species used for revegetation are appropriate to the area; and iii) Any revegetation is of an appropriate density and diversity.			
EL 8188, Condition 39 EL 7415 Condition 37	The licence holder must ensure that all water land and wetland crossings that are disturbed during prospecting operations are rehabilitated such that the natural flow of water is unimpeded and bank stability is maintained to prevent erosion.	All domains within lease	In progress	Section 6
EL 8188, Condition 40 EL 7415 Condition 38	The licence holder must comply with any relevant guidelines issued by the Director-General in the rehabilitation of disturbance resulting from prospecting operations under this exploration licence.	All domains within lease	In progress	Section 6
EL 8188, Condition 41 EL 7415 Condition 39	All rehabilitation of disturbance resulting from prospecting operations under this exploration licence must be completed before the expiry of this exploration licence or as soon as practicable following cancellation of this exploration licence, unless otherwise approved by the Minister.	All domains within lease	In progress	Section 1.2
EL 8188, Condition 42 EL 7415 Condition 40	Boreholes that have been abandoned as a result of previous mining or prospecting operations, and which have been opened up or used by the licence holder are subject to the conditions of this exploration licence as if the boreholes were constructed by the holder of this exploration licence.	All domains within lease	In progress	Noted
Occupation Permits				

Section / Condition	Requirement	Domain	Timing	Section Addressed
Occupation Permit 3.14	Without affecting the liability of the Applicant for damages or in relation to any other remedy to the reasonable satisfaction of FCNSW, the Applicant shall remedy to the satisfaction of FCNSW at its own expense any damage caused to the Area by the Applicant in breach of the provisions of this clause or otherwise including by the spillage of petroleum products or other pollutants or the deposition of polluting or obstructive materials within the area.	All domains within permit area	In progress	Noted
Occupation Permit 4.10.4	The Applicant must remedy any erosion or other Environmental damage or deterioration of the Area caused as a result of the Activity, its works or use of the Area and rehabilitate and revegetate all disturbed ground surfaces to the reasonable satisfaction of FCNSW and any Authority.	All domains within permit area	In progress	Noted
Occupation Permit 4.11	If the Applicant or Applicants Employees and Agents Damage the Area or any part of it, or any part of FCNSW's Equipment, or any equipment, structures or other facilities of any party other than the Applicant, the Applicant must within a reasonable time make good the damage to the reasonable satisfaction of FCNSW or the relevant party whose equipment, structures or other facilities were so damaged.	All domains within permit area	In progress	Noted
OTHER RELEVANT LEGISLATION				
Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021 – Part 2 (refer to Appendix B for a full list of conditions)				
Division 1 (4)	Must prevent or minimise harm to environment	All domains within lease	In progress	Sections 3, 8 and 10
Division 1 (5)	Rehabilitation to occur as soon as reasonably practicable after disturbance	All domains within lease	In progress	Section 6.2.5
Division 1 (6)	Rehabilitation must achieve final land use	All domains within lease	In progress	Section 2.3
Division 2 (7)	Rehabilitation risk assessment	All domains within lease	Complete	Section 3

2.2 Final Land Use Options and Assessments

Angus Place MP 06_0021 MOD 1 and 2 Statements of Commitments included implementation of the EIS Appendix 7.6 *Rehabilitation Strategy* (GSS, 2010). In accordance with the *Rehabilitation Strategy* (GSS, 2010) identified that infrastructure on would be rehabilitated to woodland commensurate with adjacent vegetation. It also included provision for dams and water structures to remain in the final landform where specific structures have been constructed for the storage of water as required for sediment and erosion control or some post-mining land use.

In accordance with the *Western Coal Services Project Environmental Impact Statement,* Kerosene Vale will be rehabilitated using woodland species commensurate with adjacent vegetation.

Commonwealth Colliery and Vale of Clwydd No. 2 will be rehabilitated to the satisfaction of the Resources Regulator in accordance with the conditions of CCL 704.

The post-mining land use goal is to provide a low maintenance, geotechnically stable and safe landform that is commensurate with the surrounding area.

2.3 Final Land Use Statement

The proposed post-mining land use at Angus Place includes rehabilitating all infrastructure/disturbance areas with woodland species commensurate with adjacent remnant vegetation. Additionally, a network of dams and associated water management structures will be retained in the final landform for future use.

Most of the site will be returned to woodland commensurate with adjacent vegetation. Access roads and tracks will be retained as required in the final landform.

Vale of Clywdd No. 2 will be rehabilitated to grassland, which is consistent with the adjacent areas. Commonwealth Colliery has been rehabilitated.

2.4 Final Land Use and Mining Domains

2.4.1 Final Land Use Domains

Final land use domains are defined as land management units characterised by similar final land use objectives. Each final land use domain will require specific rehabilitation methods.

The final land use domains for this RMP are presented in **Table 2-2** and shown on the Final Landform and Rehabilitation Plan (refer **Section 5**).

Table 2-2 Final Land Use Domains

Code	Final Land Use Domain	Description
A	Native Ecosystem	Comprises the Angus Place Pit Top, existing rehabilitation and components of infrastructure areas on the Newnes Plateau that will be rehabilitated. Areas will be rehabilitated with woodland species commensurate with adjacent remnant vegetation. Includes all rehabilitation to be undertaken on the Newnes Plateau. This domain will continue to provide wildlife corridors. This domain also includes infrastructure associated with Kerosene Vale which is located outside of the Angus Place Pit Top and the Newnes Plateau.
B	Agricultural - Grazing	The Vale of Clwydd No. 2 site incorporates grazing land.
C	Agricultural – Cropping	Not applicable.
D	Rehabilitation Biodiversity Offset	Not applicable.
E	Industrial	Not applicable.
F	Water Management Area	Not applicable.
G	Water Storage Area	Includes the network of dams at the Angus Place Pit Top. These structures will not be decommissioned at the end of mine life but will be maintained for future use.
H	Heritage Area	Not applicable.
I	Infrastructure	Comprises minor tracks at the Pit Top that will to infrastructure facilities on Newnes Plateau that will be retained in the final landform for use as fire trails or access tracks by recreational users

Code	Final Land Use Domain	Description
		of Gardens of Stone SCA. Comprises minor tracks at the Pit Top that will be retained in the final landform for future access and monitoring. Includes Angus Place to Wallerawang Station Private Haul Road (up to the end of the CCL). Final land use and rehabilitation objective for this area is the responsibility of the landowner.
J	Final Void	Not applicable.
K	Other	Not applicable

2.4.2 Mining Domains

Mining domains identify the footprint of areas disturbed for mining related activities. For the purpose of this RMP, mining domains have been defined as the set of discrete areas that have a particular operational or functional purpose, therefore having similar geophysical and geochemical characteristics that will have similar rehabilitation requirements.

Mining domains are presented in **Table 2-3**.

Table 2-3 Mining Domains

Code	Domain	Description
1	Infrastructure	This domain includes existing infrastructure and facilities including the Pit Top, workshops, administration buildings, hardstand/laydown areas, substations, car parks, access roads, sewage treatment plant and associated irrigation area water transfer pipeline and associated infrastructure; infrastructure associated with Kerosene Vale, hardstand/laydown areas, coal stockpile areas, derelict buildings, underground infrastructure including mine access, ventilation shafts, powerlines (overhead and trenched), pipelines (trenched) and dewatering bore facilities and associated water management structures. This domain also includes the surface infrastructure associated with former mining operations known as Commonwealth Colliery and Vale of Clwydd No.2 Colliery. This domain is active and subject to ongoing operations. Includes Angus Place to Wallerawang Station Private Haul Road (up to the end of the CCL).
2	Tailings Storage Facility	Not applicable
3	Water management Area	This domain is active and includes the Settling Ponds, Filter Pond, Secondary Pollution Pond, Primary Pollution Ponds, LDP001, Kerosene Vale Sediment Dam LDP003 and constructed wetlands, Aerating Ponds and dewatered and the Oxidation Ponds.
4	Overburden Emplacement Area	This domain includes rehabilitated areas at Commonwealth Colliery.
5	Active Mining Area (Open cut void)	Not applicable.
6	Underground Mining Area	This domain includes land above underground mining areas associated with secondary extraction within the Mining Lease area. These areas are to be managed for potential subsidence related impacts.
7	Beneficiation Facility	Not applicable.
8	Other Ancillary Infrastructure Areas	Not applicable.

3 PART 3 – REHABILITATION RISK ASSESSMENT

3.1 Summary of Risk Assessments

Table 3-1 summarises the completed rehabilitation risk assessments.

Table 3-1 Summary of Risk Assessments

Date	Risk Assessment	Details
February 2022	2022 Centennial Coal Rehabilitation and Mine Closure Risk Assessment	Undertaken as part of the preparation of this RMP and detailed in the following sections.

3.2 Rehabilitation Risk Assessment

Conditions of a mining lease granted under the *Mining Act 1992* require the lease holder to conduct a rehabilitation risk assessment and implement measures to eliminate, minimise or mitigate the risks in accordance with the Resources Regulator's *Guideline: Rehabilitation risk assessment.*

A risk assessment workshop was undertaken 9 February 2022. The workshop was used to identify the key issues that presented a risk to achieving satisfactory rehabilitation at Angus Place.

The risk assessment included key Centennial and SLR personnel and was undertaken accordance with the Resources Regulator's *Guideline: Rehabilitation risk assessment.*

The risk assessment included key Centennial and SLR personnel and was undertaken in accordance with AS/NZS ISO 31000:2018 *Risk Management – Guidelines* and the *Risk Management Handbook for the Mining Industry* (MDG1010). Centennial's Risk Matrix was used to calculate the consequence and likelihood of an event and to evaluate the subsequent risk level (risk rank).

The risk assessment has been used to inform the preparation of this RMP. The objectives of the risk assessment were to:

- Identify the risks associated with rehabilitation and closure of Angus Place to achieve the approved post-mining land uses;
- Identify knowledge gaps in Centennial's current understanding of the risks to rehabilitation;
- Identify the investigations/controls/action plans necessary to effectively mitigate risks and/or realise opportunities and to close any identified knowledge gaps;
- Inform the development of this RMP, to provide a basis to determine additional investigations and/or project works to be undertaken; and
- Provide the framework to satisfy relevant internal and government guidelines, requiring implementation of a risk-based approach to closure.

The risk workshop assessed a total of 67 risks, which are summarised as:

- 15 risks we not applicable;
- 15 risks were ranked as low;
- 23 risks were ranked as moderate;
- 10 risks were ranked as significant;
- 4 risks were ranked as high; and
- 0 risks was ranked as extreme.

3.3 Specific Risks Relating to Rehabilitation

The key risks (including significant and high risks) to successful rehabilitation and associated risk controls identified within the February 2022 workshop have been summarised in **Table 3-2**. The outcomes of the risk assessment workshop have been used to inform the preparation of this Plan.

Table 3-2 Key Rehabilitation Risks and Identified Controls

Risk Rating	Key Risk	Key Controls	Section Addressed
High	Ongoing management of the sites required for post mining land use (management in perpetuity)	MOP developed in consultation with stakeholders	Approved MOP
		RCE provision review process	RCE
		Water Treatment Project	-
		Regis pipeline project	-
		Ongoing consultation with Resources Regulator	Section 4.5
		Stakeholder Engagement Strategy being developed	Section 4.5
		Phase 1 contamination assessment	Section 6
		PMLU well understood, outlined within approved MOP	Approved MOP, Section 2
		Mod 6 including additional water pumping infrastructure, integration with regional water management system/upgrades	Section 1.2
		Hydrogeological model	Hydrogeological model
		Water balance	Water balance
High	Final landform unsuitable for final land use	Consistent with approvals / EIS Approved MOP developed in consultation with stakeholders	Approved MOP, Section 4.5
		Commitment in EIS to undertake consultation with stakeholders/landowners prior to closure.	Section 4.5
		Topography associated with Angus Place Pit Top and surface infrastructure will require very limited shaping works	Section 6
		RCE provision review process	RCE
High	Failure to achieve the rehabilitation outcome prescribed in the RMP/objectives/criteria	Environmental monitoring	Monitoring
		Monitoring program	Monitoring
		Environmental Management System	Systems
		Water Management Plan	Water Management Plan
		Kerosene Vale asbestos assessment and disposal records	Records
		VOC asbestos survey completed	Records
		Informal knowledge	-
		Phase 1 Assessment completed	Phase 1 Report
		Asbestos Register for Angus Place	Register
		Known extents of legacy sites	Section 6
		Hydrogeological models	Hydrogeological models
		Water Treatment Project	Water Treatment Project
		Mod 6 and approved water piping infrastructure	Section 1.2
		Regis pipeline project	-
		Development consent	Section 1.2
		Proposed Angus Place West project	Section 1.2

Risk Rating	Key Risk	Key Controls	Section Addressed
		Contamination assessments	Section 6
		Monitoring program	Monitoring
		Kerosene Vale asbestos assessment and disposal records	Records
		VOC asbestos survey completed	Records
		Informal knowledge	-
		Phase 1 Assessment completed	Section 6
		Asbestos Register for Angus Place	Register
		Known extents of legacy sites	Section 6
		Hydrogeological models	Section 6
High	Inadequate information, skills/experience, clearly defined responsibilities for rehabilitation, closure and relinquishment	Survey records and lease information	Records
		Record tracings	Records
		GIS database	GIS
		Closure risk assessments to identify potential knowledge gaps/required activities	Section 3
		Engineering design for construction works	Sections 4 and 7
		Industry standards	Sections 1.3 and 4
		Ongoing consultation with Resources Regulator	Section 4.5
		MOP developed in consultation with stakeholders	Approved MOP, Section 4.5
		Stakeholder Engagement Strategy being developed	Section 4.5
		Staff continuity in key roles	-
		VOC investigations, drilling for drift, sealing strategies, ecological and heritage, water sampling	Section 6
		Kerosene Vale HRA process underway	Section 6
		Phase 1 contamination assessment	Section 6
Significant	Inadequate rehabilitation provision, funding for or prioritisation of rehabilitation activities	Approved MOP developed in consultation with stakeholders Inspections RCE provision review process Specialist assessments completed (e.g. ecological, contamination)	Approved MOP, Section 4.5
		Staff continuity in key roles	-
		VOC investigations, drilling for drift, sealing strategies, ecological and heritage, water sampling	Section 6
		Phase 1 contamination assessment	Section 6
		Centennial business planning/budget process	Business Planning Process
		Corporate support for prioritisation of works/resources	-
Significant	Unauthorised access to rehabilitation areas and potential vandalism.	Fences, signage and security	Section 6
		Repair of fencing where triggered by inspections	Section 6
		Gas monitoring arrangements	-
		Low methane levels associated with seams in Lithgow region	Section 6
		Adits temporarily sealed, pending formal sealing	-

Risk Rating	Key Risk	Key Controls	Section Addressed
		Monthly inspections (including sealing adequacy)	Inspections
		HRA process underway for Kerosene Vale	-
		Temporary seal of VOC ventilation shaft	-
		Angus Place Ventilation Shaft sites fenced	Section 6
Significant	Access delayed for execution of rehabilitation works	Ongoing negotiations regarding access for Kerosene Vale and LDP003.	-
		Stakeholder Engagement Strategy being prepared	Section 4.5
		Land ownership data/Centennial GIS	Figure 3 GIS
		Level 3 Occupation Permits with FCNSW (grazing and infrastructure)	Section 1.2
		Majority of land ownership is Centennial for surface infrastructure	Figure 3
		Crown licence for monitoring equipment	Section 1.2
		Development consent	
		Angus Place West Project	
Significant	Less than adequate biological resource (e.g. subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) salvage for rehabilitation works	Material inventory for topsoil	Section 6
		Capping material available for Kerosene Vale works	Section 6
		Soil management practices in accordance with MOP	Section 6
		Ability to purchase growth medium and habitat features for required rehabilitation works	-
		RCE provision review process	RCE
		Centennial budget process	Centennial budget process
		Available and required volumes understood and no limitations to ability to source material externally	Section 6
Significant	Material and landform unsuitable to support final land use	Hydrogeological assessment	Hydrogeological assessment
		Hydrological assessment	Hydrological assessment
		Groundwater and/or surface Water management strategy	Strategy
		Site Water Management Plan Monitoring program	Monitoring program
		Contamination assessment	Section 6
		Legacy site investigations	Section 6
		Known extents of legacy sites	Section 6
Significant	Contamination, hazardous materials and dangerous goods remaining on the site at closure	Contamination assessments completed for all operations	Section 6
		Asbestos register for Angus Place	Asbestos Register
		Kerosene Vale asbestos assessment and disposal records	Records
		VOC asbestos survey completed	Records

Risk Rating	Key Risk	Key Controls	Section Addressed
		Phase 1 Assessment completed	Section 6
		Monitoring and inspections	Monitoring and Inspections
Significant	Contamination of groundwater from operations	Historical groundwater monitoring records	Records
		Contamination assessments	Section 6
		Hydrogeological assessment	Hydrogeological assessment
		Hydrological assessment	Hydrological assessment
		Groundwater and/or surface water management strategy	Water Management Strategy
		Site Water Management Plan	Water Management Plan
		Monitoring program	Monitoring
		Kerosene Vale asbestos assessment and disposal records	Records
		Vale of Clwydd No. 2 asbestos survey completed	Records
		Informal knowledge	-
		Phase 1 Assessment completed	Section 6
		Asbestos Register for Angus Place	Register
		Known extents of legacy sites	Section 6
Significant	Ventilation shaft / entries open / boreholes open / unlocated	Sealing records for boreholes	Records
		Borehole register	Borehole register
		Signage	Section 6
		Security	
		Fencing	
		Locked sites	
		Controlled access	
		Monitoring/inspections	Inspections
		Adequate records	Records
		Baseline mapping / record tracings	Records
		Geological borehole review and relinquishment process ongoing for Newnes Plateau (active piezometers, minor sites requiring additional works)	Borehole register
		Centennial GIS	GIS
		Review of Commonwealth Colliery shafts/entries completed, site inspections undertaken, evidence obtained for signs of potential access.	Section 6
		Concrete seal of shaft observed at Commonwealth Colliery.	-
		Temporary seal for VOC, pending formal sealing	-
		Sealing strategy developed for VOC and Kerosene Vale	Sealing Strategy

Risk Rating	Key Risk	Key Controls	Section Addressed
Significant	Mine entries improperly sealed and do not meet current regulatory requirements	Signage	Section 6
		Security	
		Fencing	
		Locked sites	
		Controlled access	
		Monitoring/inspections	Inspections
		Mine entry register	Register
		Adequate records	Records
		Centennial GIS	GIS
		Review of Commonwealth Colliery shafts/entries completed, site inspections undertaken, evidence obtained for signs of potential access.	Review
		VOC drift has been backfilled 40 m, drill investigation undertaken to understand required additional works	-
		Temporary sealing of Kerosene Vale adits, pending formal sealing. Sealing strategy developed for works implementation	-
		LOM infrastructure for Angus Place	Section 6
		Emergency sealing capability in place for Angus Place if required	Noted
		Proposed Angus Place West Project	-
Significant	Unlocated subsidence	Monitoring inspections	Monitoring
		Baseline mapping / record tracings	Records
		Survey programs for risk in place	Survey
		Capacity to respond if any unlocated subsidence is identified	Section 6.3
		Approved MOP developed in consultation with stakeholders	Approved MOP

3.4 Further Studies / Action Plan

A number of proposed controls and further studies were identified during the risk assessment workshop. **Table 3-3** presents an action plan for implementation of the additional risk controls (including significant and high risks).

Table 3-3 Further Studies / Action Plan

Risk Rating	Key Risk	Key Controls	Timeframe
High	Ongoing management of the sites required for post mining land use (management in perpetuity)	Confirm if hydrogeological models consider potential for fill and spill. Confirm contamination assessment status, coverage for legacy sites, status regarding recommended actions.	2025
High	Final landform unsuitable for final land use.	Investigate need for shaping, establishment of suitable final landform for Commonwealth Colliery	2027

Risk Rating	Key Risk	Key Controls	Timeframe
High	Inadequate information, skills/experience, clearly defined responsibilities for rehabilitation, closure and relinquishment	Confirm contamination assessment status, coverage for legacy sites, status regarding recommended actions.	2025
High	Failure to achieve the rehabilitation outcome prescribed in the RMP/objectives/criteria	Confirm if hydrogeological models consider potential for fill and spill. Water management post closure. Understand future management requirements for water infrastructure post-closure, including future maintenance/cost implications/transfer.	2025
Significant	Unauthorised access to rehabilitation areas and potential vandalism	No proposed additional controls considered necessary.	-
Significant	Access delayed for execution of rehabilitation works	Stakeholder Engagement Strategy to be developed, understand landowners associated with all domains at the site and potential future access requirements.	2027
Significant	Inadequate rehabilitation provision, funding for or prioritisation of rehabilitation activities	Confirm contamination assessment status, coverage for legacy sites, status regarding recommended actions.	2025
		Finalise Centennial Closure Standard (including alignment with budget process)	
		Investigate additional studies required to understand knowledge gaps regarding legacy sites, implement.	
Significant	Material and landform unsuitable to support final land use	Confirm if water monitoring data has been used in development of contaminations assessments, including legacy sites.	2025
		Confirm if additional monitoring locations may be required (or recommended) to understand surface and groundwater associated with legacy sites.	
Significant	Contamination, hazardous materials and dangerous goods remaining on the site at closure	Confirm contamination assessment status, coverage for legacy sites, status regarding recommended actions.	2025
		Confirm if PFAS has been considered by contamination assessments.	
		Confirm if there has been characterisation of reject material at Kerosene Vale.	
		Confirm if water monitoring data has been used in development of contaminations assessments, including legacy sites.	
Significant	Contamination of groundwater from operations	Confirm contamination assessment status, coverage for legacy sites, status regarding recommended actions.	2025
		Confirm if PFAS has been considered by contamination assessments.	
		Confirm if there has been characterisation of reject material at Kerosene Vale.	

Risk Rating	Key Risk	Key Controls	Timeframe
		Confirm if water monitoring data has been used in development of contaminations assessments, including legacy sites.	
Significant	Less than adequate biological resource (e.g. subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) salvage for rehabilitation works	Confirm if characterisation of topsoil at Nursery and Ventilation Facility included in Environmental Assessment. If not characterisation to be completed prior to planned use of materials.	2027
Significant	Ventilation shaft / entries open / boreholes open / unlocated	Review to be undertaken to confirm adequacy of Commonwealth Colliery sealing based upon standards of the time/safe/stable (including geotechnical inputs as required)	2027
Significant	Mine entries improperly sealed and do not meet current regulatory requirements	Review to be undertaken to confirm adequacy of Commonwealth Colliery sealing based upon standards of the time/safe/stable (including geotechnical inputs as required)	2027
Significant	Unlocated subsidence	Undertake investigation to identify legacy underground workings areas associated with Commonwealth Colliery, including low depth of cover. Ensure inspection program addresses these areas or revise accordingly.	2027

4 PART 4 – REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

4.1 Rehabilitation Objectives and Rehabilitation Completion Criteria

The overall long term mine rehabilitation objective is to provide a low maintenance, geotechnically stable and safe landform that blends in with the surrounding topography suitable for subsequent land use as determined through consultation with stakeholders and company requirements.

Specific long-term objectives include:

- Final landforms are safe, stable, non-polluting and free-draining;
- Remove all infrastructure that does not have any post-mining beneficial use;
- If required, preserve surface infrastructure that is heritage listed;
- Re-establishing land disturbed by the operation to an appropriate final land use;
- Provide habitat for fauna and corridors for fauna movement within the final landforms;
- Improve the visual amenity of the area;
- Not preclude other potential post mining land use options that may be considered feasible in the detailed mine closure planning process; and
- Monitor rehabilitation success in terms of physical and biological parameters.

4.2 MP 06_0021 Requirements

No rehabilitation objectives are specified within Angus Place development consent. Accordingly, rehabilitation objectives have been developed based on the regulatory requirements outlined in **Section 2.1**.

Angus Place's current Rehabilitation Objectives Statement (ROBJ0001255) was approved by the Resources Regulator on 30 October 2023 and is attached in **Appendix C**.

4.3 Rehabilitation Completion Criteria

Completion criteria are objective target levels or values assigned to a variety of indicators (e.g. slope, species diversity, percent groundcover), which can be measured to demonstrate progress and ultimate success of rehabilitation. As such, they provide a defined end point, at which point in time rehabilitation can be deemed successful and the lease relinquishment process can proceed. The draft rehabilitation completion criteria for Angus Place are listed in **Table 4-1**.

These completion criteria will be utilised to demonstrate achievement of rehabilitation objectives. It is noted that the completion criteria may be subject to refinement as rehabilitation progresses, including because of ongoing consultation with the relevant stakeholders, studies yet to be completed and continuous improvement process informed by rehabilitation monitoring results. The achievement (or otherwise) of the completion criteria will be monitored and reported as required.

Closure criteria have been informed by the following information:

- The RR rehabilitation guideline documents including:
  - Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines;
  - Guideline: Rehabilitation objectives and rehabilitation completion criteria;
- Completion criteria from the previously approved Angus Place MOP;
- Similar rehabilitation projects; and
- Specific information collected to date during detailed planning investigations.

It is noted that whilst the Rehabilitation Objective Statement ROBJ0001255 has been approved (**Appendix C**), the Rehabilitation Completion Criteria for Angus Place will remain in draft until approved by the Resources Regulator.

Table 4-1 Draft Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
Native Ecosystem Agricultural – Grazing Water Storage	Infrastructure Area Water Management Area	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.	Removal of all services (power, water, communications) that have been connected on the site as part of the operation.	All utility infrastructure removed.	Demolition records. Before and after site photographs. Utility service disconnection record/notification.
			Heritage obligations (e.g. development consent under the Environmental Planning and Assessment Act 1979, approvals under the Heritage Act 1977, etc.) have been met (e.g. archival recording, building retention or building demolition with footings preserved). Permits and approval documents issued. All archival reports required are complete and submitted. Copy of any relevant approval documentation and archival reports/records.	Permits and approval documents issued. All archival reports required are complete and submitted.	Copy of any relevant approval documentation and archival reports/records.
			Removal of all former mine related plant, equipment and associated infrastructure.	Infrastructure removed.	Demolition records Before and after site photographs Aerial photography (including historical imagery as relevant)
			Removal of all footings.	Where not retained, all concrete footings, foundation pads and pavements have been broken up and either removed, beneficially reused across the site or sold for some other beneficial reuse.	
			Surveying and sealing of all drill holes and boreholes in accordance with departmental guidelines and relevant	Sealing completed and verified.	Engineering report/statement Plug and abandonment log Before and after site

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
			standards.		photographs As constructed drawings Records of fill materials and concrete plugs, filling methods etc.
			Surveying and sealing of all underground mine entries and shafts, adits, and drifts in accordance with departmental guidelines and relevant standards.	Sealing completed and verified by suitably qualified engineer.	
			Monitoring equipment (e.g. piezometers, survey pegs) removed if not required.	All subsidence pegs will be appropriately removed in consultation with RR.	Records of consultation with relevant government agency Before and after site photographs
Infrastructure	Infrastructure Area	Retention of infrastructure: All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.	Potential hazards (e.g. electrical, mechanical) have been effectively isolated and secured.	Hazards isolated and secured.	Statement provided by suitably qualified engineer.
			Damage to access tracks and haul roads have been repaired and stabilised.	Repairs complete. Minimal erosion that would require moderate to significant ongoing management and maintenance.	Visual inspections Before and after site photographs
			Where applicable, necessary approvals are in place (e.g. development consent under the Environmental Planning and Assessment Act 1979) where buildings and infrastructure are to be retained as part of final land use.	Permits and approval documents issued.	Copy of any relevant approvals.
			Heritage obligations as required under the Environmental Planning and Assessment Act 1979, Heritage Act 1977, etc. have been met (e.g. archival recording, building retention and	Permits and approval documents issued; archival reports (where required) complete and submitted.	Copy of any relevant approvals.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
			restoration).		
			The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	Engineering report/statement Before and after site photographs Risk assessment verifying modes of failure are adequately addressed to minimise risks to public safety or the environment.
			Infrastructure is in a condition (e.g. structural, electrical, other hazards) that is suitable for the intended final land use.	Formal acceptance from the subsequent landowner that infrastructure is in a condition that is suitable for the intended final land use in accordance with formal agreement.	Formal acceptance from landowner.
			If any underground pipelines or other infrastructure are to remain in situ, they do not pose a hazard for the intended final land use.	The location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig.	Surveyed and marked on the as-constructed final landform plan. Copy of notification to local Council and Dial Before You Dig
			Ownership and responsibility for retained access tracks and haul roads is identified	All retained infrastructure under clear ownership for appropriate post mining land use.	Correspondence from landowner regarding agreement of final land use
			Noting it is Centennial Coal's responsibility to manage the section of the Angus Place - Wallerawang Power Station Haul Road up to the end of the consolidated coal lease. This	The stability of batters will be assessed at closure with the possibility of some minor shaping and seeding required in some sections.	Correspondence from landowner regarding agreement of final land use

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
			equates to 4193.5 metres in length. The rest of the Angus Place - Wallerawang Power Station Haul Road along with the Angus Place to Mount Piper Haul road are owned and managed by a third party. This area is currently active and will be retained after closure.		
Infrastructure Native Ecosystem Agricultural – Grazing	Infrastructure Area Overburden Emplacement Area Underground Mining (SMP)	Land Contamination: There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	No waste material and/or visible contamination areas on site surface.	There are no visible signs of contamination following the removal of plant, equipment and materials. All rubbish/waste materials removed from site. All carbonaceous material has been removed (where practical) and transported to an REA or a void for burial, or will be appropriately contained/encapsulated.	Site inspections Before and after site photographs Contamination Assessment Reports Groundwater/surface water monitoring reports
			Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to land use type	Contamination will be appropriately removed, remediated or managed so that appropriate guidelines for land use are met	Contamination Assessment Reports Groundwater/surface water monitoring reports
All Final Land Use Domains	Infrastructure Area	Residual waste materials (e.g. carbonaceous material and other wastes) will be appropriately removed or contained/encapsulated so it does not pose any hazards or constraints for intended land use.	Waste material on site surface	All rubbish/waste materials have been removed from site	Statement provided and before/after photos. Waste disposal records
All Final Land	All Mining	The final landform is stable for the	Indicators of erosion and land	Minimal erosion that would require	

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
Use Domains Native Ecosystem Agricultural – Grazing	Domains Infrastructure Area Overburden Emplacement Area	long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna. Landform that is commensurate with surrounding natural landform.	instability.	moderate to significant ongoing management and maintenance. No visual signs of land instability such as mass movement.	LIDAR survey of final landform Aerial photography Before and after photographs. Site inspections Rehabilitation Monitoring Report
			Survey of rehabilitated landform to verify final landform construction in accordance with Final Landform and Rehabilitation Plan.	Survey verifies final landform complies with final landform construction in accordance with Final Landform and Rehabilitation Plan.	LIDAR survey of final landform Aerial photography Before and after photographs. Site inspections Rehabilitation Monitoring Report
			Measured - survey of rehabilitated landform to specifically monitor settlement and/or material loss via erosion.	Survey verifies that settlement and/or material loss is within predicted limits and will not compromise final landform drainage via differential settlement.	LIDAR survey of final landform Aerial photography Before and after photographs. Site inspections Rehabilitation Monitoring Report
				Significant surface water management structures (e.g. spillways, drop structures, major drains and creek diversions) have been constructed in accordance with hydrological design.	An engineering assessment undertaken by a suitably qualified person concludes that significant surface water management structures (e.g. spillways, drop structures, major drains and creek diversions) have been constructed in accordance with hydrological design.
				High risk landforms (such as steep slopes, high walls) have been constructed in accordance with	An engineering assessment undertaken by a suitably qualified person concludes that

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
				geotechnical design.	high risk landforms (such as steep slopes, high walls) have been constructed in accordance with geotechnical design.
Native Ecosystem	Underground Mining Area		Absence of subsidence cracking or sinkholes.	No visual subsidence surface cracks or potholes remaining (attributable to former mining operations) that present a risk to the environment, safety, or the final land use objectives (excludes areas managed under an approved Subsidence Management Plan / Extraction Plan / Offset Strategy).	Before and after photographs Subsidence monitoring reports.
Water Storage	Water Management Areas	Water Approvals Structures that take or divert water such as final voids, dams, levees etc. are appropriately licensed (e.g. under the Water Management Act 2000) where required. As required ensure sufficient licence shares are held in the water source(s) to account for water take.	Final landform considers advice from relevant Government Agency whether sufficient licence shares are available in the water source to account for water stored in voids and dams in the proposed final landform.	Water approvals / licences are granted by relevant NSW Government Agency.	Copies of approvals, where relevant.
			Indicators specified by Rapid Appraisal of Riparian Condition (RARC) (Jansen et al 2005).	Assessment of stream health in accordance with RARC.	Stream health monitoring reports.
		Where required by sampling, mine water dams and sediment dams are dewatered and desilted prior to being converted to clean water dams.	Water quality sampling Mine water dams and sediment dams non-polluting	Where required based on sampling, sediment accumulated in mine water and sediment dams is appropriately removed, remediated or managed so that appropriate guidelines for land use are met, supported by records. Monitoring of water quality against guidelines for the final land use (e.g. agricultural, industrial, recreational).	Statement provided and before/after photos. Rehabilitation records Water quality testing results

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
All Final Land Use Domains	Infrastructure Area Water Management Area Overburden Emplacement Area	Drainage structures will be designed and constructed where required in accordance with Blue Book requirements.	Suitable surface water controls installed and operating effectively	Monitoring of water discharged from the Mine complies with EPL limits.	Water quality testing as per the approved *Site Water Management Plan* Photographs Rehabilitation monitoring reports
		Bushfire: The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Appropriate bushfire hazard controls (where required) have been implemented. Ownership and responsibility for ongoing bushfire management is identified	Bushfire controls implemented.	Statement provided Before and after photographs Bushfire management plan in place.
Water Storage	Water Management Area	Surface Water: Runoff and discharge water quality from mine site is similar to, or better than the pre- disturbance runoff water quality.	Water quality parameters in accordance with EPL.	Water quality discharged from rehabilitated mining operation meet specifications in EPL.	EPL has been relinquished by EPA. Contamination investigations.
Native Ecosystem	Infrastructure Area Overburden Emplacement Area	Ecological rehabilitation objective 1: The **vegetation composition** of the rehabilitation is comparable to adjacent vegetation.	Native plant species recorded from 0.04 ha fixed monitoring plots are characteristic of adjacent vegetation. All native vascular plant species are identified to species level from fixed 0.04 ha monitoring plots in accordance with the BAM. Monitoring should include appropriate reference (analogue) sites outside the mine disturbance area	Native plant species recorded within rehabilitation areas are characteristic of the reference (or target) vegetation. The rehabilitated vegetation contains at least 1 tree, 2 shrub and 6 groundcover species that are characteristic of the target vegetation type.	Before and after photos BAM plot data Rehabilitation monitoring reports
		Ecological rehabilitation objective 2: The **vegetation structure** of the	Cover and abundance of plant growth forms recorded from 0.04 ha fixed monitoring plots are	Cover, abundance and height range of native plant growth forms are characteristic of, or trending towards,	Before and after photos BAM plot data

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
		rehabilitation is comparable to (based on ongoing monitoring data) the adjacent vegetation	characteristic of the adjacent vegetation, or an ongoing trend toward becoming characteristic is evident from the monitoring data	the adjacent vegetation when compared to analogue sites. The total cover and abundance scores for each growth form group is greater than or equal to that of the adjacent vegetation or has improved since baseline monitoring (where annual data is available).	Rehabilitation monitoring reports
		Ecological rehabilitation objective 3: Levels of **ecosystem function** have been established that demonstrate the rehabilitation is self- sustainable.	Indicators of nutrient cycling are suitable for sustaining the target vegetation community	For large areas of rehabilitation (that justifies the use of multiple analogue sites) litter cover is within 10^{th}-90^{th} percentile variation range of analogue sites. For small areas of rehabilitation a cover of leaf litter is present.	BAM plot data Rehabilitation monitoring reports
			Evidence of plant regeneration from 0.04 ha fixed monitoring plots or a walk over of the ecological rehabilitation area	For large areas of rehabilitation that justifies the use of at least three analogue sites, the number of second generation individuals of trees are within the 10th-90th percentile variation range of analogue sites. For small areas of rehabilitation, evidence of second regeneration is present.	BAM plot data (stem classes) Rehabilitation monitoring reports
			Cover of exotic species within 0.04 ha fixed monitoring plots is low	For large areas of rehabilitation that justifies the use of at least three analogue sites the foliage cover of 'high threat exotic' (HTE) weeds is within 10th-90th percentile variation range of analogue sites. For small areas of rehabilitation, cover of exotic species is less than or equal to the cover of exotic species at the analogue sites.	BAM plot data Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
			Soil health is suitable to sustain the desired vegetation types.	Soil nutrient profile is suitable to sustain plant growth; Total organic carbon is within 10th-90th percentile variation range of reference sites; Soil analytes ECe (salinity) and ESP (sodicity) at rehabilitation sites are similar to reference sites	Soil chemistry reports (inc. lab results)
				Decomposer microbial populations in the soils are similar to those of reference sites, using a metric that distinguishes soils at different stages of and in different types of mine rehabilitation. The specific parameters of the metric are: 1) the actinomycete: bacteria ratio (lower values are associated with increased soil disturbance), 2) the proportion of copiotrophic bacteria (higher values are associated with increased labile soil organic carbon), and 3) the presence of the fungus *Trichoderma* (an indicator of significant amounts of plant cellulosic substrates in soils).	Soil microbial lab results Soil microbial soil assessment report
		Native fauna are utilising rehabilitation areas	Quantitative assessment of other features (e.g. leaf litter cover, bare ground, wood debris) sampled from fixed 0.04 ha monitoring plots in accordance with the BAM	Litter cover within 10^{th} -90^{th} percentile variation range of local reference site values.	Litter scores from BAM plot data

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
Native Ecosystem Agricultural – Grazing	Infrastructure Area Overburden Emplacement Area	Rehabilitation areas are sustainable and comparable with surrounding vegetation	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Where rehabilitation has been subjected to fire and drought, data shows composition, structure and function scores returning to pre-disturbance conditions, indicating resilience.	Observations during monitoring inspections; Comparison of pre- and post-fire BAM data; Comparison of pre- and post-fire climatic data (weather records over the monitoring period); Rehabilitation monitoring report
		Pest animal species are appropriately controlled and do not present a risk to rehabilitation.	Threats to rehabilitation.	Vertebrate pest species presence and damage is recorded and controlled.	Observations during monitoring inspections (ie direct and indirect evidence of pest species) Passive fauna monitoring data (eg footage from motion activated infra-red cameras) Records of pest animal control activities
Native Ecosystem	Underground Mining Area	Post mining land use to be self-sustaining natural ecosystem comprising native trees and shrubs generally representative of vegetation in comparable analogue communities.	Presence of representative species and cover.	Successful establishment of representative species, comparable to adjacent vegetation. A cover of leaf litter is present.	Before and after photographs
Agricultural - Grazing	Infrastructure Area	Agricultural Revegetation: Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use. Land use capability is capable of supporting the target agricultural	Land and Soil Capability of at least Class 6 in proposed Agricultural areas	Land and Soil Capability classification or Agricultural Land Classification criteria met.	Rehabilitation monitoring reports Independent agronomist report
			The re-established growth medium substrate (e.g. topsoil / subsoil) is capable of supporting the targeted pasture regime on a sustained basis.	Rehabilitation areas comprise representative pasture species from the seed mix and suitable for cattle grazing (where grazing is final land use).	Rehabilitation monitoring reports Independent agronomist report

Final Land Use Domain	Mining Domain	Rehabilitation Objectives (Desired Features And/Or Characteristics Of The Final Land Use Domain)	Indicator (Specific Attribute Associated With The Objective)	Rehabilitation Completion Criteria (Benchmark For The Indicator, Based On Analogue Data Where Appropriate)	Justification/ Validation (Evidence That The Benchmark Has Been Achieved)
		land use.	Pasture composition assessed, including pasture weeds.	Pasture establishment is consistent with the range of species utilised within the region.	
			Demonstration of persistence over time for palatable species.	Pasture establishment is in good health and provides adequate cover.	
			Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes of pasture	Where rehabilitation has been subjected to fire and drought, data shows composition, structure and function scores returning to pre-disturbance conditions, indicating resilience.	Observations during monitoring inspections; Rehabilitation monitoring report

4.4 Rehabilitation Objectives and Rehabilitation Completion Criteria – Stakeholder Consultation

4.4.1 Stakeholder Engagement Plan

Centennial has prepared a Stakeholder Engagement Plan (SEP) to facilitate stakeholder consultation for Angus Place rehabilitation objectives and completion criteria. This document details Angus Place stakeholders and the strategies used to communicate with them and provide the foundation for working with stakeholders prior to and during the closure process. The SEP will be regularly revised to reflect the outcomes of technical investigations, the ongoing development and execution of this RMP and the outcomes of ongoing engagement.

Relevant consultation regarding rehabilitation and closure for Angus Place has been summarized in the following sections.

4.4.2 Relevant Statutory Authorities

Angus Place regularly engages with various government and other agencies to report on its environmental performance. This is facilitated through a number of means including:

- Council representation on the CCC;
- Liaison with the NSW EPA regarding EPL conditions;
- Provision of the Annual Review to RR and other relevant Government agencies;
- Provision of the Annual Licence Return to EPA; and
- Provision of the National Pollutant Inventory (NPI) to the DAWE via EPA.

Centennial has consulted with and will continue to consult with the following regulatory bodies in relation to the Angus Place operations and rehabilitation:

- DAWE;
- DPE;
- DPE – Biodiversity Conservation Division;
- DPI – Water;
- EPA;
- NRAR;
- RR;
- Sydney Catchment Authority;
- NPWS; and
- Lithgow City Council (LCC).

Consultation will continue to be undertaken with relevant stakeholders as required under relevant approval conditions and other regulatory requirements relevant to the mine.

4.4.3 Other Stakeholders

Angus Place has consulted with and will continue to consult with a number of community groups and landholders in relation to the Angus Place operations and rehabilitation, including:

- Special interest groups including the Local Aboriginal Land Council and Aboriginal stakeholder groups;
- Non-Government Organisations (NGOs) including the Blue Mountains Conservation Society and the Colong Foundation for Wilderness;
- Relevant infrastructure owners including Energy Australia;
- Local community and affected landowners; and
- Staff, contractors and unions.

4.4.4 Community Consultative Committee

In accordance with Schedule 5, Condition 5 of MP 06_0021, a CCC has been established to monitor the operations and provide a forum whereby the community can communicate with the mine operators and be kept up to date with the progress of the mine.

In 2012 the established Angus Place CCC was combined to also include Springvale. Furthermore in October 2014 the CCC was also expanded to include Springvale Coal Services. The combined Angus Place, Springvale and Springvale Coal Services CCC facilitates a single channel of communication about the current mining operations in the area.

The formation of the Springvale and Angus Place CCC was approved by DPE in 2012. The combined Angus Place, Springvale and Springvale Coal Services CCC was approved by DPE in 2016. The CCC is operated in accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Developments* (Department of Planning 2007) with meetings held regularly.

4.4.5 Proposed Future Consultation

Consultation will continue with stakeholders during the life of mine, in accordance with the SEP. **Table 4-2** presents a summary of the proposed future consultation activities key stakeholders.

Table 4-2 Summary of Proposed Future Stakeholder Engagement Activities

Stakeholder	Activities
RR	Ongoing revisions of the RMP Submission of the Annual Reviews Submission of the Annual Rehabilitation Report
DPE	Submission of the Annual Reviews Submission of the Annual Rehabilitation Report
CCC	Submission of the Annual Reviews Submission of the Annual Rehabilitation Report CCC Meetings
Agencies	Submission of the Annual Reviews Submission of the Annual Rehabilitation Report
Stakeholder and Community Interest Groups	Submission of the Annual Reviews Submission of the Annual Rehabilitation Report

5 PART 5 – FINAL LANDFORM AND REHABILITATION PLAN

5.1 Final Landform and Rehabilitation Plan

In accordance with the requirements of the *Form and Way: Rehabilitation Management Plan for Large Mines* (RR, 2021a) a *Final Landform and Rehabilitation Plan* has been prepared to show the final land use and final landform for Angus Place (refer **Figure 6**). The current Final Landform and Rehabilitation Plan (FLRP0001241) was approved by the Resources Regulator on 30 October 2023.

CENTENNIAL REHABILITATION MANAGEMENT PLAN

ANGUS PLACE

FINAL LANDFORM AND REHABILITATION

Inset A
Scale: 1:70,000

Inset B
Scale: 1:70,000

Inset C
Scale: 1:70,000

Inset D
Scale: 1:70,000

CASTLEREAGH HIGHWAY

CCL704

ML1303

ML1699

ML1424

ML1326

SEE INSET D

SEE INSET A

SEE INSET C

SEE INSET B

ML1720

ML1670

ML1588

ML1537

CL377

ML1727

LEGEND

- Railway
- Major Road
- Mining Lease
- Project Approval Boundary - MP06_0021

Final Landuse Domain

- Agricultural – Cropping
- Agricultural – Grazing
- Rehabilitation Biodiversity Offset Area
- Final Void
- Heritage Area
- Industrial
- Infrastructure
- Native Ecosystem
- Water Management Areas
- Water Storage (Excluding Final Void)
- Other

0 0.5 1 Kilometers

Coordinate System:	GDA2020
Scale:	1:70,000 at A3
Approved FLRP:	FLRP0001241
Approval Date:	30-Oct-2023
Drawn by:	N.Lloyd
Submission ID's:	4271 - Project Approval Boundary 5204 - Final Land Use

CENTENNIAL

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6 PART 6 – REHABILITATION IMPLEMENTATION

6.1 Life of Mine Rehabilitation Schedule

The rehabilitation schedule over the life of mine (LOM), from the commencement of the RMP until expected lease relinquishment is described in the following sections.

A current snapshot of disturbance and rehabilitation from 31 December 2022 has been included as **Figure 7**. The LOM rehabilitation schedule has been presented in **Figure 8**. Future rehabilitation will be undertaken following cessation of operations to achieve the landform in **Figure 6**.

CENTENNIAL REHABILITATION MANAGEMENT PLAN

ANGUS PLACE

DISTURBANCE AND REHABILITATION DECEMBER 2022

Inset A
Scale: 1:70,000

Inset B
Scale: 1:70,000

Inset C
Scale: 1:70,000

CCL704

ML1424

ML1699

ML1326

ML1303

SEE INSET A

SEE INSET B

SEE INSET C

LEGEND

- Railway
- Major Road
- Mining Lease
- Project Approval Boundary - MP06_0021

Mining Domain Type

- Infrastructure Area
- Overburden Emplacement Area
- Underground Mining Area (SMP)
- Water Management Area

Rehabilitation Phase

- Ecosystem and Land Use Establishment

0 0.5 1 Kilometers

Coordinate System:	GDA2020 MGA Zone 56
Scale:	1:70,000 at A3
Project Number:	N/A
Date:	28/03/2023
Drawn by:	D.MacBain
Submission ID's:	4269 - Rehabilitation 4270 - Disturbance 4271 - Project Approval Boundary

CENTENNIAL

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CENTENNIAL COAL FORWARD PROGRAM

ANGUS PLACE

FORECAST DATA YEAR 2
PLAN 2B YEAR 2024

Inset A
Scale: 1:70,000

Inset B
Scale: 1:70,000

Inset C
Scale: 1:70,000

Inset D
Scale: 1:70,000

CCL704
ML1303
ML1424
ML1699
ML1326

SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D

LEGEND

- Railway
- Major Road
- Mining Lease
- Project Approval Boundary - MP06_0021

Mining Domain Type

- Beneficiation Facility
- Infrastructure Area
- Other
- Overburden Emplacement Area
- Tailings Storage Facility
- Underground Mining Area (SMP)
- Active Mining Area (Open cut void)
- Water Management Area

Rehabilitation Phase

- Decommissioning
- Landform Establishment
- Growth Media Development
- Ecosystem and Land Use Establishment
- Ecosystem and Land Use Development
- Relinquishment (Rehabilitated)
- Rehabilitation Completion

2024 Forcast Activity

- Forecast Disturbance
- Forecast Land Prepared for Rehabilitation
- Ecosystem and Land Use Establishment

0 0.5 1 Kilometers

Coordinate System:	GDA2020 MGA Zone 56
Scale:	1:70,000 at A3
Project Number:	N/A
Date:	28/03/2023
Drawn by:	D.MacBain
Annual Reporting Period:	2022
Submission ID's:	4269 - Rehabilitation 4270 - Disturbance 4271 - Project Approval Boundary 4341 - Forecast Data Year2

CENTENNIAL

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6.1.1 Infrastructure

In September 2012, Angus Place submitted an application to modify MP 06_0021 to include the construction and operation of a Ventilation Facility (APC-VS2) and associated infrastructure, to be located in the Newnes State Forest. This Modification was approved on 22 April 2013. A Construction Environmental Management Plan (CEMP) was prepared prior to the commencement of construction works associated with the Ventilation Facility Project (APC-VS2). The Ventilation Facility Project includes:

- A Ventilation Facility;
- 369 m of additional access tracks;
- A 66 kV/11 kV 40m x 40m electrical substation;
- A switchyard facility and security screening;
- 4.4 km of 66 kV trenched electrical power supply; and
- 225 m of 11 kV trenched electrical power supply.

Construction of the ventilation fan commenced in June 2013. Angus Place may continue construction associated with the Ventilation Facility (APC-VS2) during the LOM. Additional minor construction works associated with site care and maintenance activities may be undertaken during the LOM.

It is intended to undertake seal drifts at Kerosene Vale, remove infrastructure and undertake minor landform works during the LOM.

Changes to proposed activities will be reported in the Annual Rehabilitation Report and Forward Program.

6.1.2 Mining Activities

Mining is currently approved at Angus Place up until August 2024 with an application underway for Angus Place West (refer **Section 1.2**) and incorporates the following activities whilst the mine is in care and maintenance:

- Underground longwall mine, development panels and supporting infrastructure (within the Newnes Plateau and the site Pit Top);
- Operation of existing ventilation facility to allow underground inspections;
- Continued use of existing facilities and infrastructure at Angus Place;
- Maintenance of the Pit Top and associated infrastructure to allow for mining to recommence when the Springvale reserves have been extracted or if market conditions improve.

6.1.3 Mine Operations

Angus Place utilises the longwall extraction method of mining. The mining method is supported by roadway development, mined using continuous miner units. Development activities, using continuous miners, entail the extraction of coal and installation of strata support to produce underground roadways which enable access to future longwall extraction areas. All secondary extraction will be undertaken in accordance with an approved Extraction Plan.

6.1.4 Mine Production and Rehabilitation Schedule

As an underground coal mine, infrastructure at Angus Place is required LOM. Subsequently, land associated with key surface infrastructure will not become available for rehabilitation until the cessation of mining operations. Minor rehabilitation works associated with approved construction and/or exploration may be required and will be reported in the Annual Rehabilitation Report and Forward Program.

The LOM rehabilitation schedule has been illustrated in **Figures 7** to **8**. Changes to the LOM rehabilitation schedule will be reflected in the Annual Rehabilitation Report and Forward Program.

6.2 Phases of Rehabilitation and General Methodologies

Achievement of a physically and chemically stable mine landform that is adequately drained and integrates with the adjoining hilly topography will be demonstrated through the implementation of a series of conceptual rehabilitation phases. As defined by the *Form and way: Rehabilitation Management Plan (large mines)* the rehabilitation phases are presented in **Table 6-1**.

Table 6-1 Rehabilitation Phases

Rehabilitation Phase	Description
Phase 1: Active Mining	This phase is associated with active mining operations across the domains.
Phase 2: Decommissioning	This phase of rehabilitation includes activities associated with the removal of mining infrastructure, unless agreed to be retained, and the removal, remediation or management of contaminated and hazardous materials.
Phase 3: Landform Establishment	This phase of rehabilitation consists of the processes and activities required to construct the approved final landform. 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 (that is, rock raking or ameliorating sodic materials).
Phase 4: 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) to ensure achievement of the approved or, if not yet approved, the proposed: - rehabilitation objectives; - rehabilitation completion criteria; and - final landform and rehabilitation plan. 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.
Phase 5: Ecosystem and Land Use Establishment -	This phase of rehabilitation consists of the processes to establish the final land use following construction of the final landform. For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control.
Phase 6: 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 or, if not yet approved, the proposed: - rehabilitation objectives; - rehabilitation completion criteria; and - final landform and rehabilitation plan. For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling,

Rehabilitation Phase	Description
	vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile. This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.
Phase 7: Rehabilitation Completion (sign-off) –	The final phase of rehabilitation when a rehabilitation area has achieved the final land use for the mining area: - as stated in the approved rehabilitation objectives and the approved rehabilitation completion criteria; and - as spatially depicted in the approved final landform and rehabilitation plan. Rehabilitation areas may be classified as complete when the RR has determined in writing that rehabilitation has achieved the final land use following submission of the relevant application by the lease holder.

6.2.1 Active Mining

Appropriate measures and strategies are implemented during the active phase of mining to enhance rehabilitation outcomes. Works in this phase are summarised below.

Soils and Materials

Management protocols for soils and subsoils are implemented to minimise risks and enable soil resources within disturbance areas to be characterised, stripped, stockpiled and re-used appropriately. The management protocols also enable consideration of the main soil types observed within the project disturbance boundary and any specific constraints or management measures to be adopted for each soil type.

a. Soil Resources

Where soil stripping and transportation is required, Angus Place will undertake the operations in accordance with the methodologies outlined within the Angus Place Mine Extension Project Soils and Land Capability Assessment (SLR 2014). This assessment identifies the recommended amelioration for identified soil types on Newnes Plateau. The recommended amelioration for stripped soil is provided in **Table 6-2**.

Table 6-2: Recommended Amelioration for Striped Soil

Soil Type		Recommended Amelioration for Stripped Soil
No	Name	
2	Mesotrophic Brown Kandosol	Lime or gypsum application to improve acidity. Organic amendments to improve subsoil structure.
5	Brown-Orthic Tenosol	None
7	Dystrophic Brown Kandosol	Lime or gypsum application to improve soil acidity. Organic amendments to improve subsoil structure.
8a	Brown-Orthic Tenosol	Lime or gypsum application to improve acidity and sodicity / soil dispersion. Organic amendments to improve subsoil structure.

Soil Type		Recommended Amelioration for Stripped Soil
No	Name	
9	Mesotrophic Brown Kandosol	Lime or gypsum application to improve acidity.
11	Arsenic Rudosol	Lime or gypsum application to improve acidity and sodicity / soil dispersion. Organic amendments to improve subsoil structure.

Flora

The *Western Region Biodiversity Management Plan* has been developed to provide an overview of biodiversity management requirements and standardise the management of biodiversity across Centennial Coal's Western Operations. Site specific management of biodiversity at Angus Place is undertaken in accordance with the *Western Region Biodiversity Management Plan.*

A range of management measures are implemented by Angus Place to protect threatened species and communities, minimise impacts upon native flora and fauna, manage clearing on the site, control weeds and control access to environmentally sensitive areas. As part of an on-going flora and fauna monitoring program at Angus Place, detailed surveys of terrestrial vertebrate fauna populations have been undertaken on an annual basis, in spring, autumn and summer.

Additional management of flora is undertaken in accordance with relevant management plans and SMPs approved by DPE and DAWE.

Weed and Pests

Weed management at Angus Place is detailed in the Flora and Fauna Management Plan. Major weed threats include Blackberry (*Solanum nigrum*), Scotch Thistle (*Cirsium vulgare*), St. Johns Wort (*Hypericum perforatum*), English Broom *(Cytisus scoparius*) and Sweet Briar (*Rosa rubiginosa*), which are targeted by the noxious weed control program. Where Pampas Grass (*Cortaderia selloana*) and Radiata Pines (Pinus radiata) are encountered, these are sprayed as well. Weed removal and spraying occurs in October, November and December while the weeds are actively growing, with a follow up round in February or March around the Pit Top as a component of the surface maintenance contract, and results are reported in the Annual Review / Annual Rehabilitation Report. A Section 95 Certificate has been granted by BCD to enable weed control works (including hand removal of weeds) to be undertaken within Narrow Swamp (which is a Newnes Plateau Shrub Swamp EEC listed under the EPBC Act and BC Act).

A suitably qualified person will undertake these works as required. The *Western Region Biodiversity Management Plan* (GHD, 2017) identifies the detailed measures which will be implemented to control weeds and feral pests.

b. Fauna

As described above, Centennial has developed a *Biodiversity Management Plan* and *Regional Biodiversity Strategy*. These Plans have been prepared to:

- Provide an overarching document for Centennial personnel to consult on biodiversity management and information at a regional scale;
- Ensure that biodiversity is managed consistently at all Centennial sites within the western region;
- Recognise the cumulative interactions of Centennial sites within a regional context;
- Satisfy statutory requirements relevant to aquatic and terrestrial biodiversity; and
- Streamline biodiversity management at a regional scale for an improved environmental outcome.

c. Rock / Overburden Emplacement

Angus Place is an underground coal mine, subsequently there is no overburden generated at Angus Place. Whilst Commonwealth Colliery is a former open cut mine, the site has been rehabilitated. Investigations as outlined in **Section 3.4** will be completed during the LOM.

d. Waste Management

The major general waste streams from the mine include water, packaging material including plastic, paper and cardboard, wood, waste oil, oil filters, oil drums, scrap metal, hoses, bottles (plastic and glass), sewage effluent, as well as general putrescible rubbish.

General waste is disposed of to landfill by licensed waste contractors. Recyclable materials, for example, plastic, paper and cardboard products, are sorted for recycling whenever possible at the site. Oil drums and filters are recycled with other waste metals are removed from site by a metal recycling company. Waste oil collected in the workshop is stored in an underground collection sump before being removed off site by a licensed contractor for recycling.

Paper, plastic and cardboard are recycled both from bulk packaging from the store and site offices, either at the Pit Top or other infrastructure areas or transferred to a recycling facility.

All potentially hazardous material at Angus Place is stored and/or bunded appropriately in accordance with relevant standards. Where possible, all quantities of waste or recyclable material are quantified and recorded for benchmarking and continuous improvement purposes as well as reporting in accordance with the National Greenhouse and Energy Reporting Scheme.

e. Geology and Geochemistry

The principal geology of the Newnes Plateau is a sedimentary sequence of sandstone, claystone and siltstone dating from the early Permian to the late Triassic, while lower areas are commonly deposited with more recent sediments.

The Angus Place holding contains seams of the Late Permian Illawarra Coal Measures, of the Cullen Bullen Subgroup. The Lithgow Seam was previously mined using the longwall retreat method of mining prior to the mine being placed under care and maintenance. As outlined in **Section 1.2**, Centennial are currently preparing an application for the Angus Place West Project which will seek approval for continuation of mining using the bord and pillar method of mining.

The Lithgow Seam is a medium-high volatile bituminous coal (30 % VM dry ash-free) of medium rank (0.78 - 0.95 vitrinite reflectance) containing medium ash and low vitrinite content. It is highly suitable for domestic power generation without washing. Specific energy averages 34 MJ/kg dry ash-free, ash fusion (hemispherical) is above 1,400 degrees and the coal is hard with an average Hardgrove Grindability Index of 44. Sulphur, phosphorous and chlorine are low, averaging 0.55 %, 0.028 % and 0.05 % respectively. Seam ash is low in calcium, magnesium oxide and sulphur trioxide, with aluminium oxide averaging 25 %. The seam contains negligible gas levels and has a low to medium propensity for spontaneous combustion.

f. Material Prone to Spontaneous Combustion

The Lithgow Seam has a low propensity for spontaneous combustion and there have been no incidences of spontaneous combustion in the history of Angus Place. Furthermore, there is currently no planned stockpiling of coal at Angus Place during the LOM. Consequently, spontaneous combustion is not considered an operational issue that may affect rehabilitation.

g. Material Prone to Generating Acid Mine Drainage

The potential for acid generation from the topsoil and subsoil (regolith) at Angus Place is low. Acid Sulphate Soils, which are the main cause of acid generation within the soil mantle, are commonly found less than 5 m above sea level, particularly in low-lying coastal areas such as mangroves, salt marshes, floodplains, swamps, wetlands, estuaries, and brackish or tidal lakes. There has been little history of acid generation from regolith material in the Central West Region (which is located approximately 160 km from the coast). There have been no acid mine drainage issues identified at Angus Place since the commencement of operations and acid mine drainage is not considered an operational risk that may affect rehabilitation at Angus Place during the LOM.

h. Erosion and Sediment Control

Erosion and sediment control activities at Angus Place are undertaken in accordance with the site *Water Management Plan*. This objective is intrinsic to erosion and sedimentation designs and controls, and is achieved by implementing the following principles:

- Separating undisturbed, 'clean water' runoff from disturbed, 'dirty water' runoff to minimise and isolate the amount of 'dirty water' to be treated and either reused or discharged off site;
- Directing sediment-laden runoff into designated sediment control retention ponds;
- Diverting 'clean water' runoff unaffected by the operations offsite; and
- Maintaining sediment control structures to ensure that the designed capacities are maintained for optimum settling of sediments.

Management measures specific to the control of erosion and sedimentation during construction of the Ventilation Facility (APC-VS2) have been outlined in the CEMP.

i. Mine Subsidence

In accordance with the requirements of Schedule 3, Condition 3C of MP 06_0021 and the Draft Guidelines for the Preparation of Extraction Plans (DPE 2015) Angus Place will undertake all secondary extraction in future longwall panels in accordance with an approved Extraction Plan. Additional detail regarding these Plans has been provided in **Section 1.2.3**.

j. Ongoing Management of Biological Resources for Use in Rehabilitation

Biological resources are managed during the active mining phase in accordance with the *Western Region Biodiversity Management Plan*.

k. Management of Potential Cultural and Heritage Issues

Aboriginal and cultural heritage is managed in accordance with the *Western Region Aboriginal Cultural Heritage Management Plan* (RPS, 2017) and *Western Region Historic Heritage Management Plan* (RPS, 2018) which were developed in consultation with Registered Aboriginal Parties (RAPs), Heritage NSW and DPE.

l. Exploration Activities

Exploration activities will be undertaken in accordance with the requirements of the *Exploration Code of Practice: Rehabilitation*. Disturbance from previous exploration activities will be rehabilitated prior to mine closure. All exploration drill holes will be sealed in accordance with relevant RR guidelines at the time.

m. Bushfire

Angus Place operates in accordance with a Bushfire Management Plan. Bushfire management is undertaken in consultation with the RFS and previously FCNSW. Fire management within the Gardens of Stone SCA is the responsibility of NPWS. Fire fighting measures on the Pit Top are restricted to the use of fire extinguishers and fire hydrants for use of fighting fires associated with infrastructure. The RFS will be requested to assist with any bushfire events in close proximity of the Pit Top. A Bushfire Risk Assessment relating to the Ventilation Facility was prepared as part of the MP 06_0021 Mod 2 Environmental Assessment (EA). As the project is located in a bushfire prone area, the outcomes of the risk assessment were used to shape the design of the facility and associated infrastructure; including:

- Identifying and incorporating Asset Protection Zones (APZ's) into the project design;
- Installing a buried (trenched) power supply line rather than an overhead line;
- Development of safe egresses from the Ventilation Facility (APC-VS2) and Switchyard during fire events where escape via Sunnyside Ridge Road or Mayinygu Marragu Trail is not available.
- Ensuring that demountable buildings, maintenance sheds and compressors at the Ventilation Facility (APC-VS2) have a minimum setback to unmanaged vegetation of 40 m; and

- Ensuring the minimum setback from the switchyard to unmanaged vegetation is 50 m to the northwest and southwest and 25 m to the northeast and southeast.

6.2.2 Decommissioning

The decommissioning phase encompasses all works required to prepare land for rehabilitation including removal of any unnecessary built infrastructure, foundation and hardstand materials, services, equipment, and materials including wastes and contamination.

Decommissioning, demolition, and removal of infrastructure from the mine site will generally be undertaken during the mine closure phase. Any infrastructure including dams, roads and buildings which is beneficial for future use by post-mining landowners may be left in place subject to relevant landowner agreements and regulatory approvals.

Decommissioning and demolition activities will be appropriately planned and documented to ensure that appropriate approvals are in place for the works.

Further detail regarding demolition activities will be determined as the operation approaches closure. Detail in this regard will be reported in the Annual Rehabilitation Report and Forward Program.

a. Site Security

The management of public safety at Angus Place is undertaken using a variety of management measures. All site visitors are directed to the control room and are required to report and log on to an electronic visitors book. Each visitor is required to provide details including their name, company, name of staff members they are visiting, phone numbers and their arrival time. Visitors are also required to logout using the same system when they are leaving site. Visitors are issued with a sticker and pass that must be possessed at all times whilst on site and return when departing site.

The system allows Angus Place to effectively monitor the number of people visiting the site, make contact with these people if necessary and also maintain records of visit duration. CCTV footage is also recorded at various areas throughout the site and is able to effective monitor access of employees/contractors, deter unauthorised access and for increased security at Angus Place.

Angus Place also implement control measures including providing, where practical, fencing and warning signage around the Pit Top area, and security staff patrols on a regular basis.

b. Infrastructure to be Removed or Demolished

Site features, services, and structures to be decommissioned and demolished to achieve the final land use are described in **Table 6-3**.

Table 6-3 Infrastructure to be Decommissioned

Code	Domain	Major Asset	Demolition/Rehabilitation Activities	Approvals Required
Pit Top Infrastructure				
1	Infrastructure	Administration buildings	Disconnect services; demolish and remove infrastructure; and remove concrete pads.	None
		Sewage treatment and irrigation facilities	Disconnect services; demolish and remove water treatment plant; remove concrete pads; remove potentially contaminated material.	None
		Coal crushing and screening plant	Disconnect and terminate all services; demolish and remove buildings; demolish and remove coal crushing and screening plant; remove carbonaceous material.	None
		Coal stockpile	Remove carbonaceous material.	None
		Main workshops area, bathhouse, service buildings and storage sheds	Disconnect services; demolish and remove small buildings; remove concrete pads; remove potentially contaminated material; on site remediation of contaminated soil.	None
		Hardstand/Laydown Areas	Remove plant and material; and remove concrete pads.	None
		Access roads	Remove roadside markers/signs; and remove bitumen.	None
		Visitor and employee parking areas	Remove concrete pads, footings and bitumen.	None
		Portals	Access portals	RR approval for sealing
		Ventilation Facilities (APC-VS1)	Seal and rehabilitate	RR approval for sealing
		Personnel and materials drift	The drift will be filled with non-contaminated materials.	None
		Coal conveyor drift and coal conveyor drive	Demolish and remove conveyors and gantries.	RR approval for sealing

Code	Domain	Major Asset	Demolition/Rehabilitation Activities	Approvals Required
		Electrical distribution network comprising Substation 0 (located at Lidsdale) and Substations 1 – 3	Remove substation transformers.	None
		Services boreholes	Seal with an appropriately designed and engineered plug reinforcement that complies with relevant construction standards and DRE DRG RR guidelines.	RR approval for sealing
		Vale of Clwydd No. 2 Air Shaft	Shaft will be decommissioned and sealed in accordance with RR guidelines.	RR approval for sealing
		Water tanks	Demolish and remove tanks.	None
		Diesel tank	Demolish and remove tanks; remove potentially contaminated material; on site remediation of contaminated soil	None
		D1 ML Mine Water Tank	Demolish and remove tank	None
		Dewatering boreholes from underground working	Seal with an appropriately designed and engineered plug reinforcement that complies with relevant construction standards and DRG RR guidelines	RR approval for sealing
		Water Transfer Pipelines	Remove all infrastructure associated with the pipeline which is accessible above ground to ensure the landform adjacent to the pipeline is safe and non-polluting	None
		Pump Station	Pumps, or associated infrastructure not required to be maintained will be removed (or marked on plans where left in-situ by agreement with the RR and/or landholder).	None
		Geotechnical bores	Seal with an appropriately designed and engineered plug reinforcement that complies with relevant construction standards and RR guidelines.	RR approval for sealing
Newnes Plateau Infrastructure				
1	Infrastructure	Service buildings and material storage sheds	Disconnect services; demolish and remove small buildings; remove concrete pads; remove potentially contaminated material; on site remediation of contaminated soil	None
		Hardstand areas	Remove plant and material; and remove concrete pads.	None
		Ventilation Facility (APC-VS2)	Remove ventilation fans and equipment; backfill and seal shafts; construct engineered plug; disconnect services; demolish and remove infrastructure; and remove concrete pads.	RR approval for sealing

Code	Domain	Major Asset	Demolition/Rehabilitation Activities	Approvals Required
		930 and 940 Dewatering Borehole Facilities	Remove dewatering bore and compounds and grout with concrete, cap and seal.	RR approval for sealing
		Service boreholes	Seal with an appropriately designed and engineered plug reinforcement that complies with relevant construction standards and \RR guidelines.	RR approval for sealing
		Substations and switchyard	Remove substation transformers and switchyard	None
		Monitoring infrastructure (piezometers, weirs and tranducers, seismometers, survey markers)	Piezometers will be decommissioned in accordance with relevant RR requirements; surface water monitoring devises (e.g. transducers) will be decommissioned and removed; subsidence survey markers will be decommissioned and removed; boreholes will be sealed in accordance with RR requirements.	None
		Trenched power cables	Trenched power cables will be isolated and made safe in accordance with the relevant guidelines.	None
		Trenched water pipelines	Trenched pipelines will be isolated and made safe in accordance with the relevant guidelines.	None
		Tanks	Demolish and remove tanks.	None
Other infrastructure				
1	Infrastructure	Coal stockpile and infrastructure/derelict buildings at Kerosene Vale	Disconnect services; demolish and remove small buildings; remove carbonaceous material; remove concrete pads; remove potentially contaminated material; on site remediation of contaminated soil.	None
		Mine entrances at Kerosene Vale (adits)	Mine entrances are sealed and signed off by RR	RR approval for sealing
3	Water Management	Dams including the Settling Ponds, Filter Pond, Secondary Pollution Pond, Primary Pollution Ponds, LDP001 and constructed wetlands, Aerating Ponds and dewatered and the Oxidation Ponds and the Kerosene Vale Sediment Dam LDP003	Where required by sampling, drain and remove contaminated sediments from the floor of the dam to enable it to be converted into a clean water structure.	None

As required by the Angus Place consent, all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: *The Demolition of Structures*, or its latest version.

c. Buildings, Structures and Fixed Plant to be Retained

Site features, services, and structures to be retained for future use as part of the final land use are described in **Table 6-4**.

Table 6-4 Infrastructure to be Retained

Code	Mining Domain	Infrastructure to be Retained
1	Infrastructure	Comprises the tracks to infrastructure facilities on Newnes Plateau that will be retained in the final landform for use as fire trails or access tracks by recreational users of Gardens of Stone State Conservation Area. Comprises minor tracks at the Pit Top that will be retained in the final landform for future access and monitoring. Includes Angus Place to Wallerawang Station Private Haul Road (up to the end of the CCL). Final land use and rehabilitation objective for this area is the responsibility of the landowner.
3	Water Management Area	Dams and ponds are to be retained for post mining land use.

d. Management of Carbonaceous/Contaminated Materials

Carbonaceous Materials

During decommissioning, detailed inspections or audits will be undertaken within the footprint of surface infrastructure including stockpiles, access roads and haul roads to identify remaining sources of carbonaceous material. Following the inspections or audits, carbonaceous material will be removed (where practical) and reprocessed for sale or will be disposed onsite within tailings dam or in the disused underground workings.

Contaminated Materials

Measures implemented at the site to prevent contamination include storing all fuels and oils in purpose built facilities with appropriate bunding and fire-fighting provisions. Diesel is stored in above ground bunded tanks from where it is transferred to diesel pods for underground use or direct to machinery. A licenced contractor is engaged to remove and recycle and/or dispose of used oil and grease products at licensed facilities.

Spill kits are located at strategic places throughout the site and Angus Place surface staff have received spill clean-up training. Apart from the potential contamination of land by hydrocarbons, there is no other potential for contamination during the LOM.

A Phase 1 Assessment for Angus Place was completed 2007 (Aecom, 2007). A Targeted Phase 2 Environmental Site Assessment (Phase 2 ESA) at Angus Place was not required to assess the presence of contamination.

A Phase 1 Assessment for Vale of Clwydd No. 2 was undertaken in 2010 (Aecom, 2010). A Phase 2 ESA at Vale of Clwydd was completed in 2011 (Aecom, 2011). The Phase 2 ESA identified:

- Heavy and petroleum hydrocarbon impact in surface materials at three separate locations in the western portion of the site. The impact does not extend vertically. The impact does not appear to extend to the north or east, further delineation sampling to the south and west is required to delineate the extent of the impact. This impact may be associated with the former railway line and/or former activities at the site;
- Dissolved benzene, naphthalene and volatile petroleum hydrocarbons in a single groundwater sample collected to the west of the sealed mine portal and up hydraulic gradient of former surface mine infrastructure. The impact appeared to be localised to the central west of the site and likely related to naturally occurring shale oil; and
- Dissolved arsenic, nickel and zinc identified in the monitoring wells. The impact of the nickel and zinc are associated with background conditions. The arsenic may be associated with the former mining activities.

- An offsite waste dump appeared not to be impacted or contain hazardous materials. Characterisation of the material which include coal chitter appears to be 'General Soil Waste'.

e. *Hazardous Materials Management*

Prior to the demolition of any structures, a hazardous material assessment will be undertaken to determine whether there are any hazardous materials present, including asbestos. Where hazardous materials are identified, they will be assessed and quantified to enable appropriate safety measures to be implemented during removal by a licensed contractor. All hazardous material removed from the buildings will be recorded and disposed of at an approved waste management facility.

6.2.3 Landform Establishment

Landform establishment is the process of shaping the final landform to a safe, stable and non-polluting landform that is appropriate for the desired final land use and consistent with the surrounding landscape. Additional detail has been included below. The final landform for Angus Place is shown on the Final Landform and Rehabilitation Plan in **Section 5**

a. Water Management Infrastructure

The network of dams and ponds at Angus Place Pit Top will not be decommissioned at the end of mine life but will be maintained for future use. The water storages will provide a valuable water resource to surrounding fauna or an asset to the final land use.

Generally all underground water management infrastructure will be made safe and left buried in-situ. The location of water management infrastructure that is to remain in-situ will be recorded in an abandoned services register and signs will be erected where appropriate.

b. Final Landform Construction: General Requirements

Prior to the commencement of rehabilitation the landform will be established. The primary objective of landform establishment within infrastructure areas will be the stabilisation of batters, road verges, drains, banks, and cleared areas. Disturbed areas will be re-profiled to establish geotechnically stable and self-draining areas. In the case of disturbance areas associated with infrastructure sites on Newnes Plateau, rehabilitation will be undertaken in accordance with the Occupation Permit.

All areas will be trimmed, shaped and the proposed rehabilitation works will ensure that the final landforms at the sites are stable and non–polluting and mimic the near-original landform.

6.2.4 Growth Medium Development

In the context of this RMP, growth medium development encompasses activities to reinstate soils with the initial physical, chemical and biological characteristics required to establish the desired vegetation community.

Topsoil Management

Where soil stripping and transportation is required, Angus Place will undertake the operations in accordance with the methodologies outlined within the Angus Place Mine Extension Project Soils and Land Capability Assessment (SLR 2014).

Where possible, topsoil will be re-spread directly onto cleared/reshaped landforms. Where topsoil resources allow, topsoil will be spread to a nominal minimum depth range of 100 – 300 mm on all areas to be rehabilitated. Where adequate topsoil is not available, suitable alternatives may be used.

Thorough seedbed preparation will be undertaken to optimise establishment and growth of vegetation. All topsoiled areas will be lightly contour-ripped (after topsoil spreading) to create a 'key' between the topsoil and the subsoil. Ripping will be undertaken on the contour and the tynes lifted for approximately 2 m every 200 m to reduce the potential for channelised erosion on slopes greater than 10°. Ripping will be undertaken when soil is moist and immediately prior to sowing for best results. The respread topsoil surface will be scarified prior to or during seeding to reduce runoff and increase infiltration.

For areas requiring long duration topsoil stockpiling, opportunities will be investigated for the application of additional ameliorants (e.g. bio-solids) to assist with the regeneration of the desirable microorganism activity in the soil stockpiles.

The spoil generated from construction will be reused to fill the shafts during decommissioning and rehabilitation. The spoil will be stored and treated as a subsoil stockpile with regard to stockpile design and with appropriate erosion and sediment controls in place. The cuttings will be tested to ensure they are within the required limits of the *National Environment Protection Measure (NEPM) Assessment of Site Contamination (1999) - Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater*, and if required will be either treated prior to use for rehabilitation or disposed of at a licensed facility.

Soil Amelioration

Prior to respreading soils, sampling will be undertaken (either from stockpiles or in-situ soils) to determine appropriate ameliorant application. Ameliorants will be added to soils in accordance with recommendations from a soil specialist. Repeat applications of ameliorants may be required to maintain nutrient levels to rapidly establish an effective ground cover and sustain plant growth prior to evidence of nutrient recycling. Ameliorants may include gypsum, lime, fertiliser and biosolids. The use of soil ameliorants is designed to balance pH, prevent surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination.

Surface Preparation

Surface preparation activities for rehabilitated areas will commence as soon as practicable once land becomes available and/or following the completion of mining activities. The surface preparation process at Angus Place involves the following general steps:

- Installation of contours, drainage structures and erosion control measures;
- Light contour ripping parallel with the contour to provide for an adequate seed bed;
- Installation of habitat features (e.g. stag trees, woody debris) to augment the habitat value of the proposed vegetated corridors;
- Spreading of topsoil (or suitable alternative);
- Application of soil ameliorants where appropriate; and
- The respread topsoil surface will be scarified to reduce runoff and increase infiltration; and
- Revegetation.

6.2.5 Ecosystem and Land Use Establishment

The Ecosystem and Land Use Establishment phase incorporates revegetated lands and habitat augmentation, species selection, species presence and growth together with weed and pest animal control/management and establishment of flora.

Revegetation

Appropriate revegetation steps and selection criteria for the species mix will be undertaken to ensure a high success revegetation rate, and will comprise, but not be limited to, the following:

- Appropriate species selection for the rehabilitation domain;
- Optimal sowing rates and species proportions;
- Seed pre-treatment; and
- Soil amelioration and fertiliser application, where required.

The species selection will focus on those species that will successfully establish on the available growth medium, bind the soil and will result in a variety of structure and food/habitat resources. The woodland seed mix will include a mix of understorey, mid-storey and over-storey species. Angus Place will utilise woodland seed mixes to establish vegetation communities that are commensurate with surrounding existing vegetation. Whilst every attempt will be made to use species that existed prior to disturbance, additional species may be required to ensure suitable initial groundcover for site stabilisation and minimal soil erosion.

This may include the use of short-lived annual exotic non-invasive grass species (such as shirohie millet in the Spring and Summer, and oats/barley/wheat in the Autumn and Winter), however the use of these species will be minimised or avoided where possible.

Fertiliser will be applied with seed mixes to increase the likelihood of initial revegetation success. All revegetation activities will be undertaken immediately after the landform establishment stage.

Noting it is Centennial Coal's responsibility to manage the section of the Angus Place - Wallerawang Power Station Haul Road up to the end of the consolidated coal lease. This equates to 4193.5 metres in length.

The rest of the Angus Place - Wallerawang Power Station Haul Road along with the Angus Place to Mount Piper Haul road are owned and managed by a third party. This area is currently active and will be retained after closure. The stability of batters will be assessed at closure with the possibility of some minor shaping and seeding required in some sections. If this is the case a grassland seed mix will be used and the RCE updated to cover these costs.

Weed Management

A program for the control of weeds on the site will be developed and implemented. Early control of weeds will minimise competition and maximise early growth and survival of desired rehabilitation species. This can be achieved by physical removal or by chemical control where appropriate. Weed management will be a component of rehabilitation and management activities and will comprise:

- Regular inspections of the site (particularly rehabilitated areas) to identify potential weed infestations; and
- Identifying, removing and/or spraying weed populations, where appropriate.

The spread of declared noxious weeds will be prevented by using the measures above. Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Herbicides will be used in accordance with regulatory requirements. Records will be maintained of identified weed infestations and control programs will be implemented according to best management practices for the weed species of concern.

Weeds will be managed until such time that no significant weed infestations are present and they do not pose a threat to the rehabilitation success.

Pest Animal Management

Feral and pest animals can have significant detrimental impacts on emerging vegetation in rehabilitated areas and reduce the likelihood of revegetation success due to damage to juvenile vegetation from grazing, spreading weed seeds and erosion. An animal grazing control programme will be developed and implemented if required, after plant establishment occurs.

6.2.6 Ecosystem and Land Use Development

For the purposes of this RMP the ecosystem and land use development phase represents those activities required to develop sustainable ecosystems that have characteristics comparable to similar adjacent undisturbed vegetation in the area.

Rehabilitation Maintenance

Where rehabilitation monitoring confirms that the rehabilitation is not successful or is limited, maintenance works will be undertaken. This may include the following:

- Re-seeding and, where necessary, re-topsoiling and/or the application of specialised treatments such as composted mulch or bio-solids to areas with poor vegetation establishment;
- Installation of tree guards around planted seedlings or construction of temporary fencing suitable for excluding native and feral fauna species should grazing by animals be excessive;
- Replacement of drainage controls if they are found to be inadequate for their intended purpose, or compromised by vegetation or wildlife;
- De-silting or repair of sediment control structures; and
- Where monitoring indicates the presence of excessive weeds or the potential for noxious weed infestation, necessary precautions to prevent the development of weeds within the rehabilitated areas will be undertaken.

Monitoring results, any required maintenance activities and any refinements of rehabilitation techniques will be reported in the sites Annual Review / Annual Rehabilitation Report.

7 PART 7 – REHABILITATION QUALITY ASSURANCE PROCESS

Rehabilitation activities at Angus Place will be undertaken in accordance with a Rehabilitation Quality Assurance Process (RQAP), as illustrated in **Figure 9**. This process outlines the actions to be implemented throughout the lifecycle of rehabilitation, which includes the verification of execution of procedures as well as the recording of key data at each rehabilitation phase, including details of inspections, monitoring and record keeping which will be required to ensure that:

- Rehabilitation is being implemented in accordance with the nominated methodologies; and
- Identified risks to rehabilitation are being adequately addressed at each phase of rehabilitation.

Centennial will implement the RQAP through every phase of rehabilitation to confirm that the rehabilitation strategies outlined in this RMP have been completed in accordance with the nominated methodologies. The RQAP will also include inspections and documentation to verify that each phase of demolition and rehabilitation has been completed and has met the completion criteria detailed in **Section 4.4**. Documentation to be maintained would include (but not limited to):

Phase 1 – Active Mining

- Documentation of pre-clearance surveys and GDPs;
- Resource salvage records (soil, rocks, habitat trees);
- Surveys; and
- Detailed landform designs.

Phase 2 – Decommissioning

- Documentation of boreholes/shaft/adit sealing and sign off by RR;
- Inspection and demolition reports to confirm all infrastructure to be demolished has been removed;
- Documentation to identify the future landowner responsible for the ongoing upkeep and management of retained infrastructure; and
- Validation testing to ensure any contamination has been appropriately remediated and/or removed.

Phase 3 – Landform Establishment

- Survey and preparation of as constructed drawings of final constructed slopes, landforms and water drainage structures.

Phase 4 – Growth Medium Development

- Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources;
- Site records of re-spread topsoil, ameliorants, fertiliser etc.; and
- Soil testing results to confirm appropriate soil geochemical parameters for plant establishment.

Phase 5 – Ecosystem and Land Use Establishment

- Documentation of reseeding or planting activities undertaken, such as date of planting, weather conditions, seeding rates and/or planting rates; and
- Site inspections and monitoring of rehabilitated areas to allow early identification of any emerging threats to rehabilitation.

Phase 6 – Ecosystem and Land Use Development

- Inspections of temporary and permanent erosion and sediment controls;
- Inspections to identify potential weed infestations;
- Documentation of rehabilitation monitoring; and
- Documentation of weed and feral animal management and eradication programs and follow-up inspections.

A Rehabilitation Quality Checklist will be developed to be signed off after each phase of rehabilitation prior to proceeding to the next phase to confirm that RQAP objectives have been met for the relevant remediation activities.

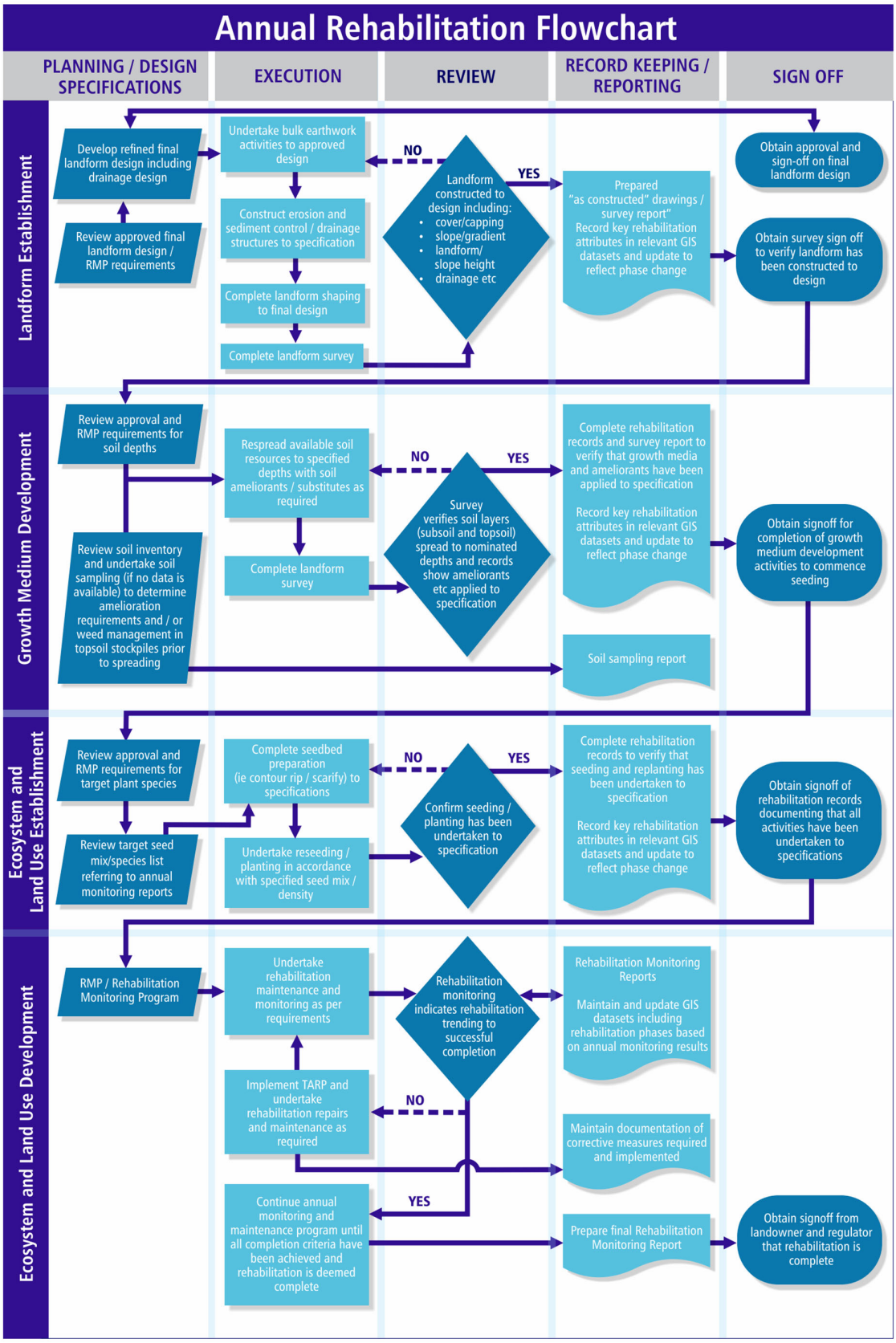


Figure 9: Rehabilitation Quality Assurance Process

8 PART 8 – REHABILITATION MONITORING PROGRAM

Angus Place has very limited existing rehabilitation and infrastructure will be retained LOM. There has not been any rehabilitation monitoring undertaken at the mine, however a baseline survey will be undertaken to understand the condition of existing rehabilitation, identify suitable analogue sites and to assess the need for ongoing monitoring. The monitoring results will also be used to identify the need for corrective actions for rehabilitation performance. The monitoring program incorporates the most appropriate indicators and methods that:

- Provide a measure of completion criteria to be assessed in accordance with the defined rehabilitation objectives;
- Adequately track changes to rehabilitation phases;
- Are reproducible;
- Utilise scientific recognised techniques; and
- Are cost-effective.

Monitoring is conducted by a suitably skilled and qualified person(s) at locations representative of the range of conditions on the rehabilitating areas and appropriate analogue sites. Monitoring results will inform refinements of rehabilitation methodology as required. Rehabilitation monitoring will be continued until it can be demonstrated that rehabilitation has satisfied all rehabilitation and closure criteria.

8.1 Analogue site baseline monitoring

8.1.1 Site Selection and Establishment

Local reference (analogue) sites are integral to the rehabilitation monitoring program and are required to form the baseline against which rehabilitation results are compared over the course of the program. The number and location of reference sites will be chosen according to the following criteria:

- Located in native vegetation representative of the target vegetation or adjacent pasture (for agricultural rehabilitation objectives) for the respective rehabilitation area;
- Vegetation is in moderate to good condition and not subject to substantial threatening processes, such as physical damage, weed infestation, grazing, bushfire damage or dieback;
- Located in native vegetation or pasture (open grassland) that is secure from future mine related activities and disturbance; and
- Plots should not be located in or near ecotones, vehicle tracks and their edges, or other disturbed areas that are readily distinguishable from the broad condition state of the vegetation zone.

Where separate areas of land are mapped into a single vegetation zone, the plots should be located across the separate areas, while being representative of the zone.

8.1.2 Reference/Analogue Sites

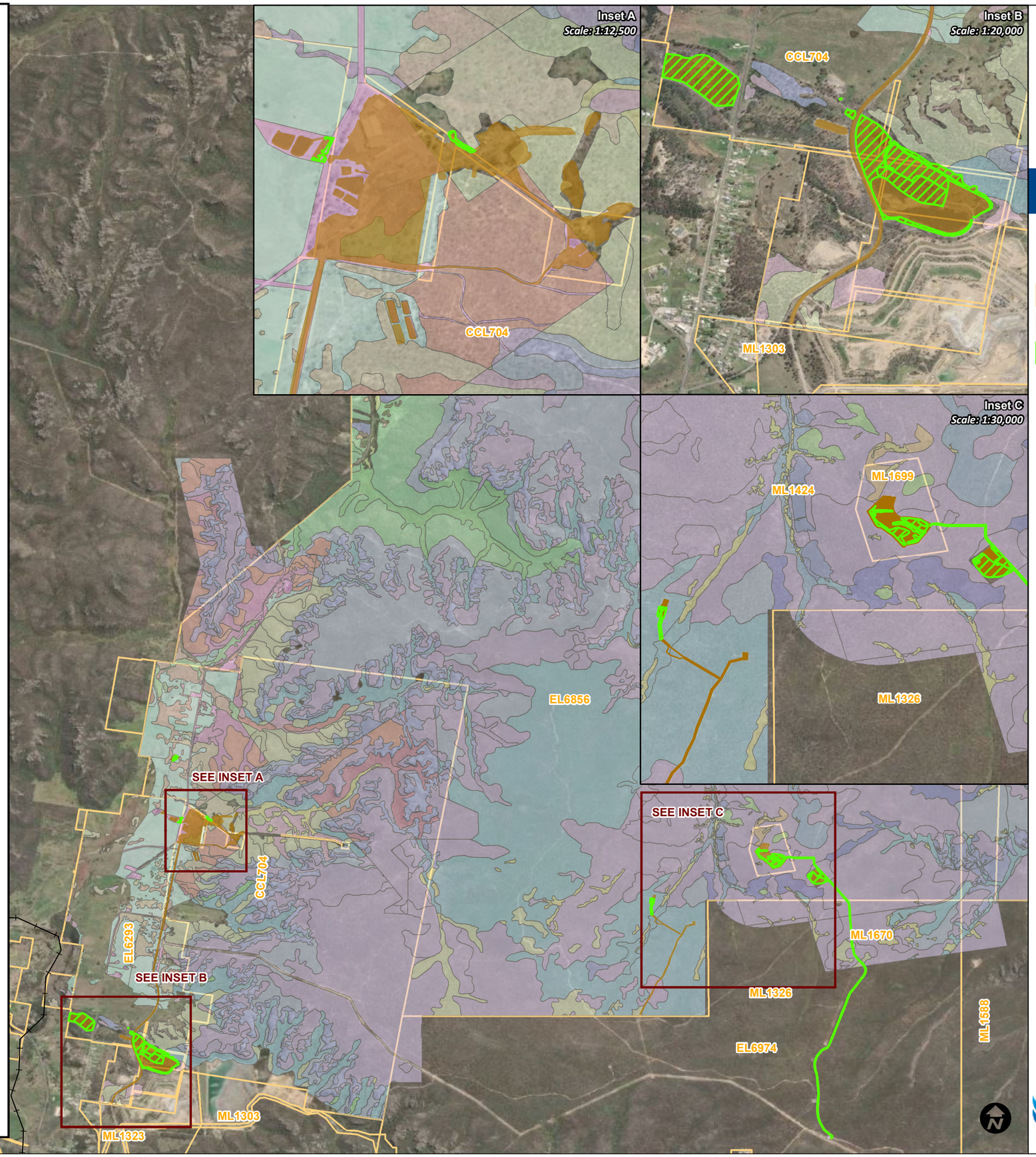
Centennial have undertaken a Rehabilitation Review (SLR, 2022) to establish a site-specific monitoring program to support the ongoing refinement of rehabilitation objectives and completion criteria assessment, and alignment with associated guidelines (refer **Section 1.3**). This includes transitioning Centennial operations to the NSW Biodiversity Assessment Method ('BAM', OEH 2020) to align with new rehabilitation objectives and completion criteria assessment (refer **Section 4).**

New reference (analogue) sites will be established in accordance with **Section 8.1.1** to increase statistical strength and allow comparison of rehabilitation scores to reference site scores (within percentile ranges) for certain variables. Existing rehabilitation areas have been presented in **Figure 10**.

LEGEND

Centennial Mapped Vegetation Communities

- Baeckea linifolia - Grevillea acanthifolia subsp. acanthifolia shrub/sedge swamp on sandstone, Sydney Basin Bioregion
- Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands
- Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin
- Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin Bioregion
- Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion
- Cleared and Severely Disturbed Lands
- Derived grassland of the South Eastern Highlands Bioregion and South East Corner Bioregion
- Dwarf Casuarina heathland of the upper Blue Mountains
- Mountain Grey Gum - Narrow-leaved Peppermint grassy woodland on shales of the Southern Highlands, southern Sydney Basin
- Narrow-leaved Peppermint - Silvertop Ash - Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion
- Red Box - Grey Gum - stringybark woodland on talus slopes of the western Blue Mountains, Sydney Basin Bioregion
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands (Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands)
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
- River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion
- Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
- Silvertop Ash - Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South Eastern Highlands Bioregion and South East Corner Bioregion
- Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion
- Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands
- Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin
- Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin Bioregion
- Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin
- Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin Bioregion
- Tableland swamp meadow on impeded drainage sites of the western Sydney Basin Bioregion and South Eastern Highlands Bioregion
- Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands Bioregion
- Tussock grass - sedgeland fen - rushland - reedland wetland in impeded creeks in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion



CENTENNIAL COAL REHABILITATION MONITORING

ANGUS PLACE

FIGURE 10: PROPOSED REHABILITATION MONITORING

LEGEND

- Railway
- Mining Lease
- Surface Disturbance
- Rehabilitation

0 0.5 1 Kilometers

Coordinate System:	GDA2020
Scale:	1:60,000 at A3
Project Number:	630.30294
Date:	29-Jul-2022
Drawn by:	LC

Proposed Indicative Rehabilitation Monitoring Sites are subject to site verification and consultation with the mine

CENTENNIAL

C:\Users\lcornish\Desktop\Projects\NTL\630.30294.00000\GIS\200 - Angus Place\Angus Place - Figure 10 Proposed Rehabilitation Monitoring.mxd

8.2 Rehabilitation Establishment Monitoring

The data yielded from the monitoring program allows an adaptive management approach by providing information to inform the type and implementation of management activities and determining the status of rehabilitation performance in relation to completion criteria. This facilitates the continual improvement and refinement of rehabilitation techniques.

Where rehabilitation performance is not trending to the nominated completion criteria this may indicate that there is a threat to long term rehabilitation success. Threats to rehabilitation may include events such as periods of drought, bushfire events, or pressures from weeds and feral animals.

The rehabilitation monitoring program will report against relevant components of the Trigger Action Response Plan (TARP) in **Section 10**. Where rehabilitation monitoring indicates that there is a potential threat to rehabilitation, the adaptive management actions will be undertaken in accordance with the TARP.

8.2.1 Rehabilitation Monitoring

Rehabilitation monitoring will be undertaken by suitably qualified practitioners (ecologist, ecological consultant, and/or botanist) annually subject to the outcomes of the baseline survey. Monitoring in spring is preferable for detection and identification of flowering plants in the rehabilitation areas and in reference (analogue) sites. Survey timing should generally be conducted in the same month each year to allow consistent data comparison over time. Sampling should be completed during 'typical' climatic conditions, and timed to avoid extreme weather events (e.g. intense or high rainfall, flooding, or during or after bushfire). Details of the monitoring methodology are included in **Section 8.3** and existing rehabilitation areas are shown on **Figure 10**.

8.2.2 Rehabilitation Inspections

Annual rehabilitation monitoring will be complimented by regular environmental inspections. These inspections will be used to identify any potentially emerging issues following rehabilitation activities and prior to adequate groundcover or species establishment.

8.3 Measuring Performance Against Rehabilitation Objectives and Rehabilitation Completion Criteria

The proposed monitoring method for Centennial Coal rehabilitation sites is summarised below and is consistent the objectives and criteria in **Section 4**. The key elements of the approach are:

- Survey design - stratification of the rehabilitation areas and reference vegetation areas – identifying locations and number of monitoring plots within rehabilitation areas and control sites (target vegetation areas); establishment of permanent monitoring stations (marked on ground, recorded and mapped)
- Photographic monitoring (or 'photo monitoring');
- Collection of vegetation and habitat data via BAM plots (with subsequent analysis and statistics);
- Collection and analysis of soil chemical analytes (as an indicator of available nutrients for plant growth in the soil medium);
- Collection and analysis of soil microbes (as an indicator of soil health for plan growth); and
- Vertebrate pest species, domesticated stock - presence and damage is recorded and photographed where present.

8.3.1 Photographic Monitoring

Photo-monitoring is to be conducted as part of the sampling of permanent vegetation (BAM) plots according to the following procedure:

- One photo (landscape view) is taken by the recorder with a GPS camera standing at the start of the 50 m transect (which bisects the BAM plot); this is taken to be the uphill end of the 50 m transect; and
- One photo (landscape view) is taken by the recorder with a GPS camera standing at the end of the 50 m transect; this is taken to be the downhill end of the 50 m transect.

8.3.2 Vegetation Composition, Function and Structure (BAM Data)

All vegetation monitoring plots are to be surveyed following the methodology detailed in Section 4.3.4 of the BAM (OEH 2020). This involves a 20 x 20 m floristic plot to assess species diversity and ground cover, a 20 x 50 m structural attribute plot to collect tree stem size, large woody debris (LWD) and hollow-bearing

tree data and five 1 m x 1 m plots to assess litter cover percentage (as well as bare ground, cryptogram and rock).

8.3.3 Soil Chemistry Analysis

Soil samples are collected from each of the established monitoring plots. Soil is sampled using an Arborline push tube soil corer to collect 0 - 10 cm of soil at approximately 5 m intervals along the centreline of the plot. These samples are then consolidated into a single sample for all rehabilitation sites for analysis.

Laboratory analysis of the samples involves examining the following soil chemistry parameters:

- pH
- Electrical conductivity (salinity)
- Chloride and sulfate
- Exchangeable Ca/Mg/K/Na
- Cation exchange capacity
- Particle size analysis
- R1 dispersion index
- Available water capacity, 15 bar and field capacity
- Organic carbon
- Total nitrate and nitrogen
- Total and extractable phosphorus
- Copper, manganese and zinc

Soil test results are rated according to the “traffic light” system to reflect suitability of analyte levels for optimal native vegetation growth.

8.3.4 Soil Microbial Analysis

The major goal of rehabilitating land subject to mining is the re-establishment of a self-sustaining vegetative cover. A successful vegetation cover will then provide source material for nutrient cycling. As decomposers, soil microbial communities mediate critical ecosystem processes, and microorganisms are an important element for successful reclamation because of their role in nutrient cycling, plant establishment, geochemical transformations and soil formation. A soil’s microbiological status may be utilised as a primary indicator of its biological properties and of the overall soil quality development over time.

Soil cores are collected from three points along the 50 m centreline within monitoring plots. Soil is sampled using an Arborline push tube soil corer to collect 0 - 10 cm of soil. These samples were then consolidated into a single sample and stored in a cool place to be analysed later for microbial content.

Generally a specialist soil scientist/consultant is required to conduct the microbial analysis. The microbial analysis should comprise the following methods:

- Moisture contents are determined after drying several grams of the soil sample for three hours at 100°C. The soil moisture contents are used to adjust all microbial number counts to a standard count per gram dry weight of soil. Water activity measurements are determined using a Decagon Devices Pawkit Water Activity Meter (Graintec Pty Ltd, Qld). It is generally accepted that the water requirements of microorganisms should be defined in terms of the water activity (Aw), rather than the water content of their growth substrate. Aw is a thermodynamic parameter defined in relation to the chemical potential of water and represents the availability of water for reaction in the growth substrate. The reduction of Aw has a marked effect on microbial growth;
- Standardised sample treatments and isolation media are utilised to distinguish the numbers of different populations of mesophilic and mesotolerant bacteria, actinomycetes and fungi. These microorganisms grow typically between 15 and 40°C. The dilution plating method is utilised as it is simple and rapid, gives repeatable results and yields excellent comparable data. Although plate counts represent only a

small portion of the total microorganisms in the sample, they provide a relative measure of cultivable microbial numbers between samples;

- Viable bacterial and fungal populations are determined by plating the inoculum onto selective bacterial and fungal isolation media followed by incubation at 25°C. The microorganisms were grouped into broad ecological and taxonomic categories for analysis. The categories examined include copiotrophic (rapidly growing) and oligotrophic (resource-limited adapted) bacteria and actinomycetes (filamentous bacteria that are important for the decomposition of complex substrates), filamentous fungi and yeasts; and
- All data analyses are undertaken using suitable statistical package.

8.3.5 General Observations

In addition to the plot and soil based surveys, the following features are also recorded:

- Evidence of erosion across the sites, documenting type and severity;
- Presence of threatened or other significant species;
- Opportunistic occurrence and abundance of weeds, specifically priority weed species, as listed under the NSW *Biosecurity Act 2015*;
- Opportunistic evidence of native fauna using the site (outside of monitoring stations); and
- Signs of disturbance, either by stock, feral animals, vehicles or humans.

8.3.6 Reporting

Outcomes of baseline monitoring results as described in **Sections 8.3.1** to **8.3.5** and any future monitoring if deemed necessary, will be reported in the Annual Rehabilitation Report / Annual Review. The Annual Rehabilitation Report / Annual Review provides additional specific detail, maps and statistics regarding planned rehabilitation activities and schedules for previous reporting period and the next three year period.

9 PART 9 – REHABILITATION RESEARCH, MODELLING AND TRIALS

9.1 Current Rehabilitation Research, Modelling and Trials

A *Persoonia hindii* (*P. hindii*) monitoring program was designed to comply with Condition 24A (e) and (h) of the Consent conditions (06_0021) for the Angus Place Ventilation Shaft Facility. The survey and monitoring program was implemented in-line with the procedures established by Sustainable Minerals Institute (SMI) Centre for Mined Land Rehabilitation (SMI CMLR) The University of Queensland (UQ).

The University of Queensland SMI CMLR developed the program in 2015 (UQ 2015), which was then performed by Gingra Ecological Surveys (2016) and most recently by RPS. The monitoring program measured effectiveness of *P. hindii* translocation.

9.2 Future Rehabilitation Research, Modelling and Trials

There are currently no planned rehabilitation research, modelling or trials at Angus Place.

10 PART 10 – INTERVENTION AND ADAPTIVE MANAGEMENT

Where rehabilitation performance is not trending to the nominated completion criteria this may indicate that there is a threat to long term rehabilitation success. Threats to rehabilitation may include events such as periods of drought, bushfire events, or pressures from weeds and feral animals.

A Rehabilitation Trigger Action Response Plan (TARP) has been developed to provide a framework to manage potential key risks to rehabilitation. The Rehabilitation TARP includes:

- Identification of the principal contributing factors and impacts for each major risk to rehabilitation;
- Identification of upper limits (trigger values) for causes and impacts that are considered to represent an unacceptable level of risk; and
- Identification of appropriate responses to mitigate or remediate the causes and impacts, including a notification protocol.

The Rehabilitation TARP provides management responses for lower (first tier) and upper (second tier) trigger values. First tier trigger values identify opportunities for closer monitoring or early intervention that may mitigate potential impacts before notable impact to rehabilitation occurs. Second tier trigger values identify when indicators have reached a threshold that requires more substantive or widespread remedial actions to remediate or mitigate rehabilitation failure.

Should any trigger conditions be met resulting in the requirement for intervention or adaptive management, actions will be reported in the Annual Rehabilitation Report. Angus Place will notify the RR and other relevant stakeholders of any incident (such as bushfire or disease) that results in major impacts to rehabilitation that are likely to significantly impact the potential to achieve rehabilitation success.

The Rehabilitation TARP is provided in **Table 10-1** and will be revised as conditions at Angus Place change or new risks to rehabilitation are identified.

Table 10-1 Trigger Action Response Plan

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Landform Stability	Slope gradient	Trigger	Rehabilitated areas have slopes that are generally <10˚.	Rehabilitated areas have slopes >10° but <14˚.	Rehabilitated areas have slopes 15°.
		Response	No response required. Continue monitoring program.	Undertake regarding and revegetation of the area.	Undertake a review of the landform design, including survey if required. Undertake regarding and revegetation of the area.
	Erosion control	Trigger	No gully or tunnel erosion. No rilling present.	Minor gully or tunnel erosion present and/or rilling <200 mm deep.	Significantly gully or tunnel erosion present and/or rilling >200mm deep.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Undertake a review of the design and provide recommendations to appropriately remediate the area. Remediate as soon as practicable
	Drainage condition	Trigger	Drainage at Angus Place is in accordance with the design criteria established within this document.	Landforms exhibiting minor drainage issues but does not threaten to cause rehabilitation failure.	Landforms exhibiting significant drainage issues, threatening or causing rehabilitation failure.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate.	Undertake a review of the design and provide recommendations to appropriately remediate the area. Remediate as soon as practicable. Liaison with RR regarding landform.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Water Quality	Monitoring parameters	Trigger	Surface water quality of runoff from rehabilitation areas is within EPL criteria and rehabilitation performance criteria established within this document.	Water quality exceeds EPL or performance criteria but does not indicate a long-term rehabilitation issue.	Water quality exceeds criteria, indicating a long term rehabilitation liability. Monitoring identifies impact to rehabilitation.
		Response	No response required. Continue monitoring program.	Review and investigate water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Reporting as per PIRMP and all statutory reporting requirements. Implement relevant responses and undertake immediate review to determine source of issues and implement remediation measures identified as soon as practicable. Liaison with BCD.
Topsoil	Monitoring Parameters	Trigger	Properties of soil are within 20 % from relevant analogue site after 5 years of rehabilitation.	Properties of soil are > 20 % from relevant analogue site after 5 years of rehabilitation; however area is able to sustain selected vegetation species.	Properties of soil are > 20 % from relevant analogue site after 5 years of rehabilitation; however area is not able to sustain selected vegetation species.
		Response	No response required. Continue monitoring program.	Investigate application of additional soil and/or use of appropriate soil ameliorants or management options to address soil quality if deemed necessary.	Consultant to be engaged to assist with recommendations to appropriately remediate soil quality and depth. Remediate as soon as practicable.
Vegetation Vegetation	Ground cover	Trigger	Five years following revegetation to woodland, a minimum of 70% total ground cover (vegetation, leaf litter, mulch) is present within rehabilitated areas.	Five years following revegetation to woodland, total ground cover (vegetation, leaf litter, mulch) of between 55-70% in rehabilitated areas.	Five years following revegetation to woodland, total ground cover (vegetation, leaf litter, mulch) is <55% within rehabilitated areas.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	A suitably trained person to inspect the site. Investigate us of appropriate management options to remediate. Remediate as possible.
	Weed presence	Trigger	Twelve months following rehabilitation no significant weed species present.	Twelve months following revegetation, >15% but <25% cover of weed species present.	Twelve months following revegetation, >25% cover of weed species present.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
		Response	No response required. Continue monitoring program.	Engage weed management contractor to remove introduced species from the site.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate.
	Species composition	Trigger	Five years following revegetation to woodland, species composition comprises native tree and shrub species consistent with analogue site.	Five years following rehabilitation, native tree and shrub species composition comprises < 75 % consistent with analogue sites.	Five years following rehabilitation to woodland, native tree and shrub species composition comprises < 60 % consistent with analogue site.
		Response	No response required. Continue monitoring program.	Review native seed mix and amend accordingly. Consider remedial actions such as tubestock planting or re-seeding to achieve required species composition.	An inspection of the site will be undertaken by a suitably trained person to investigate remedial options to achieve required species composition.
Bushfire	Fuel Load	Trigger	Fuel loads are assessed and managed as required (including maintaining fire breaks) and there is firefighting access across rehabilitation areas and water resources available for fighting fires.	Monitoring indicates fuel loads have not been managed and fire breaks have not been maintained. In the event of a fire, this would result in firefighters not being able to access the site or water resources.	A fire on site damages rehabilitated areas.
		Response	No response required. Continue monitoring program.	Reduce fuel loads and ensure access tracks are cleared. Inspect water sources and ensure sufficient water is available.	Review and update (if required) the *Bushfire Management Plan* to ensure monitoring and maintenance is completed for fuel loads, access tracks, and water bodies.

11 PART 11 – REVIEW, REVISION AND IMPLEMENTATION

11.1 Review and Revision of the RMP

The Plan will be reviewed and if required revised in the event of the following:

- An amendment to the rehabilitation objectives, completion criteria or proposed final land use;
- Changes to risks, risk control measures or rehabilitation strategies being identified during the completion of rehabilitation risk assessment or additional investigations; and
- When directed to by the RR Secretary.

11.2 Implementation of the RMP

The process for ensuring that mining and rehabilitation are conducted in accordance with the RMP is the preparation and implementation of an Annual Rehabilitation Plan. The Annual Rehabilitation Plan is prepared and managed by the Environment and Community Manager and approved by the Mine Manager and Group Manager Rehabilitation.

12 REFERENCES

Aecom (2007) *Phase 1 Environmental Site Assessment for Angus Place Colliery.*

Aecom (2010) *Phase 1 Environmental Site Assessment for Vale of Clwydd No. 2 Colliery.*

Aecom (2011) *Targeted Phase 2 Environmental Site Assessment for Vale of Clwydd No. 2 Colliery.*

Centennial (2020) *Risk Management Standard.*

Department of Industry and Investment (2010) *ESG1: Rehabilitation Cost Estimate Guidelines*.

Department of Industry, Tourism and Resources (2006) *Leading Practice Sustainable Development Program for the Mining Industry.*

Department of Resources and Geoscience (2012) *EDG01 Environmental Management Guideline for Industry – Borehole Sealing Requirements on Land: Coal Exploration*.

Gingra Ecological Services (2016) *Newnes Plateau Persoonia hindii Monitoring 2015-2016.*

GHD (2017) *Western Region Biodiversity Management Plan.*

Golder Associates (2014) *Environmental Impact Statement: Angus Place Mine Extension Project – State Significant Development 5602.*

Minerals Council of Australia (2004) *Strategic Framework for Mine Closure.*

NSW Department of Trade and Investment – Mine Safety (2011) *Minerals Industry Safety and Health Risk Management Guideline (MDG1010).*

RPS (2017) *Western Region Aboriginal Cultural Heritage Management Plan.*

RPS (2018) *Western Region Historic Heritage Management Plan.*

RPS (2021) *Western Region Biodiversity Offset Strategy.*

SLR (2014) *Angus Place Mine Extension Project Soils and Land Capability Assessment.*

SLR (2022) *Centennial Rehabilitation Review*.

Standards Australia (2009) *AS/NZS ISO 31000:2009 – Risk Management – Principles and Guidelines.*

The University of Queensland (2015) *Persoonia hindii: Monitoring, Management and Research Program.*

APPENDIX A – LAND OWNERSHIP SCHEDULE

Lot	DP	County	Parish
7	751634	Cook	Cook
13a	751666	Cook	Wolgan
173	751666	Cook	Wolgan
40	751666	Cook	Wolgan
3	722335	Cook	Wolgan
34	751666	Cook	Wolgan
39	751666	Cook	Wolgan
33	751666	Cook	Wolgan
10d	751666	Cook	Wolgan
11c	751666	Cook	Wolgan
40	751636	Cook	Cox
7002	1026540	Cook	Cox
51	751636	Cook	Cox
56	751636	Cook	Cox
63	751636	Cook	Cox
62	751636	Cook	Cox
71	751636	Cook	Cox
72	751636	Cook	Cox
73	751636	Cook	Cox
74	751636	Cook	Cox
75	751636	Cook	Cox
76	751636	Cook	Cox
77	751636	Cook	Cox
78	751636	Cook	Cox
79	751636	Cook	Cox
60	751636	Cook	Cox
358	44086	Cook	Cox
24	751636	Cook	Cox
248	751636	Cook	Cox
1	751636	Cook	Cox
A	418163	Cook	Cox
B	418163	Cook	Cox
C	418163	Cook	Cox
26	751636	Cook	Cox
54	751636	Cook	Cox

Lot	DP	County	Parish
55	751636	Cook	Cox
350	751636	Cook	Cox
340	751636	Cook	Cox
1	542432	Cook	Cox
2	542432	Cook	Cox
3	542432	Cook	Cox
25	751636	Cook	Cox
2	751636	Cook	Cox
6	751636	Cook	Cox
15	751636	Cook	Cox
1	825887	Cook	Cox
2	825887	Cook	Cox
41	751636	Cook	Cox
20	827626	Cook	Cox
21	827626	Cook	Cox
22	827626	Cook	Cox
23	827626	Cook	Cox
24	827626	Cook	Cox
25	827626	Cook	Cox
26	827626	Cook	Cox
27	827626	Cook	Cox
4	751636	Cook	Cox
43	751636	Cook	Cox
34	751636	Cook	Cox
5	751636	Cook	Cox
354	751636	Cook	Cox
1	260621	Cook	Cox
2	260621	Cook	Cox
3	260621	Cook	Cox
4	260621	Cook	Cox
5	260621	Cook	Cox
31	751636	Cook	Cox
33	751636	Cook	Cox
28	751636	Cook	Cox
1	552422	Cook	Cox
2	552422	Cook	Cox

Lot	DP	County	Parish
1	732119	Cook	Cox
2	732119	Cook	Cox
57	751636	Cook	Cox
32	751636	Cook	Cox
351	751636	Cook	Cox
1	65810	Cook	Lidsdale
1	860363	Cook	Cox
101	1033592	Cook	Cox
100	1033592	Cook	Cox
2	860363	Cook	Lidsdale
1	568265	Cook	Lidsdale
11	864305	Cook	Lidsdale
16	855844	Cook	Lidsdale
5	115922	Cook	Wolgan
1	523671	Cook	Lidsdale
2	523671	Cook	Lidsdale
1	652799	Cook	Lidsdale
406	751651	Cook	Lidsdale
51	751651	Cook	Lidsdale
15	751651	Cook	Lidsdale
418	751651	Cook	Lidsdale
419	751651	Cook	Lidsdale
2	609683	Cook	Lidsdale
403	751651	Cook	Lidsdale
404	751651	Cook	Lidsdale
405	751651	Cook	Lidsdale
176	751651	Cook	Lidsdale
5	829137	Cook	Lidsdale
16	855844	Cook	Lidsdale
17	855844	Cook	Lidsdale
12	864305	Cook	Lidsdale
30	751651	Cook	Lidsdale
173	666814	Cook	Lidsdale
1	386554	Cook	Lidsdale
2	386554	Cook	Lidsdale
40	751651	Cook	Lidsdale

Lot	DP	County	Parish
43	751651	Cook	Lidsdale
1	52865	Cook	Lidsdale
2541-3090	Cook	Cox	
1	651723	Cook	Cox
359	44086	Cook	Cox
2	722335	Cook	Wolgan
7003	1026540	Cook	Cox
Newnes State Forest		Cook	Cook

APPENDIX B – STANDARD MINING LEASE CONDITIONS

Condition	Requirement
Part 2 Standard Conditions Division 1 Condition 4	**Must prevent or minimise harm to environment** (1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease.
	(2) In this clause— harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.
Part 2 Standard Conditions Division 1 Condition 5	**Rehabilitation to occur as soon as reasonably practicable after disturbance** The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs.
Part 2 Standard Conditions Division 1 Condition 6	**Rehabilitation must achieve final land use** (1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area.
	(2) The holder of the mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1).
	(3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1). **Note**— Clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause.
	(4) In this clause—**final land use** for the mining area means the final landform and land uses to be achieved for the mining area— (a) as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement
	(b) for a large mine—as spatially depicted in the final landform and rehabilitation plan
	(c) if the final land use for the mining area is required by a condition of development consent for activities under the mining lease—as stated in the condition.
	planning approval means— (a) a development consent within the meaning of the *Environmental Planning and Assessment Act 1979*, or
	(b) an approval under that Act, Division 5.1.
Part 2 Standard Conditions Division 2 Condition 7	(1) The holder of a mining lease must conduct a risk assessment (a ***rehabilitation risk assessment***) that—
	(a) identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease—
	(i) the rehabilitation objectives,
	(ii) the rehabilitation completion criteria,
	(iii) for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan, and
	(b) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks.

Condition	Requirement
	(2) The holder of the mining lease must implement the measures identified.
	(3) The holder of a mining lease must conduct a rehabilitation risk assessment— (a) for a large mine—before preparing a rehabilitation management plan,
	(b) for a small mine—before preparing the rehabilitation outcome documents for the mine, and
	(c) whenever a hazard is identified under clause 6(3)—as soon as reasonably practicable after it is identified, and
	(d) whenever given a written direction to do so by the Secretary.
Part 2 Standard Conditions Division 3 Condition 8	**Application of Division** This Division does not apply to a mining lease unless— (a) the security deposit required under the mining lease is greater than the minimum deposit prescribed under the Act, section 261BF in relation to that type of mining lease, or
	(b) the Secretary gives a written direction to the holder of the mining lease that this Division, or a provision of this Division, applies to the mining lease.
Part 2 Standard Conditions Division 3 Condition 9	**General requirements for documents** A document required to be prepared under this Division must— (a) be in a form approved by the Secretary, and **Note**— The approved forms are available on the Department's website.
	(b) include any matter required to be included by the form, and
	(c) if required to be given to the Secretary—be given in a way approved by the Secretary.
Part 2 Standard Conditions Division 3 Condition 10	**Rehabilitation management plans for large mines** (1) The holder of a mining lease relating to a large mine must prepare a plan (***a rehabilitation management plan***) for the mining lease that includes the following— (a) a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area,
	(b) a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation,
	(c) a summary of rehabilitation risk assessments conducted by the holder,
	(d) the risk control measures identified in the rehabilitation risk assessments,
	(e) the rehabilitation outcome documents for the mining lease,
	(f) a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored.
	(2) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document.
	(3) A rehabilitation management plan is not required to be given to the Secretary for approval.
	(4) The holder of the mining lease— (a) must implement the matters set out in the rehabilitation management Plan, and
	(b) if the forward program specifies timeframes for the implementation of the matters—

Condition	Requirement
	must implement the matters within those timeframes.
Part 2 Standard Conditions Division 3 Condition 11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows— (a) to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary—within 30 days after the document is approved,
	(b) as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made,
	(c) to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment—as soon as practicable after the rehabilitation risk assessment is conducted,
	(d) whenever given a written direction to do so by the Secretary—in accordance with the direction.
Part 2 Standard Conditions Division 3 Condition 12	**Rehabilitation outcome documents** (1) The holder of a mining lease must prepare the following documents (the ***rehabilitation outcome documents***) for the mining lease and give them to the Secretary for approval—
	(a) the rehabilitation objectives statement, which sets out the rehabilitation objectives required to achieve the final land use for the mining area,
	(b) the rehabilitation completion criteria statement, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives,
	(c) for a large mine, the final landform and rehabilitation plan, showing a spatial depiction of the final land use.
	(2) If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.
Part 2 Standard Conditions Division 3 Condition 13	Forward program and annual rehabilitation report (1) The holder of a mining lease must prepare a program (a forward program) for the mining lease that includes the following—
	(a) a schedule of mining activities for the mining area for the next 3 years,
	(b) a summary of the spatial progression of rehabilitation through its various phases for the next 3 years,
	(c) a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs.
	(2) The holder of a mining lease must prepare a report (an annual rehabilitation report) for the mining lease that includes—
	(a) a description of the rehabilitation undertaken over the annual reporting period,
	(b) a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period,
	(c) a report demonstrating progress made towards the achievement of the following—
	(i) the objectives set out in the rehabilitation objectives statement,
	(ii) the criteria set out in the rehabilitation completion criteria statement,

Condition	Requirement
	(iii) for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan.
	(3) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document.
	(4) The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary.
	(5) In this clause—***annual reporting*** period means each period of 12 months commencing on—
	(a) the date on which the mining lease is granted, or
	(b) if the Secretary approves another date in relation to the mining lease—the other date.
Part 2 Standard Conditions Division 3 Condition 14	Amendment of rehabilitation outcome documents and forward program (1) This clause applies to—
	(a) a rehabilitation outcome document if it has been approved by the Secretary, and
	(b) a forward program if it has been given to the Secretary.
	(2) The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless
	(a) the Secretary gives the holder a written direction to do so, or
	(b) the Secretary, on written application by the holder, gives a written approval of the amendment.
	(3) The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval.
	Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.

APPENDIX C – APPROVED REHABILITATION OBJECTIVE STATEMENT

NSW GOVERNMENT

NSW Resources Regulator

ROBJ0001255

APPROVED REHABILITATION OBJECTIVES STATEMENT

Angus Place Colliery

MONDAY 30 OCTOBER 2023

Contents

Summary

DETAIL	APPROVAL
Reference	ROBJ0001255
Date of approval	Monday 30 October 2023
Mine	Angus Place Colliery
Contact	Russell Hart

Important note

The Regulator may make the information in your application and any supporting information (including this approval) 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 application to be confidential, please communicate this to the Regulator via the message function on this application within the Portal.

Rehabilitation Objectives

The following rehabilitation objectives have been approved.

REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
Bushfire	A1	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
Groundwater	A1	The likely volumes and quality of groundwater expected to outflow from the underground voids to the receiving surface water environment following groundwater level recovery is understood and groundwater outflows are managed to limit impacts to the surface water environment to an acceptable level of change from a reference condition.
Land and water contamination	A1	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
Landform stability	A1	Landform that is commensurate with surrounding natural landform.
Landform stability	A1	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Management of waste and process materials	A1	Residual waste materials (e.g. carbonaceous material and other wastes) will be appropriately removed or contained/encapsulated so it does not pose any hazards or constraints for intended land use.
Native revegetation	A1	The vegetation structure of the rehabilitation is similar to that of native vegetation communities including PCT 677 / 731 / 797 / 1093 / 1100 / 1191 / 1247 / 1248 / 1666 / 1731 found in the local area

APPROVED REHABILITATION OBJECTIVES STATEMENT

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REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
Native revegetation	A1	The vegetation composition of the rehabilitation contains species that are commensurate with native vegetation communities including PCT 677 / 731 / 797 / 1093 / 1100 / 1191 / 1247 / 1248 / 1666 / 1731 found in the local area
Native revegetation	A1	Levels of ecosystem function have been established that demonstrate the rehabilitation is self- sustainable.
Removal of infrastructure	A1	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
Water quality	A1	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Bushfire	A3	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
Land and water contamination	A3	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
Landform stability	A3	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Landform stability	A3	Landform that is commensurate with surrounding natural landform.
Native revegetation	A3	Levels of ecosystem function have been established that demonstrate the rehabilitation is self- sustainable.
Native revegetation	A3	The vegetation structure of the rehabilitation is similar to that of native vegetation communities including PCT 677 / 731 / 797 / 1093 / 1100 / 1191 / 1247 / 1248 / 1666 / 1731 found in the local area

APPROVED REHABILITATION OBJECTIVES STATEMENT

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REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
Native revegetation	A3	The vegetation composition of the rehabilitation contains species that are commensurate with native vegetation communities including PCT 677 / 731 / 797 / 1093 / 1100 / 1191 / 1247 / 1248 / 1666 / 1731 found in the local area
Removal of infrastructure	A3	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
Water quality	A3	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Bushfire	A4	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
Groundwater	A4	The likely volumes and quality of groundwater expected to outflow from the underground voids to the receiving surface water environment following groundwater level recovery is understood and groundwater outflows are managed to limit impacts to the surface water environment to an acceptable level of change from a reference condition.
Land and water contamination	A4	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
Landform stability	A4	Landform that is commensurate with surrounding natural landform.
Landform stability	A4	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Native revegetation	A4	The vegetation structure of the rehabilitation is similar to that of native vegetation communities including PCT 677 / 731 / 797 / 1093 / 1100 / 1191 / 1247 / 1248 / 1666 / 1731 found in the local area
Native revegetation	A4	Levels of ecosystem function have been established that demonstrate the rehabilitation is self- sustainable.

APPROVED REHABILITATION OBJECTIVES STATEMENT

ROBJ0001255 | Angus Place Colliery

NSW Resources Regulator

REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
Native revegetation	A4	The vegetation composition of the rehabilitation contains species that are commensurate with native vegetation communities including PCT 677 / 731 / 797 / 1093 / 1100 / 1191 / 1247 / 1248 / 1666 / 1731 found in the local area
Removal of infrastructure	A4	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
Water quality	A4	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Groundwater	A6	The likely volumes and quality of groundwater expected to outflow from the underground voids to the receiving surface water environment following groundwater level recovery is understood and groundwater outflows are managed to limit impacts to the surface water environment to an acceptable level of change from a reference condition.
Landform stability	A6	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Landform stability	A6	Landform that is commensurate with surrounding natural landform.
Native revegetation	A6	Post mining land use to be self-sustaining natural ecosystem comprising native trees and shrubs generally representative of vegetation in comparable analogue communities.
Water quality	A6	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Agricultural revegetation	B1	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.
Agricultural revegetation	B1	Land use capability is capable of supporting the target agricultural land use

REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
Bushfire	B1	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
Groundwater	B1	The likely volumes and quality of groundwater expected to outflow from the underground voids to the receiving surface water environment following groundwater level recovery is understood and groundwater outflows are managed to limit impacts to the surface water environment to an acceptable level of change from a reference condition.
Land and water contamination	B1	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
Landform stability	B1	Landform that is commensurate with surrounding natural landform.
Landform stability	B1	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Management of waste and process materials	B1	Residual waste materials (e.g. carbonaceous material and other wastes) will be appropriately removed or contained/encapsulated so it does not pose any hazards or constraints for intended land use.
Removal of infrastructure	B1	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
Water quality	B1	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Agricultural revegetation	B6	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.
Groundwater	B6	The likely volumes and quality of groundwater expected to outflow from the underground voids to the receiving surface water environment following groundwater level recovery is

REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
		understood and groundwater outflows are managed to limit impacts to the surface water environment to an acceptable level of change from a reference condition.
Landform stability	B6	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Landform stability	B6	Landform that is commensurate with surrounding natural landform.
Water quality	B6	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Bushfire	G3	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
Land and water contamination	G3	Where required by sampling, mine water dams and sediment dams are dewatered and desilted prior to being converted to clean water dams.
Land and water contamination	G3	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
Landform stability	G3	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Landform stability	G3	Landform that is commensurate with surrounding natural landform.
Removal of infrastructure	G3	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
Water approvals	G3	Structures that take or divert water such as final voids, dams, levees etc. are appropriately licensed (e.g. under the Water Management Act 2000) where required. As required ensure sufficient licence shares are held in the water source(s) to account for water take.

REHABILITATION OBJECTIVE CATEGORY	SPATIAL REFERENCE	REHABILITATION OBJECTIVES
Water quality	G3	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.
Bushfire	I1	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
Land and water contamination	I1	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
Landform stability	I1	Landform that is commensurate with surrounding natural landform.
Landform stability	I1	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
Management of waste and process materials	I1	Residual waste materials (e.g. carbonaceous material and other wastes) will be appropriately removed or contained/encapsulated so it does not pose any hazards or constraints for intended land use.
Removal of infrastructure	I1	All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.
Retention of infrastructure	I1	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
Retention of infrastructure	I1	All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)
Water quality	I1	Runoff and discharge water quality from mine site is similar to, or better than the pre-disturbance runoff water quality.

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