Centennial Coal

Springvale

Mining Operations Plan

Springvale Mine

1 June 2018 to 31 May 2025

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Springvale Colliery	
Mining Operations Plan	
Name of Mine	Springvale Colliery
MOP Commencement Date	1 June 2018
MOP Completion Date	31 May 2025
Mining Authorisations (Lease / Licence No.)	ML 1303, ML 1323, ML 1326, ML 1424, ML 1537, ML 1588, ML 1670, ML 1727, MLA 445, MLA 497, CL 377, MPL 314, AUTH 460, EL 6974
Name of Authorisation holder(s)	Centennial Springvale Pty Limited and Springvale SK Kores Pty Limited
Name of Mine Operator (if different)	Springvale Coal Pty Limited
Name and Contact Details of the Mine Manager (or equivalent)	Brian Nicholls Mine Manager Springvale Colliery PO Box 198 Wallerawang NSW 2845 T: (02) 6350 1613 F: (02) 6355 1502 E: Brian.Nicholls@centennialcoal.com.au
Name and Contact Details of Environmental Representative	Catherine Suggate Environment and Community Coordinator Springvale Colliery PO Box 198 Wallerawang NSW 2845 T: (02) 6350 1672 F: (02) 6355 1502 E: Catherine.Suggate@centennialcoal.com.au
Name of Representative(s) of the Authorisation Holder(s)	Brian Nicholls
Title	Mine Manager
Signature	
Date	19/7/18
Version	Final

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Abbreviations

APZ	Asset Protection Zone
AUTH	Authorisation
BBRA	Broad Brush Risk Assessment
BC Act	Biodiversity Conservation Act
CCC	Community Consultative Committee
CL	Coal Lease
CEEC	Critically Endangered Ecological Community
CHPP	Coal Handling Preparation Plant
DA	Development Application
DECCW	Former NSW Department of Environment, Climate Change and Water
DPE	NSW Department of Planning and Environment
DP&I	Former NSW Department of Planning and Infrastructure
DPI Water	Department of Primary Industries Water
DRE	Former NSW Department of Planning and Environment - Division of Resources and Energy
DRG	NSW Department of Planning and Environment – Division of Resources and Geoscience
EC	Electrical Conductivity
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EL	Exploration Licence
EMP	Environmental Management Plan
EMS	Environmental Management Strategy
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
FCNSW	Forestry Corporation of NSW
Ha	Hectare
HVAS	High Volume Air Sampler
LDP	Licenced Discharge Point
LEP	Local Environmental Plan
ML	Mining Lease
MLA	Mining Lease Application
MOP	Mining Operations Plan
MPL	Mining Purposes Lease

MPPS	Mount Piper Power Station
Mtpa	Million Tonnes per Annum
NGO	Non-government Organisation
NPI	National Pollution Inventory
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PM	Particulate Matter
POEO	*Protection of the Environment Operations Act 1997*
RCE	Rehabilitation Cost Estimate
RFS	Rural Fire Service
ROM	Run of Mine
RTRTS	Response to Response to Submissions
RTS	Response to Submissions
SCA	Sydney Catchment Authority
SDWTS	Springvale Delta Water Transfer Scheme
SMP	Subsidence Management Plan
TARP	Trigger Action Response Plan
TSC	*Threatened Species Conservation Act 1995*
TSP	Total Suspended Particulates
TSS	Total Suspended Solids

1. INTRODUCTION

Springvale Mine (Springvale) is an existing underground coal mine producing quality thermal coal which is supplied to both domestic and international markets. It is located 15 kilometres (km) to the northwest of the regional city of Lithgow and 120 km west-northwest of Sydney in New South Wales (NSW). Springvale is bordered by Angus Place to the north and Clarence Colliery to the south-east. The regional locality of Springvale is shown on **Figure 1**.

Springvale is operated by Springvale Coal Pty Limited (Springvale Coal), for and on behalf of the Springvale joint venture company owned in equal share between Centennial Springvale Pty Limited and SK Kores of Korea. Springvale utilise the longwall retreat method of mining to extract coal from the Lithgow Seam.

This Mining Operations Plan (MOP) outlines the proposed operations at Springvale as approved by Development Consent SSD-5594 (as modified) under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) and two Commonwealth approvals (EPBC 2011/5949 and EPBC 2013/6881) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The MOP covers the period from 1 June 2018 to 31 May 2025, herein referred to as the MOP term.

This MOP has been prepared to incorporate SSD-5594 Modification 2 and the construction and operation of aspects of the Springvale Water Treatment Project (SWTP) within the Springvale project application area as approved under SSD-7592.

This MOP has been prepared in accordance with the Department of Planning and Environment – Division of Resources and Geoscience (DRG) publication titled *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013). This MOP has also been prepared to satisfy the requirements of a Rehabilitation Management Plan (required by Schedule 4, Condition 32 of Development Consent SSD-5594).

1.1. History of Operations

Underground coal mining commenced at Springvale in 1995 following the granting of Springvale's granted Development Consent (DA 11/92) on 27 July 1992 by the then Minister for Planning, pursuant to Section 101 under Part 4 of the EP&A Act. The Development Consent permitted the construction and operation of an underground coal mine to extract up to 3.4 million tonnes per annum (Mtpa) of run of mine (ROM) coal, along with an overland conveyor system and a coal preparation plant (CPP).

Development Consent DA 11/92 was subsequently modified on four occasions. Modification 1 (Mod 1) was approved on 29 June 1993 and allowed for a number of amendments including changes to the pit top layout, a new mine entry, relocation of a conveyor route and use of the existing Western Main Colliery Washery (now known as the Western Coal Services site). DA 11/92 Modification 2 (Mod 2) was approved on 11 April 1994 and related to a change in the schedule of lands and tenements associated with the Development Consent. Modification 3 (Mod 3) was approved in 8 March 2013 and allowed for the construction and operation of an additional surface mine dewatering facility (Bore 8). Modification 4 (Mod 4) was approved on 5 December 2013 and allowed for a coal production increase up to 4.5 Mtpa, an increase in workforce to 310 full time employees, an extension of time to 30 September 2015 and connection of the pit top to the Council sewer system. DA 11/92 expired on 30 September 2015.

On 21 September 2015, Development Consent SSD-5594 was approved by the Planning Assessment Commission (under delegation from the Minister of Planning). The approval allows for continued underground mining operations at Springvale at existing production rates until 31

December 2028. SSD-5594 has subsequently been modified on two occasions as discussed in **Section 1.2.1.**

Operations at Springvale have been undertaken in accordance with the MOPs outlined in **Table 1**. This document replaces Springvale Colliery MOP Amendment B (November 2015 to October 2022) which was approved on 4 July 2017.

Table 1. MOP History

Detail	Amendment	Status	Issue Date	Expiry Date
Springvale Colliery MOP July 2000 to March 2005	Original MOP	Superseded	10 July 2000	31 March 2005
Springvale Colliery MOP November 2006 to November 2013	Original MOP	Superseded	2 November 2006	2 November 2013
	Amendment 1	Superseded	24 March 2009	2 November 2013
Springvale Colliery MOP March 2009 to March 2016	Original MOP	Superseded	24 May 2010	30 November 2016
	Amendment 1	Superseded	12 March 2013	30 November 2016
Springvale Colliery MOP November 2015 to October 2022	Original MOP	Superseded	25 February 2016	31 October 2022
	Rehabilitation Management Plan	Superseded	11 May 2016	31 October 2022
	Amendment A	Superseded	1 December 2016	31 October 2022
	Amendment B	Current	4 July 2017	31 October 2022

Note: Springvale submitted a MOP in early 2005 to the Department for approval, however an approval was not issued by the Department prior to the expiry of the existing MOP Approval on 31 March 2005. Following on-site discussions a revised MOP was submitted to the Department in November 2005. This MOP was approved 2 November 2006. During the period 1 April 2005 – 1 November 2006 Springvale operated in accordance with the draft MOP (Centennial Coal 2007).

1.2. Current Consents, Authorisations and Licences

1.2.1. Development Consents and EPBC Approvals

1.2.1.1. Springvale Mine Extension Project

On 7 April 2014 Springvale submitted the Environmental Impact Statement (EIS) titled *Springvale Mine Extension Project – State Significant Development 5594* (Golders, 2014) to support an application seeking development consent under Part 4, Division 4.1 of the EP&A Act to allow the continuation of underground mining operations at Springvale. The exhibition period for the EIS commenced on 12 April 2014 and ended on 26 May 2014. Following the receipt of submissions Springvale submitted a response to submissions in October 2014 titled *Response to Submissions Springvale Mine Extension Project – State Significant Development 5594* (RTS) (Springvale, 2014). Following the distribution of the RTS report a number of submissions were made by various government agencies to the DPE, a final document titled *Angus Place and Springvale Mine Extension Projects – State Significant Developments SSD 5602 and SSD 5594 Response to Response to Submissions* (RTRTS) (Centennial Coal, 2014) was submitted to the DPE on 19 December 2014.

On 27 April 2015 the Minister of Planning referred the Springvale Mine Extension Project to the Planning Assessment Commission (PAC) to review the merits of the project, with a subsequent public hearing held 27 May 2015. Following the review the PAC made a total of 15 recommendations in the Review Report, with subsequent responses provided by Centennial Coal on 9 July 2015 in the letter titled *Springvale Mine Extension Project - Response to PAC Review Report* (Centennial Coal, 2015). This report addressed the majority of recommendations outlined by the first PAC review. On 13 August 2015 a second PAC review was requested by the Minister of Planning with a public hearing held 3 September 2015. The PAC identified four recommendations for amending the conditions of consent were outlined within the Second Review Report. The PAC indicated that they were satisfied that the project can be approved, subject to conditions, and provided that the four recommendations within the Second Review Report are adequately addressed. Subsequently, the DPE issued recommended Development Consent conditions, addressing the recommendations of the PAC review on 18 September 2015.

Development Consent SSD-5594 was granted to Springvale on 21 September 2015. This consent replaces the former Development Consent DA 11/92. Springvale shall surrender all existing Development Consents in accordance with Section 10A of the EP&A Act by 21 September 2017 (in accordance with Schedule 2, Condition 10 of SSD-5594 and the DPE extension granted 20 September 2016).

Modification 1 (Mod 1) to SSD-5594 was subsequently approved by the Planning Assessment Commission (under delegation from the Minister of Planning) on 19 April 2017 to allow for:

- An increase in the workforce from the approved 310 full time equivalent (fte), including contractors, to 450 fte personnel;
- An increase in ROM production from the approved 4.5 Mtpa to 5.5 Mtpa; and
- An increase in ROM coal stockpile capacity at the pit top from the approved 85,000 tonnes to 200,000 tonnes, and an increase in the coal stockpile footprint by 0.3 ha northeast of the existing area.

Modification 2 (Mod 2) to SSD-5594 was approved by the Planning Assessment Commission (under delegation from the Minister of Planning) on 19 June 2017 to:

- Remove the requirement to meet limits for salinity of 700 (50^{th} percentile), 900 (90^{th} percentile) and 1,000 (100^{th} percentile) uS/cm by 30 June 2017; and
- Defer to 30 June 2019 the requirement to eliminate acute and chronic toxicity from LDP009 discharges to aquatic species by 30 June 2017, with acute toxicity defined as >10% effect relative to the control group and chronic toxicity defined as >20% effect relative to the control group.

SSD-5594 Mod 2 relates to the development consent granted for the Springvale Water Treatment Project (SWTP) in that it was required to defer the salinity limits until the SWTP is constructed and operational. SSD-7592 is discussed further in **Section 1.2.1.2**.

A copy of SSD-5594 Mod 2 has been attached as **Appendix 1A**.

Springvale also operate in accordance with two federal approvals under the EPBC Act granted by the Department of the Environment and Energy (former Department of Sustainability, Environment, Water, Population and Communities). Approval EPBC 2011/5949 was granted on 14 March 2012 and allows Springvale to extract coal from Longwalls 415 – 417. A second approval (EPBC 2013/6881) was issued on 15 October 2015 to allow secondary extraction associated with the Springvale Mine Extension Project SSD-5594.

Springvale is State Significant Development in accordance with Clause 8 and Schedule 1 (Item 5) of State Environmental Planning Policy (State and Regional Development) 2011, subsequently it is considered to be a Level 1 Mine as specified in *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013).

Additional detail pertaining to the Springvale Development Consents and EPBC Approvals has been provided in **Table 2**.

1.2.1.2. Springvale Water Treatment Project

The Springvale Water Treatment Project (SWTP) is approved under Development Consent SSD-7592 which was granted by the Planning Assessment Commission on 19 June 2017.

The SWTP is a collaborative project between Springvale and Energy Australia and is integral to the achievement of the Springvale mine water quality performance measures required by SSD-5594. It involves the establishment of a pipeline and ancillary facilities to transfer mine water from the existing or approved dewatering facilities on the Newnes Plateau for treatment and reuse at the Mount Piper Power Station (MPPS).

On 12 January 2018 SSD-7592 Mod 1 was approved to address minor design changes to the approved project description.

A copy of SSD-7592 Mod 1 has been attached as **Appendix 1B**.

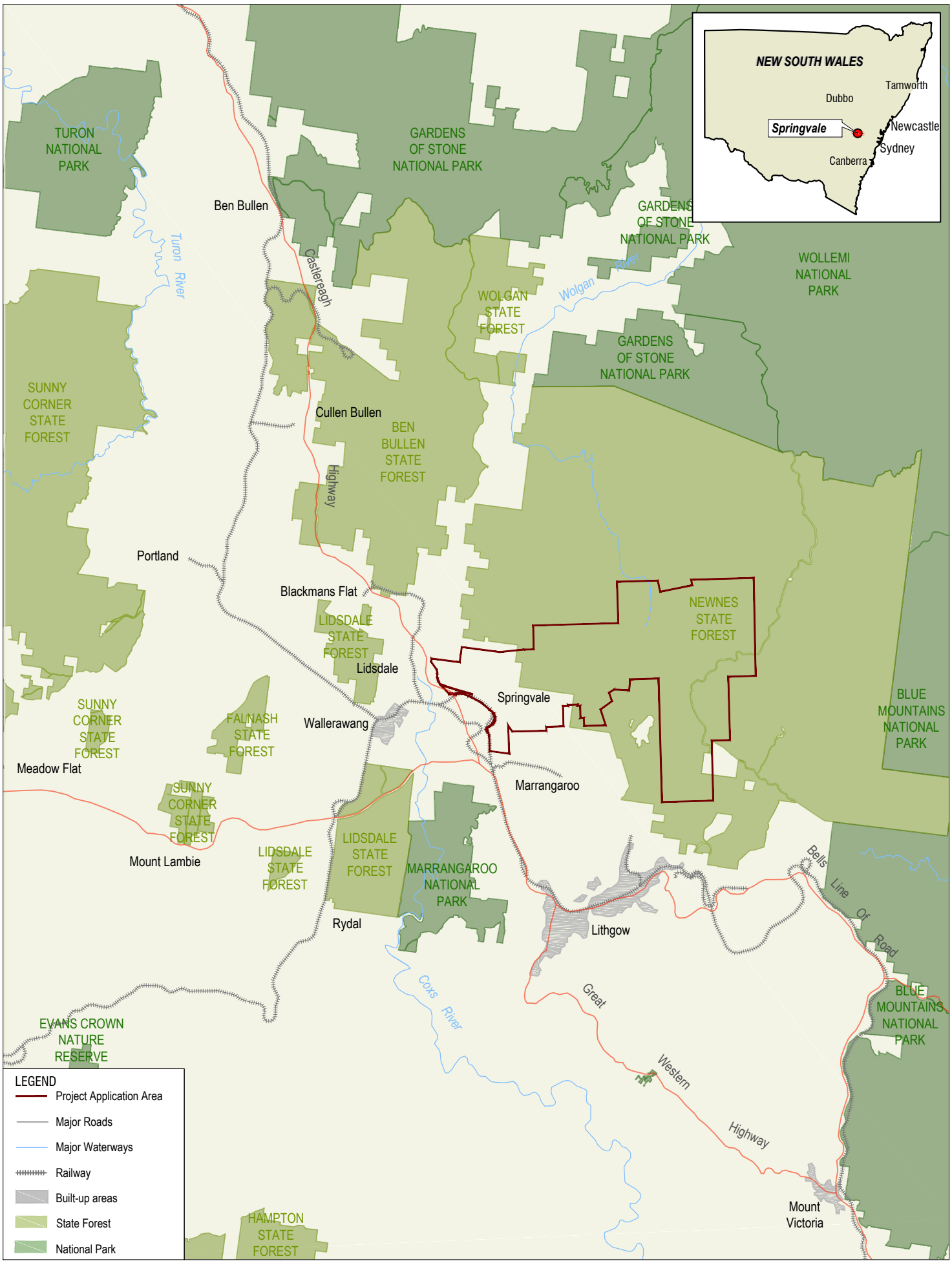
Aspects of the SWTP located within the Springvale project approval area, namely the raw water transfer pipelines on the Newnes Plateau, have been included in this MOP. However, those components of the SWTP outside of the project approval area, including the water treatment plant (located at MPPS) and the residuals transfer pipeline (located on the Western Coal Services site) have been excluded from this MOP.

Table 2. Development Consents and EPBC Approvals

Approval	Details	Date of Issue	Expiry
SSD-5594	Springvale Mine Extension Project	21 September 2015	31 December 2028
	Mod 1 – Increase in staffing to 450 full time equivalent employees, increase in ROM production to 5.5 Mtpa and increase of ROM coal stockpile capacity and stockpile footprint to 200,000 and 0.3 hectares respectively.	19 April 2017	
	Mod 2 – Modification to remove the requirement to meet limits for salinity of 700 (50th percentile), 900 (90th percentile) and 1,000 (100th percentile) uS/cm by 30 June 2017 and defer to 30 June 2019 the requirement to eliminate acute and chronic toxicity from LDP009 discharges to aquatic species by 30 June 2017, with acute toxicity defined as >10% effect relative to the control group and chronic toxicity defined as >20% effect relative to the control group.	19 June 2017	
SSD-7592	Springvale Water Treatment Project	19 June 2017	N/A
	Mod 1 – Minor amendments to the project description	12 January 2018	
DA 11/92	Development consent permitting the construction and operation of an underground coal mine and associated infrastructure.	27 July 1992	30 September 2015[1]
	Mod 1 – Modification to the pit top layout, storm water control, new mine entry point, relocation of mine ventilation shafts, extension of existing road to access shafts, utilisation of existing of existing CPP,	29 June 1993	

Approval	Details	Date of Issue	Expiry
	relocation of existing overland conveyor route.		
	Mod 2 – Modification to DA 11/92 associated with land descriptions and schedule of lands.	11 April 2004	
	Mod 3 – Construction and operation of Bore 8 dewatering facility and associated infrastructure.	11 March 2013	
	Mod 4 – Production increase from 3.4 Mtpa to 4.5 Mtpa, increase in staffing to 310 full time employees and extension of time on the consent from 28 September 2014 to 30 September 2015.	5 December 2013	
DA 461/02	Construction and operation of Ventilation Shaft 3 Facility on the Newnes Plateau.	23 January 2003	N/A
DA 461/02 Mod 1	Upgrade of Ventilation Shaft 3 Facility.	30 May 2012	N/A
EPBC 2011/5949	Mining of Longwalls 415 – 417.	14 March 2012	19 March 2032
EPBC 2013/6881	Mining associated with the Springvale Mine Extension Project.	15 October 2015	8 October 2035

1 - extension of time to 21 September 2018 has been approved by DPE. Springvale will not undertake any development or activities under DA11/92.



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Springvale Pty Ltd

SPRINGVALE MINING OPERATIONS PLAN

Locality Plan

FIGURE 1

Development Consent SSD-5594 Mod 2 conditions relevant to the preparation of this MOP/Rehabilitation Management Plan have been summarised in **Table 3** along with guidance on where each condition has been addressed within this document. **Table 3** also summarises the SSD-7952 conditions pertinent to the rehabilitation of the SWTP infrastructure within the Springvale project application area.

Table 3. Relevant Development Consent Conditions

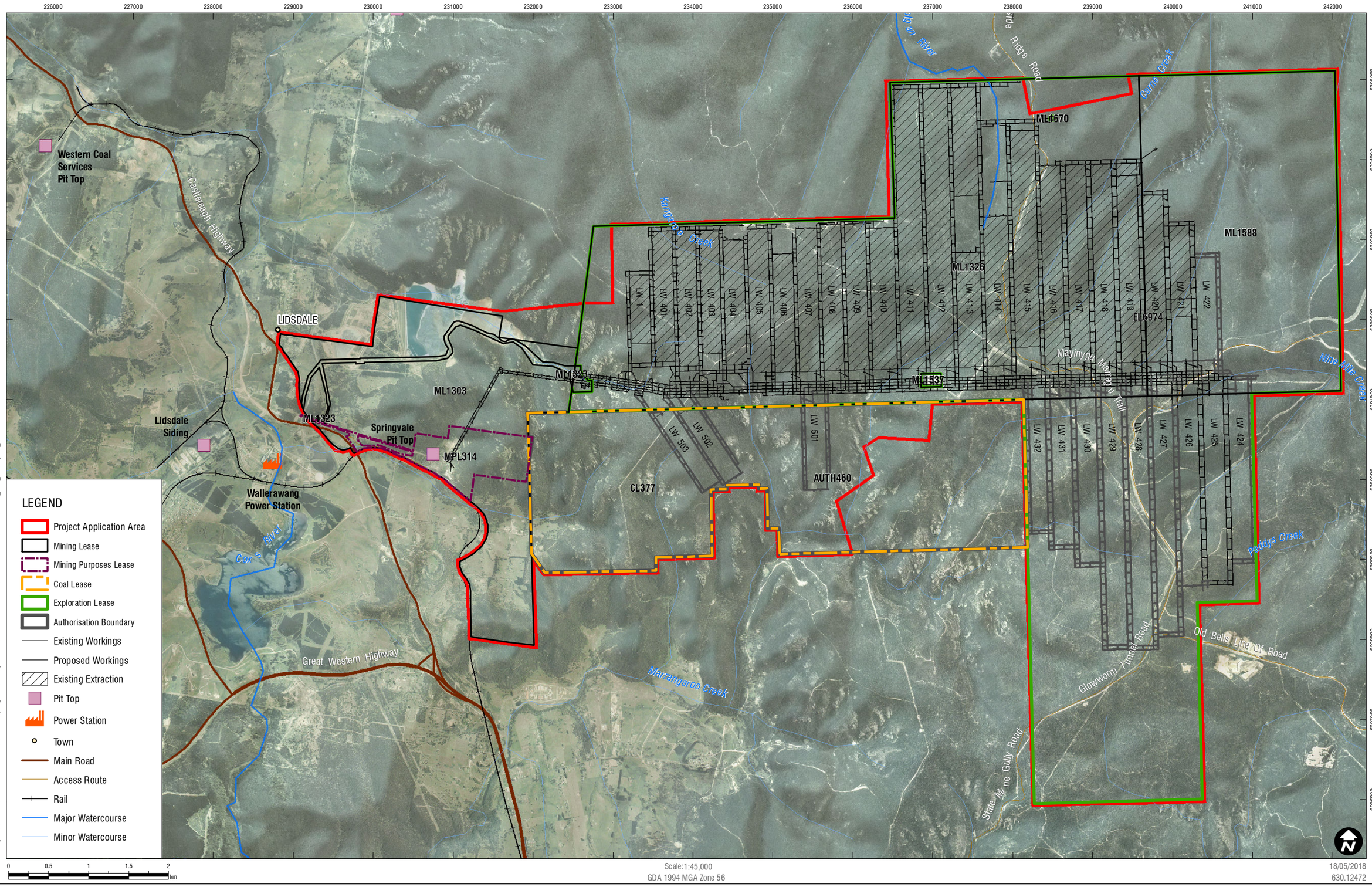
<table>
<tr><th>Condition</th><th>Condition Requirement</th><th>Section Addressed</th></tr>
<tr><td>SSD-5594 Schedule 4, Condition 30</td><td>
Rehabilitation Objectives
The Applicant shall rehabilitate the site to the satisfaction of the Department. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS, and comply with the objectives in Table 7.
Table 7: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th><th></th></tr>
<tr><td>Mine site (as a whole)</td><td>• Safe, stable & non-polluting.</td><td>Section 4</td></tr>
<tr><td>Rehabilitation materials</td><td>• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources.</td><td>Section 2</td></tr>
<tr><td>Surface infrastructure</td><td>• To be decommissioned and removed unless the Department agrees otherwise.
• All surface infrastructure sites are to be revegetated with suitable local native plant species to a landform consistent with the surrounding environment.</td><td>Section 4</td></tr>
<tr><td>Portals and vent shafts</td><td>• To be decommissioned and made safe and stable.
• Retain habitat for threatened species (e.g. bats), where practicable.</td><td>Section 2</td></tr>
<tr><td>Revegetated final landforms</td><td>• Stable and sustain the intended land use.
• Consistent with the surrounding topography to minimise visual impacts.
• Incorporate relief patterns and design principles consistent with natural drainage.</td><td>Section 4</td></tr>
<tr><td>Native flora and fauna</td><td>• Flora species used in rehabilitation selected to re-establish and complement local and regional biodiversity.
• Rehabilitated areas contribute to achieving self- sustaining biodiversity habitats.</td><td>Section 7.8</td></tr>
<tr><td>All watercourses subject to mine- water discharges and/or subsidence impacts</td><td>• Hydraulically and geomorphologically stable, with aquatic ecology and riparian vegetation that is the same, or better than prior to grant of this consent.</td><td>Section 4.3</td></tr>
<tr><td>Cliffs, minor cliffs and steep slopes</td><td>• No additional risk to public safety compared to prior to mining.</td><td>Section 4.3</td></tr>
<tr><td>Other land affected by the development</td><td>• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native plant species (unless the Department agrees otherwise).</td><td>Section 4.3</td></tr>
<tr><td>Built features damaged by mining operations</td><td>• Repair to pre-mining condition or equivalent unless the:
- owner agrees otherwise; or
- damage is fully restored, repaired or compensated for under the Mine Subsidence Compensation Act 1961.</td><td>Section 4</td></tr>
<tr><td>Community</td><td>• Ensure public safety.
• Minimise the adverse socio-economic effects associated with mine closure.</td><td>Section 4.3</td></tr>
</table>
Note: These rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by mining taking place after the date of this consent; and to all surface infrastructure parts of the development, whether constructed prior to or following the date of this consent.
</td><td>Section 4.3</td></tr>
<tr><td>SSD-5594 Schedule</td><td>Progressive Rehabilitation
The Applicant shall rehabilitate the site progressively, that is, as soon as reasonably</td><td>Section 2.2.9</td></tr>
</table>

<table>
<tr><th>Condition</th><th>Condition Requirement</th><th>Section Addressed</th></tr>
<tr><td>4, Condition 31</td><td>practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time.</td><td></td></tr>
<tr><td rowspan="9">SSD-5594 Schedule 4, Condition 32</td><td>Rehabilitation Management Plan
The Applicant shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Department. This plan must:</td><td>This document</td></tr>
<tr><td>(a) be prepared in consultation with the Department, DPI-Water, OEH, Council, WaterNSW and the CCC;</td><td>Section 1</td></tr>
<tr><td>(b) be submitted to the Department for approval within 6 months of the date of this consent, unless the Department agrees otherwise;</td><td>Section 1</td></tr>
<tr><td>(c) be prepared in accordance with any relevant Department guideline;</td><td>Section 1</td></tr>
<tr><td>(d) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);</td><td>Section 6</td></tr>
<tr><td>(e) describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including mine closure, final landform and final land use;</td><td>Sections 4, 6 and 7</td></tr>
<tr><td>(f) include interim rehabilitation where necessary to minimise the area exposed for dust generation;</td><td>Section 2.2.8</td></tr>
<tr><td>(g) include a program to monitor and report on the effectiveness of the rehabilitation measures, and progress against the detailed performance and completion criteria; and</td><td>Section 8</td></tr>
<tr><td>(h) build to the maximum extent practicable on the other management plans required under this consent.
Note: The Biodiversity Management Plan and Rehabilitation Management Plan require substantial integration to achieve biodiversity objectives for the rehabilitated mine site</td><td>Section 3</td></tr>
<tr><td></td><td></td></tr>
<tr><td>SSD-7592 Schedule 3, Condition 24</td><td>Rehabilitation Objectives
The Applicant shall rehabilitate the site to the satisfaction of the Department. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS, and comply with the objectives in Table 7.
Table 7: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>Development site (as a whole)</td><td>• Safe, stable and non-polluting;
• Minimise the visual impact of any above ground ancillary infrastructure agreed to be retained or an alternative use as far as is reasonable and feasible.</td></tr>
<tr><td>Surface infrastructure</td><td>• To be decommissioned and removed unless the Department agrees otherwise.
• All surface infrastructure sites (including pipeline routes) are to be revegetated with suitable local native species to a landform consistent with the surrounding environment.</td></tr>
<tr><td>Land use</td><td>• Restore land capability to pre-existing uses</td></tr>
<tr><td>Community</td><td>• Ensure public safety.</td></tr>
</table></td><td>Section 4
Section 4
Section 4
Section 4</td></tr>
<tr><td rowspan="4">SSD-7592 Schedule 3, Condition 25</td><td>Progressive Rehabilitation
The Applicant must:</td><td></td></tr>
<tr><td>(a) Rehabilitate all areas of the site not proposed for future disturbance (including pipeline routes) progressively, that is as soon as reasonably practicable following construction and decommissioning;</td><td>Section 4</td></tr>
<tr><td>(b) minimise the total area exposed at any time; and</td><td>Section 4</td></tr>
<tr><td>(c) employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursion on parts of the site that cannot yet be permanently rehabilitated.</td><td>Section 4</td></tr>
</table>

1.2.2. Authorisations

The Springvale holding includes Mining Lease (ML) 1303, ML 1323, ML 1326, ML 1424, ML 1537, ML 1588, ML 1670, ML 1727, one Coal Lease (CL) (CL 377) and one Mining Purposes Lease (MPL) (MPL 314). Springvale also undertake exploration activities in accordance with Exploration Licence (EL) 6974 and Authorisation (AUTH) 460. On 29 October 2012 and 2 June 2015 Centennial Springvale Pty Limited submitted Mining Lease Application (MLA) 445 and MLA 497, respectively. MLA 445 is associated with the Bore 8 dewatering facility (and the associated infrastructure corridor) and MLA 497 is associated with Licenced Discharge Point (LDP) 009. Both applications are currently being processed. The Springvale holding and relevant mining tenements have been shown on **Figure 2**. Additional details relating to these mining tenements have been provided in **Table 4**.

Relevant conditions of these tenements specify the requirements for a lease holder to prepare and carry out mining operations in accordance with a MOP. This MOP has been prepared in accordance with *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013) to satisfy the requirements of Springvale mining tenements and Development Consent SSD-5594. MOP Plans as required by *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013) are included in **Appendix 2**.



Site Layout

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FIGURE 2

Table 4. Mining Tenements

Lease	Date of Issue	Expiry
ML 1303	15 December 1992	15 December 2034
ML 1323	3 August 1993	3 August 2025
ML 1326	28 September 1993	18 August 2024
ML 1424	18 August 2003	18 August 2024
ML 1537	15 June 2003	15 June 2024
ML 1588	19 October 2006	19 October 2027
ML 1670	17 February 2012	17 February 2033
ML 1727	4 February 2016	4 February 2037
MLA 445	-	-
MLA 497	-	-
CL 377	24 February 1992	9 March 2025
MPL 314	3 August 1993	3 August 2035
EL 6974	13 December 2012	13 December 2017*
AUTH 460*	6 June 2010	6 June 2020

#MLA 445 and MLA 497 were submitted 29 October 2012 and 2 June 2015, respectively.

*A renewal application for EL6974 was submitted in November 2017.

1.2.3. Subsidence Management Plan and Extraction Plan Approvals

In May 2005, Springvale submitted a Subsidence Management Plan (SMP) Application to the NSW Department of Primary Industries (now DRG) seeking approval for first workings and secondary extraction within Longwalls 411 – 418. SMP Approval was issued on 7 March 2006 (Reference Number 04/1673). Subsequent SMP variations were submitted and approved during 2008 to 2014 allowing various changes to the mining layout within Longwalls 413 – 418. Additional details pertaining to the SMP Approvals and SMP Variations at Springvale have been provided in **Table 5**.

Underground mining in Longwalls 411 to 418 has now been completed (extraction of Longwall 418 was completed on 27 May 2016). Monitoring will continue to be undertaken post-mining in accordance with the approved Longwalls 411 to 418 SMP.

In accordance with the requirements of SSD-5594, Extraction Plans have been prepared for the secondary extraction of Longwall 419 and Longwalls 420-422.

Longwall 420-422 Extraction Plan was approved on 21 April 2017.

An extraction plan is currently being prepared for the secondary extraction of Longwalls 424-427.

Table 5. SMP Approvals and Variations

SMP	Issue Date	Description	Purpose of Refinement
Initial SMP Approval 04/1673	2006	SMP for Longwalls 411-418	Mining lease requirement for approved SMP prior to mining and in accordance with the approved dimensions of DA 11/92. Void widths of 315 m and longwalls lengths in excess of 3,750 m.

SMP	Issue Date	Description	Purpose of Refinement
Section 138 Approval (*Coal Mine Regulation Act 1982*)	January 2006	-	Approval to extract Longwalls 411 and 412 within the Lithgow Seam.
SMP Variation	November 2008	Reduction in Length of Longwalls 414-418	Longwalls 414 to 418 shortened by 471 m to the south to avoid a geological syncline running through the northern extent of these longwall blocks. Also as a result of this mine design modification, sensitive surface features have been avoided, including hanging swamps and pagodas to the north of Longwalls 416 to 418.
SMP Variation 08/8497	February 2009	Longwall 413 step around and reduction of Longwall 414	Step around of Longwall 413 was approved to avoid existing geological constraints. Longwall 414 shortened by approximately 700 m to the south due to anticipated geological conditions which could potentially lead to dangerous roof control issues and difficult mining conditions within the northern portion of Longwall 414.
SMP Variation 08/8497	August 2009	Changes to Longwall 413 block dimensions	Variation to the take-off face position in Longwall 413.
Clause 88 Approval	October 2009	-	Variation approval to extract Longwall 414 within the Lithgow Seam.
SMP Variation 08/8497	2010	Reduction in length of Longwall 414	Based on monitoring results and feedback from stakeholder consultation, Longwall 414 was shortened by in excess of 1,186 m. Dimensions were modified to avoid significant business interruption and production discontinuity. Another outcome of the shortening of Longwall 414 was the avoidance of Sunnyside Swamp.
SMP Variation 08/8497	2011	Changes in Mine Plan dimensions of Longwalls 416 and 417	Change of mine plan to reduce void width of Longwalls 416 and 417 from 315 m to 261 m and increase of chain pillar width from 45 m to 58 m. The new dimensions were to improve underground stability and minimise the risk of environmental impact to surface features.
SMP Variation 08/8497	2012	SMP Variation Longwall 415	Change in mine plan to reduce the length of Longwall 415 due to geological conditions.
SMP Variation 11/3964	2012	SMP Variation Longwall 416	Longwall 416 was shortened based upon identification of lithology change, which posed a risk to mine safety, coal quality and production rates. Also as a result of this mine design modification, sensitive surface features have been avoided, including hanging swamps to the north of Longwall 416.
SMP Variation OUT 12/27914 OUT13/37387 OUT14/33055	2013/2014	SMP Variation Longwalls 411-418	Reduction of Longwall 416 Length to current Bore 8 drive age. Subsequent approvals under same variation for Longwalls 417 and 418
SMP Variation OUT13/2174	2013	SMP Variation Longwalls 411-418	Change in mine plan dimensions for Longwalls 411–418. Increase of pillar length to 130 m.

SMP	Issue Date	Description	Purpose of Refinement
SMP Variation OUT13/1178	2013	Extension in time SMP Approval	Variation to extend relevant SMP approvals until 28 September 2014.
SMP Variation OUT13/21877	2013	SMP Variation Longwalls 411-418	Adjust Longwall 418 void dimensions to be consistent with Longwalls 416-417.
SMP Variation OUT14/9977	2014	SMP Variation Longwalls 411-418	Increase Longwall cutting height up to 3.5 m outside Newnes Plateau Shrub Swamp Buffer Zones (as defined by Department of Environment EPBC approval)
SMP Variation OUT 14/15149	2014	SMP Variation Longwalls 411-418	Extension of time to 30 September 2015.
SMP Variation OUT15/26505	2015	SMP Variation Longwalls 411-418	Extension of time to 30 September 2016.
Longwall 419 Extraction Plan Approval	July 2016	Longwall 419 Extraction Plan Approval	Approval to commence secondary extraction in Longwall 419.
Longwall 420-422 Extraction Plan Approval	21 April 2017	Longwall 420-422 Extraction Plan Approval	Approval to commence secondary extraction in Longwalls 420-422.

1.2.4. Licences

Environment Protection Licence 3607

Springvale currently operates under Environmental Protection Licence (EPL) 3607, issued under the *Protection of the Environment Operations Act 1997* (POEO Act). The licence has an anniversary date of 1 January and allows for eight Licenced Discharge Points (LDPs) and five air quality monitoring points, for both Springvale and Western Coal Services.

During the MOP term Western Coal Services will obtain an EPL. Springvale will continue to operate in accordance with EPL 3607.

Water Licences

Springvale Mine currently holds three water access licences as outlined in **Table ~~6~~ 7**. Additionally Springvale holds licences for groundwater monitoring bores under Section 115 of the *Water Act 1912*. Centennial will continue to liaise with DPI Water with regard to the sites future licensing requirements.

Dangerous Goods Licence

Springvale possesses Dangerous Goods Licence (NDG027897 2014 acknowledgement number) for the storage and handling of hazardous chemicals on the premises. Under the Regulation, further notification or renewal to WorkCover NSW is only required for significant changes to the type, quantity and location of hazardous chemicals within the premises or a change of contact details.

The Springvale licenses are summarised in **Table 6** and **Table 7**.

Table 6. Licences

Licence	Date of Issue	Expiry
EPL 3607	17 May 2000	Renewed Annually
Dangerous Goods Licence	16 February 2012	Perpetuity

Table 7. Water Licences

Licence	Works Approval	Date of Issue	Expiry
Groundwater Licence - WAL 36383	10WA118719	5 August 2013	Perpetuity
Groundwater Licence - WAL 36443	10WA118754	25 February 2010	Perpetuity
Groundwater Licence - WAL 36446	10WA118752 10WA118754	4 September 2007	Perpetuity

1.2.5. Other Approvals

Occupation Permit

The Newnes State Forest is located above the majority of the Springvale underground workings. Springvale 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. Level 2 Occupation Permits will be discussed with the FCNSW with regards to short term duration activities such as exploration drilling. Details of the Occupation Permit have been provided in **Table 8**.

Section 95 Certificate

Springvale currently holds four Section 95 Certificates and one Threatened Species Licence (formerly Section 95 Certificate) issued by the OEH. The approvals allow for the installation of monitoring equipment (subsidence and groundwater monitoring) within Shrub Swamps on the Newnes Plateau; for the hand removal of weeds within Newnes Plateau Shrub Swamp, and to undertake remediation works in East Wolgan Swamp which is a Newnes Plateau Shrub Swamp. Newnes Plateau Shrub Swamps are listed as an Endangered Ecological Community (EEC) under the *Biodiversity Conservation Act 2016* (BC Act). Previous certificates have been granted for geotechnical and geophysical investigations in additional to the installation of monitoring equipment. The certifications were issued under the *Threatened Species Conservation Act* 1995 pursuant to Section 95(2).

Additional details for the Section 95 Certificates have been provided in **Table 8**.

Table 8. Occupation Permits and Section 95 Certificates

Licence	Date of Issue	Expiry	Details
Level 3 Occupation Permit – Infrastructure	1 February 2013	1 February 2018	Approval from FCNSW allowing to operate and build surface infrastructure/facilities on the surface within the Newnes State Forest to support below ground operations.
Section 95 Certificate Document No 1111270	27 June 2013	30 June 2020	Approval from OEH to allow the hand removal of weeds from within East Wolgan Swamp and Narrow Swamp.

Licence	Date of Issue	Expiry	Details
Section 95 Certificate Document No C0000077	25 November 2013	30 June 2024	Approval from OEH to allow geotechnical/geophysical investigations and the installation of monitoring equipment within EEC.
Section 95 Certificate Document No C0002065	1 August 2016	31 August 2021	Approval from OEH to allow installation and operation of eight augured boreholes at five locations within Newnes Plateau Shrub Swamps.
Section 95 Certificate Document No C0002931	8 August 2017	8 August 2018	The installation and monitoring of a total of 14 monitoring stations along four subsidence monitoring lines within Newnes Plateau Shrub Swamps.
Threatened Species License (formerly Section 95 Certificate) Document No C0003184	6 December 2017	6 December 2022	Approval from OEH to install and operate surface water piezometers and soil moisture probes in Newnes Plateau Shrub Swamp.

*An extension to this occupation certificate has been sought.

1.3. Land Ownership and Land Use

The Springvale colliery boundary lies within the Parishes of Cox, Clwydd, Cook Marrangaroo and Lidsdale within the County of Cook. The area is encompassed by the Lithgow City Council Local Government Area (LGA). Land ownership within and surrounding the Springvale holding consists of Crown Land, privately owned land and land owned and managed by the FCNSW. Parcels of freehold land are located within the western boundaries of the holding and in the vicinity of the Springvale pit top. Land ownership is shown on Plan 1C (refer to **Appendix 2**), with a Schedule of Lands located within the holding presented as **Appendix 3**.

1.3.1. Historic Land Use

Historic land uses in the vicinity of the Springvale holding include residential uses, agriculture, open cut and underground coal mining, coal handling infrastructure, transport infrastructure, commercial forestry and power generation. Wallerawang is the closest retail and commercial centre, located approximately 3 km 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 west and northwest, respectively, of the Springvale 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 west of the Project Application Area and provides a rural fire service, park amenities and a church.

The area around Springvale has been subject to extensive mining operations in the past, with a number of active or completed mines in its vicinity, including Centennial's existing operations.

1.3.2. Current Land Use

Land use within the Springvale holding predominantly consists of historical and existing mining operations and commercial forestry in the Newnes State Forest. Newnes State Forest comprises approximately 25,000 ha of pine plantation and native hardwood forest that is selectively logged

under the FCNSW tenure and management. In addition to the timber industry, the Newnes State Forest supports a number of recreational land uses. Public access is permitted in the Newnes State Forest with common recreation activities consisting of motorcycle riding, four wheel driving, bushwalking, camping, mountain bike riding, canyoning, photography, bird watching and other recreational and adventure activities.

A small portion of land along the western boundary of the holding is cleared and is used for agriculture. There is no intensive cropping in the area.

1.3.3. Future Land Use

Following the cessation of mining operations at Springvale, the pit top and all rehabilitated areas on the Newnes Plateau will be rehabilitated to woodland commensurate with the adjacent remnant vegetation. The *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) prepared as a component of the EIS commits to the final land use for these areas becoming 'environmental protection works' which is consistent with the surrounding land use of forestry within the Newnes State Forest. Additionally the final land use aligns with the current *Lithgow Local Environmental Plan (LEP) 1994*, the *Draft Lithgow LEP 2013* and the *Lithgow Draft Land Use Strategy 2010 – 2030* (SLR 2014). A copy of the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) has been provided as **Appendix 4**.

The water management structures at the Springvale pit top will be retained in the post-mining landform for use as stock water supply. While the pit top area does not currently have an agricultural land use, the existing and current zonings are appropriate for an agricultural final land use (SLR 2014).

1.4. Stakeholder Consultation

Consultation with landowners, residents, non-government organisations and regulatory bodies associated with the site has been consistent and open through personal contact, newspaper publications (Lithgow Mercury, Coal Face etc.) and information days for projects. The community consultation process has been formalised through the Community Consultative Committee (CCC) and other communication tools including the Centennial Coal website. The website provides interested parties with information on site and the environmental performance of the mine. Rehabilitation commitments made to stakeholders are detailed in the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) and the outcomes of rehabilitation are reported in the Annual Review, which is available on the Centennial Coal website.

Springvale completes consultation in accordance with the Stakeholder Engagement Plan. The objectives of the Stakeholder Engagement Plan are to:

- Communicate with stakeholders regarding the proposed activities;
- Record and continually assess consultation processes and outcomes; and
- To consider and provide feedback on the outcomes of consultation with stakeholders into the environmental assessment process.

The Stakeholder Engagement Plan has been designed to:

- Identify stakeholder groups relevant to Springvale;
- Effectively manage and facilitate the engagement of our stakeholders;
- Communicate with stakeholders of Springvale and to share information;
- Define means of recording feedback from stakeholders and the response; and
- Ensure appropriate monitoring and reporting of community/statutory initiated enquiries and contact as per the Springvale Procedure for External Communication.

1.4.1. Community Consultation

Springvale is aware of its community obligations and the importance of open communication with the community. During the MOP term Springvale will endeavour to keep the local community affected by its operation informed of its direction, plans and environmental performance. This will be achieved by any of the following activities:

- The CCC;
- Holding Open Days and Displays at local Shows;
- Distribution of letters and newsletters;
- Information sessions;
- Local newspapers;
- The Centennial Coal website; and
- Engaging in informal discussions with local residents as required.

A complaints line currently exists at Springvale to receive calls from the local community. The complaints line (02 6350 1640) operates 24 hours a day, 7 days a week. The phone number is listed in the local directory for easy access and all residents are encouraged to contact the site regarding any issue of concern.

Springvale will undertake consultation for exploration drilling and/or groundwater monitoring purposes in accordance with the *Guideline for Community Consultation Requirements for Exploration* (DRG, 2012a). An annual report outlining community consultation undertaken in accordance with the guideline (DRE, 2012a) will be submitted annually to DRG in accordance mining tenement requirements as agreed with Centennial Coal. This report will include evidence that consultation was undertaken in accordance with the guideline.

Community Consultative Committee

In accordance with the requirements of Schedule 6, Condition 9 of SSD-5594, 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 Western Coal Services. The combined Springvale, Angus Place and Western Coal Services CCC facilitates a single channel of communication about the current mining operations in the area.

The committee is composed of:

- An independent chairperson;
- Four representatives from Centennial Coal, including the Environment and Community Coordinator;
- One representative from Council; and
- At least three representatives from the local community.

The formation of the Springvale and Angus Place CCC was approved by the DPE in 2012. The combined Springvale, Angus Place and Western Coal Services CCC was approved by the 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 biannually.

Regional Community

A significant amount of consultation was undertaken during the preparation of the *Springvale Mine Extension Project State Significant Development 5594 Environmental Impact Statement* (EIS) (Golders 2014). This consultation was completed in accordance with the Springvale Stakeholder Engagement Plan. Regional community consultation was undertaken for the project in conjunction with other regional Centennial Coal projects. This comprised:

- Advertisements in local and regional newspapers (Lithgow Mercury and the Mudgee Guardian) to make the community aware of the Springvale Mine Extension Project;
- Holding face-to-face consultations and site inspections;
- Holding public information and 'question and answer' sessions;
- Preparing letter/newsletter/information flyer drop-offs in the local community;
- Providing updates regarding the Springvale Mine Extension Project on the Centennial Coal website.

1.4.2. Statutory Authorities

Springvale has consulted with the DRG during the preparation of this MOP. The proposed approach to the MOP and the integration of the SWTP infrastructure was discussed with the DRG on 17 April 2018. The MOP was submitted to the DRG for approval in May 2018.

To satisfy the requirements of Schedule 4, Condition 32 of SSD-5594 the previous MOP was submitted for consultation with the DPE, DPI Water, OEH, Council, Water NSW and the CCC on 18 January 2016. The MOP was re-submitted to the Secretary DRE for approval prior to 21 March 2016 (subsequently satisfying the requirements of a Rehabilitation Management Plan). The DRE approved the MOP on 11 May 2016. There has been no material changes with regard to the rehabilitation management methodologies presented within this document, therefore no additional consultation is deemed warranted.

Springvale 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;
- Annual Review to the DPE;
- Liaison with the NSW EPA regarding EPL conditions;
- Provision of the Annual Review to DRG and other relevant Government agencies;
- Provision of the Annual Licence Return to EPA; and
- Provision of the National Pollution Inventory (NPI) to the Commonwealth Department of the Environment and Energy via OEH.

During the preparation of the Springvale Mine Extension Project EIS consultation was also undertaken with Commonwealth, State and Local government agencies including:

- Commonwealth Department of the Environment;
- OEH;
- EPA;
- DRG;
- Department of Primary Industries (including the DPI Water, FCNSW, NSW Agriculture, Fisheries NSW, and Catchments and Lands (Crown Lands Division));
- Roads and Maritime Services (RMS);
- NSW Health;
- Sydney Catchment Authority (SCA);
- Hawkesbury-Nepean Catchment Management Authority; and

- Council.

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

Specific consultation relating to the construction of surface infrastructure on Newnes Plateau and exploration drilling and/or groundwater monitoring activities will be undertaken in accordance with the *Exploration Activities and Minor Surface Infrastructure Management Plan* (SLR, 2016).

1.4.3. Other Stakeholders

Consultation has been undertaken between Springvale and a range of other stakeholder groups during the preparation of the Springvale Mine Extension Project EIS 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; and
- Relevant infrastructure owners including Energy Australia.

1.4.4. Stakeholder Expectations Regarding Post Mining Land Use and Rehabilitation

A report titled the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) was prepared as a component of the Springvale Mine Extension Project EIS (Golders 2014) (refer to **Appendix 4**). The strategy outlines an approach to return areas disturbed by mining-related activities to a capacity that was present pre-mining. Specifically, the Decommissioning and Rehabilitation Strategy:

- Proposes rehabilitation strategies for existing disturbed areas and surface disturbance resulting from the Springvale Mine Extension Project;
- Proposes objectives for the rehabilitation of the existing disturbed areas and disturbance that will result from the Springvale Mine Extension Project;
- Develops a strategy to rehabilitate all disturbed land to original land capability or better;
- Proposes a strategy for the re-profiling of all disturbed areas to create a self-sustaining and stable final landform which will pose no long term environmental hazard;
- Proposes to create a woodland final landform commensurate with the proposed RU2 Rural Landscape and RU3 Forestry land zonings in the *Draft Lithgow Local Environmental Plan* (2013);
- Establishes management controls that will preserve downstream water quality through creation of a final landform that is self-draining;
- Proposes an effective revegetation program for the rehabilitated areas;
- Proposes an effective monitoring program to assess performance of the rehabilitated areas; and
- Proposes preliminary success criteria for decommissioning and rehabilitation.

The Decommissioning and Rehabilitation Strategy was revised based on the adequacy comments received from the DPE on the 28 December 2013, and the DRG on 12 December 2013, relating to rehabilitation and land management. The post-mining land use and rehabilitation commitments outlined within this MOP are consistent with the Decommissioning and Rehabilitation Strategy (refer to **Appendix 4**).

2. PROPOSED MINING ACTIVITIES

2.1. Project Description

SSD-5594 allows Springvale to continue underground coal mining operations within the Lithgow Seam at rates up to 5.5 Mtpa until 31 December 2028, with subsequent rehabilitation and closure works. In summary, Springvale will undertake the following activities as approved by SSD-5594 during the MOP term:

- Continued use of existing facilities and infrastructure at Springvale, except as otherwise indicated in the EIS (i.e. the transfer of operational management and physical infrastructure regarding coal processing and distribution infrastructure to Western Coal Services Project);
- Develop underground access headings and roadways from the current mining area to the east to allow access to the proposed mining areas;
- Undertake secondary extraction by retreat longwall mining technique for the proposed Longwalls 418 to 432 and Longwalls 501 to 503;
- Install and operate up to two additional dewatering bore facilities (if required) on Newnes Plateau and the associated power and pipeline infrastructure, and upgrade the existing and construct new sections of access tracks to the facilities;
- Construct a downcast ventilation borehole at the Bore 10 facility location;
- Establish a services borehole area;
- Extension of the existing Springvale Delta Water Transfer Scheme (SDWTS) to the proposed dewatering borehole facility (Bore 10); and
- Manage predicted increase in mine inflows via discharge through Angus Place Colliery's licensed discharge point LDP001 and Springvale Mine's LDP009.

Additionally, Springvale has prepared and submitted an *Exploration Activities and Minor Surface Infrastructure Management Plan* (SLR, 2016) to the DPE in May 2016. This Plan was prepared in accordance with the requirements of Schedule 4, Condition 28 of Development Consent SSD-5594 which allows for adjustments to be made during the detailed design phase without the need for modifications to the Development Consent. The *Exploration Activities and Minor Surface Infrastructure Management Plan* was submitted to the DPE for approval on 7 October 2016.

SSD-7592 allows Springvale / Energy Australia to establish and operate a pipeline and ancillary facilities to transfer mine water from the existing or approved dewatering facilities on the Newnes Plateau for treatment and reuse at the MPPS. Construction of the SWTP will be completed during the MOP term. It is noted that SSD-5594 allows for the discharge of mine water through LDP009 via the SDWTS. This will still be utilised until the SWTP comes online July 2019 following which time portions of the SDWTS will be used in the SWTP (i.e. dewatering system to Booster Pump Station 2).

The locality of underground mining areas and proposed construction during the MOP term has been shown on **Figure 3**.

2.2. Activities Over the MOP Term

2.2.1. Exploration

Springvale will continue to undertake exploration activities for the duration of the MOP term. The exploration will be used to obtain specific geological information in terms of geotechnical conditions, coal seam quality and thickness, through core sampling. Information obtained is used for the ongoing refinement of the site's existing geological model which then allows detailed mine planning. The exploration programme also allows the installation of piezometers in the aquifers of interest for ongoing groundwater monitoring.

During the MOP term exploration and/or groundwater monitoring activities will be undertaken within EL 6974 and AUTH 460 (refer **Figure 2**) in accordance with the requirements of the *Mining Act 1992* and the *Exploration Activities and Minor Surface Infrastructure Management Plan* (SLR, 2016). All exploration and/or groundwater monitoring activities within the Project Application Area have been approved pursuant to SSD-5594. Subsequently no further approval under Part 5 of the EPA Act 1979 is required.

Due-diligence field inspections and targeted surveys of the proposed drill sites and associated access tracks will be undertaken by appropriately qualified ecologist and heritage specialists prior to commencement of works. This is to ensure the potential for localised impacts and risks are minimised and, where necessary, appropriately managed. Noise assessments will be undertaken when proposed drill sites are in proximity to sensitive receptors. The combination of environmental sensitivity risk mapping and targeted due-diligence surveys of potential drill sites will provide greater flexibility in selecting the most suitable final drill site locations with minimal impact on the local environment. Copies of any due diligence assessments will be provided to DPE, DRG and FCNSW (where applicable).

At least seven days prior to the proposed commencement of any exploration drilling and/or groundwater monitoring activities, Springvale will notify DRG and FCNSW (where applicable). Before commencing any exploration and/or groundwater monitoring drilling, Springvale will carry out an assessment of the risk of blowouts. Details of the assessment will be notified to the DRG at least seven days prior to the proposed commencement of drilling. If this assessment indicates that there is potential for a blowout to occur, blowout prevention equipment will be installed, in accordance with the *Schedule of Onshore Petroleum Exploration and Production Safety Requirements* (Department of Mineral Resources, 1992).

Following vegetation clearing at the drill hole site, appropriate erosion and sediment controls will be installed and maintained around disturbed areas in accordance with the Blue Book (Landcom, 2004). Felled trees and topsoil are stockpiled for use in rehabilitation. The planning, design, construction and maintenance of all access tracks will be generally in accordance with *Managing Urban Stormwater: Soils and Construction, Volume 2C, Unsealed Roads* (DECC 2008).

In accordance with the requirements of EL 6974 and AUTH 460 Springvale will use above-ground sumps or in-ground sumps, where appropriate. In-ground sumps will be lined with an impermeable liner. Where suitable, above ground sumps are used to minimise the disturbance footprint resulting from the prospecting operations. The sump used to store drilling fluid, comprising a mixture of water and mud or a biodegradable polymer, is lined with plastic sheets. Water required for drilling is sourced from one of the dewatering bore facilities and is transported to the drill sites using water trucks.

Exploration bores are generally drilled by open hole drilling method (123 mm and/or 99 mm diameter bit) to 10 m above the Lithgow Seam. The bore is HQ diameter cored from 10 m above the Lithgow Seam roof, to 10 m below the Lithgow Seam Floor.

During drilling, fluid is continuously pumped to the drill head to facilitate the removal of cuttings, stabilise the borehole, cool the cutting head and lubricate the passage of the product pipe. The drilling fluid is generally sent into a reclaimer which removes the drill cuttings and maintains correct viscosity of the fluid. All drilling fluid recovered that cannot be recycled will be vacuum pumped and removed from site following OEH's *Waste Classification Guidelines* (DECCW, 2009) and the use of a licensed waste transporter to a receiving facility or other destination allowable under EPL 3607.

All cored holes will be surveyed and permanently marked in accordance with DRG guidelines so their location can be easily re-identified. Spoils or cuttings generated during drilling will generally be collected, segregated and disposed of in properly constructed containers and removed to a licenced landfill. Occasionally spoils or cuttings may be stockpiled on site for use in rehabilitation including for back-filling drilled holes, in cases where no piezometer installation occurs. Sealing of the drill holes

within AUTH 460 will be undertaken in accordance with the requirements of *EDG01: Borehole Sealing Requirements on Land: Coal Exploration* (DRG, 2012b). Sealing of drill holes within EL 6974 will be undertaken in accordance with the *Exploration Code of Practice: Rehabilitation* (DRG, 2015). Completed and proposed exploration activities will be reported in the Annual Review.

2.2.2. Construction

Construction activities as approved by SSD-5594 are expected to be undertaken by the end of 2018. These activities have been detailed below and have been illustrated on **Figure 3**.

Mine Services Borehole Compound

Additional mine services boreholes may be required to service the new mining areas to the east and southeast of the existing workings. If required, these boreholes will be located within the mine services borehole compound to be located on Newnes Plateau. The construction of this facility will be undertaken if required and will lead to a reduction in the number of underground vehicle movements and associated diesel use.

The mine services borehole compound will accommodate up to four 500 mm diameter surface to seam boreholes to convey materials such as ballast and concrete underground. It will be approximately 90 m x 100 m. Following vegetation clearing over the entire construction footprint at the Mine Services Borehole Compound drill pad site location, and prior to the mobilisation of the drill rig and other plant required for the construction of the boreholes, erosion and sediment controls will be implemented to mitigate any potential water quality impact on the receiving environment from surface disturbance. The localised erosion and sediment controls (for example, sediment fences, clean and dirty water diversion structures), to be implemented at the drill pad sites will be consistent with the objectives of Springvale Mine's Water Management System and will be carried out in accordance with the industry best practice principles for the region and guidelines for erosion and sediment control (Landcom, 2004). During construction a permanent sediment basin will be installed to capture dirty water runoff from disturbed areas via clean water diversion bunds installed on the perimeter of the site compound.

A shed, housing a telephone and concreting equipment, will be permanently installed within the compound. The compound will be fenced and locked at all times to ensure public safety and security.

Springvale Delta Water Transfer Scheme

Springvale will continue to utilise the existing SDWTS, however the existing SDWTS will be extended during the MOP term. The extension of the existing scheme will be undertaken to the proposed Bore 10 dewatering facility that will be established on Newnes Plateau. This dewatering facility is required to facilitate the progress of coal extraction further to the east, the southeast and the southwest of the existing workings to ensure water levels underground are kept at safe and manageable levels. The location of Bore 10 is controlled by the proposed mine plan and the coal seam floor contours. It is located at the lowest point in the mine relative to longwalls it will dewater.

The extension will comprise the installation of trenched pipelines within dedicated infrastructure corridors of 10 m widths established along existing tracks or new sections of tracks. The extensions to Bore 10 will involve installation of approximately 4.7 km of pipes within the infrastructure corridors. The new pipelines will connect to the existing network at the point where the SDWTS extension to the Bore 8 facility exists (which is in the vicinity of Sunnyside Ridge Road and Maiyingu Marragu Trail intersection) (refer to **Figure 3**).

Bore 10 Dewatering Facilities

One new dewatering facility is proposed to be established on Newnes Plateau. Bore 10 will be installed as mining progresses to the east and then the southeast of the existing workings. Bore 10 will manage mine inflows from Longwalls 424 – 432 and Longwalls 501 – 503.

The timing of the construction, operation and rehabilitation of Bore 10 will be contingent upon the progression of underground workings. Bore 10 is currently anticipated to be constructed in late 2019 and is estimated to have a 6 month construction timeframe.

The site will include four boreholes founded on concrete pads and equipped with submersible pumps will extend from the surface to below the Lithgow Seam. The bore site will have a cuttings sump and ancillary surface electrical control equipment. In addition to the four dewatering boreholes that will be installed at the Bore 10 Dewatering Facility, an additional downcast ventilation borehole will also be constructed at the site.

The site will be installed with erosion and sediment controls, and water management structures to separate dirty water runoff from clean water to minimise pollution of receiving waters. It is noted that the erosion and sediment controls will be temporary; however these will be maintained until after rehabilitation has been completed.

The construction footprint of each bore facility will be 90 m x 110 m, with the final constructed footprint to be 50 m x 70 m. A 20 m Asset Protection Zone will be established around each facility to mitigate the risk of fire. Each bore site will be fenced with a lockable gate for public safety and security. Prior to the commencement of construction for the Bore 10 dewatering facilities, bore construction details will be provided to DPI Water.

The extension of the SDWTS and power supply to Bore 10 will involve the installation of trenched pipelines and 11 kV power cables. These works will be undertaken within dedicated infrastructure corridors of 10 m widths established along existing tracks or new sections of tracks. The power supply will originate from the existing Substation 4 and will involve trenching of approximately 5.1 km of 11 kV power cables. Following the trenching of the pipelines and power cables, the infrastructure corridor will be rehabilitated to create approximately 5 m wide access tracks to the respective drill pad areas to allow vehicular access during operations.

Infrastructure Corridors and Access Tracks

Existing forest access tracks will be used where available to access the Mine Services Borehole Compound (if required) and the Bore 10 Dewatering Facility. Where existing access tracks are not available, new 5 m wide sections of tracks will be established. Ancillary 10 m wide infrastructure corridors will be constructed adjacent to existing tracks and new sections of tracks (refer **Figure 3**).

Infrastructure corridors will be established to provide for the extension of existing trenched water pipelines from the Bore 10 Dewatering Facilities to manage mine inflows during future mining. The extensions of the SDWTS to the bore 10 facilities will involve installation of approximately 4.7 km of pipeline within the infrastructure corridor. The new pipelines will connect to the existing network. The locations of the existing SDWTS pipeline and proposed infrastructure corridor are shown on **Figure 3**.

The infrastructure corridor will also be used for the trenching of approximately 4.7 km of 11 kV power cables and fibre optic cables from Substation 5 to the Mine Services Borehole Compound and the Bore 10 Dewatering Facilities. An additional infrastructure corridor will be established to provide power supply and telecommunications from the existing Borehole Pump Substation to Booster Pump Station 2. These works will be undertaken within a 5 m corridor and will involve the trenching of approximately 800 m of 11 kV power cables and fibre optic cables. These works will be undertaken within existing tracks to minimise clearing requirements. All new electrical power cables will be trenched to avoid the potential for overhead lines to trigger bushfires or be destroyed by bushfires. The location of these infrastructure corridors has been shown on **Figure 3**.

Following the trenching of water pipelines, 11 kV power cables and fibre optic cables, infrastructure corridors will be rehabilitated to create 5 m wide access tracks which will be retained in the final landform for use by FCNSW.

Substation 4 supplies power to Substation 5 located at the Ventilation Shaft 3 Facility via overhead powerlines. Substation 5 supplies power to the main ventilation fan, air compressors, and is the main underground production and auxiliary supply at the Ventilation Shaft 3 Facility. Power supply and communications for the Bore 10 Dewatering Facilities will be via Substation 5 and an 11 kV Distribution Board that will be installed at Booster Pump Station 1 (refer **Figure 3**).

Springvale Water Treatment Project

During the MOP term, Springvale / Energy Australia will complete the construction of the SWTP. Construction associated with the SWTP applicable to this MOP will be the installation of the water transfer pipelines from the dewatering infrastructure on the Newnes Plateau to the water treatment plant at MPPS.

The new pipeline will be trenched in previously disturbed areas following the alignment of existing mine infrastructure and access tracks. The pipeline will follow the alignment of a disused logging trail for the descent from Newnes Plateau. Trenched will follow the alignment of existing access tracks to minimise any disturbance required. There is anticipated to be a 10 m wide disturbance along the length of the alignment. Following trenching, disturbed areas will be progressively rehabilitated soon as possible to reduce the 10 m disturbance corridor to a 5 m wide access track.

In some sections, the pipeline will be installed by directional drilling to avoid disturbance to infrastructure and the environment (ie road, rail and river crossings). Directional drilling involves the exaction of launch and receival pits on either side of the length of pipeline to be installed. These pits will be established in cleared area along the pipeline alignment within the approved disturbance footprint. The directional drill will be launched from one pit and drill head will be driven horizontally using lengths of drilling rods which are continually added as required for the length of the drilled section. At completion of the bore, the drilling head will enter the receival pit and the new pipeline will be pulled back through the bored section.

The launch and receival pits will be located within previously cleared areas within the project application area and there will be no disturbance to the surface of the ground for the length of the drilled section between the launch and receival pits.

Erosion and sediment controls will be installed progressively as required along the pipeline corridors ahead of the construction activities. Topsoil and vegetation root stock will be conserved and restored along any areas disturbed by the pipeline construction.

Disturbed areas associated with the launch and receival pits will be progressively rehabilitated as soon as possible following installation of the pipeline.

The construction of the SWTP will involve the installation of approximately 8.1 km of pipeline within the Springvale Project Approval Area. The location of the SWTP is shown on **Figure 3**.

2.2.3. Mining Operations

Springvale 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.

During the MOP term Springvale will develop and extract longwalls in the existing northern and southern lease areas, comprising Longwalls 421 – 422 (east of the existing workings) and Longwalls 424 – 432 (southeast of the existing workings) and Longwalls 501 to 503 (southwest of the existing workings) (refer to **Figure 4**). Due to current geology and geotechnical constraints a decision was made to remove Longwall 423 from the mine plan.

It is noted that a number of minor changes to the longwall dimensions and sequencing have been adopted in the Extraction Plan for Longwalls 424-427. These are generally the same as those presented in the EIS. Changes include:

- Shortening the commencing (i.e. southern) ends of Longwalls 424, 425, 426 and 427 by 475 m, 215 m, 164 m and 155 m, respectively;
- Proposed Longwalls 424 - 427 have also been shifted approximately 16 m towards the west; and
- The mining sequence has also been modified, with Longwall 424 now proposed to be extracted after the completion of Longwalls 425 - 427.

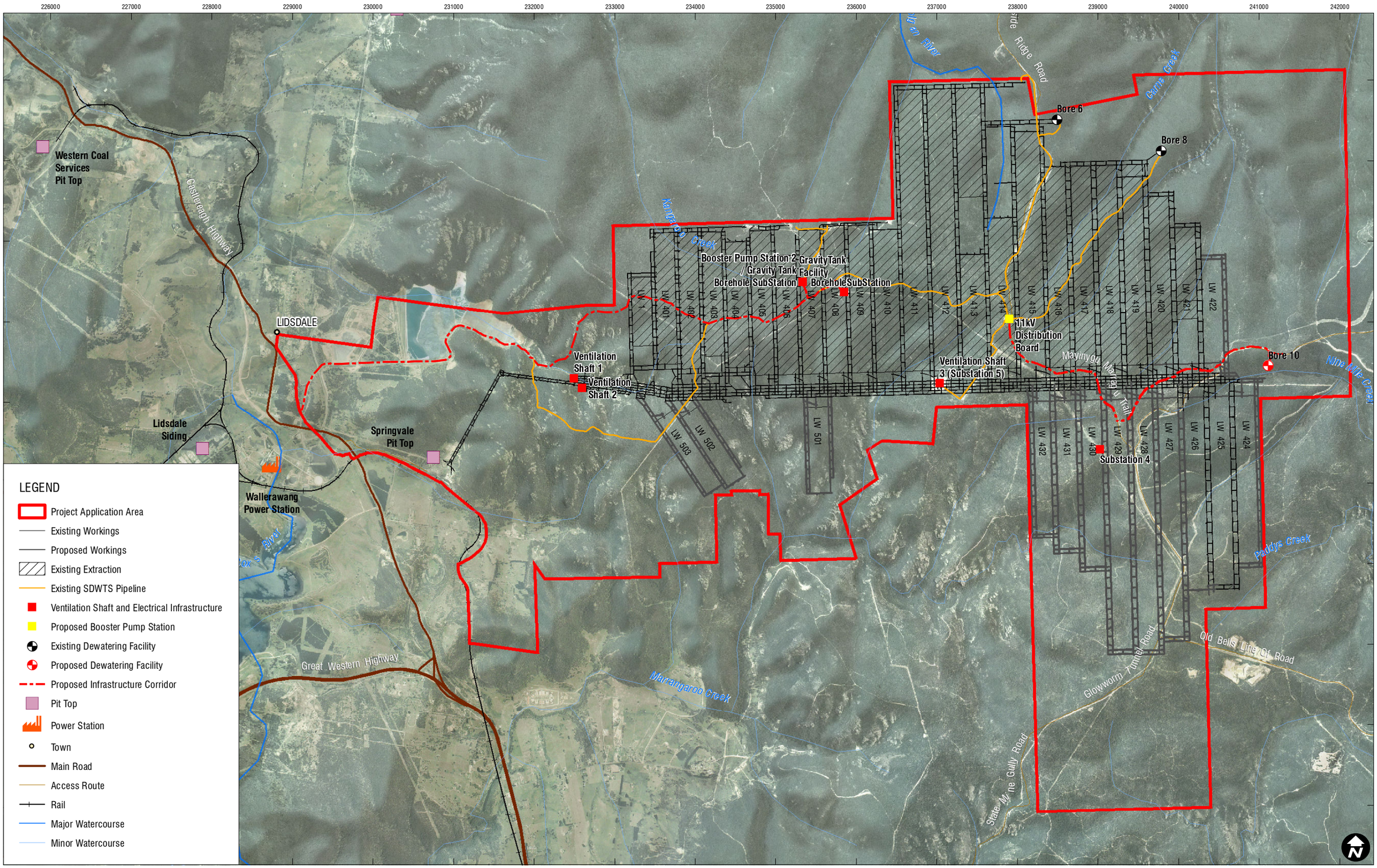
The deferral of Longwall 424 extraction in the mining sequence (i.e. 425, 426, 427, 424) is due to a number of factors requiring additional operational assessment (e.g. Longwall 424 rehand, Clarence Colliery boundary interactions) and Lease constraints (Mining Lease boundary proximity, part lease transfer).

An indicative mining schedule for the MOP term has been illustrated on Plans 3A – 3H (refer to **Appendix 2**) and details provided in **Table 9**.

Table 9. Proposed Mining Schedule during the MOP Term

Year	First Workings	Secondary Extraction
2018*	425 MG, 425 TG, 426, 427	421, 425
2019	425 MG, 426, 427, 428, 429, 424	425, 426, 427
2020	428, 424, 429, 430, Bore 10	427, 424
2021	429, 430, 431	424, 428
2022	430, 431, 432, 501	428, 429
2023	432, 501, 502, 503	429, 430, 431
2024	502, 503	431, 432, 501
2025*	-	501, 502

*Covers the period from 1 June – 31 December 2018 and 1 January – 31 May 2025, respectively.



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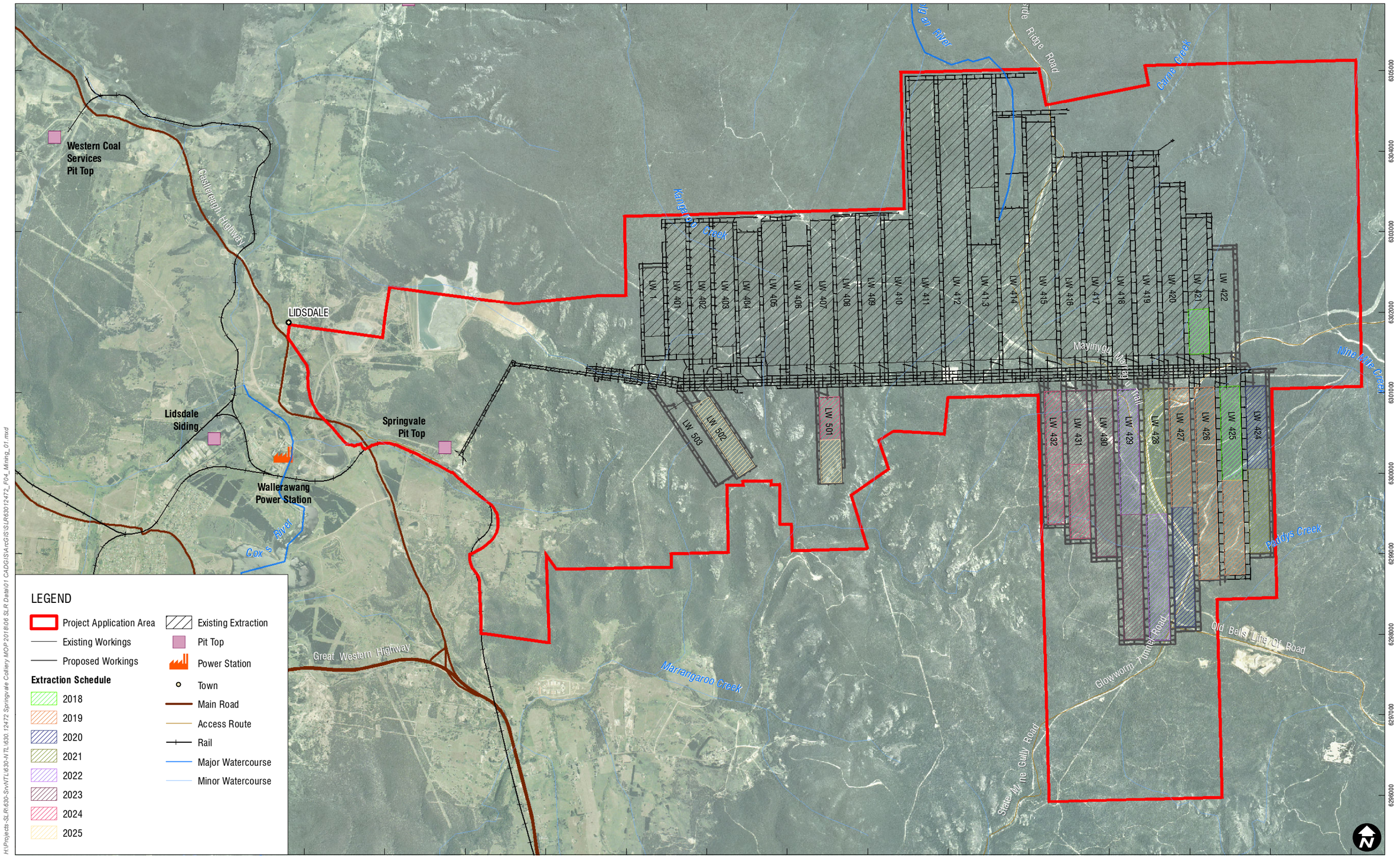
Construction During the MOP Term

FIGURE 3



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Mining During the MOP Term

FIGURE 4

\\au.slr.local\Corporate\Projects-SLR\630-Srv\NTL\630-NTL\630.12472 Springvale Colliery MOP 2018\06 SLR Data\01 CADGIS\CAD\SLR630124 72_F05_SVPitTopInfra_01.dwg

LEGEND:

Coal Stockpile Area

DATE	11.05.2018
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG7_SVPITTOPINFRA_V3.dwg
SCALE	1 : 4000

Figure 5

Springvale Pit Top Surface Infrastructure

0 75 150 M

Centennial Coal
Springvale

Prepared by: SLR

A4

2.2.4. Rock/Overburden Emplacement

Springvale is an underground coal mine, subsequently there is no overburden generated at the site.

2.2.5. Processing Residues and Tailings

Coal extracted during development by continuous miners is deposited into shuttle cars for transport to the drift conveyor. Coal from the longwall shearer is also transported by an armoured face conveyor to the drift conveyor. Coal is transported from the underground workings by the drift conveyor onto the temporary ROM coal stockpile area at the pit top (maximum 200,000 tonne) via the Rill Tower. ROM coal is reclaimed from the coal stockpile area by two activators and two vibratory feeders. The feeders use vibration to feed the coal material onto the reclaim conveyor. The coal is then transferred from the reclaim conveyor to a steel frame fully clad crusher and screening plant.

The 50 mm product within the crusher and screening plant is collected in the underpan of the first stage of the screen and deposited directly onto a conveyor and subsequently transferred to the overland conveyor system without further processing. All crushed coal is transported off site and minimal reject material is generated at the pit top.

The overland conveyor system delivers coal directly to Mount Piper Power Station or to Western Coal Services for stockpiling and processing within its coal handling and processing plant. It is noted that the Development Consent also allows for the transport of ROM coal to the Wallerawang Power Station via overland conveyor system, however the facility was closed by Energy Australia in March 2015 due to decreasing demand for energy. In the event that the power station was to reopen, Springvale would also recommence supply of coal to the site. The overland conveyor system, approximately 10 km in length, runs the entire route and the upper belt of the system is used to transfer the ROM coal to the power stations and the Springvale Coal Services site at a maximum speed of 900 to 1,000 tonnes per hour (tph).

No production waste comprising reject materials from ROM coal processing (washing) will arise from the site. However, volumes of coal waste comprising ballast and coal reject from underground road maintenance activities will be generated. This material will be disposed at the reject emplacement areas (REAs) within the Western Coal Services site. The materials will be transported from the Springvale pit top to the Western Coal Services site using road haulage.

All ROM coal is transported offsite for sale or processing at Western Coal Services. Subsequently no tailings or reject materials are generated at Springvale. The transport of ROM coal by overland conveyor, stockpiling and processing of ROM coal is all undertaken by Western Coal Services in accordance with SSD-5579 and the *Western Coal Services MOP* (SLR 2017).

In accordance with SSD-5594, Springvale has the contingency to transport up to 50,000 tonnes per annum of ROM coal to local domestic market customers by road.

2.2.6. Waste Management

Production Waste

The reject materials (fine and course) produced during the processing of ROM coal along with ballast and coal reject from underground road maintenance activities is emplaced at Western Coal Services, as discussed in **Section 2.2.5**.

Non-Production Waste

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 recycled whenever possible at the site. Oil drums and filters are recycled with other waste metals, and 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.

Sewage is pumped directly into the Council sewer main at the intersection of Wolgan Road and Duncan Street in Lidsdale.

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 Springvale 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.

2.2.7. Decommissioning and Demolition Activities

No decommissioning or demolition activities are proposed during the MOP term.

2.2.8. Temporary Stabilisation

Temporary stabilisation will be required at construction areas during the MOP term. Prior to the re-establishment of vegetation cover, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials. Consideration will be given to erosion and sediment control procedures for activities undertaken during the construction phase. These procedures may include restricted access during wet weather or to areas under rehabilitation, reporting of erosion and sediment hazards or incidents and regular checking and maintenance of structures.

The temporary control measures utilised are selected dependent on the site constraints (dispersive soils, slope), time of year, type of flow (concentrated or sheet flow) and the duration of disturbance. Specialist contractors are utilised to install the erosion and sediment control measures and quantities of erosion and sediment control materials are maintained by both Springvale and the contractor at all times.

2.2.9. Progressive Rehabilitation and Completion

Rehabilitation at Springvale will be undertaken progressively during the MOP term and will involve partial rehabilitation of the following disturbed areas after completion of construction on Newnes Plateau:

- Exploration drill hole and/or groundwater monitoring sites; and
- Following the installation and/or trenching of pipelines associated with the SWTP, infrastructure corridors will be rehabilitated to create approximately 5 m wide access tracks.

- Following the trenching of pipelines, power cables and fibre optic cables to the Booster Pump Station 1, Mine Services Bore Facility, and Bore 10 Dewatering Facilities, infrastructure corridors will be rehabilitated to create approximately 5 m wide access tracks~~.~~; and
- Following trenching of power cables and fibre optic communications cables from the Borehole Pump Substation to Booster Pump Station 2, the 5 m corridor will be rehabilitated.

While Bore 5 is no longer in operation for dewatering activities, the borehole has been retained for emergency water input. The remaining area of the compound, as far as practicable, will be rehabilitated to reduce the compound footprint.

It is noted that exploration drill holes that are consistent with the requirements of the Centennial Coal groundwater plan/model will be used for groundwater monitoring. These exploration boreholes will be approved to remain open or be partially grouted to allow access to install groundwater monitoring equipment to subsequently satisfy the commitments as outlined within the Springvale Mine Extension Project EIS (Golder Associates, 2014) and the Response to Submissions (Springvale, 2014). Exploration drill hole sites that are unsuitable for future groundwater monitoring purposes will be sealed in accordance with relevant DRG guidelines.

2.2.10. Material Production Schedule during MOP Term

The material production schedule during the MOP term is provided in **Table 10**. Any proposed changes to this schedule will be outlined in the Annual Review.

As outlined in **Section 2.2.5**, only ROM coal is produced at Springvale, subsequently there is no reject material or product coal. Rejects and product coal are determined after the ROM coal is processed by the Coal Handling Preparation Plant (CHPP) at Western Coal Services. This information captured in the *Western Coal Services MOP* (SLR 2017).

Table 10. Material Production Schedule during the MOP Term

Material	Unit	2018*	2019	2020	2021	2022	2023	2024	2025*
Stripped Topsoil	m^3	5,600	31,200	0	0	0	0	0	0
Rock/overburden	m^3	0	0	0	0	0	0	0	0
ROM Coal	Mt	4.38	4.28	4.47	4.39	4.45	4.45	3.69	0.401
Reject Material	Mt	0	0	0	0	0	0	0	0
Product	Mt	0	0	0	0	0	0	0	0

*Projected values cover the period from 1 June – 31 December 2018 and 1 January – 31 May 2025, respectively.

2.3. Primary Domains

For the purpose of this MOP, primary (operational) domains have been defined as the set of discrete areas that have a particular operational or functional purpose. All areas previously disturbed by mining, or proposed to be subject to the activities described in **Sections 2.1** and **2.2**, have been assigned to an appropriate primary domain. Primary domains at Springvale are defined in **Table 11**. The footprint of each primary domain at the commencement of the MOP term is depicted on Plan 2 (refer to **Appendix 2**).

Table 11. Primary Domains

Domain	Description	Code
Infrastructure	Includes existing and proposed infrastructure and facilities at the pit top and Newnes Plateau including workshops, administration buildings, powerlines (overhead and trenched), pipelines (trenched), substations, car parks, access roads, sewage treatment plant and associated irrigation area, hardstand/laydown areas, coal stockpile areas, underground infrastructure including mine access, ventilation shafts, service boreholes, booster pump stations, pipelines, dewatering bore facilities, associated water management structures, exploration and/or groundwater monitoring sites, and existing rehabilitation areas. The dewatering bores and other infrastructure no longer required will be progressively rehabilitated. Equipment components within this domain that are not sold at mine closure or relocated to other Centennial Coal sites will be decommissioned and/or demolished. The disturbed areas will be rehabilitated, with the exception of the tracks to the infrastructure facilities on Newnes Plateau. In accordance with SSD-5594, these tracks will not be rehabilitated but will be retained for use as fire trails or access tracks by recreational users of Newnes State Forest and FCNSW.	1
Other Areas	Includes all areas not captured in Domains 1, 3, 4 and 5. The Domain includes the existing mining areas where limited rehabilitation works may be required due to subsidence impacts. This also includes some infrastructure on the Newnes Plateau, such as boreholes, where remediation may be required. However, this excludes all disturbance associated with the construction/maintenance activities undertaken by service providers (i.e. power and roads).	2
Water Management Area	Includes the network of dams and associated water management infrastructure at Springvale pit top. These structures will not be decommissioned at the end of mine life but will be maintained for future use.	3
Conservation Sites	Includes the Airly Offset Site, Wolgan Road Northern Offset Site, Wangcol Creek Rehabilitation, Lamberts Gully Rehabilitation, Commonwealth Colliery Rehabilitation Site, Wolgan Road Southern Management Site, Brays Land Lidsdale Management Site and the Coxs River Angus Place Management Site. The Conservation Sites are managed collectively by the Centennial West Operations in accordance with the October 2014 version of the *Regional Biodiversity Strategy Western Projects* (RPS 2014a) (refer to **Appendix 5**).	4
Existing Rehabilitation	This domain includes existing rehabilitation areas at the Bore 1 – 4 dewatering facilities, services corridor to the Bore 8 dewatering facility, Old Fire Dam, Settlement Pond, ventilation facility and infrastructure corridors associated with Booster Pump Station 1 and 2.	5

2.4. Asset Register

The asset register included as **Table 12** provides a summary of the key features of each primary domain at the time of MOP commencement (refer to **Section 2.3**), and principal activities required for rehabilitation. This asset register is intended to provide a suitable level of context for the Springvale Rehabilitation Cost Estimate (RCE) (refer to **Section 2.4.1**); subsequently the asset register only includes area calculations for Springvale domains within the colliery holding.

It is noted that although some infrastructure managed and operated by Angus Place and Western Coal Services is located within the Springvale holding (i.e. the infrastructure corridor to the Angus Place Ventilation Facility APC-VS2 and conveyors to the Springvale pit top managed by Western Coal Services), infrastructure specific to these operations have been addressed separately within the Angus Place and Western Coal Services MOPs and the associated RCE.

The areas for each primary domain represent the total disturbance footprint for each domain at the commencement of the MOP term, as depicted on **Plan 2** (refer to **Appendix 2**).

Table 12. Asset Register

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Domain 1 – Infrastructure: 37.0 ha					
Pit Top Infrastructure					
Administration buildings, bathhouse and portable offices	Administration and staff facilities/workshops – currently utilised	Disconnect services; demolish and remove infrastructure; and remove concrete pads.	None	2,415	m^2
Sewage treatment and irrigation facilities	Treatment of waste water/sewage from amenities on site – currently utilised	Disconnect services; demolish and remove water treatment plant; remove concrete pads; remove potentially contaminated material.	None	1	item
Coal crushing and screening plant	Crushing and screening of coal – currently utilised	Disconnect and terminate all services; demolish and remove buildings; demolish and remove coal crushing and screening plant; remove carbonaceous material.	None	1	item
Coal stockpile	Storage of ROM coal – currently utilised	Remove carbonaceous material.	None	17,681	m^2
Workshops, service buildings and material storage sheds	Workshops, service buildings and storage of materials/equipment – currently utilised	Disconnect services; demolish and remove small buildings; remove concrete pads; remove potentially contaminated material; on site remediation of contaminated soil.	None	2,352	m^2
Hardstand/Laydown Areas	Storage of equipment - currently used.	Remove plant and material; and remove concrete pads.	None	42,185	m^2
Access roads	Access road from Castlereagh Highway – currently utilised	Remove roadside markers/signs; and remove bitumen.	None	0.7	ha
Visitor and employee parking areas	Car park – currently utilised	Remove concrete pads, footings and bitumen.	None	5,446	m^2
Personnel and materials drift	Access to underground workings – currently utilised	The drift will be filled with non-contaminated materials.	None	1	item
Portals	Access portals- currently utilised	Sealed in accordance with DRG guidelines.	None	2	item

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Coal conveyor drift and coal conveyor drive	Transporting coal from the underground workings to the surface – currently utilised	Demolish and remove conveyors and gantries.	None	1	item
Electrical distribution network comprising Substation 0 (located at Lidsdale) and Substations 1 – 3	Power supply – currently utilised	Remove substation transformers.	None	4	item
LDP001	Licenced water discharge points – currently utilised	Drain dam; demolish and remove concrete; remove material; fill dam void.	None	330	m^2
Sewage Treatment Ponds (LDP002)	Wastewater treatment and licenced discharge point – currently utilised	Drain and remove sediments from the floor of the dams to be decommissioned and dispose of material appropriately; fill dam voids.	None	1,240	m^2
Pit Top Collection System	Water management system which sources and stores mine water from the existing underground workings for operational use – currently utilised	Remove pipes and pumping system.	None	1	item
Newnes Plateau Infrastructure					
Ventilation Shaft 1 and 2 Facilities	Mine air ventilation – currently utilised	Remove ventilation fans and equipment; backfill and seal shafts; construct engineered plug; disconnect services; demolish and remove infrastructure; and remove concrete pads.	None	2	item
Dewatering Bore 6 and 8 Facilities	Water management – currently utilised	Remove dewatering bore and compounds and grout with concrete, cap and seal.	DRG approval for sealing	2	item
Ventilation Shaft 3 Facility	Mine air ventilation – currently utilised	Remove ventilation fans and equipment; backfill and seal shafts; construct engineered plug; disconnect services; demolish and remove infrastructure; and remove concrete pads.	None	2	item
Substations 4 and 5	Power supply – currently utilised	Remove substation transformers.	None	2	item

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Service borehole (at the Ventilation Shaft 3 Facility)	Transfer of mine service to underground workings – currently utilised	Seal with an appropriately designed and engineered plug reinforcement that complies with relevant construction standards and DRG guidelines.	DRG approval for sealing	1	item
Monitoring infrastructure (piezometers, weirs and transducers, seismometers, survey markers	Monitoring of water and subsidence – currently utilised	Piezometers will be decommissioned in accordance with relevant DRG requirements; surface water monitoring devices (e.g. transducers) will be decommissioned and removed; subsidence survey markers will be decommissioned and removed; boreholes will be sealed in accordance with DRG requirements.	None	TBC	item
SDWTS	Transfer of mine water – currently utilised	Trenched pipelines and power cables will be isolated and made safe in accordance with the relevant guidelines.	None	22,463	m
Booster Pump Station 1 and 2	Water Management – currently utilised	Disconnect services; demolish and remove infrastructure; and remove concrete pads.	None	2	item
SWTP	Transfer of mine water – not yet constructed	Trenched pipelines and power cables will be isolated and made safe in accordance with the relevant guidelines.	None	8,138	m
Dams at Ventilation Shaft 3 Facility (excluding the Emergency Holding Pond)	Water storage – currently utilised	Drain and remove sediments from the floor of the dams to be decommissioned and dispose of material appropriately; fill dam voids.	None	997	m^2
Domain 2 – Other Areas: 5763.4 ha					
No building or plant located within this domain	N/A	N/A	N/A	N/A	N/A
Domain 3 – Water Management Area: 1.2 ha					
Dams including the Fire Dam, Primary (or Stockpile) Pond, Secondary Pond, Duck Pond and Emergency Holding Pond	Water storage – currently utilised	Drain and remove contaminated sediments from the floor of the dam to enable it to be converted into a clean water structure.	None	14,847	m^2
Domain 4 – Conservation Sites: 834.9 ha					
No building or plant located within this domain	N/A	N/A	N/A	N/A	N/A

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Domain 5 – Existing Rehabilitation: 9.9 ha					
No building or plant located within this domain	N/A	N/A	N/A	N/A	N/A

2.4.1. Rehabilitation Cost Estimate

The RCE prepared for this MOP submission has been calculated to undertake the necessary works to achieve the desired final land use (refer to **Section 4** and **Plan 4**). In accordance with the *ESG1: Rehabilitation Cost Estimate Guidelines* (DRG 2010), the RCE has been prepared based upon a "snapshot" of disturbance at the end of 2018. The RCE provides for:

- Decommissioning and demolition of all surface infrastructure;
- Rehabilitation of all areas disturbed by mining as depicted in **Plan 3A**, with the exception of dams to be retained for post mining use and infrastructure corridors on the Newnes Plateau to be retained by FCNSW; and
- Mobilisation costs, project management and contingencies.

A copy of the RCE was submitted to DRG with this MOP for approval in May 2018.

3. ENVIRONMENTAL ISSUES MANAGEMENT

3.1. Environmental Risk Assessment

All environmental risks and controls for Springvale have been identified and documented in the 2015 Broad Brush Risk Assessment (BBRA). This included key operational and rehabilitation risks for Springvale. The BBRA was undertaken on 2 June 2015 and included key Springvale personnel.

A revision to the Springvale and component Environmental BBRA is proposed to be conducted in 2018. A separate environmental risk assessment was completed in May 2018, updating key risks and activities on-site. The May 2018 risk assessment will inform the site wide BBRA to be completed later in 2018.

The following information is from the 2015 BBRA. In future MOP amendments, updated findings from the 2018 BBRA will be presented.

Centennial Coal's Risk Management Standard Risk Matrix was used to calculate the consequence and likelihood of an event to evaluate the subsequent risk level (risk rank). Risks are ranked as Low, Moderate, Significant, High or Extreme. This system operates in accordance with AS/NZS ISO 31000/2009. Of the 103 risks assessed:

- 38 risks were ranked as low;
- 36 risks were ranked as moderate;
- 16 risks were ranked as significant;
- 10 risks were ranked as high; and
- 3 risks were ranked as extreme.

The risk assessment included a number of business areas, including health and safety, financial, and operational risks. Of the 29 risks ranked as significant, high and extreme, six were environment and community risks. These related to:

- A non-compliance with development consent conditions resulting in environmental damage (Extreme);
- Greater than predicted subsidence effects on natural features resulting in impacts to surface/groundwater (High);
- Breach of EPL conditions resulting in environmental damage (Significant);
- Aquifer interference beyond approval limits resulting in effects on groundwater (Significant);
- Soil contamination from hydrocarbons (Significant); and
- Greater than predicted noise impacts on neighbours (Significant).

Existing Environmental Management Plans (EMPs) have been prepared which incorporate the risks and controls identified in the abovementioned BBRA. All EMPs have been prepared in accordance with the requirements of SSD-5594 and submitted for approval by the DPE. To ensure the continued implementation and improvement of the Springvale Environmental Management System (EMS), the identification and assessment of site based hazards and risks (aspects and impacts) is undertaken periodically. The primary objectives of the environmental risk analysis include:

- Identification of potential hazards/impacts;
- Determination of the consequence of the hazard/impact occurring;
- Determination of the likelihood of an event occurring;
- Assessment of the risk by determining the probability (likelihood) and consequence (effect) of each hazard/impact; and
- Identification of the controls/safe guards to mitigate the hazard/impact.

3.2. Environmental Risk Management

All mining operations at Springvale are undertaken in accordance with EMPs and environmental procedures which have been developed to achieve compliance with SSD-5594, DA 11/92, EPBC 2011/5949, EPBC 2013/6881, EPL 3607 ,SMP Approvals (04/1673, 08/8497 and 11/3964), Longwall 419 and Longwalls 420-422 Extraction Plan Approvals. These management plans are integral to the implementation of the MOP and should be read in conjunction with this document. The management plans which have been prepared (or are in the process of being prepared) for Springvale are presented in **Table 13.**

Table 13. Springvale Management Plans

Management Plan	Condition	Status
Longwall 424 - 427 Extraction Plan: - Biodiversity Management Plan; - Built Features Management Plan; - Powerline Management Plan; - Private Property Management Plan; - Heritage Management Plan; - Land Management Plan; - Public Safety Management Plan; - Subsidence Monitoring Program; - Swamp Monitoring Programme; - Water Management Plan;	Schedule 3, Condition 10	Currently being prepared
Longwall 420 - 422 Extraction Plan: - Biodiversity Management Plan; - Built Features Management Plan; - Heritage Management Plan; - Land Management Plan; - Public Safety Management Plan; - Subsidence Monitoring Program; - Swamp Monitoring Programme; - Water Management Plan;	Schedule 3, Condition 10	Approved
Longwall 419 Extraction Plan: - Biodiversity Management Plan; - Built Features Management Plan; - Heritage Management Plan; - Land Management Plan; - Public Safety Management Plan; - Subsidence Monitoring Program; - Swamp Monitoring Programme; - Water Management Plan;	Schedule 3, Condition 10	Approved
Longwalls 411 – 418 Subsidence Management Plan: - Environmental Management Plan; - Environmental Monitoring Program; - Newnes Plateau Shrub Swamp Management Plan; - Public Safety Management Plan; - Infrastructure Management Plan; - Land Management Plan; - Subsidence Management Plan; - Subsidence Monitoring and Reporting Programme; - Subsidence Community Consultation Process;	Mining lease Requirement – now replaced by Extraction Plans	Approved

Management Plan	Condition	Status
Temperate Highland Peat Swamp on Sandstone Monitoring and Management Plan for Longwall 418;	EPBC Approval 2013/6881 Conditions 6 and 7	Approved
Western Region Noise Management Plan	Schedule 4, Condition 4	Approved
Western Region Air Quality & Greenhouse Gas Management Plan	Schedule 4, Condition 7	Approved
Upper Cox's River Action and Monitoring Plan	Schedule 4, Condition 13	Submitted – not approved
Western Region Water Management Plan, including: - Site Water Balance - Surface Water Management Plan - Groundwater Management Plan	Schedule 4, Condition 14	Submitted – not approved
Biodiversity Management Plan	Schedule 4, Condition 18	Submitted – not approved
Catchment Improvement and Land Management Plan	Schedule 4, Condition 18A	Submitted – not approved
Western Region Cultural Heritage Management Plan	SSD-5594 Schedule 4, Condition 24	Approved
Exploration and Minor Surface Infrastructure Management Plan	Schedule 4, Condition 28	Approved
Rehabilitation Management Plan	Schedule 4, Condition 32	This document (previous version approved)
Regional Stygofauna Monitoring and Assessment Plan;	Schedule 4, Condition 17	Approved
Pollution Incident Response Management Plan	EPL 3607	Prepared and Implemented

The above documents will be reviewed and updated as required, and where appropriate superseded for consistency with Development Consent requirements during the MOP term. In accordance with the requirements of Schedule 3, Condition 10 of SSD-5594 Extraction Plans will be prepared for any future secondary workings and submitted for approval by DPE and DRG.

3.3. Environmental Issues Management

3.3.1. Air Quality

Air quality at Springvale is managed in accordance with the *Western Region Air Quality and Greenhouse Gas Management Plan*. This document outlines the dust management and monitoring that will be undertaken by Springvale to ensure compliance with the requirements of SSD-5594 and EPL 3607. The *Western Region Air Quality and Greenhouse Gas Management Plan* was updated in 2016.

The main potential dust sources from the Springvale operations include unsealed or dirty traffic areas, coal stockpiles, ventilation fans and coal being conveyed. Dust controls used on unsealed or dirty traffic areas include the use of water carts, water cannons/sprinklers and regular road sweeping. Dust emissions from the mine ventilation fan are quite low due to the high humidity and low dust levels within the underground mine. In addition, low emission diesel fuel is used underground to reduce air borne particles. Extracted coal on the stockpiles which is transported by trucks is typically moist (10%), which reduces the likelihood of dust emanating from the stockpiles and haulage operations. Covers and coal moisture control dust emissions from surface conveyors.

Depositional dust monitoring occurs at two sites within the vicinity of the surface operations, and one High Volume Air Sampling (HVAS) unit operates on an adjoining property on Springvale Land, measuring Particulate Matter less than 10 micrometres in diameter (PM_{10}) and Total Suspended Particulates (TSP).

3.3.2. Erosion and Sedimentation

Erosion and sediment control activities at Springvale are undertaken in accordance with the Western Region Water Management Plan. Management of erosion and sedimentation at Springvale is implemented principally to ensure that water discharged off site complies with suspended solids limits detailed in EPL 3607. 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.

3.3.3. Surface Water

Springvale undertake the management and monitoring of surface water in accordance with the *Western Region Water Management Plan*. This document incorporates the recommended management measures and monitoring programs outlined within the Springvale Mine Extension Project EIS and the supporting specialist assessments. The principal objective of surface water management at Springvale is to ensure that the water quality leaving the site meets the appropriate quality standards outlined in EPL 3607.

The Springvale surface and underground water management systems control the quality of water leaving the site. Licenced Discharge Points (LDPs) are monitored during discharge in accordance with the requirements of SMP approvals, EMPs and EPL 3607. Monitoring results are reported in the Annual Review.

3.3.4. Groundwater

The management and monitoring of groundwater at Springvale is undertaken in accordance with the *Western Region Water Management Plan*. There is an extensive network of groundwater monitoring stations at Springvale, with monitoring results reported in the Annual Review. As part of the environmental management plans for Springvale Colliery, an intensive monitoring programme has been implemented on the Newnes Plateau to detect any impacts from underground mining on the groundwater regime, and in particular the Newnes Plateau Shrub Swamps (NPSS). The greater monitoring programme incorporates NPSS and groundwater monitoring locations above both Springvale and the adjacent Angus Place.

3.3.5. Contaminated Land

Measures implemented at the site to prevent contamination include storing all fuels and oils in purpose built facilities with appropriate bunding and firefighting 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 Springvale 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 MOP term.

A Phase 1 Assessment for the Springvale Mine was carried out in December 2010. In 2012 AECOM conducted a Targeted Phase 2 Environmental Site Assessment (Phase 2 ESA) at Springvale to assess the presence of contamination. The Phase 2 ESA identified on-site soil and groundwater contamination at a number of sites, including:

- Heavy end petroleum hydrocarbon contamination in soils in equipment storage areas;
- Elevated concentrations of heavy end petroleum hydrocarbons and naphthalene in one groundwater sample south east of the pit top area, as well as in sediment and surface water collected from a drainage channel discharging into Dam 3 and in surface water collected from Dam 4; and
- Dissolved cadmium, copper, nickel and zinc were reported at concentrations in the groundwater and surface water exceeding the adopted assessment criteria, however, some of these elevated metal concentrations may be attributed to naturally occurring background conditions.

The report concluded that the lateral and vertical extent of the soil and sediment contamination was not comprehensively evaluated due to the widespread distribution of sampling locations, and that further delineation sampling in each of the areas where contamination was identified would be required to confirm the extent of impact. Further studies will be continued during the MOP term.

3.3.6. Acid Mine Drainage

The potential for acid generation from the topsoil and subsoil (regolith) at Springvale 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 Springvale since the commencement of operations.

3.3.7. Flora and Fauna

The *Western Region Biodiversity Management Plan* (updated in 2017) 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 Springvale is undertaken in accordance with Appendix B of the *Western Region Biodiversity Management Plan.*

A range of management measures are implemented by Springvale 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 Springvale, detailed surveys of terrestrial vertebrate fauna populations have been undertaken on an annual basis, in spring, autumn and summer.

In accordance with Condition 7 of EPBC Approval 2011/5949, Springvale has prepared the *Temperate Highland Peat Swamps on Sandstone Monitoring and Management Plan for Longwalls 415 to 417*. In 2015 a *Temperate Highland Peat Swamps on Sandstone Monitoring and Management Plan* was prepared for Longwall 418 and EPBC 2013/6881 was granted by the Department of the Environment on 15 October 2015, prior to the commencement of secondary extraction in the panel.

The purpose of this Plan is to provide a structure for monitoring the federally listed Temperate Highland Peat Swamps on Sandstone (which includes the Newnes Plateau Shrub Swamps and Newnes Plateau Hanging Swamps communities as listed under the BC Act) systems to determine if there are any mining related impacts upon the communities.

Springvale will undertake secondary extraction in future longwall panels in accordance with an approved Extraction Plan, including a *Swamp Monitoring Program*. This document will replace the *Temperate Highland Peat Swamps on Sandstone Monitoring and Management Plan*. The Program will be prepared in consultation with OEH and the Department of the Environment.

Vegetation Clearing

In accordance with the requirements of Development Consent SSD-5594 Springvale will not clear more than 8.94 ha of native vegetation. In addition Springvale must also satisfy the requirements of the State Environmental Planning Policy (SEPP) (Mining, Petroleum Production and Extractive Industries) 2007. The SEPP exempts development for mine dewatering infrastructure where the construction activities are not within an environmentally sensitive area and are of minimal environmental impact. To meet the minimal impact criteria additional disturbance areas will be less than 0.25 ha (the threshold for biodiversity offsets). If the requirements of Development Consent SSD-5594 and the SEPP could not be met, a modification to the development consent will be required.

All disturbance has been located where possible to avoid threatened flora species (including the avoidance of all recorded *Persoonia hindii* and *Veronica blakelyi*), hollow bearing trees, EECs, and to minimise clearing.

All exploration activities will continue to be undertaken within EL 6974 and AUTH 460 in accordance with the requirements of the *Mining Act 1992* and the *Exploration and Minor Surface Infrastructure Management Plan*. Due-diligence field inspections and targeted surveys of the proposed drill sites and associated access tracks will be undertaken by appropriately qualified ecologists prior to commencement of works to ensure the potential for localised impacts and risks are minimised and, where necessary, appropriately managed. The due diligence assessments will include a “7 part test” of significance. In the event that threatened flora species, EECs or hollow bearing trees are identified during the due diligence inspections, access tracks and exploration/groundwater monitoring sites will be relocated to avoid impacts where possible. The combination of environmental sensitivity risk mapping and targeted due-diligence surveys of potential drill sites will provide greater flexibility in selecting the most suitable final drill site locations with minimal impact on the local environment.

Conservation Sites

The *Regional Biodiversity Strategy Western Projects* (RPS 2014a) was prepared to provide compensatory measures for the impacts associated with the following Centennial projects:

- Springvale Mine Extension Project
- Springvale Bore 8;
- Angus Place Mine Extension Project;
- Angus Place Ventilation Facility;
- Springvale Western Coal Services;
- Neubeck Coal Project; and
- Clarence Reject Emplacement Area (REA 6).

Conservation sites have been proposed that consider several factors, including providing greater areas of commensurate habitat to that being lost, wherever possible. Additionally, sites that have strategic value due to their position in relation to other large tracts of forested habitats or the existing or potential high biodiversity values have been investigated.

The offsets package outlined within the *Regional Biodiversity Strategy Western Projects* (RPS 2014a) has been divided into three forms:

(1) Offsets land to be secured in perpetuity with an Offsets Management Plan:
- Airly Offset Site; and
- Wolgan Road Northern Offset Site.

(2) Rehabilitation land in accordance with a defined Rehabilitation Plan:
- Wangcol Creek Rehabilitation;
- Lamberts Gully Rehabilitation; and
- Commonwealth Colliery Rehabilitation Site.

(3) Land management to be rehabilitated and restored as per a Land Management Plan:
- Wolgan Road Southern Management Site;
- Brays Lane, Lidsdale Management Site; and
- Coxs River, Angus Place Management Site.

EECs listed under the BC Act to be protected by these offsets include Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC (20.08 ha); and Montane Peatlands and Swamps (1.46 ha). Additionally the offset strategy includes the White Box – Yellow Box – Blakely's Red Gum Woodland Endangered Ecological Community (38.58 ha) which is listed as EEC under the BC Act and as a Critically Endangered Ecological Community (CEEC) under the EPBC Act.

The location of conservation sites are shown on Plan 4 (refer to **Appendix 2**). These sites are managed collectively by the Centennial West Operations in accordance with the *Regional Biodiversity Strategy Western Projects* (RPS 2014a) (refer to **Appendix 5**).

Cox's River Restoration Program

Many cumulative impacts affect the nature and quality of the Coxs River catchments. Impacts include mine water discharge from both underground mine operations and from open cut mine operations. Impacts to water quality and quantity are also experienced from power generation and from the surrounding human settlements.

The *Regional Biodiversity Strategy Western Projects* (RPS 2014a) provides an opportunity to implement the Coxs River Catchment Restoration Program, which is aimed to further enhance the biodiversity values that exist within the Coxs River Catchment and ameliorate the cumulative impacts associated with Centennial projects and the many other projects that influence the physical and chemical nature of the Coxs River. The bounds of the restoration program overlap with many of the conservation sites and have been included to provide a measure of the adequacy of all initiatives proposed in the Regional Strategy.

The core objective of the Coxs River Catchment Restoration Program is to improve the terrestrial and aquatic biodiversity value of the Coxs River. This will be achieved by removing grazing pressure; restoring riparian vegetation; native species planting within derived native grasslands; and weed removal/control including Willows.

The location of the Coxs River Catchment Restoration Program has been shown on Plan 4 (refer to **Appendix 2**). These areas will be managed collectively by the Centennial West Operations in accordance with the *Regional Biodiversity Strategy Western Projects* (RPS 2014a).

In addition, in 2018 the *Cox's River Catchment Improvement and Land Management Plan* (CILMP (GHD, 2018) was prepared and submitted to DPE in accordance with Schedule 4 Condition 18A of SSD-5594 (Mod 2). The objectives of the CILMP are to fulfil Centennial's statutory requirements and statement of commitments under Schedule 2 Condition 18A of SSD-5594 consent by:

- Providing a flexible and adaptable best-practice approach to native vegetation and riparian management and restoration at the project site;
- Guiding native vegetation and riparian management and restoration planning and works for a 10 year period;
- Protecting, restoring and enhancing in-stream native vegetation associations of the project site;
- Protecting, restoring and enhancing native vegetation associations within the riparian corridor of the project site;
- Partial restoration of natural Coxs River flows and hydrological function;
- Stabilising areas of active in-stream erosion;
- Directing the cost-effective management and delivery of best-practice native vegetation community restoration outcomes; and
- Advise best-practice and ecologically sustainable grazing management upon tenanted Centennial lots.

3.3.8. Weed and Pests

The most prominent weed species identified include Blackberry (*Solanum nigrum*), Scotch Thistle (*Cirsium vulgare*) and St Johns Wort (*Hypericum perforatum*) which are targeted by the noxious weed control program within the monthly surface maintenance program. Weeds are targeted during the autumn and spring seasons.

A Section 95 Certificate has been granted by the OEH to enable weed control works (including hand removal of weeds) to be undertaken in both the East Wolgan Swamp and Narrow Swamp (which are both Newnes Plateau Shrub Swamps EEC listed under the BC Act). A suitably qualified contractor (Bush Doctor) continues to undertake these works as required.

The *Western Region Biodiversity Management Plan* (updated in 2017) identifies the detailed measures which will be implemented to control weeds and feral pests.

3.3.9. Blasting

An Explosives Management Plan is in place at Springvale. Monitoring of ground vibration and over pressure levels is conducted during underground shot firing used to remove stone and dyke materials. An annual blast monitoring report is included in the Annual Review if any blasting was undertaken.

3.3.10. Noise

Springvale monitor and manage noise impacts in accordance with the Western Region Noise Management Plan. The main noise sources from Springvale include the compressor, coal handling plant and stockpile dozer.

During the MOP term Springvale will undertake construction and exploration drilling and/or groundwater monitoring activities on Newnes Plateau. These activities will be undertaken in accordance with the *Exploration Activities and Minor Surface Infrastructure Management Plan*. Noise assessments will be undertaken when proposed drill sites are in proximity to sensitive receivers.

Noise mitigation controls include the installation of noise attenuating mufflers on the stockpile dozer; installation of ‘quacker’ reverse alarms on the stockpile dozer during the daytime and use of a flashing light warning signal during the night time to replace the beeper; restricting the stockpile dozer to second gear while reversing to reduce ‘track slap’; and weekly inspection of conveyor idlers and prompt replacement of damaged or highly worn idlers during maintenance. Additionally, cladding has been installed on the southern wall of the ROM conveyor drive building.

3.3.11. Visual and Lighting

Visual impact mitigation measures have been incorporated into existing operations at Springvale and will continue to be utilised during the MOP term as relevant. Existing visual mitigation measures consist of:

- Elevated conveyors at the pit top are clad in neutral coloured steel sheeting;
- New infrastructure components will use non reflective and neutral toned cladding to reduce the visual impacts;
- Lights at the pit top have been designed and installed to Australian Standard 4282-1997 to minimise light spill and direct shining towards receptors;
- The pit top rehabilitation plan provides for revegetation with native woodland and grasslands;
- Newnes Plateau pipelines and powerlines will be buried and the clearing corridor promptly revegetated; and
- Newnes Plateau infrastructure will be progressively dismantled and rehabilitated to an appropriate land use.

Visual stray light is not considered to pose any potentially adverse environmental impacts at Springvale due to the small surface footprint, locality, and the distance to neighbouring properties. There have been no complaints received in the operating life of the Colliery in relation to visual stray light.

3.3.12. Heritage (Aboriginal and European)

During 2014 Centennial Coal prepared a *Western Region Aboriginal Cultural Heritage Management Plan* in consultation with relevant stakeholders. The plan was approved by the Department of Environment on 23 October 2014. This document provides Centennial Coal with a consistent approach to the following across the western operations:

- Consultation with Aboriginal communities regarding identification of Aboriginal cultural heritage sites;
- Identification of consistent minimum standards and processes for identification of Aboriginal heritage sites; and
- Monitoring and management of Aboriginal cultural heritage.

The *Western Region Aboriginal Cultural Heritage Management Plan* was updated in 2017.

Prior to the commencement of any exploration and/or groundwater drilling activities, due-diligence surveys will be undertaken in accordance with the *Western Region Aboriginal Cultural Heritage Management Plan*. Due diligence surveys will be undertaken by appropriately qualified heritage specialists to ensure the potential for localised impacts and risks are minimised and, where necessary, appropriately managed. In the event that Aboriginal heritage sites are identified, access tracks and exploration/groundwater monitoring sites will be relocated to avoid impacts. The combination of environmental sensitivity risk mapping and targeted due-diligence surveys of potential drill sites will provide greater flexibility in selecting the most suitable final drill site locations with minimal impact on the local environment.

If it is suspected Aboriginal Cultural Heritage Material has been encountered during the MOP term, work will cease immediately in that area, and the area will be cordoned off. Contact will be made with OEH, a suitably qualified archaeologist and the relevant Aboriginal stakeholders, so that it can be adequately assessed and managed. In the unlikely event that skeletal remains are uncovered, the relevant command area of the NSW Police will be contacted and if skeletal remains are deemed to be of Aboriginal origin, contact will be made with the OEH, a suitably qualified archaeologist and the relevant Aboriginal stakeholders.

European heritage is managed in accordance with the *Western Region Historic Heritage Management Plan* which was updated in 2016.

If, during the course of clearing works, significant European cultural heritage material is uncovered, work will cease in that area immediately. The NSW Heritage Branch will be notified and works only recommence when an appropriate and approved management strategy is instigated.

3.3.13. Spontaneous Combustion

The Lithgow Seam has a low to medium propensity for spontaneous combustion, with spontaneous combustion issues in relation to in-situ or processed Lithgow Seam coal being rare. The highest risk of spontaneous combustion in relation to coal from the Lithgow Seam appears to be during stockpiling for longer than one year. Coal at Springvale is stockpiled for short periods and subsequently spontaneous combustion is not considered to be an issue at the site. There have been no incidents of spontaneous combustion in the history of Springvale.

3.3.14. Bushfire

Springvale operates in accordance with a *Bushfire Management Plan*. Bushfire management is undertaken in consultation with the Rural Fire Service (RFS) and FCNSW. Fire management and controlled burns within the Newnes State Forest are the responsibility of FCNSW.

Springvale has reduced the operational risk of bushfire through incorporation of mitigation and avoidance measures during the design of proposed construction works. During the design phase, required asset protection zones (APZs) for dewatering boreholes and the mine services borehole area were incorporated. APZs for Booster Pump Station 1 and Booster Pump Station 2 will be determined prior to the commencement of construction. All new electrical power cables forming part of the infrastructure corridors to the dewatering bore sites and the mine services borehole will be trenched which avoids the potential for overhead lines to trigger bushfires or be destroyed by bushfires.

In accordance with the approved Bushfire Management Procedure, Springvale has committed to ensuring that there is an adequate APZ around all assets identified in the Bushfire Management Procedure, situated on land owned by Springvale and/or land managed/owned by a private or State organisation (i.e. FCNSW). For all assets with personnel working in them on a regular basis, the Bushfire Management Procedure stipulates the fuel load will be reduced down to 10 t/ha or less within 30 m of the asset. For all other assets the fuel load is to be reduced down to 10 t/ha or less within 20 m of the asset.

Springvale also undertakes a number of bushfire risk management procedures such as prohibiting entry into Newnes State Forest during severe fire weather, reducing fuel loads and maintaining access, having a fire response and a procedure for ‘hot works’. Personnel involved in ‘hot works’ are trained in emergency procedures. Fire hydrants and hoses have been installed at a number of locations around the pit top. The RFS will be requested to assist with any bushfire events in close proximity of the Pit Top.

3.3.15. Mine Subsidence

Springvale submitted an SMP Application seeking approval for the development and secondary extraction of Longwalls 411 – 418 in 2005 in accordance with the requirements of relevant mining tenements. SMP Approval was issued on 7 March 2006 (Reference Number 04/1673). Underground mining in Longwalls 411 to 418 has now been completed. Monitoring will continue to be undertaken post-mining in accordance with the approved Longwalls 411 – 418 SMP and component plans (refer **Table 13**).

In July 2016, the Longwall 419 Extraction Plan was approved by the DPE allowing for the secondary extraction of Longwall 419. The management and monitoring of mine subsidence resulting from the

secondary extraction of Longwall 419 was undertaken in accordance with the Longwall 419 Extraction Plan and component plans (refer **Table 13**).

In April 2017, the Longwall 420 – 422 Extraction Plan was approved by the DPE allowing for the secondary extraction of Longwalls 420 to 422. The management and monitoring of mine subsidence resulting from the secondary extraction of Longwalls 420 – 422 will be undertaken in accordance with the Longwall 420 – 422 Extraction Plan and component plans (refer **Table 13**).

Springvale is currently preparing an Extraction Plan to manage secondary extraction in Longwalls 424 to 427.

In accordance with the requirements of Schedule 3, Condition 10 of SSD-5594 and the *Draft Guidelines for the Preparation of Extraction Plans* (DPE 2015) Springvale will undertake all secondary extraction in future longwall panels in accordance with an approved Extraction Plan.

3.3.16. Public Safety

Public safety is a priority management aspect at Springvale. The mine has an approved *Public Safety Management Plan* to manage potential subsidence related risks to public safety in all surface infrastructure areas on Newnes Plateau. This has been developed during the preparation of previous SMP Applications and updated where required.

Springvale also implement controls measures including providing, where practical, fencing and warning signage around the pit top area, and security staff patrols on a regular basis. The *Public Safety Management Plan* also outlined management measures including erecting warning signs in areas that may be affected by subsidence and undertaking subsidence repairs as soon as practicable following identification. All actions will be completed as per the Trigger Action Response Plan.

A Construction Traffic Management Plan has been prepared to include measures such as warning signs at appropriate locations on the main access roads to the infrastructure sites. Caution will be advised to all road users for when access tracks will be used by increased numbers of heavy vehicles. Current controls will remain in place, and minimal risk to public safety is predicted.

Further detail regarding public safety is provided in the *Public Safety Management Plan*. This will be updated during the MOP term to include any relevant, new information.

3.4. Operational Issues which Affect Rehabilitation

3.4.1. Geology and Geochemistry

The Springvale holding contains seams of the Late Permian Illawarra Coal Measures, of the Cullen Bullen Subgroup. The Lithgow Seam is presently mined using the longwall retreat method of mining and this method will continue to be used throughout the duration of the MOP term. Depth of cover to the Lithgow Seam, directly above the proposed longwalls varies from 180 m to 420 m.

The main structures influencing strata behaviour at Springvale are large displacement strike slip faults and small displacement normal and reverse faults. Palaris (2013) established that there were four types of geological structures within the Springvale holding. Type 1 and Type 2 structure zones are interpreted to be structures that penetrate from the basement strata, through the coal measure strata, to the surface. It is therefore likely that these structures will affect the mine subsidence movements resulting from the secondary extraction of longwalls at Springvale. Type 3 structure zones are noted to occur only to Lithgow Seam level and Type 4 structure zones occur within the basement. It is therefore unlikely that Type 3 and Type 4 structures will have any significant effect upon mine subsidence movements resulting from secondary extraction of longwalls during the MOP term.

As a component of the Springvale Mine Extension Project EIS, MSEC (2013) prepared a report titled *Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Environmental Impact Statement for the Proposed Longwalls 416 to 432 and 501 to 503 in the Lithgow Seam*. MSEC assessed the potential for locally increased subsidence and compressive strains to result from mining in proximity to Type 1 and Type 2 structures. MSEC noted that "potential for impacts generally result from differential movements (i.e. curvature and strain), rather than from vertical subsidence. It is expected that the compressive strains at the lineaments above the proposed Longwalls 416 to 419 will be similar to those observed above the previously extracted longwalls at Angus Place and Springvale Collieries, which were typically between 5 mm/m and 15 mm/m." Subsequently it is not expected that geological structures should cause any increased subsidence that will affect rehabilitation.

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.

3.4.2. Material Prone to Spontaneous Combustion

As outlined in **Section 3.3.13**, the Lithgow Coal Seam has a low to medium propensity for spontaneous combustion and there have been no incidences of spontaneous combustion in the history of Springvale. Consequently, spontaneous combustion is not considered an operational issue that may affect rehabilitation at Springvale during the MOP term.

3.4.3. Material Prone to Generating Acid Mine Drainage

As outlined in **Section 3.3.6**, the potential for acid generation from the topsoil and subsoil (regolith) at Springvale is low and there have been no acid mine drainage issues identified at Springvale since the commencement of operations. Subsequently, acid mine drainage is not considered an operational risk that may affect rehabilitation at Springvale during the MOP term.

3.4.4. Mine Subsidence

Should subsidence impacts occur to surface features, remediation and rehabilitation will be undertaken in accordance with the existing SMP, and future approved Extraction Plans that will be developed. Subsidence remediation and rehabilitation will be on-going throughout the life of the mine. Any cracking in the surface soils associated with mining activities is expected to be typically within the range of less than 5 mm to 25 mm (MSEC, 2013). Surface cracks are expected to be generally isolated and minor in nature due to the reasonable depths of cover above the proposed longwalls, the relatively low magnitudes of predicted strain, and the clayey soils which can more readily absorb ground strains.

The majority of surface cracking is predicted to be naturally filled with soil during subsequent flow events, especially during times of heavy rainfall (MSEC, 2013). Any surface cracks within rehabilitated areas will be remediated in accordance with the methodology outlined in **Section 7.2.2**.

3.4.5. Erosion and Sediment Control

Erosion and sediment control/water management is outlined in **Sections 3.3.2** and **3.3.3**. The main operational erosion and sediment controls used in rehabilitation areas include:

- Clean water diversion drains and banks;

- Temporary drains;
- Sediment fences and other temporary controls;
- Sediment dams; and
- Inspections and monitoring.

Triggers for erosion and sediment control management in rehabilitation are outlined in the Trigger Action Response Plan (TARP) (refer to **Section 9.2**).

3.4.6. Soil Type(s) and Suitability

The topsoil associated with the proposed infrastructure to be constructed during the MOP term is generally stable; however, amelioration to improve soil structure and some inherent sodicity and acidity soil characteristics is generally required. While the sandy texture and the poor structure that characterises the majority of topsoils is not ideal, the soil is nonetheless able to facilitate germination, and appropriate management of this soil and amelioration (such as treatment with gypsum, lime, organic amendments etc.) will provide an acceptable and stable media for revegetation. Where practically possible, topsoil resources should be salvaged where they are to be disturbed and stockpiled for respreading during rehabilitation works (SLR 2013).

The subsoils range between stable and unstable due to characteristics such as sodicity, salinity and acidity. As a result of these factors, stripping the subsoil for most soil types is not recommended unless required for rehabilitation works (SLR 2013).

Table 14 summarises the limitations for the soil type situated associated with proposed construction areas and provides recommendation on suitable soil stripping depths.

Table 14. Recommended Soil Stripping Depths

Soil Type		Recommended Soil Stripping Depth (m)	Recommended Amelioration for Stripped Soil	Stripping Depth Limitation	Associated Surface Infrastructure
No.	Name				
2	Mesotrophic Brown Kandosol	0 – 0.10	None	Strongly sodic subsoil	- Dewatering Bore 10 services area - Mine services borehole compound
4	Brown-Orthic Tenosol	0 – 0.25	Organic amendments to improve structure required. Lime or gypsum application to improve soil acidity.	Marginally sodic subsoil	- Mine services borehole compound
6	Mesotrophic Brown Kandosol	0 – 0.40	Organic amendments to improve structure required. Lime or gypsum application to improve soil acidity.	Sodic subsoil	- Dewatering Bore 10 services area - Mine services borehole compound - Booster Pump Stations 1 and 2 - Infrastructure corridor
7	Dystrophic Brown Kandosol	0 – 1.10	Lime or gypsum application to improve soil acidity.	Parent Material	- Dewatering Bore 10 services area

3.4.7. Flora and Fauna

During the MOP term Springvale will undertake secondary extraction of longwalls beneath Newnes Plateau Shrub Swamps and Newnes Plateau Hanging Swamps.

Temperate Highland Peat Swamps on Sandstone (THPSS) systems are federally listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). THPSS include the Newnes Plateau Shrub Swamps and Newnes Plateau Hanging Swamps communities as listed under the *Biodiversity Conservation Act 2016* (BC Act).Centennial Coal has significant experience with 13 Newnes Plateau Shrub Swamps and 26 Newnes Plateau Hangings Swamps being directly or partially mined beneath at Springvale and Angus Place. As a component of the Springvale Mine Extension Project EIS, MSEC (2013) prepared a report titled *Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Environmental Impact Statement for the Proposed Longwalls 416 to 432 and 501 to 503 in the Lithgow Seam*. This assessment concluded that "The studies undertaken indicate that the incidence of impacts on swamps due to mine subsidence ground movements is very low and, in some of these cases, the impacts that were observed were associated with natural events or mining related surface activities. It is expected, therefore, that the incidence of impacts on the swamps within the Extension Area resulting from mining induced ground movements will also be low" (MSEC 2013).

In the event that impacts were to be identified within Newnes Plateau Shrub Swamps or Newnes Plateau Hanging Swamps, rehabilitation of the sites will be undertaken in accordance with the *Temperate Highland Peat Swamps on Sandstone Monitoring and Management Plan,* the *Western Region Biodiversity Management Plan* (updated in 2017) , or the Swamp Monitoring Program. . All rehabilitation will be undertaken in consultation with DRG, OEH, FCNSW and the Department of Environment.

As outlined in **Section 3.3.7**, due diligence surveys will be undertaken by appropriately qualified ecologists prior to the commencement of any exploration and/or groundwater drilling activities. In the event that threatened flora species, EECs or hollow bearing trees are identified during the due diligence inspections, access tracks and exploration/groundwater monitoring sites will be relocated to avoid impacts where possible.

Management of feral animals will be undertaken as outlined in **Section 3.3.8**. No additional fauna related risks to rehabilitation have been identified.

3.4.8. Slopes and Slope Management

Potential subsidence-related impacts upon slopes will be remediation and rehabilitation in accordance with the existing SMP and Extraction Plans, as well as future approved Extraction Plans that will be developed. Steep slopes will be visually monitored throughout the mining period and up until mining induced movements cease.

There are no additional identified slope related risks to rehabilitation at Springvale.

3.4.9. Visual and Lighting

There are no identified visual or lighting risks to rehabilitation at Springvale.

3.4.10. Heritage (Aboriginal and European)

The *Springvale Mine Extension Project Cultural Heritage Impact Assessment* (RPS 2014b) identified thirty four Aboriginal cultural heritage sites within the colliery holding or within 50 m of this boundary. One locally listed heritage item exists above Longwalls 426 and 427. Item I245 is listed on the Lithgow Local Environmental Plan (LEP) and consists of the Wolgan Valley Railway Corridor (Newnes

to Zig Zag). The present state of physical archaeological remains associated with this item within the area is unknown. The majority of the route currently follows an unsealed public road.

Of the Aboriginal cultural heritage sites identified, none were located in areas of proposed construction.

As outlined in **Section 3.3.12**, due diligence surveys will be undertaken by appropriately qualified heritage specialists prior to the commencement of any exploration and/or groundwater drilling activities. In the event that Aboriginal heritage sites are identified, access tracks and exploration/groundwater monitoring sites will be relocated to avoid impacts.

3.4.11. Bushfire

The majority of the land within the Project Approval Area has been identified as bushfire prone land. Fire history data from the FCNSW indicates that the majority of bushfires in the area spread from the north and east of Springvale Colliery due to the direction of dominant winds throughout the bushfire season. A number of fire trails exist across the Newnes Plateau, namely Sunnyside Ridge Road, Campbells Track and Maiyingu Marragu Trail. These act as containment lines mitigating a degree of bushfire risk to Springvale Colliery's infrastructure.

Existing infrastructure at the pit top and on Newnes Plateau are surrounded with the relevant bushfire Asset Protection Zones (APZs) as defined by Rural Fire Services (RFS, 2006a).

Springvale has reduced the operational risk of bushfire through incorporation of mitigation and avoidance measures in the Project design. During the design phase, required APZs for dewatering boreholes and the Mine Services Borehole area were incorporated into Project. APZs for Bore 10 and the SWTP will be determined prior to the commencement of construction. All new electrical power cables forming part of the infrastructure corridors to the Bore 10 site and the Mine Services Borehole will be trenched which avoids the potential for overhead lines to trigger bushfires or be destroyed by bushfires.

Springvale Colliery has established a *Bushfire Management Plan* and the associated *Bushfire Management Procedure* in consultation with the NSW Rural Fire Service. These documents identify both the risks posed by bushfire to Springvale Colliery assets, and control strategies to mitigate these risks.

4. POST MINING LANDUSE

4.1. Regulatory Requirements

Regulatory requirements specific to post-mining land use, landscape and rehabilitation outcomes at Springvale are summarised in **Table 15**.

Table 15. Regulatory Requirements Relating to Post Mining Land Use and Rehabilitation

Section/Condition	Requirement	Applicable Area	Status
SSD-5594			
Schedule 4, Condition 30	Mine Site (as a whole) is to be safe, stable and non-polluting.	Entire site	In progress
	Rehabilitation materials from disturbed areas are to be recovered, managed and recovered to be used as rehabilitation resources.	Entire site	In progress
	Surface infrastructure to be decommissioned and removed (unless the Department agrees otherwise) and revegetated with suitable local native plant species to a landform consistent with the surrounding environment.	Entire site	In progress
	Portals and vent shafts to be decommissioned and made safe and stable; habitat for threatened species (e.g. bats) is to be retained, where practicable.	Entire site	To be undertaken at mine closure
	Revegetated final landforms are to be stable and sustain the intended land use, be consistent with the surrounding topography to minimise visual impacts and incorporate relief patters and design principles consistent with natural drainage.	Entire site	In progress
	Native flora and fauna - flora species used in rehabilitation selected to re-establish and complement local and regional biodiversity. Rehabilitated areas contribute to achieving self-sustaining biodiversity habitats.	Entire site	In progress
	All watercourses subject to mine- water discharges and/or subsidence impacts - hydraulically and geomorphologically stable, with aquatic ecology and riparian vegetation that is the same, or better than prior to grant of this consent.	Entire site	In progress
	Cliffs, minor cliffs and steep slopes result in no additional risk to public safety compared to prior to mining.	Entire site	In progress
	Other land affected by the development – restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native plant species (unless the Department agrees otherwise).	Entire site	In progress
	Built features damaged by mining operations repair to pre-mining condition or equivalent unless the: owner agrees otherwise; or damage is fully restored, repaired or compensated for under the *Mine Subsidence Compensation Act 1961*.	Entire site	In progress
	Community – ensure public safety; and minimise the adverse socio-economic effects associated with mine closure.	Entire site	To be undertaken at mine closure

Section/Condition	Requirement	Applicable Area	Status
Schedule 4, Condition 31	Progressive Rehabilitation – The Applicant shall rehabilitate the site progressively, that is, 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.	Entire site	In progress
Schedule 4, Condition 32	Rehabilitation Management Plan – The Applicant shall prepare and implement a Rehabilitation Management Plan for the development to the satisfaction of the Department *Note: Specific requirements of the Rehabilitation Management Plan have been addressed in* ***Table 3****.*	Entire site	In progress
Statement of Commitments			
12	Progressive rehabilitation will be undertaken in accordance with the Rehabilitation Strategy appended to this EIS. Within 6 months of approval, the Mining Operations Plan will be updated to include the rehabilitation requirements outlined in the Rehabilitation Strategy of this EIS.	Entire site	In progress
SSD-7592			
Schedule 3, Condition 24	Development site (as a whole) is to be safe, stable and non-polluting.	SWTP	In progress
	Above ground ancillary infrastructure - The visual impact of any above ground ancillary infrastructure agreed to be retained is to be minimised as far as is reasonable and feasible.	SWTP	In progress
	Surface infrastructure - All surface infrastructure sites (including pipeline routes) are to be revegetated with suitable local native species to a landform consistent with the surrounding environment.	SWTP	In progress
	Land use – land capability will be restored to pre-existing uses	SWTP	In progress
	Community – ensure public safety	SWTP	In progress
Schedule 3, Condition 25	Progressive rehabilitation – the Applicant must rehabilitate all areas of the site not proposed for future disturbance (including pipeline routes) progressively; that is as soon as reasonably practicable following construction and decommissioning.	SWTP	In progress
	Minimise the total area exposed at any time;	SWTP	In progress
	Employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursion on parts of the site that cannot yet be permanently rehabilitated.	SWTP	In progress
Statement of commitments	Trenched sections of pipeline on the Newnes Plateau will be rehabilitated as soon as practicable following pipeline installation.	SWTP	In progress
	All surfaces and / or property disturbed or damaged by the proposed works will be replaced, repaired, re-instated, or otherwise restored to a pre-existing or better condition.	SWTP	In progress
Mining Tenements			

Section/Condition	Requirement	Applicable Area	Status
ML 1537, Condition 35 (k)	The lease holder shall consult with the Authority and take account of the Authority's input in the planning phase of the rehabilitation to ensure the measures to be undertaken are to the satisfaction of the Authority with regards to water quality protection and future land use.	Lease area	In progress
ML1303, ML1323, ML 1727 and MPL314, Condition 2	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Lease area	In progress
ML1303, Condition 3(b) , ML1323, ML 1727 and MPL314, Condition 3(b)	The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which: (i) identifies areas that will be disturbed; (ii) details the staging of specific mining operations, mining purposes and prospecting; (iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use; (iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and (v) reflects the conditions of approval under: the *Environmental Planning and Assessment Act 1979*; the *Protection of the Environment Operations Act 1997*; and other approvals relevant to the development including the conditions of this mining lease.	Lease area	Complete
ML1303 and ML 1727, Condition 3(f)	The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must: (i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP; (ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and (iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website.	Lease area	In progress
ML1537, Condition 21 and 23	If so directed by the Minister the registered holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any lands within the subject area which may have been disturbed by the operations hereby authorised, whether such operations were or were not carried out by the registered landholder, or by prospecting operations carried out by the registered landholder.	Lease area	In progress
ML1537, Condition 22	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this concession or authorisation, as the case may be, or any renewal thereof, the registered holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Lease area	To be undertaken at mine closure
ML1537, Condition 36(h)	During operations and progressively, the registered holder shall rehabilitate, consolidate and make trafficable all roads and firebreaks at present existing and which may be affected by the operations to the	Lease area	In progress

Section/Condition	Requirement	Applicable Area	Status
	satisfaction of the District Forester, the Regional Manager or his deputy.		
EL 6974, Condition 25	The license holder must ensure that all topsoil removed in the course of prospecting operations is stockpiled for later use in rehabilitating those operations.	Lease area	In progress
EL 6974, Condition 26(h)	Once a borehole ceases to be used, the borehole must be completely filled with cement grout during drill rod withdrawal and plugged, unless otherwise approved by the Minister.	Lease area	In progress
EL 6974, Condition 37 and EL 6974, Condition 41	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.	Lease area	In progress
EL 6974, Condition 38	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; (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.	Lease area	In progress
EL 6974, Condition 39	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.	Lease area	In progress
EL 6974, Condition 40	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.	Lease area	In progress
EL 6974, Condition 42	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.	Lease area	In progress
EL 6974, Condition 44	The (Environmental Management) Report must be prepared in accordance with any Director- General's requirements for environmental and rehabilitation reporting on exploration licences and include	Lease area	In progress

Section/Condition	Requirement	Applicable Area	Status
	information on all disturbance resulting from prospecting operations and rehabilitation carried out within the exploration licence area. The report must be prepared to the satisfaction of the Director-General.		
ML1326, ML153 CL377 and ML1588, Condition 2(4)	The MOP must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify: (b) mining and rehabilitation method(s) to be used and their sequence; (f) progressive rehabilitation schedule; (j) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining land use/vegetation.	Lease area	Complete
ML 1326, CL377 and ML1588, Condition 15 (2)	If the lease holder drills exploratory drill holes he must satisfy the Director General that: g) once any drill hole ceases to be used the land and its immediate vicinity is left in a clean, tidy and stable condition.	Lease area	In progress
ML 1326, Condition 29	The lease holder shall: j) complete work in relation to rehabilitation within the Warragamba Outer Catchment Area before termination of the authority to the satisfaction of the Authority.	Lease area	In progress
ML1670, Condition 7	Any disturbance as a result of these activities under this lease must be rehabilitated to the satisfaction of the Director- General.	Lease area	In progress
AUTH460, Condition 16 and ML1670, Condition 14(d)	(g) As soon as possible after they are no longer required for prospecting operations temporary access tracks must be rehabilitated and revegetated to the satisfaction of the Department. (h) Rehabilitation activities undertaken in regard to this condition must be included in reports prepared in accordance with condition 28(a).	Lease area	In progress
AUTH460, Condition 23(b)	(vi) once any drill hole ceases to be used the land and its immediate vicinity is to be rehabilitated to its former condition	Lease area	In progress
AUTH460, Condition 27	Land disturbed must be rehabilitated to 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. (v) The land does not pose a threat to public safety. (b) Any topsoil that is temporarily removed	Lease area	In progress

Section/Condition	Requirement	Applicable Area	Status
	from an area of prospecting operations must be stored, maintained and returned as soon as possible in a manner acceptable to the Department. (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. (d) All rehabilitation of disturbed areas should be completed before the expiry of the licence or immediately following termination of the licence.		
Occupation Permit			
Occupation Permit 2349, Condition 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.	Occupation Permit Area	In progress
Occupation Permit 2349, Condition 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.	Occupation Permit Area	In progress
Occupation Permit 2349, Condition 4.11	If the Applicant or Applicant's 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.	Occupation Permit Area	In progress
Occupation Permit 2349, Condition 7.2.1	The applicant must remove or fill as the case may be all excavations and other earth works so as not to compromise the rehabilitation potential of the Area in particular to with regard to standing timber or the surface of the ground including anything that may result in erosion of the soils in the Area, in carrying out such remediation works.	Occupation Permit Area	In progress

4.2. Post Mining Land Use Goal

Springvale is required under the Development Consent and mining tenements to return any land disturbed by mining operations to its pre-mining capacity. The proposed post mining land use at Springvale 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.

With the different proposed post mining land uses, the landscape goals differ. Post mining land use options were assessed during the preparation of the Springvale Mine Extension Project EIS, which was submitted to support an application for Development Consent to the DPE. Development Consent

SSD-5594 was approved on 21 September 2015. The post-mining land uses outlined in this MOP are consistent with the EIS and the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) (refer to **Appendix 4**).

Most of the site will be returned to 'woodland' which is consistent with the surrounding land use and the pre-mining environment. The final landform will also include permanent water bodies and drainage structures that will be maintained for future use. In accordance with the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) and as outlined within this MOP, Centennial Coal propose to retain all tracks to infrastructure facilities on Newnes Plateau in the final landform for use as fire trails or access tracks by recreational users of Newnes State Forest and FCNSW. However, unless retention for future use, including management responsibility, has been accepted by FCNSW these access roads will be rehabilitated following the cessation of mining activities.

A conceptual final landform rehabilitation plan which details land use is provided on Plan 4 (refer to **Appendix 2**).

4.3. Rehabilitation Objectives

Rehabilitation objectives for Springvale are outlined in Schedule 4, Condition 30 of Development Consent SSD-5594 and have been provided as **Table 16**.

Table 16. SSD-5594 Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	• Safe, stable & non-polluting.
Rehabilitation materials	• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources.
Surface infrastructure	• To be decommissioned and removed unless DRG agrees otherwise. • All surface infrastructure sites are to be revegetated with suitable local native plant species to a landform consistent with the surrounding environment.
Portals and vent shafts	• To be decommissioned and made safe and stable. • Retain habitat for threatened species (e.g. bats), where practicable.
Revegetated final landforms	• Stable and sustain the intended land use • Consistent with surrounding topography to minimise visual impacts • Incorporate relief patterns and design principles consistent with natural drainage
Native flora and fauna	• Flora species used in rehabilitation selected to re-establish and complement local and regional biodiversity • Rehabilitated areas contribute to achieving self-sustaining biodiversity habitats
Watercourses subject to mine-water discharges and/or subsidence impacts	• Hydraulically and geomorphologically stable, with aquatic ecology and riparian vegetation that is the same, or better than prior to grant of this consent.
Cliffs, minor cliffs and steep slopes	• No additional risk to public safety compared to prior to mining.
Other land affected by the development	• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native plant species (unless DRG agrees otherwise).
Built features damaged by mining operations	• Repair to pre-mining condition or equivalent unless the: - owner agrees otherwise; or - damage is fully restored, repaired or compensated for under the

Feature	Objective
	Mine Subsidence Compensation Act 1961.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects associated with mine closure.

Specific rehabilitation objectives to the SWPT are outlined in Schedule 3, Condition 24 of Development Consent SSD-7592 and have been provided as **Table 17.**

Table 17. SSD-7592 Rehabilitation Objectives

Feature	Objective
Development site (as a whole)	• Safe, stable and non-polluting; • Minimise the visual impact of any above ground ancillary infrastructure agreed to be retained or an alternative use as far as is reasonable and feasible.
Surface infrastructure	• To be decommissioned and removed unless the Department agrees otherwise. • All surface infrastructure sites (including pipeline routes) are to be revegetated with suitable local native species to a landform consistent with the surrounding environment.
Land use	• Restore land capability to pre-existing uses
Community	• Ensure public safety.

In order to achieve the post mining land use goal outlined in **Section 4.2**, Springvale has developed a number of additional rehabilitation objectives. These objectives are:

- Rehabilitation and the outcomes will be consistent with the EIS and subsequent documents 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, 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 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 effectively as possible whilst providing that the above objectives are achieved.

4.4. Proposed Post Mining Landform

There will be no significant change in landform during and after mining to what is current. Springvale is located in an area of significant topographical variation, with existing elevation across the colliery

holding ranging from 900 m AHD to greater than 1,175 m AHD. Topography across the colliery holding comprises narrow gorges with high ridgelines and steep sided slopes of sandstone cliffs.

Being an underground mine, only very minor landform changes are expected to occur due to minimal subsidence (which will not require landform re-shaping). The maximum predicted total vertical subsidence in the mining area outside the surface lineaments is 1,650 mm. The maximum predicted total curvature (both hogging and sagging) is 0.60 km^{-1} and maximum predicted tilt of 25 mm/m (representing a change in grade of 1 in 40). Given the rugged topography of the existing landform, the final landform will be comparable with the existing landform.

Minor cut and fill may be required at Newnes Plateau infrastructure sites and more substantial cut and fill at the pit top. In limited cases, minor trimming of fill batters will be required. No bulk earthmoving or significant landform re-shaping is proposed.

The proposed final landform following the completion of mining and rehabilitation activities has been illustrated on Plan 4 (refer to **Appendix 2**).

4.5. Detailed Mine Closure Planning

In accordance with the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014) and the *Strategic Framework for Mine Closure* (Minerals Council of Australia, 2004) Springvale will commence the detailed mine closure planning process at least five years prior to the anticipated mine closure date (i.e. the planned cessation of mining). Based upon current approvals, mining operations at Springvale will cease in 2025. SSD_5594 approves Springvale to carry out mining operations on the site until 31 December 2028.

Detailed mine closure planning will include the following:

- Stakeholder consultation regarding mine closure will commence five years prior to planned closure of the mine to assist in minimise long term impacts associated with mine closure, including socio-economic impacts;
- An agreed detailed mine closure plan will be developed at least two years prior to the anticipated mine closure date;
- An infrastructure demolition plan will be developed two years prior to mine closure; and
- The final closure plan will be submitted to the appropriate regulatory agencies for approval two years prior to cessation of mining.

5. REHABILITATION PLANNING AND MANAGEMENT

5.1. Domain Selection

In accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013), Springvale has been categorised into a series of primary (operational) domains and secondary (post mining land use) domains as outlined in **Table 18**. Primary domains at the commencement of the MOP term have been illustrated on **Plan 2** and the proposed post mining land use (secondary domains) that these operational areas will be rehabilitated to following the cessation of mining at Springvale have been shown on **Plan 4** (refer to **Appendix 2**).

Primary domains have been defined on the basis of existing land management units within the mine site which have similar operational purposes and therefore similar geophysical characteristics. Secondary domains have been defined as land management units characterised by similar post mining land use objectives.

Table 18. Domain Table

Primary Domain	Code	Secondary Domain	Code
Infrastructure – Includes existing and proposed infrastructure and facilities at the pit top and Newnes Plateau including workshops, administration buildings, powerlines (overhead and trenched), pipelines (trenched), substations, car parks, access roads, sewage treatment plant and associated irrigation area, hardstand/laydown areas, coal stockpile areas, underground infrastructure including mine access, ventilation shafts, service boreholes, booster pump stations, pipelines, dewatering bore facilities, associated water management structures, exploration and/or groundwater monitoring sites, and existing rehabilitation areas. The dewatering bores and other infrastructure no longer required will be progressively rehabilitated. Equipment components within this domain that are not sold at mine closure or relocated to other Centennial Coal sites will be decommissioned and/or demolished. The disturbed areas will be rehabilitated, with the exception of the tracks to the infrastructure facilities on Newnes Plateau. In accordance with SSD-5594, these tracks will not be rehabilitated but will be retained for use as fire trails or access tracks by recreational users of Newnes State Forest and FCNSW.	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 Newnes State Forest and FCNSW.	A
Other Areas – Includes all areas not captured in Domains 1, 3, 4 and 5. The Domain includes the existing mining areas where limited rehabilitation works may be required due to subsidence impacts. This also includes some infrastructure on the Newnes Plateau, such as boreholes, where remediation may be required. However, this excludes all disturbance associated with the construction/maintenance activities undertaken by service providers (i.e. power and roads).	2	**Rehabilitation Woodland** – Comprises the Springvale Pit Top, existing rehabilitation and components of infrastructure areas from the Newnes Plateau that will be rehabilitated, but will exclude access tracks and overhead 11 kV and 66 kV powerlines. Areas will be rehabilitated with woodland species commensurate with adjacent remnant vegetation. Includes all rehabilitation to be undertaken on the Newnes Plateau and covers areas adjacent to the existing undisturbed native vegetation. This domain will continue to provide wildlife corridors.	B

Primary Domain	Code	Secondary Domain	Code
Water Management Area – Includes the network of dams and associated water management infrastructure at Springvale pit top. These structures will not be decommissioned at the end of mine life but will be maintained for future use.	3	**Rehabilitation Water Management Area** – Comprises the footprint of water management structures retained in the final landform at the Springvale pit top.	C
Conservation Sites – Includes the Airly Offset Site, Wolgan Road Northern Offset Site, Wangcol Creek Rehabilitation, Lamberts Gully Rehabilitation, Commonwealth Colliery Rehabilitation Site, Wolgan Road Southern Management Site, Brays Land Lidsdale Management Site and the Coxs River Angus Place Management Site. The Conservation Sites are managed collectively by the Centennial West Operations in accordance with the October 2014 version of the *Regional Biodiversity Strategy Western Projects* (RPS 2014a) (refer to **Appendix 5**).	4		
Existing Rehabilitation - This domain includes existing rehabilitation areas at the Bore 1 – 4 dewatering facilities, services corridor to the Bore 8 dewatering facility, Old Fire Dam, Settlement Pond, ventilation facility and infrastructure corridors associated with Booster Pump Station 1 and 2.	5		

5.2. Domain Rehabilitation Objectives

General rehabilitation objectives for Springvale are outlined in **Section 4.3**. Rehabilitation Domains require specific management objectives to realise the desired final land use outcome due to the distinct geophysical features associated with the current land function.

Rehabilitation objectives for each domain, and the relevant regulatory and approval requirements, are listed in **Table 19**.

Table 19. Domain Rehabilitation Objectives

Domain	Rehabilitation Objectives
Primary Domains	
Domain 1 – Infrastructure	• All infrastructure removed or made safe. • All hazardous materials and contaminated materials removed. • Stable landform that is non-polluting. • Drainage structures will be designed and constructed where required in accordance with Blue Book. • Land and Soil Capability Class 5. • Ecosystem health satisfying completion criteria. • Ecosystem structure satisfying completion criteria. • Ecosystem composition satisfying completion criteria.

Domain	Rehabilitation Objectives
Domain 2 – Other Areas	• Stable landform that is non-polluting. • Drainage structures will be designed and constructed where required in accordance with Blue Book. • Land and Soil Capability Class 5. • Ecosystem health satisfying completion criteria. • Ecosystem structure satisfying completion criteria. • Ecosystem composition satisfying completion criteria.
Domain 3 – Water Management Area	• Water quality non-polluting and appropriate for agricultural final land use. • Water quality leaving site to be in accordance with the EPL water quality criteria. • Drainage structures will be designed and constructed where required in accordance with Blue Book requirements.
Domain 4 – Conservation Sites	• Stable landform that is non-polluting. • Drainage structures will be designed and constructed where required in accordance with Blue Book requirements. • Land and Soil Capability Class 5. • Ecosystem health satisfying completion criteria. • Ecosystem structure satisfying completion criteria. • Ecosystem composition satisfying completion criteria. • Local native plant species. • A landform consistent with the surrounding environment. • Overall management in accordance with the *Regional Biodiversity Strategy (RPS 2014).*
5 - Existing Rehabilitation	• All hazardous materials and contaminated materials removed. • Stable landform that is non-polluting. • Drainage structures will be designed and constructed where required in accordance with Blue Book. • Land and Soil Capability Class 5. • Ecosystem health satisfying completion criteria. • Ecosystem structure satisfying completion criteria. • Ecosystem composition satisfying completion criteria.
Secondary Domains	
Domain A - Infrastructure	• All hazardous materials and contaminated materials removed. • Stable landform that is non-polluting. • Drainage structures will be designed and constructed where required in accordance with Blue Book.
Domain B – Rehabilitation Woodland	• All hazardous materials and contaminated materials removed. • Stable landform that is non-polluting. • Drainage structures will be designed and constructed where required in accordance with Blue Book. • Land and Soil Capability Class 5. • Ecosystem health satisfying completion criteria. • Ecosystem structure satisfying completion criteria. • Ecosystem composition satisfying completion criteria.
Domain C – Rehabilitation Water Management Area	• Water quality non-polluting and appropriate for agricultural final land use. • Water quality leaving site to be in accordance with the EPL water quality criteria. • Drainage structures will be designed and constructed where required in accordance with Blue Book requirements.

5.3. Rehabilitation Phases

Achievement of the agreed post mining land use will be achieved through a series of conceptual phases which are described as:

- **Phase 1: Decommissioning** – removal of hard stand areas, plant, equipment, buildings and other structures, contaminated materials, hazardous materials;
- **Phase 2: Landform Establishment** – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology;
- **Phase 3: Growth Medium Development** – incorporates physical, chemical and biological components of the growing media and ameliorants that are used to optimise the potential of the media in terms of the preferred vegetative cover;
- **Phase 4: Ecosystem Establishment** – incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control /management and establishment of flora;
- **Phase 5: Ecosystem Development** – incorporates components of floristic structure, nutrient cycling recruitment and recovery, community structure and function which are the key elements of a sustainable landscape; and
- **Phase 6: Land Relinquishment** – completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished from the mine lease.

Table 20 provides a summary of the expected completion of rehabilitation phases for each relevant domain at the end of the MOP term. The projected rehabilitation phases in 2025 have been shown on **Plan 3H** (refer to **Appendix 2**).

Table 20. Summary of Projected Rehabilitation Phases at end of the MOP Term

Domain / Rehabilitation Phase	Infrastructure – Infrastructure (1A)	Infrastructure – Rehabilitation Woodland (1B)	Other Areas – Rehabilitation Woodland (2B)	Water Management Area – Rehabilitation Water Management Area (3C	Conservation Sites – Rehabilitation Woodland (4B)	Existing Rehabilitation – Rehabilitation Woodland (5B)
Active	✓	✓	✓	✓	✓	✓
Phase 1 – Decommissioning	×	×	×	×	✓	✓
Phase 2 – Landform Establishment	×	×	×	×	✓	✓
Phase 3 – Growth Medium Development	×	×	×	×	✓	✓
Phase 4 – Ecosystem and Land Use Establishment	×	×	×	×	✓	✓

Domain / Rehabilitation Phase	Infrastructure – Infrastructure (1A)	Infrastructure – Rehabilitation Woodland (1B)	Other Areas – Rehabilitation Woodland (2B)	Water Management Area – Rehabilitation Water Management Area (3C	Conservation Sites – Rehabilitation Woodland (4B)	Existing Rehabilitation – Rehabilitation Woodland (5B)
Phase 5 – Ecosystem and Land Use Sustainability	×	×	×	×	✓	✓
Phase 6 – Land Relinquishment	×	×	×	×	×	×

6. PERFORMANCE INDICATORS, AND COMPLETION CRITERIA/RELINQUISHMENT CRITERIA

6.1. Performance Measures

Performance measures are used to quantify the rehabilitation and land management program in terms of efficiency and effectiveness. They are also used to establish the indicative timeframes for completion, and the standards of completion.

During the MOP term, performance measures used to quantify rehabilitation will include:

- Inspections for indicators relating to landform design;
- Rehabilitation monitoring;
- Water monitoring;
- Flora and fauna monitoring;
- Soil sampling.

6.2. Performance Indicators and Completion Criteria

Performance indicators will be used during rehabilitation to assess performance at Springvale. Indicators relate to both the biophysical and built environment, and can be measured consistently over time. Indicators used will include:

- Removal of infrastructure upon decommissioning;
- Adequate condition of slopes, drainage, and erosion on rehabilitation areas;
- Results of hazardous materials audits within specified ranges;
- Water management structures are safe, stable and non-polluting;
- Soil parameters adequate to sustain ecosystems;
- Vegetation communities and structure development consistent with analogue communities; and
- Water quality within EPL and Development Consent parameters.

The performance indicators and completion criteria for each of the rehabilitation phases are included in **Tables 21 - 25**.

Table 21. Phase 1 – Decommissioning Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
All Domains						
Hazardous and contaminated materials removed, remediation of land as required.	Removal of hazardous materials	A hazardous materials assessment has been undertaken and any hazardous and contaminated materials are identified and removed from site by a licenced contractor (verified by Certificates of disposal).	Section 5.6 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Remediation of contaminated land as required	A contamination assessment has been undertaken and any contaminated areas have been remediated so that appropriate guidelines for land use are satisfied.	Section 5.5 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Carbonaceous material	Remove remaining carbonaceous material.	Section 8.1.1.6 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain 1 – Infrastructure						
Built infrastructure including: the Bore 6, Bore 8 and Bore 10 dewatering facilities; the service borehole facility; booster pump stations, SWTP, exploration drill hole sites; infrastructure corridors following the trenching of pipelines and power cables will be progressively decommissioned when no longer required. All other infrastructure will be decommissioned post mining.	Removal of infrastructure	Remove all nominated infrastructure, unless agreed with stakeholders, including the landowner FCNSW, for their retention.	Section 8.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Demolition of infrastructure	All demolition work has been carried out in accordance with *AS2601-2001: Demolition of Structures* or its latest version	Section 3.2.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Disconnect / remove services	All services, including power, water, data and telephone, that are not required for demolition activities have been safely isolated, disconnected and terminated. Generally all underground services will be made safe and left buried in-situ.	Section 8.1.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Trenched pipelines and power cables have been isolated, capped and made safe in accordance with the relevant guidelines.	Section 8.1.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Overhead 66 kV and 11 kV powerlines on Newnes Plateau have been made safe and left for future use.	Section 8.1.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		All other overhead powerline connections to the infrastructure sites have been isolated and removed.	Section 8.1.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Groundwater piezometers removed and sealed	All piezometers will be decommissioned and sealed in accordance with DRG requirements, excluding those being retained for monitoring purposes.	Section 8.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
	Portals sealed in accordance with DRG guidelines	Bulkhead constructed ≥ 20m from surface entry point	Section 8.1.1.6 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Depth of cover of solid strata at bulkhead site ≥15m				
		Strata at portal entrance secure and incapable of being weathered or spalling to expose portal beyond lip of solid rock				
		Bulkhead seal erected at portal entrance				
		Portal bulkheads and surrounds completely covered with earth				
	Ventilation shafts and service bore holes decommissioned and sealed	Sites will be decommissioned and sealed in accordance with DRG guidelines.	Section 8.1.1.5 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	LDP001 and Sewage Treatment Ponds rehabilitated	Structures are drained and sediments removed and disposed of material appropriately. Dam voids are filled and surface is seeded.	Section 8.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	No public safety risk	Excavations have been rendered safe; all holes/pits and other openings are securely capped, filled or otherwise made safe; access to members of the public and livestock is restricted as appropriate to site conditions; no rubbish remains at the surface, or at risk of being exposed through erosion.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Removal of machinery	Removal of all mobile machinery from the site.	Section 8.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	No petroleum, chemicals and explosive products on site	Removal of all petroleum, chemicals and explosive products from the site.	Section 8.1.1.4 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain 2 – Other Areas						
No decommissioning activities in this domain.						
Domain 3 – Water Management Area						
Dams including the Fire Dam, Primary (or Stockpile) Pond, Secondary Pond, Duck Pond and Emergency Holding Pond dewatered and desilted prior to being converted to clean water dams	Pumping infrastructure	All pumps and associated infrastructure is decommissioned and removed from site.	Section 8.1.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Hazardous materials	Sediments accumulated in dams are removed from the floor of the dam converting to clean water structure.				
	Obsolete water management structures	All drains and banks not required in the final landform have been demolished and removed.				
	Dams to remain	Dams to remain at closure to remain for future use.				
	Erosion control	Presence of sediment and erosion controls for the minimisation of discharge of dirty water off site.				
		Presence of water management structures (e.g. contour banks and diversion drains) to direct water into the retained dams or other into stable areas.				
	Water quality	Water quality of the receiving waters (e.g. Springvale Creek) is not affected by surface water runoff from the site, Discharge water meets the contaminant limits (EC, pH, TSS and oil and grease) of the EPL conditions.				
Domain 4 – Conservation Sites						
No decommissioning activities in this domain.						
Domain 5 – Existing Rehabilitation						
No decommissioning activities in this domain.						

Table 22. Phase 2 – Landform Establishment

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
All Domains						
Final landforms are safe, stable, non-polluting and free-draining.	Stable final land form	Final landform is consistent with surrounding landforms.	Section 8.2.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Erosion control	Erosion control structures have been installed at intervals commensurate with the slope of the landform.				
Domain 1 – Infrastructure						
Final landforms are safe, stable, non-polluting and free-draining.	Surface water drainage	The land form is stable and contour banks and diversion drains are installed to direct water into stable areas or sediment control basins.	Section 8.2.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
Quality material is used for rehabilitation	Material characterisation	Determine soil characterisation of the topdressing material and treat if necessary with soil conditioners and fertilisers.	Section 8.4 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
Domain 2 – Other Areas						
Final landforms are safe, stable, non-polluting and free-draining.	Surface water drainage	The land form is stable and contour banks and diversion drains are installed to direct water into stable areas or sediment control basins.	Section 8.2.1 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain 3 – Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Stable landform	Water storages to be rehabilitated to a stable non-polluting condition.	Section 8.2.3 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Landform drainage design	Landform drainage structures including drains and retained dams have been designed and constructed in accordance with *Managing Urban Stormwater: Soils and Construction, Volume 1 and Volume 2E*, Mines and Quarries (the Blue Book) (Landcom, 2004) requirements.	Section 3.3.2 of this MOP	Yes	All current structures are designed in accordance with Blue Book	Not complete - all water management structures will be designed in accordance with Blue Book
	Geomorphic stability	Drainage structures are assessed to be stable with no active gully heads, tunnel erosion or bank failure.	Section 3.3.2 of this MOP	No	Not complete	Not complete
Domain 4 – Conservation Sites						
Quality material is used for rehabilitation	Material characterisation	Soil analysis of (substrate material characterisation) within the existing rehabilitation area (offset) will be undertaken to determine potential constraints relating to current rehabilitation.	Section 8.4 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
Slopes less than 14 degrees (unless approved)	Slopes	Rehabilitated slopes are generally less than 10 degrees and not more than 14 degrees without DRG approval.	*Development of Rehabilitation Criteria for Native Ecosystem Establishment on Coal Mines in the Hunter Valley* (Nichols 2005)	No	Generally in accordance with this criteria.	Some sections will be greater than 14 degrees.

Table 23. Phase 3 – Growth Medium Development

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domains 1 – Infrastructure / Domain 2 – Other Areas						
Growth medium has suitable physical and chemical parameters	Topsoil	Previously stockpiled topsoil has been used in the rehabilitation activities.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Where resources allow, topsoil will be spread to a nominal depth range of 100 – 300 mm on all rehabilitated areas.	Section 8.3.2 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Topsoil stockpiles will be less than 3 m high.	Section 5.2.3 of the *Soils and Land Capability Assessment* (SLR 2014)	Yes	All topsoil currently stored onsite meets this criteria.	Remain within criteria.
	Amelioration	Suitable and alternative topsoil substitute (for example bio-solids, organics, etc.) have been used at the construction sites, if required to make up any short-fall in the topsoil required for complete rehabilitation.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Table 24. Phase 4 – Ecosystem and Land Use Establishment

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain B – Rehabilitation Woodland						
Effective maintenance and management of rehabilitation areas. Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community	Species Selection	A mixture of native trees, shrubs and grasses representative of regionally occurring woodland is present.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Established species survive and/or regenerate after disturbance.				
		Weeds do not dominate native species after disturbance or after rain (<15 % weeds present in monitoring sites).				
		Pests do not occur in substantial numbers or visibly affect the development of planted species.				
		Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present).				
	Rehabilitation monitoring	Undertake annual rehabilitation monitoring as required to determine target community structure and floristics.	Section 8 of this MOP	No	To commence during MOP term	To be continued
	Development of woodland habitat	Minimum of 70% vegetative cover (vegetation, leaf litter, mulch) is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m^2 in area or >10 m in length down slope.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		More than 70% of shrubs and/or trees are healthy when ranked healthy, sick or dead.	Based on criteria for similar sites.	No	Not complete	Not complete
		Habitat features, including structures suitable for fauna habitat are incorporated into native vegetation rehabilitation areas.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain C – Rehabilitation Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Discharge water quality	Discharge water quality meets the EPL criteria.	EPL 3607	Yes	Water generally meets criteria.	Water monitoring to continue.

Table 25. Phase 5 – Ecosystem Development

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
All Domains (excluding Domain A – Infrastructure)						
Ecosystem health	Functional indicators	Presence of vertebrate and invertebrate species representative of a broad range of functional indicator groups involved in different ecological processes.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Habitat	Typical food and water sources required by the majority of vertebrate and invertebrate inhabitants of that ecosystem type are present.				
	Land Use	The rehabilitated sites can be managed for the designated land uses without any greater management inputs than other land in the area being used for a similar purpose.				

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain B – Rehabilitation Woodland						
Ecosystem health	Sustainability	Species are capable of setting viable seed, flowering or otherwise reproducing. Evidence of second generation of tree/shrub species.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
		Evidence of active use of habitat provided during rehabilitation such as nest boxes, and logs and signs of natural generation of shelter sources including leaf litter.				
	Nutrient cycling – rehabilitation monitoring	Nutrient cycling and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts.	Section 8 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Rehabilitation monitoring	Continue rehabilitation monitoring until self-sustaining levels are confirmed.	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Vegetation health	More than 75 per cent of trees are healthy and growing as indicated by long term rehabilitation monitoring.	*Development of Rehabilitation Criteria for Native Ecosystem Establishment on Coal Mines in the Hunter Valley* (Nichols 2005)	No	Not complete	Not complete
	Vegetation Structure	Rehabilitation monitoring confirms woodland rehabilitation areas provide a range of structural habitats (e.g. eucalypts, shrubs, ground cover, developing litter layer etc.).	Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete
	Rehabilitation monitoring results	Total woody species richness differs 10 – 20 % from analogue sites	Based on criteria for similar sites.	No	Not complete	Not complete
		Less than 20 % bare ground cover.	10% improvement of criteria in Section 9 of the *Decommissioning and Rehabilitation Strategy* (SLR 2014)	No	Not complete	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
		The dominant species found within rehabilitation sites are found in analogue sites.	*Development of Rehabilitation Criteria for Native Ecosystem Establishment on Coal Mines in the Hunter Valley* (Nichols 2005)	No	Not complete	Not complete
Domain C – Rehabilitation Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Discharge water quality	Discharge water quality meets the EPL requirements.	EPL 3607	Yes	Water generally meets criteria.	Water monitoring to continue.
	Discharge water quality	Water quality of the receiving waters is not affected by surface water runoff from the site, discharge water meets the contaminant limits (EC, pH, TSS and oil and grease) of the EPL criteria.	EPL 3607	Yes	Water generally meets criteria.	Water monitoring to continue.

7. REHABILITATION IMPLEMENTATION

7.1. Status at MOP Commencement

The status of each Primary and Secondary Domain at the commencement of this MOP term has been shown on **Plan 2**. The status of operations and rehabilitation relevant to each domain at the commencement of the MOP term is summarised in **Table 26**.

Table 26. Status of Primary and Secondary Domains at MOP Commencement

Domain	Status at MOP Commencement
Primary Domains	
Domain 1 – Infrastructure	This domain Includes existing and proposed infrastructure and facilities at the pit top and Newnes Plateau including workshops, administration buildings, powerlines (overhead and trenched), pipelines (trenched), substations, car parks, access roads, sewage treatment plant and associated irrigation area, hardstand/laydown areas, coal stockpile areas, underground infrastructure including mine access, ventilation shafts, service boreholes, booster pump stations, pipelines, dewatering bore facilities, associated water management structures, exploration and/or groundwater monitoring sites, and existing rehabilitation areas. This domain is active and subject to ongoing operations.
Domain 2 – Other Areas	This Domain includes the existing mining areas where limited rehabilitation works may be required due to subsidence impacts. This also includes some infrastructure on the Newnes plateau, such as boreholes, where remediation may be required. This domain is active.
Domain 3 – Water Management Area	This domain is active and includes the Fire Dam, Primary (or Stockpile) Pond, Secondary Pond, Duck Pond and Emergency Holding Pond.
Domain 4 – Conservation Sites	Includes the conservation sites outlined within the October 2014 version of the *Regional Biodiversity Strategy Western Projects* (RPS 2014a) (refer to **Appendix 5**). This area is under rehabilitation maintenance.
Domain 5 – Existing Rehabilitation	This domain includes existing rehabilitation areas at the Bore 1 – 4 dewatering facilities, services corridor to the Bore 8 dewatering facility, Old Fire Dam, Settlement Pond, ventilation facility and infrastructure corridors associated with Booster Pump Station 1 and 2. This domain will increase during the MOP term as additional infrastructure corridors are progressively rehabilitated. This area is under rehabilitation maintenance.
Secondary Domains	
Domain A - Infrastructure	This domain includes access roads that will be retained in the final landform. The locality of these access roads has been shown on Plan 4 (refer to **Appendix 2**).
Domain B – Rehabilitation Woodland	9.9 hectares of woodland rehabilitation have been established at the commencement of the MOP term. These areas include the Bore 1 – Bore 4 dewatering facilities, services corridor to the Bore 8 dewatering facility, Old Fire Dam, the Settlement Pond Site, infrastructure corridors and ventilation facilities.
Domain C – Rehabilitation Water Management Area	Final landform drainage structures will remain at closure as shown on Plan 4 (refer to **Appendix 2**).

7.2. Proposed Rehabilitation Activities during the MOP Term

Disturbance and rehabilitation activities during the MOP term are shown on **Plans 3A** to **3H**. A description of proposed activities for each domain is provided in **Sections 7.2.1 – 7.2.6**. A summary of forecast rehabilitation progress at Springvale during the MOP term has been provided in **Table 27**.As the proposed exploration and/or groundwater monitoring activities to be undertaken during the MOP term have not yet been confirmed, the disturbance and rehabilitation associated with these activities has not been quantified within this MOP. Subsequently proposed exploration and/or groundwater monitoring activities have been excluded from **Table 27**, **Table 28** and the MOP Plans. Details of rehabilitation and disturbance resulting from these activities will be reported in the Annual Review.

Table 27. Rehabilitation and Disturbance Rates during the MOP Term

Year	Total Disturbance Area (ha)	Total Rehabilitation Area (ha)	Cumulative Rehabilitation Areas)	Comments
Start of MOP*#	38.2	9.9	9.9	See Plan 2
2018	38.2	0	9.9	See Plan 3A
2019	40.1	4.9	14.9	See Plan 3B - Increase rehabilitation associated with progressive rehabilitation of infrastructure corridors associated with Bore 10 and the SWTP.
2020	37.6	2.4	17.3	See Plan 3C - Increase rehabilitation associated with progressive rehabilitation of infrastructure corridors associated with Bore 10 and the SWTP.
2021	37.6	0	17.3	See Plan 3D
2022	37.6	0	17.3	See Plan 3E
2023	37.6	0	17.3	See Plan 3F
2024	37.6	0	17.3	See Plan 3G
End of MOP*	37.4	0.2	17.5	See Plan 3H – Increase in rehabilitation associated with minor rehabilitation (decommissioning) of Bore 6.

*Start of MOP is 1 June 2018 and end of MOP is 31 May 2025.

#Pre-MOP disturbance at Springvale previously included exaggerated infrastructure corridor and access road widths. The revised areas are reflective of actual mine related disturbance based upon aerial imagery.

Note: Disturbance areas reflect the total footprint of infrastructure and water management structures during the MOP term, this is not representative of vegetation clearing. Where possible infrastructure will be located within areas of existing disturbance to minimise environmental impacts and in such instances clearing of vegetation will not be required.

7.2.1. Domain 1 – Infrastructure Area

During the MOP term Springvale will progressively rehabilitate a number of infrastructure corridors on Newnes Plateau. Following the trenching of pipelines, power cables and fibre optic cables to the Bore

10 Dewatering Facilities, infrastructure corridors will be rehabilitated to create approximately 5 m wide access tracks.

Following the installation of the SWTP pipelines, the infrastructure corridors will be rehabilitated to create approximately 5 m wide access tracks.

It is noted that it is not possible to show the detail of the rehabilitation of disturbance and retained access track on the MOP Plans. As described previously, a 10m corridor was established for the installation of buried infrastructure, of which 5m was rehabilitated and 5m retained as the access track. As such, unless further disturbance is proposed (i.e. SWTP pipeline infrastructure installation), the infrastructure corridors (where FCNSW access tracks will remain post land use) are shown as Domain 5 Existing Rehabilitation and Domain A Infrastructure. Access tracks that will be rehabilitated post mining have been shown as Domain 5 Existing Rehabilitation and Domain B Rehabilitation Woodland. The areas reported in **Table 26** and **Table 27** reflect the fact that 5m of disturbance is rehabilitated and 5m is retained.

Additionally, Springvale will progressively rehabilitate exploration drill hole sites that are unsuitable for future groundwater monitoring purposes. Rehabilitation of the drill site will commence as soon as practical after completion of drilling activities.

Rehabilitation of the sites will be undertaken in accordance with the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014), the *Exploration Activities and Minor Surface Infrastructure Management Plan* (SLR, 2016) and the methodology outlined in **Sections 7.5 – 7.9**. The proposed rehabilitation works will ensure that the final landform at the site is stable and non–polluting, and mimics the near-original landform for an end land use of open forest.

Adequate erosion and sediment controls will be implemented during all rehabilitation works, to ensure sediment is contained within the disturbed area. These controls will be maintained on an ongoing basis until such time that the success of the revegetation activities has been demonstrated.

The location and timing of these works during the MOP term has been outlined in **Section 2.2.9** and has been illustrated on Plans 3A – 3H (refer to **Appendix 2**).

7.2.2. Domain 2 – Other Areas

Should subsidence impacts occur to surface features, remediation and rehabilitation will be undertaken in accordance with the existing SMP, the existing Extraction Plan and future approved Extraction Plans that will be developed. Subsidence remediation and rehabilitation will be on-going throughout the life of the mine. Any cracking in the surface soils associated with mining activities is expected to be typically within the range of less than 5 mm to 25 mm (MSEC, 2013). Surface cracks are expected to be generally isolated and minor in nature due to the reasonable depths of cover above the proposed longwalls, the relatively low magnitudes of predicted strain, and the clayey soils which can more readily absorb ground strains.

The majority of surface cracking is predicted to be naturally filled with soil during subsequent flow events, especially during times of heavy rainfall (MSEC, 2013). If any surface cracks are found not to fill naturally, some remedial measures may be required at the completion of mining. Where necessary, rehabilitation methods for surface features may include such actions as repairing surface cracks in roads and general disturbed areas where the land surface has been cleared, or surface cracking in the natural environment. These works will be undertaken as per best practice for landform design in mine rehabilitation (Department of Industry, Tourism and Resources, 2006).

Should cracking occur in roads or general disturbed areas, the surface will be graded and the cracks filled with sand, or other suitable material, prior to the surface being re-graded and compacted. If the area is no longer utilised, it will be deep ripped, topsoiled and appropriately revegetated.

Subsidence cracking on the Newnes Plateau may also occur in densely vegetated areas away from established tracks. In such instances where access by equipment is an issue, the most natural way to rehabilitate surface cracking is to place locally occurring vegetative matter above or within the cracks, hastening the natural processes that occur over a prolonged period. Appropriate materials placed in or above the cracks will be determined by the size of the cracks and the intended depth to which these materials would be used in the rehabilitation. Logs, sticks, leaf litter and local soil (ensuring a localised seed bank) could all be placed within and/or above the cracks. This form of rehabilitation would result in a natural looking rehabilitated crack that would continue to accumulate additional natural leaf litter and debris over time. Using this method of rehabilitation would avoid additional access requirements and significant disturbance to existing natural vegetation. Prior to implementing this method of rehabilitation, a site inspection will be undertaken by the Environment and Community Coordinator to determine if the site and the associated substrate are suitable for infilling with natural materials (i.e. subsidence cracks within sandy soils are likely to repair naturally through sedimentation and infilling). If the substrate is not suitable for infilling with natural materials (i.e. subsidence cracks are within rocky areas) infilling of subsidence cracks will be undertaken using non-decomposing materials such as rocks and local soil (ensuring a localised seed bed).

MSEC (2013) stated that the predicted changes in grade along the Wolgan river are small when compared to the existing natural grades and, therefore, it is unlikely that there would be any significant changes in the levels of ponding, flooding or scouring of the river banks, or any significant changes in the stream alignment. Similarly, the predicted post mining grades along the minor drainage lines within the subsidence area are similar to the natural grades and, therefore, it is not expected that there would be any significant adverse changes in ponding or scouring resulting from the proposed mining. MSEC (2013) also stated that there could be some very minor localised areas which could experience small increases in the levels of ponding, where the natural gradients are low immediately upstream of the longwall chain pillars.

The predicted post mining grades within the swamps in the subsidence area are similar to the natural grades and, therefore MSEC has stated that it is not expected that there would be any adverse changes in ponding or scouring within the swamps.

Any disturbance associated with access tracks to the groundwater (piezometer) and surface water monitoring sites will be reshaped as required and re-vegetated to be consistent with the surrounding vegetation.

If any other mining related disturbance or infrastructure is identified in this domain, they will be rehabilitated in accordance with relevant guidelines.

7.2.3. Domain 3 – Water Management Area

This domain will remain active during the MOP term. There is no proposed rehabilitation within this domain.

7.2.4. Domain 4 – Conservation Sites

This domain will remain active during the MOP term and will be managed collectively by the Centennial West Operations in accordance with the October 2014 version of the *Regional Biodiversity Strategy Western Projects* (RPS 2014a) (refer to **Appendix 5**).

7.2.5. Domain 5 – Existing Rehabilitation

Approximately 9.9 ha of rehabilitation has already been established at the commencement the MOP term. Approximately 7.6 ha of additional rehabilitation will be established during the MOP term associated with the Bore 10 and SWTP infrastructure corridors.

7.2.6. Domain A – Infrastructure

This domain refers to the forest access roads that Centennial Coal proposes to retain in the final landform following mine closure. This post-mining land use is in accordance with the *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy* (SLR 2014). However, unless retention for future use, including management responsibility, has been accepted by FCNSW these access roads will be rehabilitated following the cessation of mining activities.

The infrastructure domain is active and subject to ongoing operations. The location of the access roads to be retained in the final landform have been shown on Plan 4 (refer to **Appendix 2**).

7.2.7. Domain B – Rehabilitation Woodland

Approximately 7.6 ha of additional woodland rehabilitation will be established during the MOP term. This rehabilitation will be associated with areas of the Bore 5 compound, Bore 10 and the associated infrastructure corridors as well as the infrastructure corridors associated with the SWTP.

7.2.8. Domain C – Rehabilitation Water Management Area

This domain refers to the surface water management structures (dams) that will be retained in the final landform following mine closure. The water management domain is active and subject to on-going operations. The locality of these structures that will retained in the final landform have been shown on Plan 4 (refer to **Appendix 2**).

7.3. Summary of Rehabilitation Areas during the MOP Term

A summary of rehabilitation in each primary and secondary domain during the MOP term is outlined in **Table 26**.

Table 28. Summary of Rehabilitation Proposed during the MOP Term

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Total Area at MOP start (ha)	Area at end of MOP (ha)	Comment
Infrastructure (1)	Infrastructure (A)	1A	Active	5.3	7.7	There will be an increase in this domain due to the disturbance associated with the construction of Bore 10, the SWTP and the associated infrastructure corridors during the MOP term.
			Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	0	0	
			Ecosystem and Land Use Sustainability	0	0	
			Relinquished Lands	0	0	
Domain Total				**5.3**	**7.7**	
Infrastructure (1)	Woodland Rehabilitation (B)	1B	Active	31.7	28.6	There will be a decrease in this domain due to the rehabilitation of infrastructure corridors during the MOP term.
			Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	0	0	
			Ecosystem and Land Use Sustainability	0	0	
			Relinquished Lands	0	0	

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Total Area at MOP start (ha)	Area at end of MOP (ha)	Comment
Domain Total				**31.7**	**28.6**	
Other Areas (2)	Woodland Rehabilitation (B)	2B	Active	5763.4	5756.6	There will be a minor decrease in this area as infrastructure corridors for Bore 10 and the SWTP are disturbed and rehabilitated during the MOP term. There is potential for minor remediation of subsidence cracks following the secondary extraction of Longwalls 418 – 429, however these are likely to be naturally filled with soil during subsequent flow events (MSEC 2013).
			Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	0	0	
			Ecosystem and Land Use Sustainability	0	0	
			Relinquished Lands	0	0	
Domain Total				**5763.4**	**5756.6**	
Water Management Area (3)	Water Management Area (C)	3C	Active	1.2	1.2	There is no proposed rehabilitation within this domain during the MOP term.
			Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	0	0	
			Ecosystem and Land Use Sustainability	0	0	
			Relinquished Lands	0	0	
Domain Total				**1.2**	**1.2**	
Conservation Sites (4)	Rehabilitation Woodland (B)	4B	Active	0	0	This domain includes all conservation sites that will be managed collectively
			Decommissioning	0	0	

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Total Area at MOP start (ha)	Area at end of MOP (ha)	Comment
			Landform Establishment	0	0	by the Centennial West Operations in accordance with the October 2014 version of the *Regional Biodiversity Strategy Western Projects* (RPS 2014). This domain does not change during the MOP term.
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	0	0	
			Ecosystem and Land Use Sustainability	834.9	834.9	
			Relinquished Lands	0	0	
Domain Total				**834.9**	**834.9**	
Existing Rehabilitation (5)	Rehabilitation Woodland (B)	5B	Active	0	0	There will be an increase in this domain as minor areas of the Bore 5 compound, infrastructure corridors associated with the SWTP and Bore 10 are rehabilitated during the MOP term.
			Decommissioning	0	0.2	
			Landform Establishment	7.4	0	
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	2.5	14.8	
			Ecosystem and Land Use Sustainability	0	2.5	
			Relinquished Lands	0	0	
Domain Total				**9.9**	**17.5**	
Overall Total				**6646.44**	**6646.44**	

7.4. Relinquishment Phase Achieved during MOP Term

As mining activities at Springvale are planned to continue past the MOP term, no areas are anticipated to meet the required rehabilitation obligations for lease relinquishment.

7.5. Landform Design

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, full rehabilitation will be undertaken in accordance with the Occupation Permit, and to FCNSW's standard and satisfaction.

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 for an end land use of open forest.

7.6. Topsoil Management

Where soil stripping and transportation is required, Springvale will undertake the operations in accordance with the methodologies outlined within the *Springvale Mine Extension Project Soils and Land Capability Assessment* (SLR 2013). This assessment identifies the recommended soil stripping depths based upon the identified soil types that will disturbed during construction works on Newnes Plateau. This detail has been provided as **Table 12**.

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.

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 at construction sites, 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, and will be minimised or avoided where possible. 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.

7.7. 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 Springvale 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;
- Application of soil ameliorants where appropriate;
- The respread topsoil surface will be scarified to reduce runoff and increase infiltration; and
- Revegetation.

7.8. 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.

In Domain B, endemic species mixes will be utilised. 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. Springvale 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, 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.

7.9. 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.

8. REHABILITATION MONITORING, RESEARCH AND REPORTING

8.1. Rehabilitation Monitoring

A commitment to effective rehabilitation involves an on-going monitoring (and concurrent maintenance as required) program that will be developed for in consultation with FCNSW. Areas of completed rehabilitation will be regularly inspected and assessed against the short-term and long-term rehabilitation objectives.

A dedicated monitoring system was established in spring 2015 to assess effectiveness of implementation of the rehabilitation measures as well as to identify the need for corrective action as soon as required. The initial scale of the monitoring program reflects the nature of current disturbance/rehabilitation at Springvale, and will increase commensurately during the MOP term to incorporate new areas of rehabilitation. The monitoring program has been developed for relevant domains, incorporating the most appropriate indicators and methods that:

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

Monitoring of the rehabilitation areas at Springvale will be undertaken using the Biobanking Assessment Methodology and the Ecosystem Function Analysis technique. Rehabilitation monitoring will include analysis of the following:

- Rehabilitation age and technique used;
- Slope and general soil description;
- Vegetation characteristics, which includes species, count and diversity results;
- Erosion observations, which will include type and severity of erosion along a 50 m transect;
- Sustainability assessment with regards to safety, landform stability and land use; and
- Limitations to future success of rehabilitation.

Monitoring will be conducted annually by independent, suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. In addition to the rehabilitated areas, at least two reference sites will be monitored to allow a comparison of the development and success of the rehabilitation against a control. Analogue sites will be selected based on the following general criteria:

- Contain vegetation types similar to the rehabilitation sites;
- Secure from future mining related disturbance; and
- Contain vegetation and conditions suitable as a basis for rehabilitation performance criteria.

Data from analogue rehabilitation sites is an integral part of the monitoring procedure throughout the monitoring process, so that varying seasonal conditions ultimately result in a “band” of values that act as the long-term target for rehabilitation. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness. The outcome of these reviews will be included in the Annual Review.

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

8.2. Research and Rehabilitation Trials and Use of Analogue Sites

Centennial Coal established a research program titled the *Persoonia hindii Research and Management Plan* to address the requirement for research the protection and management options for the endangered shrub. On 16 November 2015 Springvale received written approval from the DPE to discontinue this program. Potential mining-related impacts to *Persoonia hindii* will be monitored and managed in accordance with the *Western Region Biodiversity Management Plan* and the *Exploration and Minor Surface Infrastructure Management Plan*.

9. INTERVENTION AND ADAPTIVE MANAGEMENT

9.1. Threats to Rehabilitation

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.

Section 3.4 provides examples of key threats to rehabilitation. Where rehabilitation monitoring indicates that there is a significant threat to rehabilitation, Springvale will undertake adaptive management in accordance with the TARP (refer to **Section 9.2**).

9.2. Trigger Action Response Plan

The following TARP for rehabilitation has been developed to identify required management actions in the event of impacts specifically to rehabilitation areas, or where rehabilitation outcomes are not achieved in an acceptable timeframe. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards.

The TARP is provided as **Table 29**, and will be reviewed and may be revised as conditions at Springvale change or new risks to rehabilitation are identified.

Table 29. Rehabilitation 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 regrading and revegetation of the area.	Undertake a review of the landform design, including survey if required. Undertake regrading 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.	Significant gully or tunnel erosion present and/or rilling >200 mm 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 drainage of the area and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable.
	Drainage condition	Trigger	Drainage at Springvale 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 drainage design and provide recommendations to appropriately remediate the area. Remediate as soon as practicable. Liaison with DRG 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. Monitoring does not illustrate impact to rehabilitation.	Water quality exceeds criteria, indicating a long term rehabilitation liability. Monitoring illustrates impact to rehabilitation.
		Response	No response required. Continue monitoring program.	Review and investigation of water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Reporting as per 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 OEH.
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 results at relevant analogue site after 5 years of rehabilitation; however area is able to sustain selected vegetation species.	Properties of soil are > 20 % from results at relevant analogue site after 5 years, however the 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	Ground cover	Trigger	Five years following rehabilitation to woodland, ≥ 70 % total ground cover (vegetation, leaf litter, mulch) is present within rehabilitated areas.	Five years following rehabilitation to woodland, total ground cover (vegetation, leaf litter, mulch) of between 55 – 70 % in rehabilitated areas.	Five years following rehabilitation 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 use of appropriate management options to remediate. Remediate as appropriate.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
	Weed presence	Trigger	Twelve months following rehabilitation, no significant weed infestations present.	Twelve months following rehabilitation, > 10 % but < 25 % cover of undesirable species present.	Twelve months following rehabilitation, > 25 % cover of undesirable species present.
		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 rehabilitation to woodland, species composition comprises native tree and shrub species consistent with analogue site.	Five years following rehabilitation to woodland, native tree and shrub species composition comprises < 75 % consistent with analogue site.	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. Investigate remedial options to achieve required species composition.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
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 are 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.

10. REPORTING

As is currently undertaken, during the MOP term a summary of rehabilitation monitoring will be included in each Annual Review. This summary will include:

- Results of rehabilitation monitoring against key performance measures/indicators;
- Comparison of rehabilitation results against predictions presented in this MOP;
- Key trends in monitoring results and progression towards performance indicators and achievement of rehabilitation objectives;
- Reporting on discrepancies between the predicted and actual results;
- Reporting of where a TARP has been implemented to counter poor/unpredicted rehabilitation results or environmental impacts;
- Results of trials;
- Non-compliances;
- Incidents/near misses; and
- Any other requirements from the DRG.

In accordance with the requirements of the Longwalls 411 – 418 SMP Approval, Springvale have submitted Subsidence Management Status Reports and an End of Panel Report to DRG for Longwall 418. Following the submission of Subsidence Management Status Reports and the End of Panel Report for Longwall 418 approval has been sought to cease these reporting requirements. Following the commencement of secondary extraction in future longwall panels (in accordance with an approved Extraction Plan), Springvale will also report the effectiveness of rehabilitation strategies to DRG and DPE in Six-monthly Environmental Monitoring Reports.

11. PLANS

Springvale is classified as a Level 1 Mine, and therefore the following Plans have been prepared for this MOP:

- **Plans 1A – 1C** show the location and pre mining natural and physical environment at Springvale;
- **Plans 2** shows the mine domains at commencement the MOP;
- **Plans 3A – 3H** are a series of Plans which show the annual sequence of mining and rehabilitation activities over the MOP term;
- **Plan 4** shows the proposed post mining land use and landform at the end of mine life; and
- **Plan 5** shows vertical and longitudinal cross sections.

These Plans are contained in **Appendix 2**.

12. REVIEW AND IMPLEMENTATION OF THE MOP

12.1. Review of the MOP

This section provides the protocol for periodic review of this MOP. Reviews are conducted to assess the effectiveness of the procedures against the objectives of the MOP. The MOP will be reviewed, and if necessary revised, following the submission of the following:

- EPL Annual Return
- Annual Review;
- Incident report;
- Audit; or
- Any modification to the conditions of the Development Consent.

This MOP may also be revised due to:

- Deficiencies being identified;
- Results from the monitoring and review program;
- Recommendations resulting from the monitoring and review program;
- Changing environmental requirements;
- Improvements in knowledge or technology become available;
- Change in legislation;
- Where a risk assessment identifies the requirement to alter the MOP; and
- Change in the activities or operations associated with Springvale.

Any major amendments to the MOP that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders. Any amendments to the MOP will be completed in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013), or its latest version.

12.2. Implementation

Table 30 defines personnel who are responsible for the monitoring, review and implementation of this MOP.

Table 30. Responsibilities for Implementation of the MOP

Title	Responsibility
Mine Manager	Implement the procedures referenced in this MOP. Undertake training in relevant Management Plans and procedures as required. Provide resources required to implement this MOP. Construct landforms in accordance with this MOP.
Mine Surveyor	Implement the procedures referenced in this MOP. Undertake training in relevant Management Plans and procedures as required. Ensure that mining activities are undertaken in accordance with this MOP.
Technical Services Manager	Implement the procedures referenced in this MOP. Undertake training in relevant Management Plans and procedures as required. Ensure that mining activities are undertaken in accordance with this MOP.

Title	Responsibility
Environment and Community Coordinator	Prepare or project manage the relevant Management Plans. Implement, monitor and review the programs and procedures linked to this MOP. Consult with regulatory authorities as required. Undertake monitoring as required. Undertake maintenance as required. Provide measures for continual improvement to this MOP and procedures. Ensure all personnel undertaking works in relation to this MOP are trained and competent. Report the progress of any rehabilitation and monitoring of biodiversity in the Annual Review. Undertake site based actions to implement this MOP in cooperation with the Mine Manager.

13. REFERENCES

Centennial Coal (2007). *Springvale Coal 2006 Annual Environmental Management Plan*.

DEC (2006). '*The Vegetation of the Western Blue Mountains. Unpublished report funded by the Hawkesbury-Nepean Catchment Management Authority*' Department of Environment and Conservation, Hurstville, NSW.

Department of Environment and Climate Change (2008). *Managing Urban Stormwater; Soils and Construction Volume 2C, Unsealed Roads.*

Department of Environment, Climate Change and Water (2009). *Waste Classification Guidelines.*

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

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

Department of Mineral Resources (1992). *Schedule of Onshore Petroleum Exploration and Production Safety Requirements*.

Department of Planning (2007). *Guidelines for Establishing and Operating Community Consultative Committees for Mining Developments.*

DPE (2015). *Draft Guidelines for the Preparation of Extraction Plans*.

DRG (2010). *ESG1: Rehabilitation Cost Estimate Guidelines.*

DRG (2012a). *Guideline for Community Consultation Requirements for Exploration.*

DRG (2012b). *EDG01 Environmental Management Guideline for Industry - Borehole Sealing Requirements on Land: Coal Exploration.*

DRG (2013). *ESG3: Mining Operations Plan (MOP) Guidelines.*

DRG (2015). *Exploration Code of Practice: Rehabilitation.*

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

GHD (2016). *Springvale Water Treatment Project – State Significant Development 7592 Environmental Impact Statement*

Landcom (2004). *Managing Urban Stormwater; Soils and Construction (The Blue Book) Volume 1.*

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

MSEC (2013). *Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Environmental Impact Statement for the Proposed Longwalls 416 to 432 and 501 to 503 in the Lithgow Seam.*

Nichols, O. G (2005). *Development of Rehabilitation Completion Criteria for Native Ecosystem Establishment on Coal Mines in the Hunter Valley*. Australian Centre for Minerals Extension and Research, QLD.

RFS (2006). Planning for Bush Fire Protection". NSW Rural Fire Service, NSW.

RPS (2014a). *Regional Biodiversity Strategy Western Projects.*

RPS (2014b). *Springvale Mine Extension Project Cultural Heritage Impact Assessment*.

SLR (2013). Springvale Mine Extension Project Soils and Land Capability Assessment.

SLR (2014a). *Springvale Mine Extension Project Decommissioning and Rehabilitation Strategy.*

SLR (2017). *Western Coal Services MOP.*

SLR (2016). *Exploration Activities and Minor Surface Infrastructure Management Plan*.

Standards Australia (1997). *AS/NZ 4282:1997 Control of the Obstructive Effects of Outdoor Lighting.*

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

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