



Centennial Coal



CENTENNIAL COAL SPRINGVALE COLLIERY ANNUAL REVIEW

January 2017 to December 2017

March 2018



Table 1. Annual Review Title Block

Name of Operation	Springvale Colliery
Name of Operator	Springvale Coal Pty Limited
Development Consent/ Project Approval #	SSD 5594
Name of holder of development consent / project approval	Centennial Springvale Pty Limited
Mining Lease #	ML1303, ML 1323, ML 1326, ML 1424, ML 1537, ML 1588, ML 1670, ML 1727, MLA 445, MLA 497, CL 377, MPL 314, EL 6974, AUTH 460
Name of Holder of Mining Lease	Centennial Springvale Pty Ltd and Springvale SK Kores Pty Ltd
Water License #	10WA118719 (WAL 36383) 10BL603519 (WAL 36383) 10BL602017 (WAL 36443) 10BL601863 (WAL 36446)
Name of Holder of Water License	Centennial Springvale Pty Ltd
MOP/RMP Start Date	November 2015
MOP/RMP End Date	October 2022
Annual Review Start Date	1 January 2017
Annual Review End Date	31 December 2017
<p>I, M Cairney, certify that this audit report is a true and accurate record of the compliance status of Springvale Colliery for the period 01/01/2017 to 31/12/2017 and that I am authorized to make this statement on behalf of Springvale Colliery.</p> <p><i>Note:</i></p> <p>a) <i>The Annual Review is an 'environmental audit' for the purposes of s122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion) in an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p>b) <i>The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents –maximum penalty 2 years imprisonment or \$22,000,or both).</i></p>	
Name of Authorised Reporting Officer	<i>MICHAEL CAIRNEY</i>
Title of Authorised Reporting Officer	<i>MD + CEO</i>
Signature of Authorised Reporting Officer	<i>M Cairney</i>
Date	<i>28-3-18</i>

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1. STATEMENT OF COMPLIANCE

Table 2 provides a statement of compliance with the relevant approvals during the reporting period.

Table 2. Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
SSD 5594	No
EPBC 2011/5949	Yes
EPBC2013/6881	Yes
SMP LW 411-418 (04/1673)	Yes
ML 1303	Yes
ML 1323	Yes
ML 1326	Yes
ML 1424	Yes
ML 1537	Yes
ML 1588	Yes
ML 1670	Yes
CL 377	Yes
MPL 314	Yes
EL 6974	Yes
AUTH 460	Yes
EPL 3607	No
WAL 36383	Yes
WAL 36443	Yes
WAL 36446	Yes

Table 3 provides a list of conditions that were not complied with during the reporting period.

Table 3. Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Section addressed in Annual Review
SSD 5594 / EPL3607	Schedule 4, Condition 1 / L4.4	Noise Criteria Limit	Non-Compliant	Noise limits exceeded	Section 6.2, Section 11
EPL 3607	L2.4	Water and Land Concentration limits	Non-Compliant	Concentration limits exceeded	Section 11

Note: Compliance Status Key for Table 3

Risk Level	Colour Code	Description
High	Non-complaint	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-complaint	Non-compliance with: <ul style="list-style-type: none"> • Potential for serious environmental consequences, but is unlikely to occur; or • Potential for moderate environmental consequences, but is likely to occur
Low	Non-complaint	Non-compliance with: <ul style="list-style-type: none"> • Potential for moderate environmental consequences, but is unlikely to occur; or Potential for low environmental consequences, but is likely to occur
Administrative	Non-complaint	Only to be applied where the non-compliance does not result in any risk of environmental harm (eg submitting a report to government later than required under approval conditions)

2. INTRODUCTION

Springvale Mine is an existing underground coal mine producing high quality thermal coal which is supplied to both domestic and international markets. It is located 15 kilometres to the northwest of the regional city of Lithgow and 120 kilometres west-northwest of Sydney in New South Wales (NSW). This is shown in Figure 1.

Underground coal mining commenced at Springvale Mine in 1995 following the granting of Springvale Mine's development consent (DA 11/92) on the 27th of July 1992, pursuant to Section 101 under Part 4 of the NSW Environmental Planning and Assessment Act, 1979 (EP&A Act). Springvale Coal Pty Limited is the operator of Springvale Mine.

On the 21st of September 2015 SSD 5594 was approved by the Department of Planning and Environment. Modifications 1 and 2 to SSD 5594 were subsequently approved in 2017 by the Planning Assessment Commission (PAC), under delegation from the Minister. The approval of SSD 5594 (including Mods 1 and 2) 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 the project includes:

- continued longwall mining operations to extract up to 5.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal from the Lithgow Seam;
- continued operation of the mine's pit top area, support facilities and utilities;
- extension and continued use of the Springvale Delta Water Transfer Scheme, bore dewatering facilities and ventilation infrastructure;
- continued processing (sizing and screening) of ROM coal at the pit top area;
- continued stockpiling of ROM coal (200,000 tonnes (t) capacity);
- continued transportation of processed coal by overland conveyor to Centennial's Western Coal Services site (WCSS) for further processing or to the Mt Piper Power Station;
- continued transportation of processed coal by road haulage to other local domestic customers (limited to 50,000 tpa); and
- rehabilitation of the pit top area and Newnes Plateau surface infrastructure sites.

A summary of the development consent and mining lease boundary is shown in Figure 2 and 3.

The main components of Springvale Mine's operations are an underground longwall mine, accessed via the Springvale pit top, and supporting surface infrastructure within the pit top area and on Newnes Plateau within the Newnes State Forest. The Newnes Plateau infrastructure areas are accessed for light vehicles via State Mine Gully Road located in north Lithgow, and Old Bells Line of Road through Clarence for light and heavy vehicles Newnes Plateau and Pit Top disturbance Areas are shown in Figure 4 and 5 respectively.

"The Environmental Planning and Assessment Amendment (Sydney Drinking Water Catchment) Act 2017 No 47 which was passed by the NSW Parliament in October 2017 validated SSD 5594 (and the modifications) following earlier court proceedings challenging the development consent."

The contact details for Springvale personnel responsible for environment management and community relations, along with details for community complaints and enquiries have been provided in Table 4.

Table 4 provides the names and contact details of the key personnel who are responsible for the environmental management of the operation.

Table 4. Environmental Management Contact Details

Contact	Position	Contact Details
Primary Contacts		
Brian Nicholls	Mine Manager	T: (02) 6350 1613
		F: (02) 6355 1502
		E: brian.nicholls@centennialcoal.com.au
Catherine Suggate	Environment and Community Co-ordinator	T: (02) 6350 1672
		F: (02) 6355 1502
		E: catherine.suggate@centennialcoal.com.au
Community Enquiries/Complaints		
Springvale Enquiries and Community Complaints		T: (02) 6350 1640

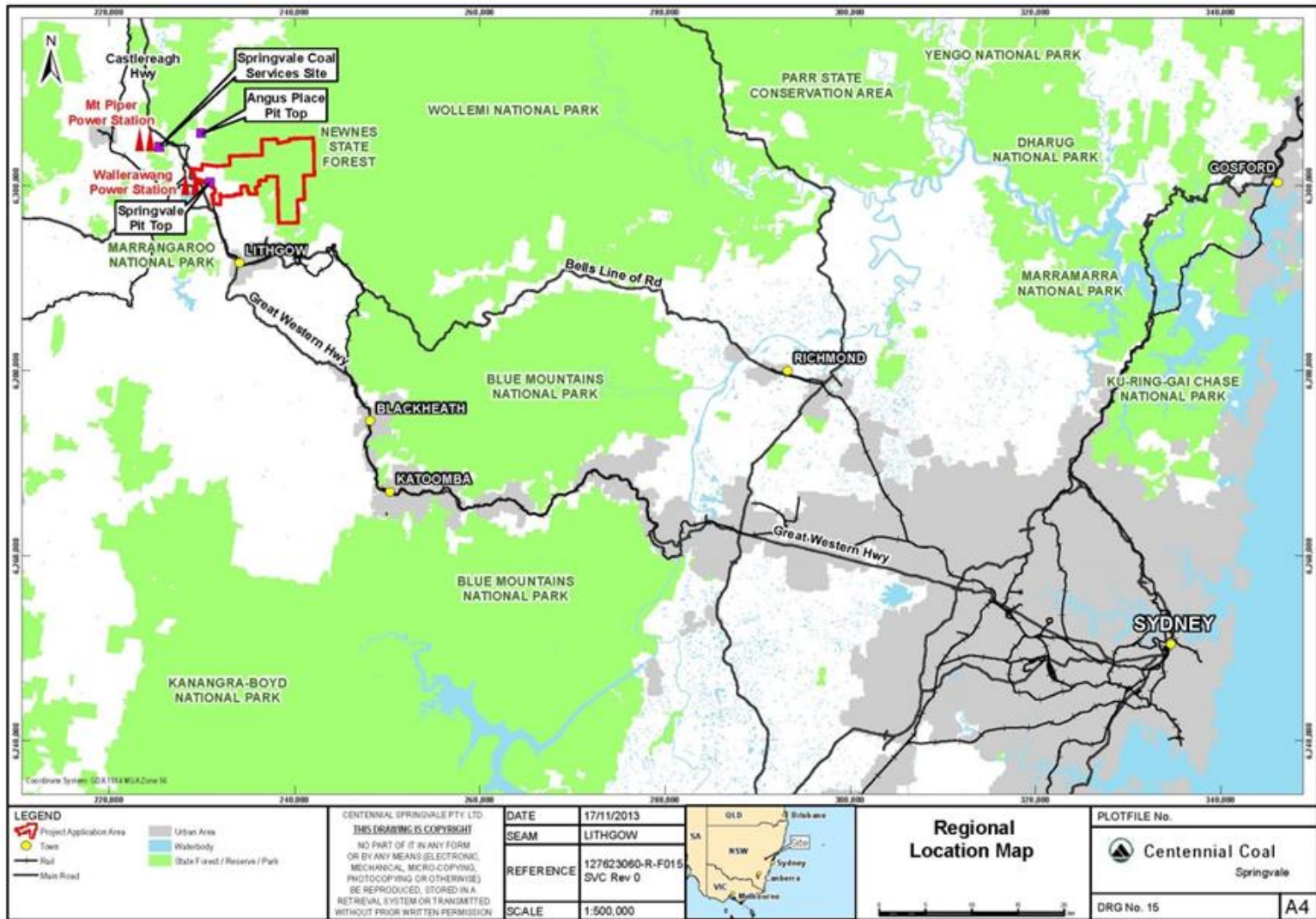


Figure 1. Regional Context

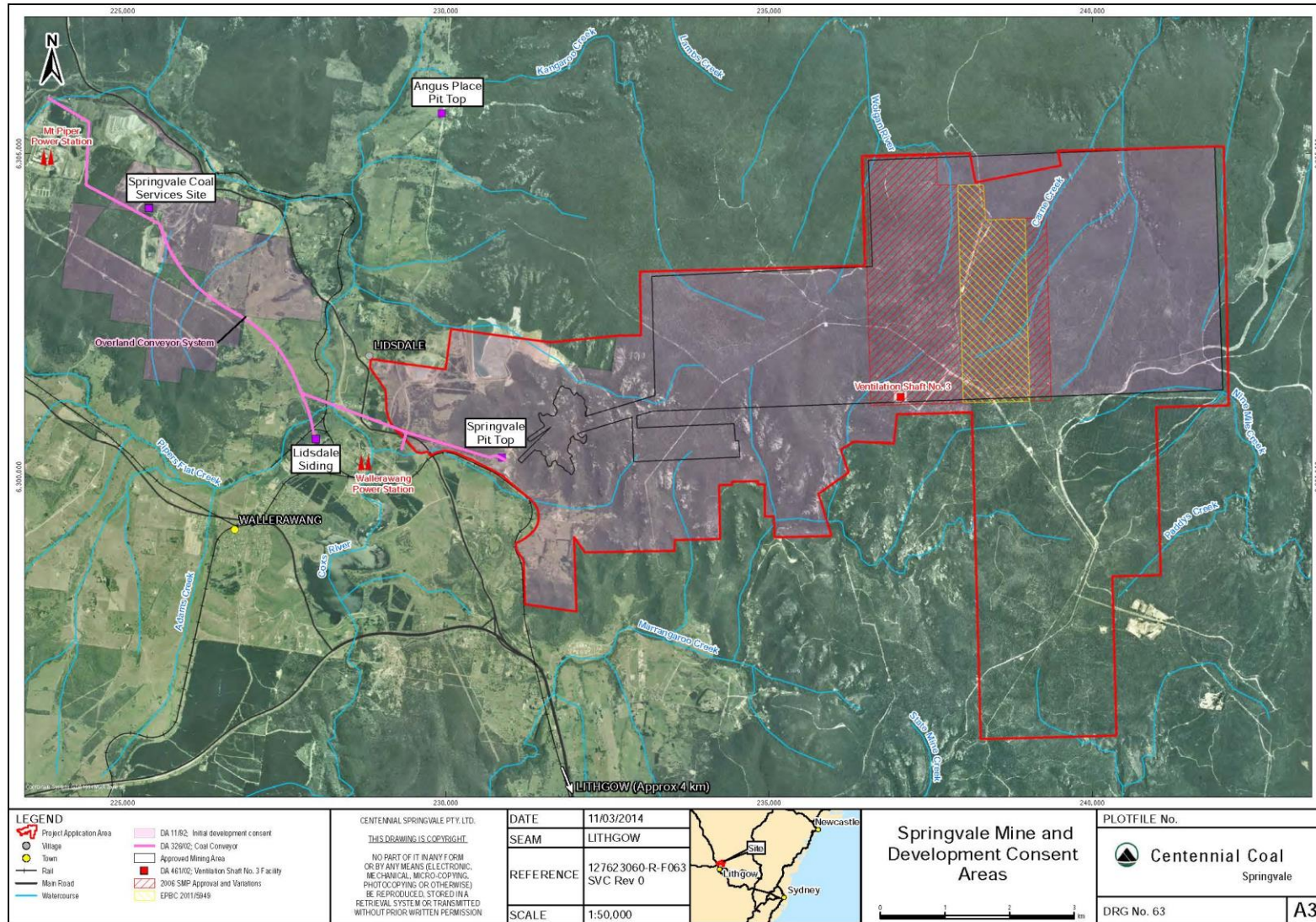


Figure 2. Development Consent Boundary

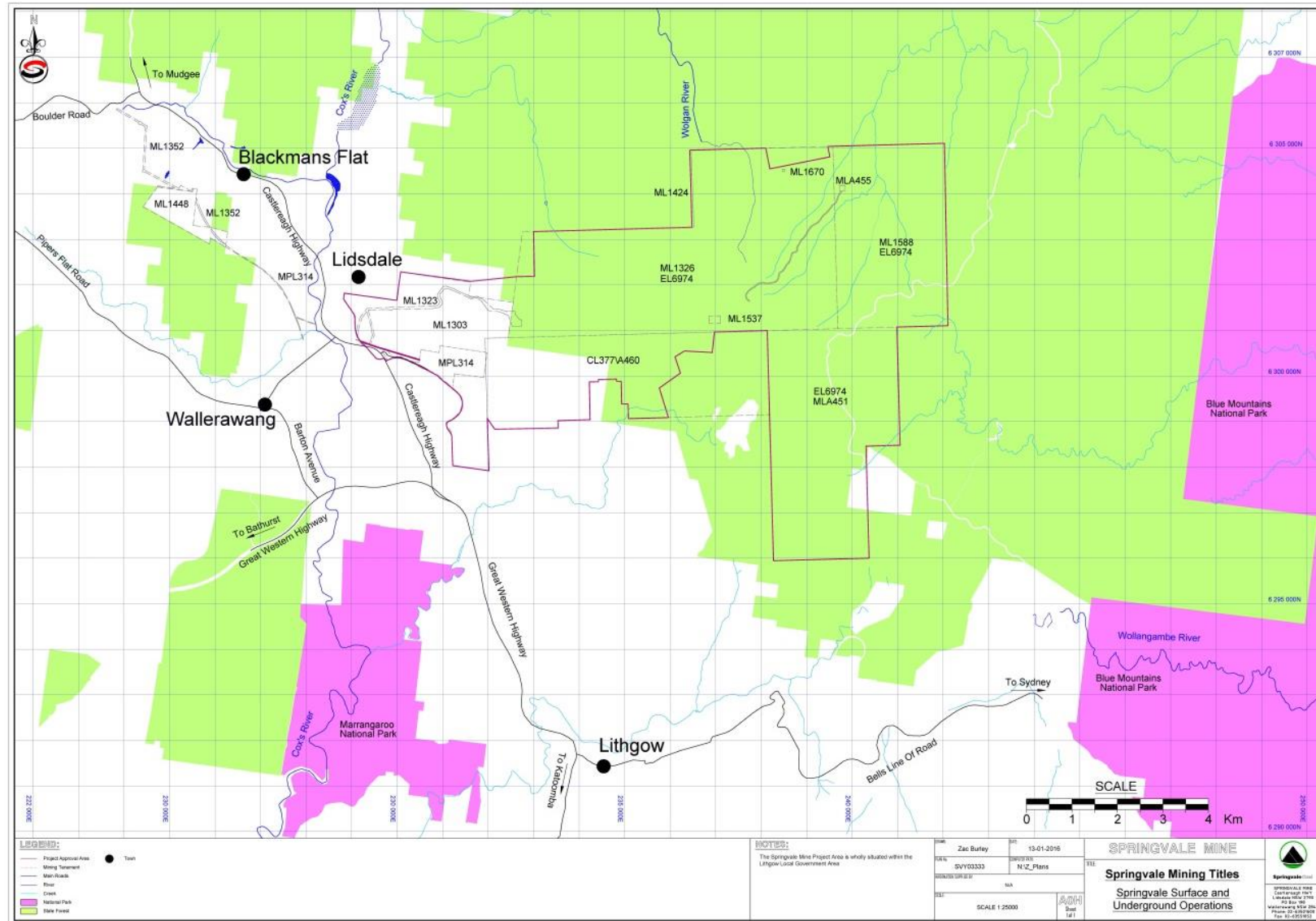


Figure 3. Mining Lease Boundaries

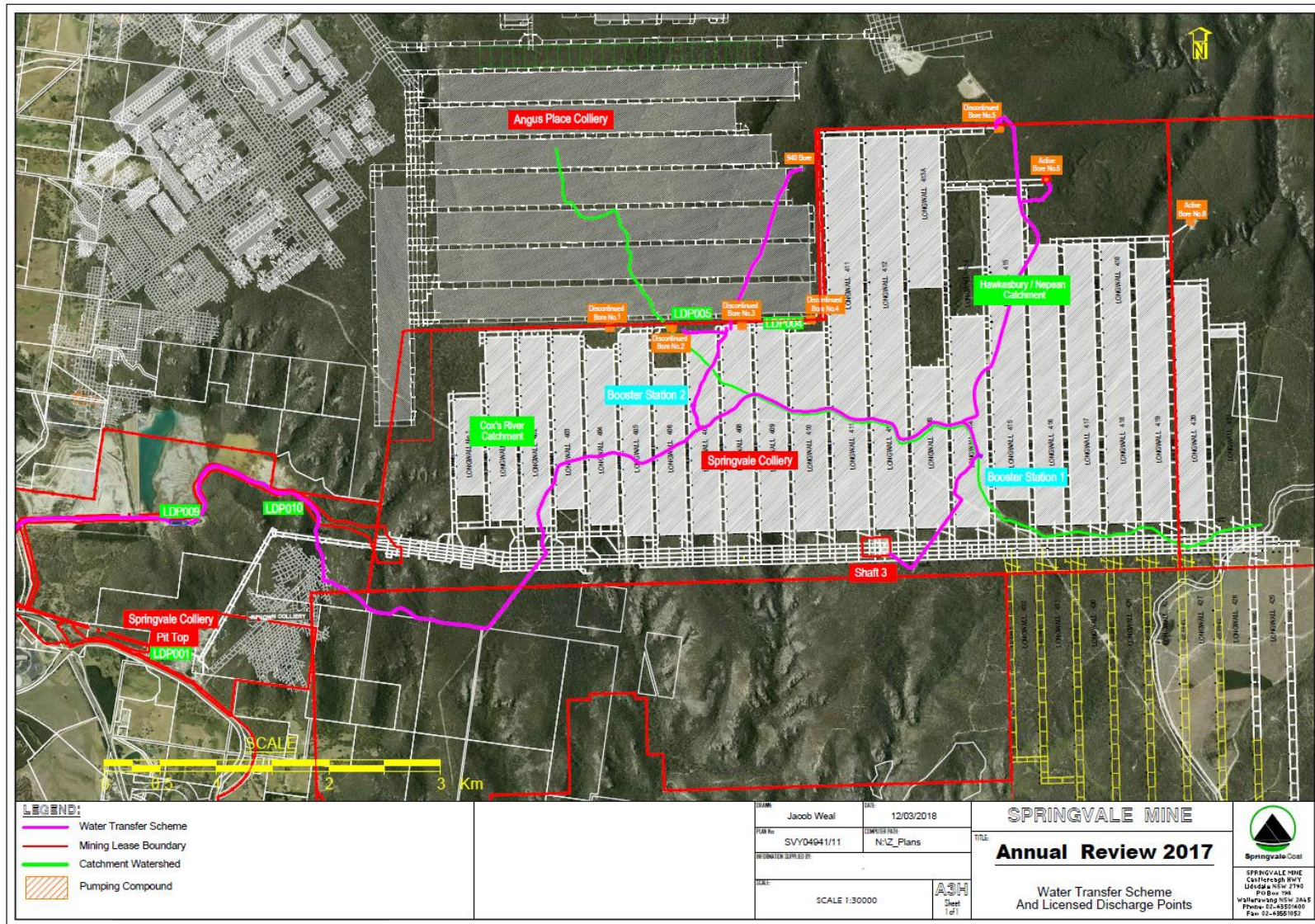


Figure 4. Newnes Plateau Operational Disturbance

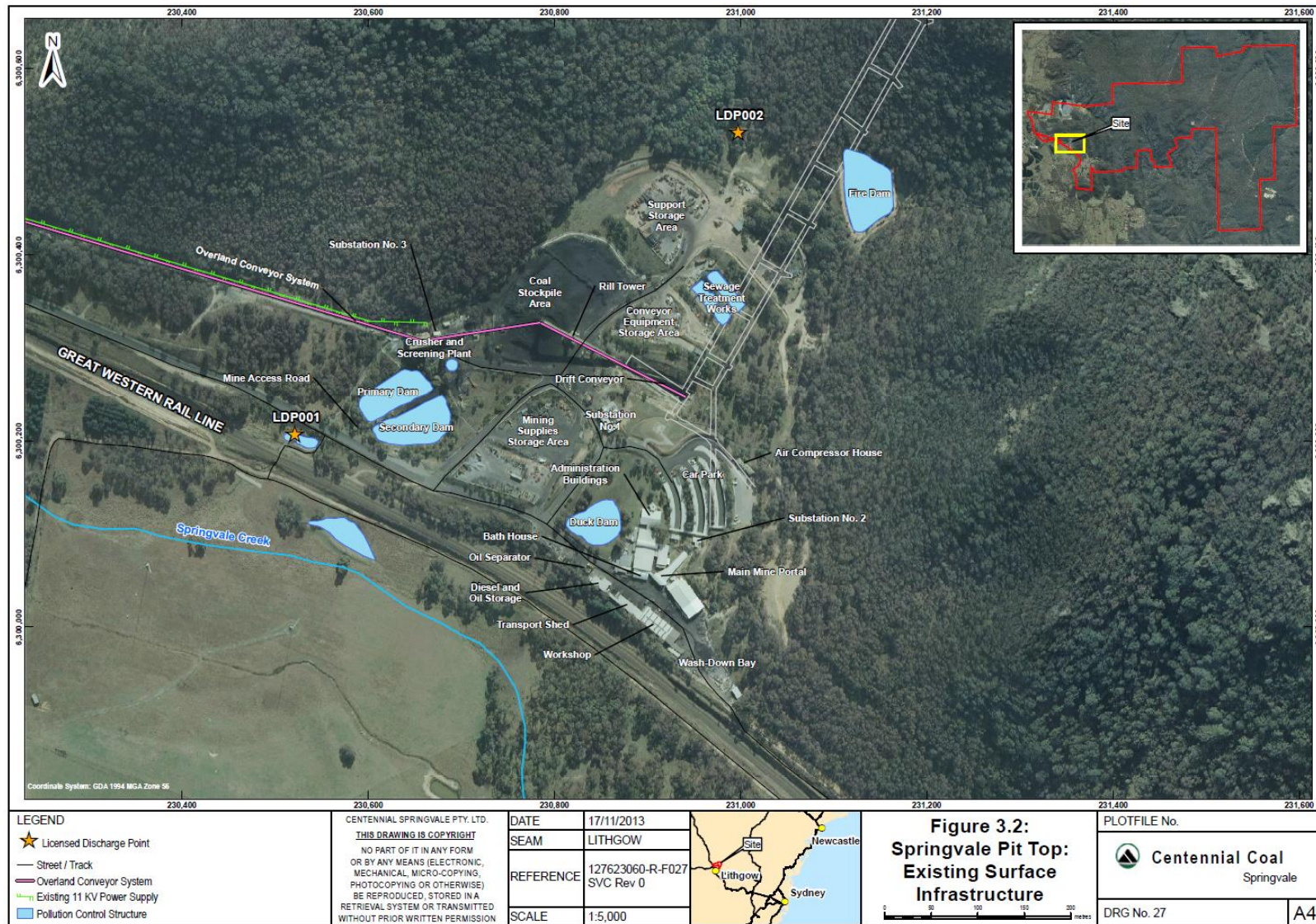


Figure 5. Springvale Pit Top Operational Disturbance

3. APPROVALS

Section 3 details the environmental approvals held by Springvale under the EP&A Act, Mining Act, POEO Act, NPW Act, Water Act, Water Management Act, Radiation Act, and any changes made to these approvals during the reporting period.

3.1. Development Consents and EPBC Approvals

Development Consent SSD 5594 was granted to Springvale on the 21st of September 2015. This consent supersedes the former Development Consent DA 11/92. In accordance with Schedule 2, Condition 10 of SSD 5594, DA 11/92 was required to be surrendered by the 21st of September 2016. Given the large number of landholders within the existing development consent boundaries, Centennial requested and received agreement by DPE to extend the date for the surrender of the consent to the 21st of September 2018. All development and activities at Springvale from the 21st of September 2016 will be undertaken in accordance with SSD 5594 and DA 11/92 will not be relied upon to undertaken development or activities beyond those encompassed by SSD 5594.

Springvale also operates in accordance with two federal approvals under the EPBC Act granted by the Department of Environment (former Department of Sustainability, Environment, Water, Population and Communities). Approval EPBC 2011/5949 was granted on the 14th of March 2012 and allows Springvale to extract coal from Longwalls 415 – 417. A second approval (EPBC 2013/6881) was issued on the 15th of October 2015 to allow secondary extraction associated with the Springvale Mine Extension Project SSD 5594. During the reporting period, the Springvale Extraction Plan for Longwall 420 - 422 was approved by DoE and DPE.

Additional detail pertaining to the Springvale Development Consents and EPBC Approvals has been provided in Table 5.

Table 5. Development Consents and EPBC Approvals

Approval	Details	Date of Issue	Expiry
SSD 5594	Springvale Mine Extension Project	21 September 2015	31 December 2028
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

Two Modifications to SSD 5594 were submitted to DPE in 2016 and approved during the reporting period. Details of these are outlined in Table 6 below.

Table 6. SSD 5594 Modification Details and Status

Modification No.	Details of Modification	Date of Application /Exhibition Period	Status
Mod 1	<ul style="list-style-type: none"> • Increase of the approved workforce (including contractors) from 310 full time equivalent (FTE) to 450; • Increase in ROM coal production from the approved 4.5 Mtpa to 5.5 Mtpa; and • Increase in the existing stockpile capacity at the Springvale pit top from 85,000 tonnes to 200,000 tonnes capacity and an increase in the coal stockpile footprint by 0.3ha northeast of the 	23/07/2016 / 02/08/2016 – 23/08/2016	Approved 19 April 2017

Modification No.	Details of Modification	Date of Application /Exhibition Period	Status
	stockpile area.		
Mod 2	<ul style="list-style-type: none"> To remove the requirement to <i>Meet limits for salinity of 700 (50th percentile), 900 (90th percentile) and 1000 (100th percentile) uS/cm by 30 June 2017; and</i> To defer to 30 June 2019 the requirement to <i>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.</i> 	22/12/2016 / 24/01/2017 – 28/02/2017	Approved 19 June 2017

Voluntary Undertaking

On the 11th of July 2017, Centennial Coal entered into a voluntary undertaking with DPE. The Voluntary Undertaking enforces commitments made by Centennial in a letter to DPE dated 26th of May 2017, to secure the biodiversity offsets by the 1st of April 2018 for the following development consents:

- Angus Place PA 06_0021;
- Clarence Colliery DA 504-00;
- Springvale Mine SSD_5594;
- Western Coal Services SSD_5579.

Since the voluntary undertaking was entered into, Centennial has revised the Western Region Biodiversity Offset Strategy to address feedback from OEHL dated 1st February 2018 and submitted the Western Region Biodiversity Offset Strategy to DPE for approval.

Centennial has commenced the securing of the offset lands in accordance with the Western Region Biodiversity Offset Strategy through the:

- Submission of BioBanking Applications for biodiversity offset sites referred to as Lot 5 Pipers Flat, Lots 1 2 and 125 Springvale Mine and Lot 56 Wolgan Road; and
- Submission of an application for a Conservation Agreement on biodiversity offset site Lot 163 Carinya on 21st March 2018.

Centennial has received advice from OEHL and the Biodiversity Conservation Trust the processing of the Agreement Applications will take up to six months.

Regardless, land management activities have commenced on the offset sites in accordance with the requirements of the Voluntary Undertaking.

3.2. Authorisations

The Springvale holding includes Mining Lease (ML) 1303, ML 1323, ML 1326, ML 1424, ML 1537, ML 1588, ML 1670, 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 the 29th of October 2012 and 2nd of 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. ML 1727 was obtained in 2016 and is associated with the proposed longwall panels 424 – 432.

Additional details relating to these mining tenements have been provided in Table 7.

Table 7. Mining Tenements

Lease	Grant Date	Expiry Date
ML 1303	15 December 1992	15 December 2034
ML 1323	3 August 1993	3 August 2035
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 June 2006	19 June 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	11 December 2007	13 December 2017*
AUTH 460	7 July 1992	6 June 2020

^MLA 445, and MLA 497 were submitted 29 October 2012 and 2 June 2015, respectively. Both applications are still being processed.

*EL6974 renewal lodged during the reporting period.

3.3. SMP Longwalls 411 - 418

In May 2005, Springvale submitted a Subsidence Management Plan (SMP) Application to the NSW Department of Primary Industries (now DRE) seeking approval for first workings and secondary extraction within Longwalls 411 – 418. SMP Approval was issued on the 7th of March 2006 (Reference Number 04/1673). Subsequent SMP variations were submitted and approved between 2008 and 2014 allowing various changes to the mining layout within Longwalls 413 – 418. Underground mining in Longwalls 411 to 418 has now been completed (extraction of Longwall 418 was completed on the 27th of May 2016). Monitoring will continue to be undertaken post-mining in accordance with the approved Longwalls 411 to 418 SMP.

Additional details pertaining to the SMP Approvals and SMP Variations at Springvale have been provided in Table 8.

Table 8. 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 (<i>Coal Mine Regulation Act 1982</i>)	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 SEWPaC 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.

As shown in **Table 8**, there were no further SMP Variations during the reporting period.

3.4. Extraction Plans

3.4.1. Longwalls 420 – 422

On the 21st of April 2017, the Longwall 420 - 422 Extraction Plan was approved allowing for the commencement of secondary extraction in Longwall 420. Mining commenced within Longwall 420 on the 29th of April 2017. Monitoring of subsidence related impacts will be undertaken in accordance with the requirements of the Longwall 420 - 422 Extraction Plan.

The Extraction Plan was been developed in accordance with the requirements of:

- SSD 5594, Schedule 3, Conditions 1, 2, 3, 4, 5, 6, 7, and 10;
- EPBC 2013/6881 Conditions 2, 4, 5, 7, 9, 12; and
- Department of Planning and Environment and NSW Trade and Investment Guidelines for the Preparation of Extraction Plans.

This Annual Review encompasses the Six-Monthly Environmental Monitoring Report requirement of the Longwall 420 - 422 Extraction Plan, which states that the reports will be submitted by 31st of September (covering January to June) and by the 31st of March in the form of an Annual Review.

3.5. Licences

Environment Protection Licence

Springvale currently operates under Environmental Protection Licence (EPL) 3607, issued under the *Protection of the Environment Operations Act 1997* (POEO Act). One variation to EPL 3607 was issued during the reporting period.

Table 9. EPL Variations

Licence	Details of Variation	Date of Variation	Purpose of Variation
EPL 3607	Amended condition U1.1 to remove all 30 June 2017 salinity and toxicity targets.	28 June 2017	To align with SSD 5594 Mod 2 approval (refer Section 3.1 Table 6)

Water Licences

Springvale currently holds four groundwater extraction licences as outlined in Table 10. Additionally Springvale holds licences for groundwater monitoring bores under the Water Act.

Dangerous Goods Licence

Springvale possesses Dangerous Goods Licence (NDG027897 2014 acknowledgement number) for the storage and handling of hazardous chemicals on the premises. During the reporting period, the Dangerous Goods Licence was updated to reflect more accurate chemical quantities stored on site and contact personnel. No additional chemicals were added to the Licence.

The Springvale licenses are summarised in Table 10.

Table 10. Licences

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

3.6. 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 11.

Section 95 Certificate

Springvale currently holds five Section 95 Certificates 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 Threatened Species Conservation Act 1995 (TSC Act). Previous certificates have been granted for geotechnical and geophysical investigations in addition to the installation of monitoring equipment. The certifications were issued under the TSC Act, pursuant to Section 95(2). Additional details for the Section 95 Certificates have been provided in Table 11.

Table 11. Occupation Permits and Section 95 Certificates

Licence	Date of Issue	Expiry	Details
Level 3 Occupation Permit – Infrastructure	17 December 2012	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.
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 Swamp.
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 operated surface water piezometers and soil moisture probes in Newnes Plateau Shrub Swamp.

3.7. Annual Review Requirements

The Annual Review has been developed to satisfy the reporting requirements of the approvals listed in Table 12.

Table 12. Annual Review Requirements

Approval	Condition No	Requirement	Where addressed in Annual Review
Development Consent SSD 5594	Schedule 6 Condition 12	By the end of March each year, or as otherwise agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:	Noted
		(a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;	Section 8
		(b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the: <ul style="list-style-type: none"> i. relevant statutory requirements, limits or performance measures/criteria; ii. requirements of any plan or program required under this consent; iii. monitoring results of previous years; and iv. relevant predictions in the EIS; 	Section 6 & 7
		(c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;	Section 11
		(d) identify any trends in the monitoring data over the life of the development;	Section 6 & 7
		(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6 & 7
		(f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	Section 6 & 7
CL 377 ML1326 ML1424 ML1537 ML 1588	Condition 3	ANNUAL ENVIRONMENTAL MANAGEMENT REPORT (AEMR)	Noted
		1) Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General. 2) The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of <ul style="list-style-type: none"> a) the accepted Mining Operations Plan; b) development consent requirements and conditions; c) Environment Protection Authority and Department of Land and Water Conservation licences and 	Section 6 & 7

Approval	Condition No	Requirement	Where addressed in Annual Review
		<p>approvals;</p> <p>d) any other statutory environmental requirements;</p> <p>e) details of any variations to environmental approvals applicable to the lease area. and</p> <p>f) where relevant, progress towards final rehabilitation objectives.</p> <p>3) After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.</p> <p>4) The lease holder shall, as and when directed by the Minister, co-operate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies.</p>	<p>Noted</p> <p>Noted</p>
<p>ML1303</p> <p>ML1323</p> <p>ML1727</p> <p>MPL 314</p>	<p>Condition 3 (f)</p>	<p>The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:</p> <p>(i) Provided a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP.</p> <p>(ii) Be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and</p> <p>(iii) Be prepared in accordance with any relevant annual reporting guidelines published on the Department's website.</p>	<p>Section 8</p>
<p>ML 1670</p>	<p>Condition 4</p>	<p>(a) The lease holder must lodge Environment Management Reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-general.</p> <p>(b) The EMR must:</p> <p>i) Report against non-compliance with the MOP;</p> <p>ii) Report on progress in respect of rehabilitation completion criteria;</p> <p>iii) Report on the extent of compliance with regulatory requirements; and</p> <p>iv) Have regard to any relevant guidelines adopted by the Director-General.</p>	<p>Section 8</p>
<p>LW419 Extraction Plan</p> <p>LW420-422 Extraction Plan</p>	<p>Section 6.1.3</p> <p>Section 7.1.3</p>	<p>Annual Review</p> <p>The Annual Review is completed in accordance with the post-approval requirements for State significant mining developments Annual Review Guidelines (2015) as required by the Department of Planning and Environment, incorporating the reporting requirements of the Department of Resources and Energy.</p> <p>The Annual Review will include information on operational activities, environmental performance and non-conformances and complaints received. This report is made available on the Centennial Coal website.</p>	<p>Section 6 & 7</p>

4. OPERATIONS SUMMARY

Springvale has approval for the extraction of up to 5.5 million tonnes per annum (Mtpa) of ROM coal from the Lithgow Seam underlying the Project Application Area. Coal processing and distribution is managed at the Springvale Coal Services site in accordance with the Western Coal Services Project (State Significant Development 12_5579). The exception for this is the transport of up to 50,000 tonnes per annum of coal from the Springvale pit top to local domestic customers by road haulage.

Table 13. Production Summary

Material	Approved Limit (and source)	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Waste Rock/ Overburden	NIL	Not Applicable	Not Applicable	Not Applicable
ROM Coal	5.5 million tonnes per calendar yr (Source: SSD5594 S2 C6)	4.293898 Mt	4.036498 Mt	4.379710 Mt
Coarse reject	NIL	Not Applicable	Not Applicable	Not Applicable
Fine reject (Tailings)	NIL	Not Applicable	Not Applicable	Not Applicable
Saleable product	NIL	Not Applicable	Not Applicable	Not Applicable

There are no inconsistencies between approved limits and actual production.

4.1. Other Operations

All operational management of coal processing and transport facilities is undertaken by the Western Coal Services Project (State Significant Development 12_5579), except for the transport of up to 50,000 tonnes per annum of coal from the Springvale pit top to local domestic customers by road haulage which is needed to be authorised by SSD 5594.

Springvale's operational summary is presented in Table 14. Operations relating to the Western Coal Services Project are reported in the Western Coal Services Annual Review.

Table 14. Operations Summary

	Approved Limit (and source)	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Comment (if applicable)
Hours of operation	24 hours a day, 7 days a week (Source: SSD5594 S2 C7)	24 hours a day, 7 days a week	24 hours a day, 7 days a week	No change
Transport (rail)	NIL	Not Applicable	Not Applicable	Not Applicable
Transport (road)	50,000 tonnes of ROM Coal per calendar year (Source: SSD 5594 S2 C8)	49943.9t	13666.6t	Within approved limits

4.1. Exploration

No exploration activities were conducted during the reporting period.

Approval was sought during the reporting period to conduct exploration over the proposed northern and southern longwall areas (EL6974). Consultation and approval activities conducted during the reporting period included:

- Landholder (Forestry Corporation of NSW) approval;
- DPI Water approval for EL6974 Groundwater Monitoring and Modelling Plan;
- Community consultation through CCC meetings and notifications (notification in the local newspaper, CCC member notification, local member notification);
- Sydney Catchment Authority, DPE and DRE notification;
- Exempted Area approval; and
- ESF4 form application.

Exploration is planned for 2018 under this project.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Table 15 outlines actions required from the previous Annual Review.

Table 15. Actions from previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Amend Section 6.3 (Air Quality) of Annual Review to reflect that Springvale is required to monitor TSP and PM10 per SSD 5594 Condition 7d of Schedule.	DPE	Amendment made to Air Quality section of Annual Review.	Section 6.1
Weed management at Vent Shaft site and LDP009	DRG	Weed management (manual removal and weed spraying) conducted throughout reporting period to reduce number weed growth at these and other locations.	Section 6.3
Implement erosion and sediment control measures at Vent Shaft and Booster Station 1 sites.	DRG	Work was undertaken at both sites to improve and/or maintain erosion and sediment control standards. Further work will be conducted in quarter 1 2018.	Section 6.4
Monitoring and potential remediation of Airstrip Dam	DRG	Monitoring of the AirStrip dam has been conducted monthly throughout the reporting period. No remediation activity has been completed as the suitability of remediation actions is being investigated.	Section 11 – Table 52
Review thick placement of logs on rehabilitated slope.	DRG	Subsequent rehabilitation monitoring report has found that native plant are	Section 8.4.2

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Reduce thickness where assessed as potentially detrimental to regrowth.		continuing to establish at this site. Springvale will target reducing the number of logs and woody debris at this site in 2018.	

6. ENVIRONMENTAL PERFORMANCE

Sections 6 and 7 provided results and analysis of environmental performance during the reporting period.

6.1. Air Quality

Potential dust sources from the Springvale Colliery 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. In December 2010 Springvale installed and commissioned a High Volume Air Sampler (HVAS) capable of measuring both Total Suspended Particles (TSP) and PM10. The unit is located on an adjoining property on Springvale Lane. The system operates automatically for a 24 hour period every 6 days in accordance with Australian Standards. Monitoring of TSP and PM10 is required under Schedule 4, Condition 5 of SSD 5594.

There is no recent history of fugitive dust complaints from adjoining residents nor has there been any regulatory notices issued requiring surface dust suppression. The Springvale Environmental Management System provides a platform for the maintenance and operation of dust control measures. Compliance monitoring is undertaken for due diligence and compliance purposes using independent contractors.

The Springvale Colliery pit top is situated against the Newnes State Forest and therefore is largely enclosed by native forest. Coal delivered to the ROM stockpile is wet with moisture levels ranging from 10-12% which acts to reduce particulate emissions. Other measures which are routinely employed at the Springvale Colliery to reduce emissions of particulate matter are the implementation of speed limits on internal roads, the enclosure of coal crushing and screening processes and material transfer by conveyor as well as the use of water carts on open areas of site. In addition, paved and bitumen covered pit top areas are swept with a street sweeper twice per week to minimise dust loading.

6.1.1. Dust Monitoring

Depositional Dust

Air quality monitoring has been undertaken during the reporting period in accordance with SSD 5594 and EPL 3607 requirements. The results obtained were below the criteria levels specified in SSD 5594.

Table 16 presents a summary of dust results obtained during the reporting period. Figure 6 shows the mean result of both the dust gauges.

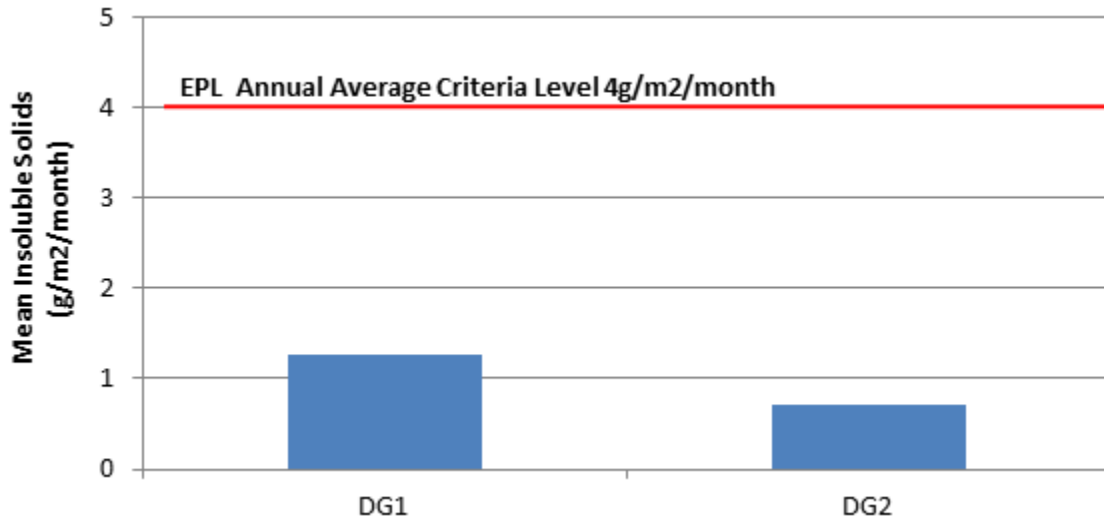
Air quality results are also presented graphically in Appendix 1.

Table 16. 2017 Monthly Dust Gauge Results

Month	DG1	DG2
January	1.4	1.1
February	1.5	0.8

Month	DG1	DG2
March	1.6	0.7
April	0.8	0.4
May	0.8	0.9
June	1.0	0.4
July	0.7	1.4
August	1.7	0.5
September	1.5	0.6
October	1.9	0.7
November	1.2	0.7
December	1.1	0.3

Figure 6. 2017 Average Dust Gauge Deposits



A comparison of the 2014 - 2017 dust monitoring results is presented in Table 17.

Table 17. Annual Average Dust Monitoring Results

Springvale Dust Gauge	2014	2015	2016	2017
DG1	1.44	1.53	1.53	1.27
DG2	0.51	0.68	0.29	0.71
AVERAGE	0.99	1.11	0.91	0.99

Results recorded at DG1 were consistent with previous results recorded, with a slight decrease in average results. Following a significant drop from 2015 to 2016, results at DG2 were consistent with results recorded in 2014 and 2015. No significant change was observed between historical results and results recorded during the reporting period. The annual average insoluble solids for

all dust gauges in the reporting period were all below the annual average of the EPL 4g/m²/month guideline.

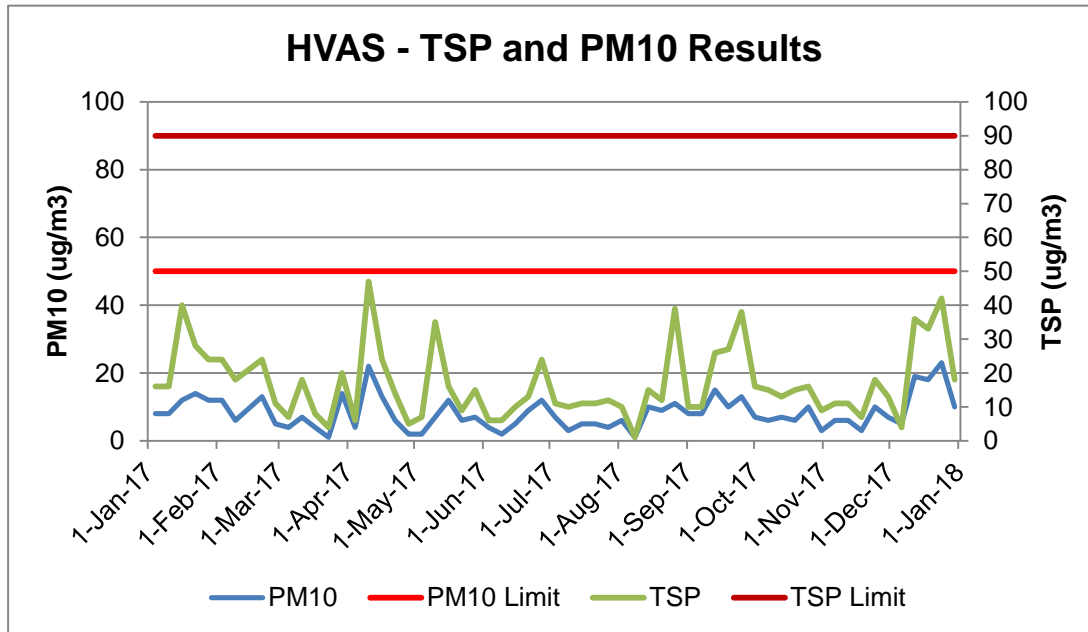
Total Suspended Particulates (TSP) and Particulate Matter (PM10)

The HVAS monitoring system was commissioned in late 2010. Monitoring of TSP and PM10 is required under Schedule 4, Condition 5 of SSD 5594. A comparison of the 2014 - 2017 average results is displayed in Table 18. Results are consistent with historical results. Figure 7 shows the 2017 TSP and PM10 results against criteria limits during the reporting period. No exceedances were identified during the reporting period.

Table 18. HVAS Average Results

AVERAGE	TSP (µg/m ³)	PM10 (µg/m ³)
2014	15	7
2015	14	8
2016	19	9
2017	17	8

Figure 7. 2017 HVAS (TSP and PM10) Results



6.2. Biodiversity

A comprehensive environmental monitoring program has been prepared which covers the LW411-418 SMP Area in accordance with relevant conditions of the SMP Approval and Longwall 419 Extraction Plan Area. Additional Management Plans also exist under EPBC 2011/5949 and EPBC 2013/6881. Monitoring and management of biodiversity impacts has been undertaken in accordance with these documents. Results are also presented in the SMSR, EPBC Annual Reports and Six Monthly Environmental Monitoring Reports.

6.2.1. Flora Triggers

Triggers for flora have been developed using data collected from reference site monitoring carried out since 2003. The triggers have been developed based on an analysis of natural variance in vegetation communities which has been determined following an analysis of reference site data.

Details of trigger levels for flora are set out in Table 19. Each trigger has a defined level of change and a defined timescale in which this change is to be observed to determine whether an impact has occurred.

Spring 2016 Report Results

As per the 2016 Annual Report, the following Initial Notification Report was submitted to the Department of Environment in relation to the Spring 2016 performance indicator exceedances on the 9th of March 2016:

Two flora performance trigger indicators were found to have exceeded performance indicator triggers during Spring 2016 monitoring. These were:

- The condition of *Gleichenia dicarpa* (a key swamp species) was below the trigger threshold for three Carne West monitoring sites (i.e. WC02, WC03 and WC04). This result is consistent with findings reported in the winter 2016 monitoring report for WC03 and WC04. However, differences to the winter 2016 reporting include a new trigger event at WC02 and a return to within range condition for WC01.
- An increase in bare ground of greater than 100 m² over a 3 year period at WC04. The change observed is 1.25% in summer 2016 to 28.75% in spring 2016.

Following the submission of the 2016 Annual Report, a Trigger Investigation Report was submitted on the 3rd of May 2017 as per the THPSSMP for Longwalls 415 - 417.

Summer 2017 Report Results

Three flora performance trigger indicators were found to have exceeded performance indicator triggers during Summer 2017 monitoring. These were:

- A change in the number of species of greater than 30% for a given site within a three year period was observed at Carne West monitoring sites WC01 and WC02. A trigger was also observed in one reference site (TRI01).
- An increase of 1 additional eucalypt individual at impact site LGG01 in Lower Gang Gang Swamp (i.e. an increase of more than 3 individuals within a one year period).*

*Note: LGG01 was incorrectly reported as a trigger notification. Site LGG01 was considered as an impact site, however is a reference site in the context of the monitoring program. Under the monitoring program, trigger indicators do not apply to reference sites.

An Initial Notification Report and Trigger Investigation report were completed as per the THPSSMP for Longwalls 415 - 417.

Details of the triggers are also presented in Table 19.

Table 19. Flora Trigger Levels

Performance Indicator	Parameter Measured	Trigger Level*	Spring 2016	Summer 2017
Change in species assemblage	Change in diversity of native species	A change in the number of species of greater than 30 % for a given site within a three year period.	Trigger in LGG01 (reference swamp). Reason unknown.	Flora trigger observed in two impact sites (WC01 and WC02). Flora trigger observed in one reference site (TRI01).
	Recruitment of eucalypt species	An increase in eucalypts in an impact site compared to reference sites of more than three individual plants within a one year period.	No exceedance in trigger values observed.	Flora trigger observed in two impact sites (SSE01 and LGG01). LGG01 is a new trigger.SSE01 is a continuance of a prior trigger.
Change in condition	Condition of key species	A decline in condition score at an impact site of more than 1.5 compared to the average condition score at un-impacted sites within a one year period.	WC02, WC03 and WC04 have exceeded a condition trigger for the key swamp species <i>Gleichenia dicarpa</i> . WC03 and WC04 represent repeat triggers.	Flora trigger observed in all four West Carne sites for overall condition (WC01, WC02, WC03 and WC04). WC01 and WC02 exhibited trigger level decreases in condition for the key swamp species <i>Gleichenia dicarpa</i> and <i>Baumea rubiginosa</i> .
	Non-live ground cover	An increase of bare ground of more than 100m ² in a site within a three year period.	Increase of magnitude exceeding the trigger level was observed in WC04. Trigger consistent with 'condition of key species' trigger.	No impact sites showed an increase in bare earth beyond the trigger level.
	Non-native weeds	An increase in non-native weed species of more than 4 in a monitoring site (each having a cover of greater than 5%) compared to the average number in reference sites within a one year period.	No impact sites showed an increase in weed species beyond the trigger level.	No impact sites showed an increase in weed species beyond the trigger level. Invasive species previously detected in CCS01 and LGG01 were not detected in this monitoring event.

*Taken from THPSS MMP 415-417 and THPSS MMP 418. Data collection method used consistent with Erskine and Fletcher (2011).

6.3. Weed Management

Major weed threats include Blackberry, Scotch Thistle, St. Johns Wart, which are targeted by the noxious weed control program within the monthly surface maintenance program. Weeds are targeted during the autumn and spring seasons. The weed control program mainly focuses on controlling weeds on the Pit Top, Overland Conveyor and Coal Services Sites.

Weed control works are carried out where required, as identified during the inspections of the Pit Top and disturbance areas of the Newnes Plateau. During the reporting period, additional weed eradication campaigns were conducted at the Vent Shaft site and LDP009 in accordance with the recommendations from DRG as part of the inspection in 2017. The program included hand removal of weeds from both locations (graveled area of Vent Fan site and LDP009 slope) and spraying of any remaining weeds at both sites.

6.4. Erosion and Sediment Control

There are minimal exposed earthen areas at Springvale and most activities at the pit top are undertaken on relatively flat areas. In addition, high activity areas are sealed (e.g. car park areas). Internal unsealed roads are maintained to prevent dust, primarily through dust suppression sprays and water carts. Sediment fences are installed where required to filter sediment from drainage / seepage. Sediment is controlled by a series of dams and water treatment facilities at the Springvale pit top and at Newnes Plateau infrastructure sites. Water discharged is monitored for suspended solids.

Erosion and sediment control work conducted during the reporting period included:

- Repair of pit top stockpile-dirty water drain sediment fence;
- Clean out of pit top clean water drain, including gabion wall sediment and vegetation matter build up;
- Repair and installation of sediment fencing at Bore 6 and Bore 8;
- Installation of rock drains, sediment fencing and maintenance of drains at Vent Fan Site (as per DRG recommendation);
- Installation of sediment control structures (log barriers and sediment fences) at Booster Pump Stations 1 and 2 (as per DRG recommendation – further improvement work is planned in quarter 1 2018 on this recommendation, in particular around topsoil management); and
- Repair of minor erosion points at LDP009.

6.5. Feral Animals

There were no issues of concern regarding feral animal control during the reporting period.

6.6. Heritage

6.6.1. Aboriginal Heritage

In 2016 Centennial Coal prepared a Western Region Aboriginal Cultural Heritage Management Plan in consultation with relevant stakeholders. This document aims to provide Centennial and Springvale with a consistent approach to consultation with local Aboriginal communities regarding Aboriginal cultural heritage identification as well as identify consistent minimum standards and processes for aboriginal cultural heritage identification, monitoring and management across Centennial's western operations. The plan was approved by the DPE and was in effect during the reporting period.

The first aboriginal heritage site projected to be undermined, as applicable to SSD 5594, was the isolated artefact (Site #45-1-2739) located above Longwall 419. The only potential effect on this site from subsidence is that it will be located at a slightly lower elevation than that at which it now exists.

In accordance with the Heritage Management Plan (prepared under Schedule 3, Condition 10h of SSD 5594), a Baseline inspection and report was undertaken for Site #45-1-2739 in advance of Longwall 419. Two post mining inspections were conducted, the Phase 3 inspection being undertaken during the reporting period.

The timing and findings of the inspections undertaken during the reporting period are detailed in Table 20.

Table 20. Aboriginal Heritage Inspections

Site	Inspections Undertaken	Findings During Reporting Period
#45-1-2739 Milky Quartz Core	Phase 1 (baseline) – 16/12/2015 Phase 2 (post undermining) - 17/11/2016 <u>Phase 3 (post mining, secondary inspection) – 17/10/2017</u>	Phase 3 inspection did not identify the recorded artefact (milky quartz core). The artefact had been identified during Phase 1 and 2 inspections. The parties (RPS Heritage consultant, Aboriginal Party representatives, Springvale Environment Coordinator) in attendance were in agreement that there were no noticeable changes in the site condition from the Phase 2 inspection, with no surface disturbances noted and that the site was in overall good condition. That the artefact could not be located during monitoring, was likely due to the increased level of ground litter and/or disturbance by animal activity.

EIS (1992) Predictions \ Recommendations

The archaeological survey undertaken as part of the EIS predicts that the shelters above the area proposed for Longwall mining are not at risk from subsidence. It was recommended that shelter sites be included in any subsidence monitoring programs as a check on their stability.

During the reporting period, no noticeable damage to these shelter sites was observed, nor damage caused by subsidence. These findings are representative of those predicted within the EIS.

6.6.2. Natural and European Heritage

In 2016 Centennial Coal prepared a Western Region Historic Heritage Management Plan. The plan was approved by the DPE and was in effect during the reporting period.

Newnes State Forest occupies the area above the Springvale underground coal leases. The area is currently managed by Forests NSW who regularly carries out logging activities of both its pine plantations and native forests. In addition to logging activities, tracks are maintained by Forests NSW which attracts a large number of 4WD and trail bike riders. The area is also very popular for campers and bushwalkers. In 2006, the Newnes State Forest was gazetted as a hunting area for Bow Hunters.

Previously, an historical heritage assessment was completed including a review of relevant Commonwealth, State and local historic heritage registers. The review of relevant registers included the National Heritage List, Commonwealth Heritage List, State Heritage Register, State Government Agency Heritage and Conservation Register and the Lithgow City Local Environmental Plan. No historic heritage items and/or National Heritage Places have been identified within the Springvale Colliery holding.

A European scarred tree (Springvale Tree) was initially recorded as an Aboriginal scarred tree and registered on the Aboriginal Heritage Management System (AHIMS) as site number 45-1-2788. Subsequent assessment of the tree revealed it to be of European origin and is currently registered as 'not a site' on the AHIMS database. The site is being managed in accordance with the Historic Heritage Management Plan. Subsequent Phase 2 and Phase 3 inspections will be conducted in accordance with the Historic Heritage Management Plan as undertaken.

Table 21 details the inspection timing and findings during the reporting period.

Table 21. European Heritage Inspections

Site	Inspections Undertaken	Findings During Reporting Period
#45-1-2788 European Scar Tree	Phase 1 (baseline) – <u>24/11/2017</u>	The Phase 1 inspection found the scarred tree in good condition with no damage to trunk or branches identified.

6.7. Meteorological Monitoring

Springvale mine is required to operate a meteorological station on-site in accordance with EPL 3607. The meteorological station conforms to AS3580.14. A summary of meteorological data collected from Springvale Colliery during 2017 is presented in Table 22.

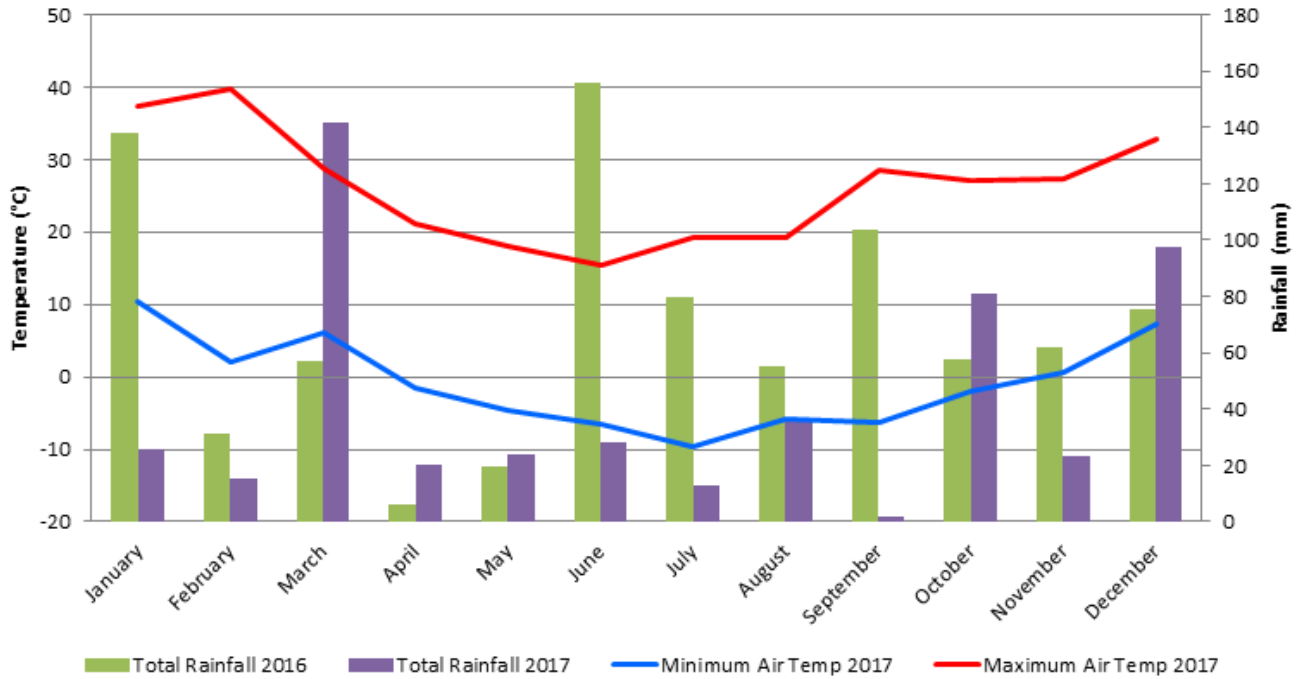
Table 22. Site Weather Data

Month	Total Rainfall (mm)	Minimum Temperature (°C) @ 2m	Maximum Temperature (°C) @ 2m
January	25.8	10.4	37.27
February	15.6	2.07	39.81
March	141.8	6.19	28.68
April	20.0	- 1.48	21.07
May	23.6	- 4.63	17.98
June	28.2	- 6.64	15.35
July	12.6	- 9.73	19.13
August	37.0	- 5.77	19.13
September	2.0	- 6.26	28.51
October	81.2	- 1.95	27.03
November	23.0	0.59	27.43
December	97.6	7.32	32.91

The minimum temperature recorded on-site during the reporting period was -9.73°C in July and the maximum temperature recorded was 39.81°C in February. Maximum temperatures recorded during 2017 were generally slightly higher compared to 2016, while minimum temperatures were consistently lower June through September.

Annual temperature and rainfall is presented in Figure 8, with 2016 rainfall data also presented for comparative purposes. Total annual rainfall decreased by 332mm from 841mm in 2016 to 508mm in 2017.

Figure 8. Annual Temperature and Rainfall

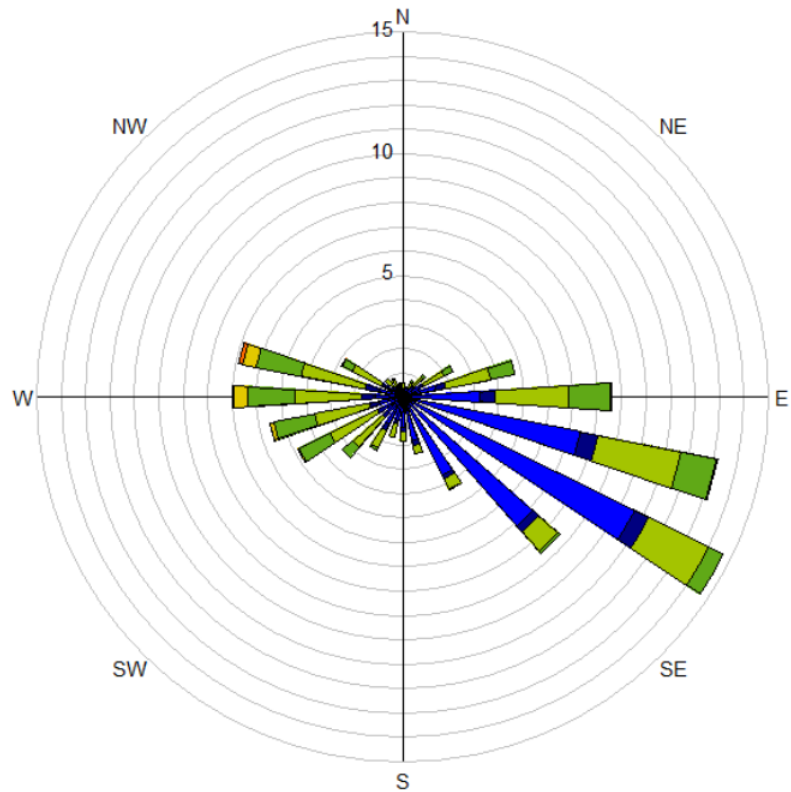


An annual wind velocity and direction wind rose is presented in Figure 9. Both parameters are consistent with 2016 averages, with the predominant wind speed and wind direction during the reporting period 1.307m/sec and east south east respectively.

Figure 9. Annual Wind Rose

Wind Direction as Percentage of Time

- 0-0.5 m/s
- 0.5-1.0 m/s
- 1.0-3.0 m/s
- 3.0-5.0 m/s
- 5.0-7.0 m/s
- 7.0-10.0 m/s
- >10.0 m/s



6.8. Noise

Operator attended noise monitoring was conducted at five locations during the reporting period in accordance with requirements under SSD 5594 and EPL 3607.

Table 23 below compares the results of the operator attended noise monitoring with relevant noise goals.

As noted in Table 3, five exceedances of the noise criteria occurred during the reporting period. One exceedance occurred during quarter 2 monitoring (daytime), two exceedances during quarter 3 (night and sleep disturbance) and two during quarter 4 (night and sleep disturbance). The exceedances were all in relation to the operation of the stockpile dozer/s operating on the Springvale ROM stockpile, the primary noise contributors being track slap and engine noise.

Following the quarter 2 exceedance, the dozer was inspected by Westrac technicians who removed a recently installed guard around the dozer alternator, which was thought to be exacerbating noise levels. Further details of this exceedance result are outlined in Section 11.

Subsequent to the quarter 3 exceedances, noise attenuation measures were investigated to be installed on the dozer to minimize noise emissions. The project has progressed through the remainder of the reporting period and the installation of the attenuation measures is scheduled to commence during April 2018. The attenuation work is proposed to involve the change out of the track rollers, idlers, drive sprockets and muffler.

Compliance with the noise criteria goals was otherwise achieved at all other noise monitoring locations during all monitoring periods.

Results are shown graphically in Appendix 5, with results from 2014 onwards included for trend analysis. 2017 results are consistent with previous years with no significant trends identified.

Table 23. Noise Monitoring Results Summary 2017

Location	Q1	Q2	Q3	Q4	Criteria Limit
Day (LAeq (15 minute) dBA)					
S1 (EPL ID No. 11)	<30	32	36	44	44
S2 (EPL ID No. 12)	<30	48	40	43	43
S3 (EPL ID No. 13)	Inaudible	Inaudible	Inaudible	Inaudible	35
All other privately-owned land					35
S4 (EPL ID No. 14)	Inaudible	35	34	30	35
S5 (EPL ID No. 14)	Inaudible	32	<33	Inaudible	35
Evening (LAeq (15 minute) dBA)					
S1	<30	41	37	42	44

Location	Q1	Q2	Q3	Q4	Criteria Limit
S2	<30	42	38	41	43
S3	Inaudible	Inaudible	Inaudible	Inaudible	35
All other privately-owned land					35
S4	Inaudible	33	30	Inaudible	35
S5	Inaudible	33	26	Inaudible	35
Night (LAeq (15 minute) dBA)					
S1	30	43	45	42	42
S2	34	45	43	47	43
S3	Inaudible	Inaudible	Inaudible	Inaudible	35
All other privately-owned land					35
S4	<30	36	34	30	35
S5	Inaudible	32	31	Inaudible	35
Night (LA1 (1 minute) dBA)					
S1	33	49	55	49	52
S2	50	52	51	57	53
S3	Inaudible	Inaudible	Inaudible	Inaudible	60
All other privately-owned land					45
S4	<30	42	43	33	45
S5	Inaudible	37	34	Inaudible	45

6.9. Mine Subsidence

During the 2017 reporting period, coal was extracted from longwalls 419, 420 and 421. Extraction of longwall 419 was completed on the 18th March 2017 with a total chainage of 2340m. Extraction of longwall 420 commenced on the 29th of April 2017 and was completed on the 9th of November 2017 with a total chainage of 2086m. Extraction of longwall 421 started on the 19th of December 2017 and chainage at 31st of December 2017 was 1628m.

No anomalous surface movements were detected during the reporting period that warranted investigation.

EIS (1992) Predictions \ Recommendations

Subsidence monitoring results are within predictions detailed in the EIS. These predictions for subsidence are detailed below:

- 33 (potential) longwall panels;
- Panels 1 – 2 to experience subsidence range from 40% of mined thickness (i.e. 1.2m) to 65% (i.e. 1.95m) and tensile strain between 5mm/m and 13mm/m;
- Panels 3 – 25 to experience similar subsidence levels (40 – 65%), although the depth of cover increases from panel 3 – 19 (e.g. panels 3 – 7 between 310 – 355m and panels 8 – 25 between 295 – 420m);
- Maximum subsidence over panels 3 – 19 (i.e. 40% of mined thickness or 1.44m); and Subsidence to occur within 6 – 9 months post extraction, with the majority of subsidence occurring within 4 months of the longwall passing a particular point.

6.10. Waste

The major 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 treated and applied to land in the on-site sewage treatment plant

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.

Non-production waste is managed in accordance with the EIS and existing Mining Operations Plan, with all potentially hazardous material stored and/or banded 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.

During the reporting period a recycling rate of 31.46% (Total offsite waste tonnes / Recycled waste) was achieved. This represents an increased recycling rate, compared to 20.29% in 2016.

In 2017, Springvale implemented a waste sorting trial at site to improve waste segregation, equipment recovery and recycling rates. The trial was in place from September to December and was successful in its implementation, with improvements noted including:

- Increased scrap steel recovery;
- Improved oil drum handling and disposal;
- Improved waste segregation through sorting of general waste bins on-site; and
- Increased equipment recovery for site, reducing general waste.

Waste sorting will continue in 2018 with the objective of continuing to improve on waste segregation, hydrocarbon (oil/chemical drum) management and recycling.

A summary of the waste removed and recycled is presented in Figures 10 and 11.

Figure 10. 2017 Waste Management Summary

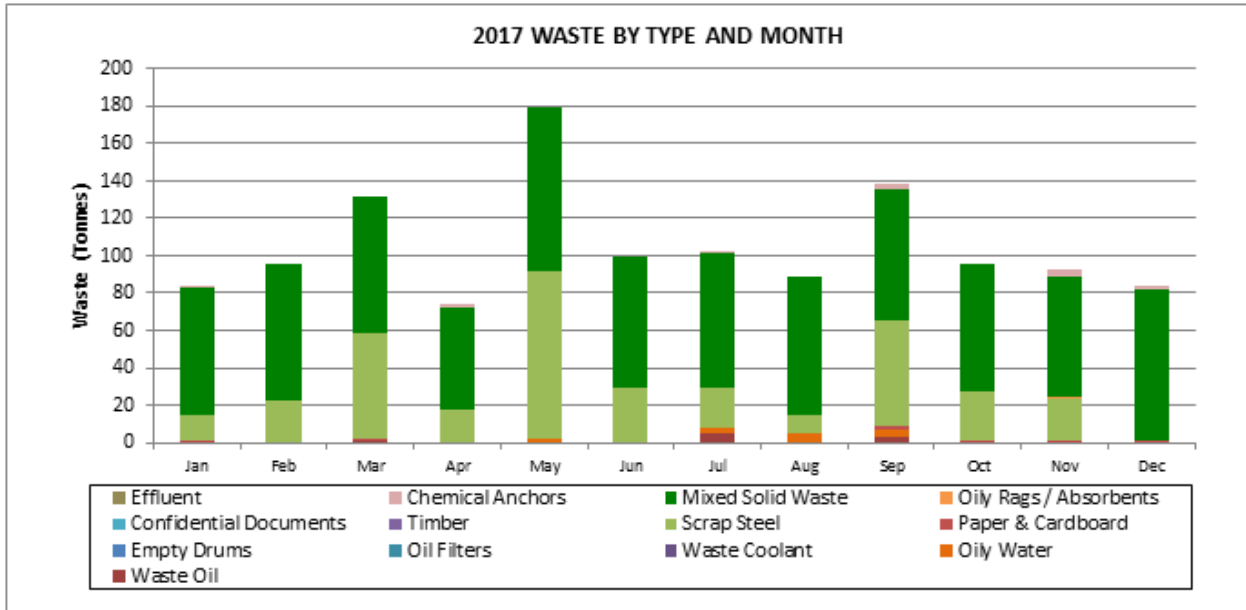
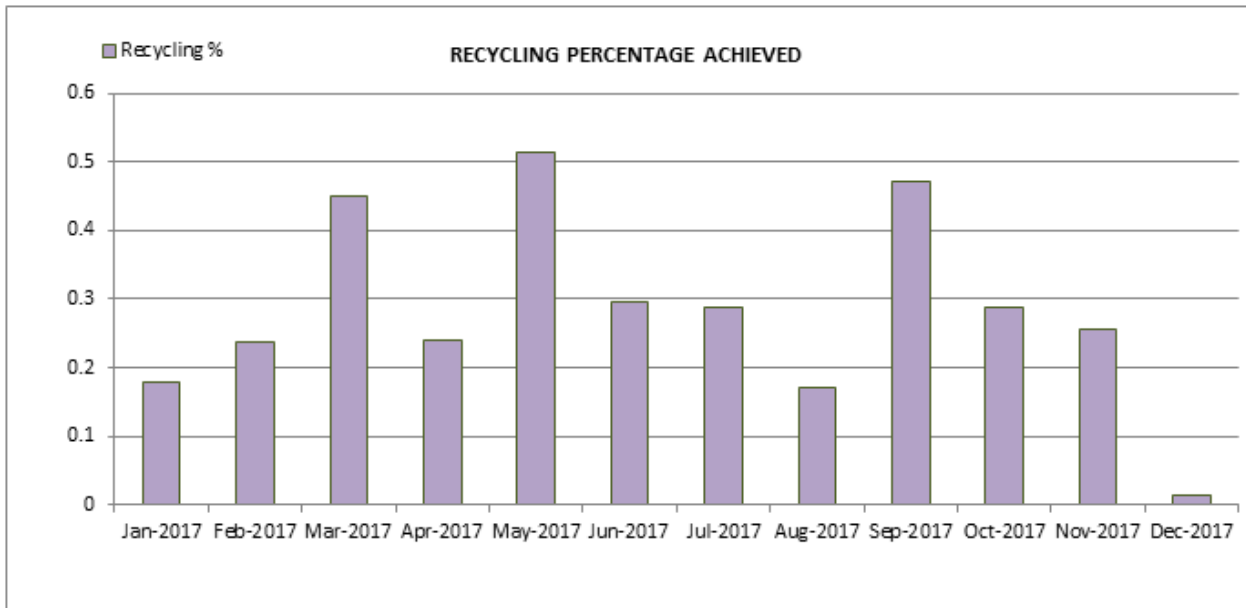


Figure 11. 2017 Recycling Summary



6.11. Hydrocarbon Contamination

Fuels and oils are stored 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 licenced facilities.

6.12. Spontaneous Combustion

The Lithgow coal seam has a low propensity for spontaneous combustion with no spontaneous combustion issues in relation to in-situ or for processed Lithgow seam coal. The highest risk of spontaneous combustion in relation to Lithgow seam coal appears to be during stockpiling for periods greater than approximately 1 year. Springvale coal is generally stockpiled for less than 1 year. There have been no incidences of spontaneous combustion in the life of Springvale mine.

EIS (1992) Predictions \ Recommendations

As predicted within the EIS, no occurrences of spontaneous combustion were observed during the reporting period.

6.13. Bushfire

The majority of the land within the Springvale holding has been identified as Bushfire Prone Land. Fire history data from the Forestry Corporation of NSW indicates that the majority of bushfires in the area spread from the north and east of Springvale Mine 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 Mine's infrastructure.

Springvale Mine has established a Bushfire Management Plan (SV-MS-029 (2013)) and the associated Bushfire Management Procedure (SV-MS-029-WP-568 (2011)) in consultation with the NSW Rural Fire Service. These documents identify both the risks posed by bushfire to Springvale Mine assets, and control strategies to mitigate these risks.

In 2013 the devastating State Mine fire burnt through more than 46,000 hectares. The bushfire caused power outage and minor damage to mine infrastructure located on the Newnes Plateau. Several flora monitoring plots on the Springvale lease were affected by the bushfire.

In 2017 there were no bushfires affecting Springvale Colliery. The Springvale Bushfire Risk Assessment (which informs the Bushfire Management Plan) was reviewed in 2017 in consultation with the NSW Rural Fire Service and FCNSW.

EIS (1992) Predictions \ Recommendations

The EIS details the requirement for firefighting services to access water at the Pit Top and Washery in the event of a bushfire. Current bushfire controls include the Springvale-Delta Transfer Scheme, which pumps up to 30ML per day from Springvale Coal and Angus Place Colliery to LDP009 discharge point. Along the pipelines length, fire hydrant points have been installed for use by fire services.

7. WATER MANAGEMENT

The following table presents water take for Springvale 2016/2017 financial year. It is important to note that Table 24 reports on the WATER YEAR which is from the 1st of July to the 30th of June, not the calendar year. Water take was within Water Access Licence limits.

Table 24. Water Take

WAL Number	Water Sharing Plan, source and management zone (as applicable)	Entitlement (ML)	Passive take/flows (ML)	Active pumping (ML)	TOTAL (ML)
WAL 36383	Sydney Basin Richmond Groundwater Source	5,958	N/A	5822.7	5822.7
WAL 36446	Sydney Basin Coxs River Groundwater Source	3,300	N/A	851.4	851.4
WAL 36443	Sydney Basin Coxs River Groundwater Source	585	N/A	585	585

Note: Volume is reported in annual megalitres (ML)

7.1. Surface Water Monitoring

Surface water monitoring is undertaken in accordance with EPL 3607. Results of the monitoring are reported on an annual basis to the OEH via the EPA Annual Return. The following tables provide a summary of results obtained during the reporting period.

Two amendments to the Site Water Management Plan were prepared during the reporting period following Mod 1 and Mod 2 amendments to SSD 5594.

7.1.1. Water Quality – Licensed Discharge Points

Water quality results for LDP001 and LDP009 are presented in Tables 25 and 26 below.

LDP water quality results are also presented graphically in Appendix 2.

Table 25. LDP001 Quality

Pollutant	Unit of measure	Lowest sample value	Mean of sample	Highest sample value	Limit
Conductivity	microsiemens per centimeter (µS/cm)	104	1069.68	1284	NA
Filterable iron	milligrams per litre (mg/L)	<0.05	<0.05	<0.05	NA
Filterable manganese	milligrams per litre (mg/L)	<0.001	0.003	0.016	NA
Oil and Grease	milligrams per litre (mg/L)	<5	1.08	13	10
pH	pH	6.79	8.43	9.2	6.5-9.0

Pollutant	Unit of measure	Lowest sample value	Mean of sample	Highest sample value	Limit
Total suspended solids	milligrams per litre (mg/L)	<5	1.36	7	30

EC ranged from 104µS/cm to 1284µS/cm with an average of 1069.68µS/cm. This is slightly higher than the 2015 and 2016 average of 910.62µS/cm and 962.72µS/cm respectively, however generally consistent with previous years.

Filterable iron were consistently below the respective detection limits (<0.05) during the reporting period.

Filterable manganese ranged from <0.001mg/L to 0.016mg/L with an average of 0.003mg/L. This is slightly lower than the 2015 and 2016 average of 0.005mg/L and 0.01mg/L respectively, however generally consistent with previous years.

Oil and grease results ranged from <5mg/L to 13mg/L with an average of 1.08mg/L. One exceedance was recorded during the reporting period. The likely cause of exceedance was contaminated underground water captured in dewatering system. The oil boom installed at LDP001 did not effectively control contamination. All other results were below the level of detection during the reporting period.

pH ranged between 6.79 to 9.2 with an average of 8.43. An acid dosing system was in place during the reporting period, which utilizes real time technology to adjust to varying flows and pH levels continued to operate effectively during the reporting period. Two pH exceedances were recorded during the reporting period. Low pH levels exist in water structures at Springvale and the acid dosing system was installed to dose to maintain pH levels between compliance limits . No failure of the dosing system occurred during either exceedance, however low flow events preceding recorded non-compliance results may have caused an increase in pH level in LDP001 discharge pond (due to low discharge and standing water).

TSS ranged from <5mg/L to 7mg/L with an average of 1.36mg/L. This is slightly higher than the 2015 and 2016 averages of 1.15mg/L and 0.93mg/L respectively, however generally consistent with previous years.

Table 26. LDP009 Quality

Pollutant	Unit of measure	Lowest sample value	Mean of sample	Highest sample value	Limit
Aluminium (dissolved)	milligrams per litre (mg/L)	<0.01	0.011	0.08	0.45
Arsenic (dissolved)	milligrams per litre (mg/L)	0.005	0.012	0.021	0.024
Boron (dissolved)	milligrams per litre (mg/L)	0.06	0.073	0.15	0.37
Conductivity	microsiemens per centimeter	997	1199	1407	1200

Pollutant	Unit of measure	Lowest sample value	Mean of sample	Highest sample value	Limit
Copper (dissolved)	milligrams per litre (mg/L)	<0.001	0.00002	0.001	0.007
Fluoride	milligrams per litre (mg/L)	1	1.26	1.6	1.8
Iron (dissolved)	milligrams per litre (mg/L)	<0.05	0.003	0.07	0.4
Manganese (dissolved)	milligrams per litre (mg/L)	<0.001	0.010	0.023	1.7
Nickel (dissolved)	milligrams per litre (mg/L)	<0.001	0.002	0.004	0.047
Oil and Grease	milligrams per litre (mg/L)	<5	0.158	7	10
pH	pH	6.78	7.83	8.37	6.5-9
Total suspended solids	milligrams per litre (mg/L)	<5	2.62	15	50
Turbidity	nephelometric turbidity units (NTU)	0.8	2.6	6	50
Zinc (dissolved)	milligrams (mg/L) per litre	<0.005	0.004	0.014	50

Results for Arsenic, Aluminium, Boron, Copper, Fluoride, Iron, Manganese, Nickel, Oil & Grease, pH, total suspended solids, turbidity and Zinc were all within EPL criteria limits for the reporting period. No anomalous results were identified for these parameters during the reporting period.

Two Arsenic exceedances were recorded in 2016, however all 2017 results were within criteria limits. No issues with the Ferric Chloride dosing system that treats Bore 940 (an LDP009 water source) were noted during the reporting period.

EC results ranged from 997µS/cm to 1407µS/cm with an average of 1199µS/cm. This is consistent with the previous reporting period, where the average was 1198.2µS/cm. Twenty-five exceedances against the EPL criteria level of 1200µS/cm were recorded during the reporting period. The increased EC levels and exceedances have been attributed to the increased exposure of mine water with goaf material. Further details regarding the exceedances are presented in Section 11. The construction of the Springvale Water Treatment Project (SWTP), scheduled to be operating by June 2019, will allow mine water will bypass LDP009 and be treated at the MPPS water treatment plant.

Licensed Discharge Points 6 and 7 are not associated with SSD 5594 and no discharges from Licensed Discharge Points 4, 5 and 10 occurred during the reporting period. No water quality results have therefore been included for these points.

7.1.2. Surface Water Flows – Newnes Plateau

Surface Water Flows and Levels

Surface water flows and levels at Springvale are monitored at six separate locations as detailed below:

- Sunnyside Swamp – flows are interpreted through pool depth monitors.
- Carne West Swamp – flows are interpreted through pool depth monitors.
- Carne West Pool.
- Tristar Swamp.
- Twin Gully Swamp.
- Marrangaroo Creek Upstream.

Carne West Pool (CWP)

Carne West Pool (CWP) is located downgradient of Carne West Swamp and monitors the pool depth of surface flows into Carne Creek. The pool depth monitor was installed at the bottom end of Carne West Swamp on 30 May 2012.

Pool depth can be seen increasing with rainfall earlier in the year, peaking with the intense rainfall event observed in March. Thereafter, pool depth gradually declined, peaking with smaller intermittent rainfall events. Despite some intense rainfall events, no flows were observed from September which is likely a compounded effect from below average rainfall experienced from March onwards.

It is noted that spikes in pool depth do not always have a clear, immediate relationship to individual rainfall readings. Progressive increases in pool depth during periods of below average rainfall indicate that there is considerable storage retained in the swamp alluvium/peat, and a delayed release of this water to the pool is occurring. Historically, the lag time appears to vary from several days up to several months but pool depth has become more rainfall dominant since water levels at CW1 and CW2 declined. However, this decrease in the rainfall retention by the swamp and overall rainfall dominance also coincides with declining CRD.

Carne West Swamp

No flow was recorded (dry) at Carne West Swamp during the reporting period. This is consistent with results in 2015 and 2016, however flows have historically been identified before this time.

Sunnyside Swamp

Low base flows were reported at Sunnyside Swamp during the reporting period. No flow was recorded in March but increased flow coincides with large rainfall events.

Tristar Swamp

Flow rates ranging from approximately 100kL/day to 350 kL/day were recorded for Tristar during the reporting period. There is generally an increase in streamflow after periods of rainfall.

Twin Gully Swamp

Flows at Twin Gully Swamp during the reporting period were large, with a peak flow of 909kL/day occurring on 26/06/2017. This large peak isn't consistent with the rainfall observations as during the period of low rainfall during May to July large flows were maintained. This may be due to groundwater storage and base flow contribution.

Marrangaroo Creek Upstream

No flow was recorded at Marrangaroo Creek Upstream during the reporting period due to below average rainfall.

7.1.3. Water Quality – Newnes Plateau

Surface water quality is monitored at the following locations:

- Sunnyside Swamp – within swamp.
- Sunnyside swamp – directly down gradient of the swamp (Wolgan river US).
- Upper Wolgan River – upstream of confluence with East Wolgan Swamp.
- Upper Wolgan River – downstream of the junction with East Wolgan Swamp.
- Carne West Swamp – CW1 and CW2.
- Sunnyside East Swamp – SSE3.
- Carne Swamp.

The Sunnyside Swamp and Upper Wolgan River sites are monitored for electrical conductivity (EC), pH, manganese and iron. The Carne West Swamp and Sunnyside East Swamp sites are monitored for electrical conductivity (EC), pH and iron. The monitoring results are discussed below.

Wolgan River

A summary of the water quality statistics for Wolgan River are provided in Table 27.

Table 27. Wolgan River - 2017 Water Quality Statistics

Site	Analyte	Min	Max	Mean
East Wolgan D/S Junction	pH	5.68	9.74	6.68
	EC (uS/cm)	19.0	39.0	28.8
	Mn (mg/L)	0.001	0.010	0.005
	Fe (mg/L)	0.12	0.81	0.37
Sunnyside U/S Junction	pH	5.84	8.34	6.66
	EC	17.0	120.0	34.4
	Mn (mg/L)	0.002	0.015	0.006
	Fe (mg/L)	0.18	0.70	0.36

During the reporting period, pH values measured at East Wolgan D/S Junction and Sunnyside U/S Junction appear to trend lower than in 2016 and are more in line with observations from 2011 to 2014. The pH at East Wolgan D/S Junction and Sunnyside U/S Junction are very similar. However, since monitoring has commenced, no obvious trends in pH are apparent and values remain sporadic. Highly alkaline pH was recorded at both East Wolgan D/S Junction and Sunnyside U/S Junction in August which is the second most alkaline pH (8.34) for Sunnyside Swamp U/S Junction and the most alkaline pH (9.74) recorded for East Wolgan D/S Junction. The following sampling event shows both sites to be neutral in pH.

EC values measured at East Wolgan D/S Junction and Sunnyside U/S Junction averaged 28.8 µS/cm and 34.4 µS/cm respectively during the reporting period, despite a large peak in February. It should be noted that peaks have also been observed historically. EC was stable during the reporting period.

Manganese concentrations over the reporting period show a similar trend to the previous reporting period and are within historical observations.

Iron concentrations at both sites show almost identical trends over the reporting period with values ranging from 0.30mg/L to 0.81mg/L, which is typically in the lower range of historical data. A peak in Fe was observed in March which is associated with flushing from rainfall.

Overall, besides the large alkaline peak in pH observed at East Wolgan D/S Junction, which was not repeated the following sampling event, East Wolgan D/S Junction and Sunnyside U/S Junction remained within historical observations during the reporting period.

Sunnyside Swamp

A summary of the water quality statistics for Sunnyside Swamp are provided in Table 28.

Table 28. Sunnyside Swamp - 2017 Water Quality Statistics

Site	Analyte	Min	Max	Mean
Sunnyside Swamp D/S	pH	5.1	11.29	6.78
	EC (uS/cm)	23	55	33
	Mn (mg/L)	0.002	0.039	0.007
	Fe (mg/L)	0.06	0.86	0.47
Sunnyside Swamp U/S	pH	5.35	8.32	6.37
	EC	25	77	36
	Mn (mg/L)	0.002	0.028	0.013
	Fe (mg/L)	0.17	0.88	0.36

The same alkaline observation that was recorded at East Wolgan D/S Junction in August was also observed at Sunnyside Swamp D/S. A short lived pH of 11.29 was observed at Sunnyside Swamp D/S which is the highest reading recorded since monitoring commenced. After this observation, pH at Sunnyside Swamp D/S remained stable. The alkaline reading was not observed at Sunnyside Swamp U/S and remained stable during the reporting period. The means for Sunnyside Swamp U/S and Sunnyside Swamp D/S during the reporting period were slightly higher than historical data but remained within the bounds of historical observations.

EC values at Sunnyside Swamp D/S and Sunnyside Swamp U/S have remained within historical limitations during the reporting period with an average of 33 µS/cm and 36 µS/cm respectively. Other than a small peak in EC in March which is associated with flushing from rainfall, Sunnyside Swamp U/S and Sunnyside Swamp D/S were mostly stable during the reporting period.

Manganese concentrations over the reporting period show a similar trend to the previous reporting periods. Seasonal variation in Mn is apparent, with concentrations in cooler months decreasing and concentrations in warmer months increasing. However, Mn concentrations were within historical observations during the reporting period.

The iron concentrations for Sunnyside Swamp U/S and Sunnyside Swamp D/S during the reporting period with an average of 0.36 mg/L and 0.47 mg/L respectively. The iron

concentrations for Sunnyside Swamp U/S and Sunnyside Swamp D/S remained relatively constant during the reporting period with the exception of a peak associated with flushing from rainfall in March.

Overall, monitoring results for Sunnyside Swamp U/S and Sunnyside Swamp D/S remained within historical observations during the reporting period.

Carne Swamp

A summary of the water quality statistics for Carne Swamp are provided in Table 29. Only three water quality samples were taken during the reporting period due to the intermittent nature of flows through Carne Swamp which have become rainfall dominated.

Table 29. Carne Swamp - 2017 Water Quality Statistics

Site	Analyte	Min	Max	Mean
Carne Swamp	pH	5.23	6.22	5.89
	EC (uS/cm)	28.0	32.0	31.8
	Mn (mg/L)	0.003	0.026	0.017
	Fe (mg/L)	0.18	0.32	0.24

Due to Carne Swamp being dry for the majority of the reporting period only three samples were taken. No trends are apparent for pH, EC Mn and Fe and the values observed were within historical limits.

Sunnyside East Swamp

A summary of the water quality statistics for Carne Swamp are provided in Table 30. There is little historical data for this location as monitoring for Sunnyside East Swamp began in March 2016. Sixteen samples were collected during the reporting period.

Table 30. Sunnyside East Swamp - 2017 Water Quality Statistics

Site	Analyte	Min	Max	Mean
Sunnyside East	pH	4.40	8.10	6.30
	EC (uS/cm)	23.0	432.0	63.0
	Mn (mg/L)	0.008	0.017	0.011
	Fe (mg/L)	0.09	0.47	0.20

The pH levels fluctuate between 5.02 and 8.10 over the reporting period with no apparent trend. Generally, the observed pH values for the reporting period are greater, and fluctuated more readily, than previous pH values observed during 2016.

The EC values generally fluctuate between 23 and 73µS/cm over the reporting period with no apparent trend. However, EC peaked in November at 432µS/cm and was experienced after an extended period of dry conditions (no flow) between July and November. The high EC value was temporary and EC returned to baseline levels in following monitoring events.

Mn concentrations were relatively consistent during the reporting period at approximately 0.01mg/L and are consistent with historical Mn data.

Fe concentrations show a stable trend during the reporting period. Peaks are seen in March and December which are associated with flushing from rainfall. Despite little historical data, the peaks are in line with observations in other swamps.

7.1.4. Water Volume

Water volume for the reporting period was monitored through flowmeters located at discharge points LDP001, LDP002 and LDP009. Daily discharge volumes are measured against EPL 3607 volume limits and reported on monthly in the EPL 3607 Environmental Monitoring Report published on the Springvale website. Annual discharge volumes are outlined in Table 31. Discharged volume was within EPL 3607 limits during the reporting period.

Table 31. Water Volume

Licensed Discharge Point	Annual Total (kilolitres)
LDP001	309117.59
LDP002	1.69
LDP004	No discharge
LDP005	No discharge
LDP009	8063305.8
LDP010	No discharge

7.2. Water Balance

The regional groundwater model for Springvale is currently in the process of being rebuilt in MODFLOW from the original COSFLOW model built by CSIRO. Updates will be outlined in subsequent Reports.

7.3. Groundwater Monitoring

7.3.1. Groundwater Monitoring Strategy

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 Colliery and the adjacent Angus Place Colliery. The monitoring locations within the Springvale mining lease boundary include the following main aspects:

- Groundwater levels are monitored in 10 swamps, with a total of 31 swamp piezometers.
- Surface water flows in swamps are measured at Junction Swamp (v-notch weir), Sunnyside Swamp (pool depth) and Carne West Swamp (pool depth).
- The groundwater levels in the shallow aquifer system of the Buralow Formation and Banks Wall Sandstone are measured in 17 piezometers that have been installed on the ridges between the swamps.
- Groundwater levels in the perched aquifer system of the Buralow Formation are measured in 3 piezometers which have been installed downgradient of Carne West Swamp, Gang Gang South West Swamp and Gang Gang East Swamp.

- Hydrogeological conditions in the shallow and deep groundwater systems above the working seam are monitored by Vibrating Wire Piezometers (VWP), installed in 11 boreholes across the entire spatial extent of the mining lease boundary.
- Rainfall data is collected at the Newnes Plateau Prison Farm rain gauge and at the Bureau of Meteorology rain gauge at Maddox Lane, Lithgow (BoM Station No. 063132).
- Water quality data is collected, when available, from 19 swamp piezometers across 8 swamps.
- Surface water quality data is collected, when available, at 14 surface water sites within 7 swamps and 1 tributary.

Data are recorded at various frequencies as follows:

- At swamp and aquifer piezometers data is recorded daily.
- Surface water level data in pools and weirs is recorded daily.
- VWP data is recorded daily.
- Manual measurements at swamp, perched and ridge piezometers are undertaken monthly.
- Barometric data is recorded daily for correction of swamp, perched and ridge piezometer water levels.
- Swamp water quality data is recorded monthly.

7.3.2. Swamp Water Levels

Rainfall deficits observed during the reporting period are shown to influence water levels observed at all swamp piezometers indicating that, despite the potential for groundwater base flows at some swamp piezometers such as TG1 and TS3, the water level declines were experienced regionally. Although more recent rates of water level decline appear to be accentuated at CC1 and GG1 which are in closer proximity to active mining.

As most of the swamp piezometers were installed during a rainfall surplus from 2010 to 2013, it is likely that the perched water tables in the Buralow Formation, providing swamps with base flows, were highly charged at this time. However, with declining CRD, it appears that swamps are becoming increasingly responsive to continued drying conditions as can be seen at MS1, BS1 and BS2. This suggests that, as well as reduced rainfall recharge, the swamps are now experiencing reduced groundwater base flow. Furthermore, the lack of prior observation during drought conditions makes it difficult to differentiate between potential mining related impacts and climatic influences on swamp water levels.

Sunnyside West Swamp

There is one piezometer installed in Sunnyside West Swamp, the details of which are shown in Table 32.

Table 32. Sunnyside West Swamp Piezometer Information

Piezometer	Mined Status	Monitoring Commencement
SW1	LW413B and LW414	26/07/2007

The water levels in SW1 correspond closely with Cumulative Rainfall Deviation (CRD). Intense periods of rainfall often see an immediate response in water levels followed by a steady decline between rainfall events. This was observed during rainfall events in March where the water level peaked sharply followed by a steady decline until it was dry by September. Rainfall in December

also showed a small and short lived peak. Overall, water level trends at SW1 are consistent with historical trends.

Sunnyside Swamp

There are five piezometers installed in Sunnyside Swamp, the details of which are shown in Table 33.

Table 33. Sunnyside Swamp Piezometer Information

Piezometer	Mined Status	Monitoring Commencement
SS1	Not Undermined	12/05/2005
SS2	Not Undermined	12/05/2005
SS3	Not Undermined	12/03/2010
SS4	Not Undermined	12/03/2010
SS5	Not Undermined	12/03/2010

Water levels declined at SS1, SS2, SS4 and SS5 due to below average rainfall between January to March; SS3 was dry during this period. Above average rainfall in March caused water levels to peak at SS1, SS4 and SS5 which was followed by a steady decline and stabilisation. SS3 water levels fluctuated in response to rainfall in March, April and May but has remained consistently dry since July.

A continuation of below average rainfall led to a declining trend at SS1 and SS2 from August with SS2 almost dry by December. Historically, water levels at SS2 have not been this low and emphasises the impact that consistent rainfall deficits during 2017 have had at Sunnyside Swamp. Furthermore, SS4 and SS5 water levels can be seen declining from December, as a delayed and subdued response to below average rainfall since April.

Sunnyside East Swamp

Three piezometers are installed into Sunnyside East Swamp as shown in Table 34.

Table 34. Sunnyside East Swamp Piezometer Information

Piezometer	Mined Status	Monitoring Commencement
SSE1	LW417	12/03/2010
SSE2	LW417	12/03/2010
SSE3	LW418	12/03/2010

SSE1 and SSE2 showed small fluctuations in water levels at the base of the piezometers in response to rainfall events and soil moisture but were largely dry for the majority of the reporting period. SSE3 showed no response to rainfall and was dry during the reporting period.

Carne West Swamp

There were previously four piezometers installed into Carne West Swamp as shown in Table 35. An additional piezometer SPR1601 was installed in 2016. The installed depth of SPR1601 is 6.3m, and it is the deepest of the five piezometers.

Table 35. Carne West Piezometer Information

Piezometer	Mined status	Monitoring Commencement
CW1	Undermined LW419	12/05/2005
CW2	Undermined LW419	12/05/2005
CW3	Adjacent LW417	14/10/2011
CW4	Adjacent LW417	14/10/2011

CW1 – CW4 were mostly dry during the reporting period. A small amount of water can be seen in CW1 which is water trapped in the bottom of the piezometer from rainfall events and soil moisture.

Historically, water levels at CW1 and CW2 steadily declined from July 2014 and have been mostly dry to date. Since installation in October 2011, CW3 and CW4 have only responded to prolonged and above average rainfall events and have been dry since July 2013.

Carne Central Swamp

There is one piezometer installed in Carne Central Swamp as shown in Table 36.

Table 36. Carne Central Swamp Piezometer Information

Piezometer	Mined status	Monitoring Commencement
CC1	Not Undermined	14/10/2011

Water levels at CC1 declined in response to the rainfall deficit between January and March in a similar fashion to that previously observed between February and June 2016. Rainfall in March relieved declining water levels, as did subsequent rainfall events in April and May, which helped to sustain water levels until August. Thereafter, water levels at CC1 dropped sharply, temporarily responding to rainfall events in October, November and December, but continued a downward trend and was close to dry in December.

Historically, the gradient of water level declines seen during the reporting period are similar to those previously observed but the magnitude in water level declines differ. The decline in water levels observed at CC1 is believed to be associated with a continuing decline in CRD since 2013.

Gang Gang West Swamp

There are six piezometers in Gang Gang West Swamp, as shown on Table 37. Two of these (GW1 and GW2) were in place before the 2016 monitoring period and an additional four piezometers (SPR1602, SPR 1603, GW3 and GW4) were installed in August and October 2016.

Table 37. Gang Gang West Piezometer Information

Piezometer	Mined status	Monitoring Commencement
GW1	LW420	14/10/2011
GW2	LW420	14/10/2011
GW3	Not undermined	01/10/2016
GW4	LW420	01/10/2016

GW2 responded to rainfall in March with a short and sharp peak. Thereafter, the water level steadily declined, sustained by smaller rainfall events in April and May. From the response to rainfall in May, GW2 was dry for the remainder of the reporting period. Historically, the responses observed during the reporting period are not characteristic of GW2 which has shown consistent water levels, despite rainfall deficits, since installation in 2011.

GW3 shows fluctuating water levels between January and March in response to below average rainfall from January to March followed by high rainfall in late March. After which, water levels steadily declined before dropping sharply in early August. Between August and October GW3 was dry but briefly responded to an intense rainfall event in October. After the brief rainfall response in October, GW3 was dry for the remainder of the reporting period.

GW1 and GW4, up gradient of Gang Gang West Swamp, were dry during the reporting period and showed no response to rainfall. Historically, GW1 showed consistent water levels up to February 2015 where water levels began to steadily decline. GW1 has been consistently dry since February 2015 and GW4 has been dry since installation in October 2016.

Gang Gang Swamp

There are three piezometers installed in Gang Gang Swamp, as shown in Table 38. One of these (GG1) was in place before the 2017 monitoring period and two additional piezometers (GG2 and GG3) were installed in October 2016.

Table 38. Gang Gang Swamp Piezometer Information

Piezometer	Mined status	Monitoring Commencement
GG1	LW420	14/10/2011
GG2	LW420	01/10/2016
GG3	LW420	01/10/2016

Water levels at GG1 and GG3 corresponded with the rainfall deficit observed between January and March and again with declining CRD from June to October. Water level responses were more pronounced at GG1 than GG3 in response to rainfall events, and GG3 showed more tolerance to the rainfall deficit throughout most of the reporting period. Water levels at GG1 responded to rainfall in October, November and December, but an overall declining trend continued until it was dry in mid-December.

GG2, up gradient of GG1 and GG3, briefly responded to rainfall in March with a short and sharp increase in water level but was dry for the remainder of the monitoring period.

East Wolgan Swamp

East Wolgan Swamp is located above the eastern extent of the current Angus Place longwalls and has been undermined by Angus Place Colliery longwalls 960 and 970. The swamp is the down gradient extension of the Junction Swamp above the neighboring Springvale Colliery, and is a licensed discharge point (LDP004) for Springvale. LDP004 is licensed for emergency discharge. There were no recorded discharge events into the East Wolgan Swamp during the review period.

The water level at East Wolgan swamp is monitored at WE1 and WE2 and water levels closely resemble rainfall patterns and intensity. Since early 2009 the responses have declined to short duration spikes in water level and since mid-2009 WE1 and WE2 water levels have generally remained at or below the base of piezometer.

During the reporting period water levels at both WE1 and WE2 continued to respond intermittently to large rainfall events.

7.3.3. Regional Shallow Aquifer Water Levels

Standpipe Piezometers

A series of nineteen ridge boreholes have been established to monitor the groundwater level in the perched and shallow aquifers of the Buralow Formation and Banks Wall Sandstone at Springvale.

The standpipe piezometers are summarised in Table 39.

The Standpipe piezometers are equipped with water level pressure transducers (with the exception of Bore RSE) and data loggers, and are installed over a large spatial extent of the Springvale mining lease boundary.

Standpipe piezometers monitoring water levels in the regional shallow aquifer generally display stable trends which fluctuate with rainfall and climatic conditions in the same manner as previous years.

Table 39. Standpipe Piezometer Locations

Monitoring Point	Easting	Northing	Monitoring Date	Hole Depth	Data Recording Method
AP5PR	236529	6308528	28/07/2010	94	Pressure transducer
RSE	236840	6304191	20/12/2005	Unknown	Manual dip (two monthly)
RSS	238072	6303500	01/12/2005 to 14/12/2011	43.9	Pressure transducer
			14/12/2011		
SPR1101	238484	6302635	14/11/2011 to 12/12/2013	47.4	Pressure transducer
SPR1104	239746	6303184	4/11/2011	47	Pressure transducer
SPR1106	239980	6304227	15/12/2011	86.2	Pressure transducer
SPR1107	239739	6301305	4/11/2011	55.6	Pressure transducer
SPR1108	241045	6303314	4/11/2011	76.1	Pressure transducer
SPR1109	239186	6302160	14/12/2011	60.1	Pressure transducer
SPR1110	238699	6302330	14/12/2011	65.8	Pressure transducer
SPR1111	240404	6303692	14/12/2011	60.9	Pressure transducer
SPR1112	240852	6302995	15/12/2011	50	Pressure transducer
SPR1113	240625	6302995	13/02/2012	60.6	Pressure transducer
SPR1210	239677	6300052	31/05/2013	131.2	Pressure transducer
SPR1211	239677	6300052	31/05/2013	133.8	Pressure transducer
SPR1301	239275	6299271	26/05/2014	86.7	Pressure transducer
SPR1401	238453	6303547	21/11/2014	46.55	Pressure transducer
SPR1402	238163	6303489	6/01/2015	92.9	Pressure transducer
SPR1403	239133	6303287	5/08/2015	51.1	Pressure transducer

Eight of the piezometers either show a continuation of gradual declining groundwater levels that are subdued and delayed responses to declining CRD, or show stable trends (SPR1106, SPR1108, SPR1112, SPR1113, SPR1301, SPR1403, RSS and AP5PR). SPR1211 shows a gradual decline after a gradual rising trend that commenced in early 2015.

Piezometers that display notable trends within the reporting period are:

- SPR1104, located directly above LW420, shows a gradual decline in water levels from 1064.6mAHD to 1061.8mAHD (dry), dropping by approximately 2.8m. The groundwater level was gradually declining until late June before dropping approximately 1.5m as it was undermined by LW420 and has been dry since.
- The groundwater level at SPR1107, located above LW420, dropped below the level logger as LW419 passed in late December 2016 and early January 2017. The level logger was lowered in September and shows a consistent decline in groundwater levels for the remainder of the reporting period. SPR1107 was undermined by LW420 in August but continued steady groundwater level declines as previously observed.
- SPR1111, located 500m north of LW420, shows a stepped drop in groundwater levels in February due to LW419 intercepting a lineament (Centennial 2017). The response was confirmed with manual observations as a legitimate aquifer response. For the remainder of the reporting period, the groundwater level at SPR1111 can be seen gradually declining.

Several piezometers have been vandalised or are now consistently dry:

- SPR1210 was damaged by forestry operations in January 2016.
- SPR1402 has been vandalised and is no longer able to be monitored.
- SPR1110 and RSE remains below the base of the piezometer.

Standpipe Water Level Interpretation

Piezometers outside of the impacted area display water levels trends that are either subdued and delayed responses to declining CRD since 2013 or show stable trends.

Piezometers that are within an area 200m of the goafs edge, known as the Angle of Draw (AoD), or within a 600m area of the goafs edge, known as the Trigger Investigation Area (TIA), displayed groundwater trends associated with undermining (stepped drops due to bed separation and parting, fracture dilation and sudden increase in storage capacity) or dewatering (steady groundwater declines as aquifers fill increased storage space created from subsidence). The AoD is a nominal boundary from the longwalls goaf edge in which the greatest amount of subsidence is observed. The TIA is also a nominal boundary used in recent Swamp Monitoring Plans (SMP), and is used to monitor piezometers within 600m of an active longwall for signs of mining impacts.

SPR1111 was not within the AoD or TIA when the sudden drop in groundwater level was observed in February. At the time of the response, SPR1111 was approximately 2 km away from the LW419 mining face. The response observed is believed to be a far field depressurisation response due to the interception of a lineament when mining LW419 (Centennial 2017). The sudden drop was confirmed as a legitimate aquifer response which was confirmed with routine manual water level measurements. The stable water level observed after the stepped drop at SPR1111 is suggestive of a sudden increase in pore space due to bed separation and/or fracture/fault dilation along the lineament. SPR66, which was within 600m of LW419, also demonstrated decreases in piezometric pressures in all 8 sensors around the same time as SPR1111.

Vibrating Wire Piezometers

Multi-level vibrating wire piezometers (VWPs) have been installed in boreholes across the mining lease area to monitor pore pressures in the shallow and deep aquifer systems. Most of the VWPs are located in the centre of the current workings at Springvale Colliery, in the area that is being currently mined, or will be mined in the future.

For the analysis and interpretation of groundwater levels in this report, only VWP monitoring points within the proximity of active longwalls during the reporting period have been analysed, these being SPR36, SPR66, SPR67 and SPR1208, as shown in Table 40.

Table 40. Vibrating Wire Piezometer Locations

Monitoring Point	Easting	Northing	Monitoring Frequency	Monitoring Commence Date	No.of Functioning Piezometers	VWP Setting Depth (mbgl)*
SPR36	239359	6303500	Daily	May 2005	1 of 8	35, 75, 130, 146, 274, 320, 376, 389
SPR66	239827	6301992	Daily	September 2009	0 of 8	35, 80, 130, 180, 230, 290, 348, 372
SPR67	238712	6302278	Daily	September 2009	5 of 8	35, 50, 70, 90, 110, 160, 200, 260
SPR1208	240965	6301652	Daily	November 2012	8 of 8	89.7, 129.7, 225.7, 270, 303.2, 379.7, 410.7, 420.7

***Bold** indicates the sensors which are no longer functioning or have been disconnected.

SPR36

SPR36 is located to the west of LW420, above LW419, and originally monitored the piezometric pressures across eight formations. Four (Sensors #3, #5, #6 and #7) of the eight sensors were still operating until the end of September 2016 and display a sharp decline in piezometric pressures in September 2016 when LW419 passed. Since the passing of LW419, communications with 7 sensors has been lost. Currently only the shallowest sensor (#8) is still recording pressures and shows the continuation of a slight declining trend during the reporting period.

SPR66

SPR66 is located directly above LW420. The piezometric pressures are monitored in eight formations at SPR66.

Located within the Lithgow seam, Sensor #1 was disconnected on 1/6/2017 to avoid any potential repercussions when the sensor was mined out and shows a similar trend to sensor #2 prior to disconnection.

Historically, SPR66 can be seen depressurising in sensors #1 to #5 in response to mining LW416-419. Sensors #6 to #8, above the Mt York Claystone, are also seen depressurising due to LW416-418 but to a lesser extent. Responses in sensors #6 to #8 increased as LW419 and LW420 approached. Communications with all sensors was lost when SPR66 was undermined by LW420. Again, depressurisation responses are the result of increased storage capacity due to subsidence from approaching longwalls.

SPR67

SPR67 is located above LW417. Piezometric pressures were originally monitored in eight formations at SPR67, however communication was lost with sensor #1 in 2014, and with Sensors #2 and #3 in 2015 when SPR67 was undermined by LW417. Sensors #4 to #8, located above the Mt York Claystone show stable water levels during the reporting period.

SPR1208

SPR1208 is located to the east of LW419-421 and measures piezometric pressures in eight formations. At its closest point, SPR1208 is approximately 650m from LW421. During the reporting period, a gradual decline in piezometric pressures is observed in sensors #8, #2, #4, #3, #5 and #6. Sensor #7, located below the Lithgow seam, shows a mostly stable trend, slightly decreasing in line with other sensors from August 2017.

Sensor #1 shows a depressurisation response beginning in October 2016, temporarily stabilising in May 2017 before declining again in September 2017. The decline in September and subsequent pressure increase was also observed at sensors #2, #4, #3, #5 and #6. Sensor #8, located above Sensor #1, does not show a similar response but rather a gradual pressure decline.

Declines in piezometric pressures in affected sensors are responses to increased storage capacity (bed parting/separation, fracture dilation etc) due to subsidence from mining of LW419 and LW420.

7.3.4. Groundwater Quality Monitoring

Groundwater quality is monitored at two separate locations:

- Carne West Swamp – CW1 and CW2
- Sunnyside East Swamp – SSE3

Carne West Swamp

It was not possible to collect samples at CW1 and CW2 for analyses over the reporting period, as the piezometers were dry.

Sunnyside East Swamp

It was not possible to collect a sample at SSE3 for analyses over the reporting period, as the piezometer was dry.

7.3.5. Soil Moisture Monitoring

Soil moisture monitoring commenced in October 2016 at Gang Gang West (GW1SM, GW3SM) and Gang Gang East (GG2SM, GG3SM).

- At GW1SM, all the probes showed stable soil moisture level trends. The shallower probes (0cm and 10cm) had a less pronounced response to rainfall with small peaks in moisture levels, remaining stable throughout the period. Deeper probes (20cm to 50cm) only show a response to significant rainfall events displaying a sharp peak in moisture levels but otherwise remains stable between rainfall events. The deepest 50cm probe shows a slower decline in moisture levels retaining moisture for longer durations. In general, soil moisture at GW1 is low, remaining below 20% for the majority of the reporting period.
- At GW3SM soil moisture declined until rainfall in March which temporarily stabilised moisture levels. The soil moisture probes did not capture data from March to May during the significant rainfall event but since repair on 03/05/2017 has resumed functionality. From August, soil moisture steadily declined into October with intermittent rainfall events briefly increasing soil moisture thereafter. The peaks in moisture associated with rainfall events are more pronounced in deeper probes as seen from October to December. In general, soil moisture has declined over the reporting period, fluctuating with rainfall events and ranged from 30-60% from January to August and 25-10% from August to December. The decrease in soil moisture at GW3SM is due to below average rainfall experienced during 2017.
- At GG2SM the probes recorded a decrease in soil moisture over the reporting period. The shallower probes (0cm to 40cm) remained relatively dry throughout the reporting period with moisture levels generally below 10%. Probes (0cm to 20cm) showed no significant response to rainfall events, and probes (30cm and 40cm) only showed a response to the intense rainfalls that occurred in March. Deeper probes (50cm to 80cm) showed a declining trend with peaks associated with large rainfall events. At the beginning of the reporting period, moisture levels at the deep probes (50cm to 80cm) ranged between 50-60% and stabilise around 25-40% towards the end of the period.
- At GG3SM there is generally a high soil moisture recorded. The 0cm probe shows stable moistures levels ranging within 15-25%. The 10cm probe remains stable around 30% with peaks associated with rainfall events. Soil moisture at the 20cm and 30cm probes vary depending on rainfall, peaking to 100% during rainfall events then dropping sharply to approximately 10% between rainfall events. The 30cm probe is also at a level in which the swamp water level fluctuates most readily and can be seen at 100% between February and August when swamp water levels at piezometer GG3 were at their highest. Deeper probes (40cm to 100cm) displayed stable soil moisture levels between 75-85% as they are fully saturated.

7.4. Surface Water and Groundwater Triggers

During the reporting period, nine monitoring sites were triggered under relevant Trigger Action Response Plans (TARPs). As part of the response process, an Initial Notification is sent out to relevant regulators and a subsequent Trigger Investigative Report is completed and supplied to these same regulators. A trigger does not necessarily infer that an impact has occurred, but rather that further investigation is required. Springvale will continue to review the TARP actions in relation to these triggers, conducting further investigative work as required. Table 41 outlines further details regarding the triggers.

Table 41. Surface Water and Groundwater Trigger Details

Monitoring Site	Trigger Document	Notification / Investigative Reporting Dates	Trigger Report Findings
APNEPGAN	LW419 Water Management Plan	Initial Notification – 6/04/2017 Investigative Report – 18/04/2017	The reduction in surface flows observed at APNEPGAN from September 2016 coincides with a period of decreasing rainfall. However from comparison with historical rainfall responses and rainfall response at reference site APNEPTRI, it is not considered that rainfall alone was responsible for the observed flow reduction. <ul style="list-style-type: none"> Swamp groundwater levels measured at Gang Gang East and Gang Gang South West generally show a declining trend from approximately September 2016 with increased level fluctuation. From mid-October GW1, GW4 and GG2 are no longer recording a water level, indicating that the groundwater level is below the data logger. The LW 419 face passed adjacent to Gang Gang South West swamp during October and November 2016, which coincides with the timing of the period of reduced flows. The response observed in groundwater level data measured at Gang Gang East and South West swamps and flow data measured at APNEPGAN appears consistent with the hypothesis discussed in Centennial Coal (2017). The hypothesis suggests that mining in the vicinity of significant fault zones can cause changes to standing water levels in swamps.
GW2	LW420 – 422 Swamp Monitoring Program EPBC 2013/6881	Initial Notification – 22/05/2017 Investigative Report – 14/07/2017	GW2 exceeded the short term trigger criteria set out in the LW420-422 SMP. GW2 has previously exceeded its 95 th percentile pre-mining threshold during the pre-mining period on several occasions and was in exceedance before the longwall approached within 600m. Applying the 95 th percentile to reference piezometers also showed exceedances during the pre-mining period due to rainfall deficit which has affected swamps on a regional scale. The longwall approach is not observed as a major contributor to the exceedance of GW2 with a combination of declining CRD and the mining of a regional fault structure during LW418 and LW419 considered more likely influences.
GG1	LW420 – 422 Swamp	Initial Notification –	Although the water levels at GG1 dropped below the short-term trigger level during the postmining period, the response is not dissimilar to water levels observed in February 2017 in

Monitoring Site	Trigger Document	Notification / Investigative Reporting Dates	Trigger Report Findings
	Monitoring Program EPBC 2013/6881	16/10/2017 Investigative Report – 15/12/2017	response to rainfall deficit. The effects of drought and/or prolonged rainfall deficit on monitored swamps are not fully understood, as the duration of monitoring at most impact and reference piezometers is relatively short and began on the back of a prolonged wetting period from 2010 to 2013. In an environment of natural water level regression, it is difficult to distinguish between climatic influences and gradual or progressive mining influences. The effects, or not, of mining influences will become more apparent with on-going monitoring and the comparison of GG1 to long-term triggers.
GG2	LW420 – 422 Swamp Monitoring Program EPBC 2013/6881	Initial Notification – 12/09/2017 Investigative Report – 27/10/2017	GG2 exceeded its pre-mining trigger level approximately three months before LW420 was within 600m which then continued into the post-mining period. Prior to exceedance and between the December 2016 and March 2017 rainfall events, the water level at GG2 was hovering just above its respective trigger level. After rainfall in March 2017, the water level at GG2 fluctuated at or below the base of the piezometer, periodically exceeding its respective pre-mining trigger level during the pre-mining period. The post-mining period commenced on the 4 th August 2017 and the exceedance trigger occurred 7 days after on the 10 th August 2017 once the short trigger criteria had been met. It is not known whether peaky responses to rainfall are characteristic of the water levels in this portion of Gang Gang East Swamp because of the short pre-mining monitoring period. The impact of recent rainfall deficits is evident at historically water logged swamps such as GG1, CC1 and BS2, with some of the lowest water levels recorded since monitoring began and triggering respective trigger levels during the pre-mining period. Furthermore, swamp piezometers located over Angus Place also experienced these rainfall deficits indicating the climatic impact was on a regional scale. The effects of drought on monitored swamps are not fully understood, as the duration of monitoring at most impact and reference piezometers is relatively short and began on the back of a prolonged wetting period from 2010 to 2013. It is hard to distinguish between mining and climate impacts without monitoring swamps during significant pre-mining rainfall deficit or drought as post-mining climatic responses can easily be confused for mining impacts. Applying the 95 th percentile to reference piezometers also showed exceedances during the pre-mining period due to rainfall deficit which has affected swamps on a regional scale. The longwall approach is not observed as a major contributor to the exceedance of GG2 with available data indicating the water levels in the swamp around GG2 is largely rainfall dominated.
SPR1104 and	LW419 Swamp Monitoring Program	Initial Notification – 23/12/2016	Both SPR1104 and SPR1107 exceeded the 5 th percentile pre-mining thresholds during the pre-mining period. This caused the immediate trigger of SPR1104 and SPR1107 when the longwall approached within 600m. With the same trigger criteria applied, reference

Monitoring Site	Trigger Document	Notification / Investigative Reporting Dates	Trigger Report Findings
SPR1107	EPBC 2013/6881	Investigative Report – 16/02/2017	piezometers SPR1108, SPR1111, and SPR1113 were also found to trigger during the pre-mining period indicating a regional climatic influence on groundwater levels. This is supported by a rainfall deficit from March 2013 which is observable through cumulative rainfall deviation. SPR1104 shows a sharp declining trend towards the end of September 2016 that does not correlate with reference piezometers or climatic conditions. The hydrograph indicates that groundwater level in the vicinity of the piezometer have re-equilibrated with reduced groundwater levels above the longwall goaf which have been impacted by subsidence, likely fracture dilation and bed separation resulting in increased storage capacity and a corresponding reduction in groundwater levels. This is further supported by stabilisation towards the end of the data set. There is no evidence of continued decline that might be associated with vertical fracturing or deep drainage at this stage.
SPR1108	LW420 – 422 Swamp Monitoring Program EPBC 2013/6881	Initial Notification – 21/11/2017 Investigative Report – 09/01/2018	Statistical assessment of pre and post-mining groundwater level data for SPR1108 indicate that the groundwater level dropped below the short term trigger level before the LW420 mining face was within 600m of the piezometer. When LW420 came within 600m of SPR1108, groundwater levels remained below the respective trigger level for the one-month observation period, as detailed in the SMP, and the short term trigger was exceeded. LW420 was completed on the 9/11/2017. No obvious indication of mining impacts are observed in the gradual decline in groundwater levels at SPR1108, which is considered to be climatically driven.
SPR1111	LW420 – 422 Swamp Monitoring Program EPBC 2013/6881	Initial Notification – 16/06/2017 Investigative Report – 11/07/2017	SPR1111 was in exceedance of its respective trigger level during the premining period and as a result was in immediate breach when LW420 commenced on the 29/04/2017. It is believed that the sudden drop in water level observed in early February 2017 is a legitimate aquifer response which has been verified with manual water level measurements. SPR66, which was within 600m of LW419, also demonstrates decreases in piezometric pressures in all 8 piezometers around the same time as SPR1111. The timing of the response observed at SPR1111 indicates that the water level drop is unrelated to LW420 and is believed to be a far field depressurisation response due to the interception of a lineament when mining LW419 (Centennial 2017). The stable water level observed after the stepped drop at SPR1111 is suggestive of a sudden increase in pore space due to bed separation and/or fracture/fault dilation along the lineament. Further to this, no indication of deep drainage (typical of a consistently declining water level) has been observed at the time of reporting.

8. REHABILITATION

8.1. Rehabilitation in 2017

Springvale has adopted a progressive approach to rehabilitation to reduce and mitigate potential environmental impacts. Facilities no longer required, for example, exploration sites, or ventilation and dewatering facilities, are rehabilitated soon after decommissioning, to return disturbed land to the original landform. Rehabilitation is followed up with periodic inspections and maintenance as necessary based upon evidence of endemic regrowth, weeds and soil disturbance. Rehabilitation acceleration techniques are undertaken as required following approval from the Forestry Corporation of NSW (FCNSW) and in accordance with the Springvale – FCNSW Level 3 Occupation Permit.

Due to the underground nature of mining operations at Springvale, surface disturbance and the need for progressive rehabilitation is relatively minor compared to that required at an open cut mining operation. No major rehabilitation of the pit top and Newnes Plateau infrastructure is anticipated until site closure.

During the reporting period, minor rehabilitation and disturbance activities were undertaken. These activities are outlined in Table 42.

Table 42. Disturbance and Rehabilitation During the Reporting Period

Disturbance	Rehabilitation
<p>1 hectare of disturbance associated with Booster Pump Stations 1 and 2.</p> <p><u>Note:</u> While 1 hectare of disturbance was forecast, assessments completed for the project re-forecast the disturbance to be approximately 0.19 hectares. The MOP and RCE will be updated once the disturbance area has been confirmed</p>	<p>1.4 hectares of rehabilitation associated with the Booster Pump Station 1, Booster Pump Station 2 and associated infrastructure corridors</p>

The status of mining and rehabilitation as at the end of 2017 is presented in Table 43 and Figure 12.

Table 43. Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	Year 2016 (ha)	Year 2017 (ha)	Year 2018 (ha)
A. Total mine footprint¹	37.9	38.9	42.2
B. Total active disturbance²	34.4	35.4	37.3
C. Land being prepared for rehabilitation³	0	1.4	2.9
D. Land under active rehabilitation⁴	3.5 [^]	4.9 [#]	4.9
E. Completed rehabilitation⁵	0	0	0

[^]The 3.5 ha of land under rehabilitation as at the end of 2015 relates to the Bore 1 – Bore 4 dewatering facilities, services corridor to the Bore 8 dewatering facility, Old Fire Dam and the Settlement Pond Site.

[#]Additional 1.4 ha of rehabilitation associated with the Booster Pump Station 1, Booster Pump Station 2 and associated infrastructure corridors.

Increases to the mine footprint and total active disturbance in 2018 are associated with the scheduled construction of the Bore 10 dewatering facility and associated infrastructure corridor.

¹ **Total Mine Footprint:** includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in the DRE MOP/RMP Guidelines). Please note that subsidence remediation areas are excluded.

² **Total Active Disturbance:** includes all areas requiring rehabilitation

³ **Land being prepared for rehabilitation:** includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE MOP/RMP Guidelines)

⁴ **Land under active rehabilitation:** includes areas under rehabilitation and being managed to achieve relinquishment – includes ‘ecosystem and land use establishment’ and ‘ecosystem and land use sustainability’ (as defined under the DRE MOP/RMP Guidelines)

⁵ **Completed rehabilitation:** requires formal sign off from DRE that the area has successfully met the rehabilitation land use objectives or completion criteria

8.2. Rehabilitation Monitoring

Rehabilitation monitoring was undertaken during 2017 on the Newnes Plateau and at the Pit Top. Monitoring continued at five previously established rehabilitation monitoring sites (SPR1, SPR2, SPR3, SPR4 and SPR5). Four additional sites were established in 2016 and will be included in the ongoing monitored program (SPR6, SPR7, SPR8 and SPR9).

- SPR 1 – Rehabilitation site previously used as a dam. The Old Fire Dam has since been infilled with soil and or seeded with native vegetation;
- SPR 2 – Rehabilitation site on the Newnes Plateau is associated with the infrastructure corridor to the Bore 8 Dewatering Facility;
- SPR 3 – Rehabilitation site on the Newnes Plateau at the previous Bore 2 Dewatering Facility;
- SPR 4 – Control site for the Pit Top located upslope from SPR 1;
- SPR 5 – Control site on the Newnes Plateau;
- SPR 6 – Rehabilitation site located on Newnes Plateau at the previous Bore 1 Dewatering Borehole;
- SPR 7 – Rehabilitation site located on Newnes Plateau at the previous Bore 3 Dewatering Borehole;
- SPR 8 – Rehabilitation site located on Newnes Plateau at previous Bore 4 Dewatering Borehole; and
- SPR 9 – Control site located on Newnes Plateau.

A summary of monitoring results at rehabilitation sites is provided below:

SPR 1

The survey determined that the vegetation within SPR1 is comprised of native vegetation with a similar composition to the midstorey and shrub layer of the surrounding native forest; although the site generally lacks canopy species (i.e. eucalypts). It is therefore recommended that canopy species are planted via tubestock at a density of one plant per 10m². Planting should occur in autumn when conditions are favourable for the establishment of seedlings. Species suitable for planting include the following:

- *Eucalyptus dives* (Broad-leaved Peppermint)
- *Eucalyptus mannifera* (Brittle Gum);
- *Eucalyptus pauciflora* (Snow Gum); and
- *Eucalyptus radiata* (Narrow-leaved Peppermint).

There is no evidence of significant erosion within the site and therefore no further soil surface management is required. Exotic plant species were observed at this site (Blackberry, Panic Veldt Grass and Cat's Ear), although infestations were minor and chemical control is not recommended at this stage.

SPR 2

The rehabilitation area at SPR 2 is developing well and ten native plant species were identified within the site for the first time in 2017. As stated in the 2016 assessment report, the site contains a number of large diameter logs and a thick cover of woody debris. It was suggested that the woody debris could retard seed germination rates and seedling establishment in its early stages (when seeds require space and sun exposure to germinate). Nonetheless, in 2017, it is apparent that native plants are establishing between the woody debris and this growth is expected to increase.

No evidence of significant erosion occurs within the site and therefore no further soil surface management is required. No exotic plant species were observed at this site.

SPR 3

The native vegetation on this site is in good health and an additional three native species were identified within the site for the first time in 2017. The vegetation has almost reached the species diversity of the respective control site (SPR 5). Similar to the other rehabilitation sites, no

problematic erosion is apparent and material retention is likely to increase as vegetation becomes more established. No further soil surface management is required.

No exotic plant species were observed at this site. Ongoing monitoring will allow the appearance of new weed species and weed growth to be identified and controlled appropriately.

SPR 6

The vegetation at SPR6 is least developed relative to the other monitoring sites and contains several large bare areas. The diversity of native plant species is also relatively low (i.e. 23 species) and below the benchmark for the target vegetation community (PCT 1789: 39 species). It is therefore recommended that canopy species are planted via tube-stock at a density of one plant per 10m². Planting should occur in autumn when conditions are favourable for the establishment of seedlings. Species suitable for planting within the site include the following:

- Eucalyptus dives (Broad-leaved Peppermint)
- Eucalyptus mannifera (Brittle Gum);
- Eucalyptus pauciflora (Snow Gum); and
- Eucalyptus radiata (Narrow-leaved Peppermint).

It should be noted that SPR 6 does contain seedlings of midstorey, shrub and groundcover species that are commensurate with the target vegetation community. It is likely that midstorey and groundcover species will colonise the site naturally from the surrounding forest.

No problematic erosion is apparent and material retention is likely to increase as vegetation becomes more established. No further soil surface management is required.

SPR 7

The native vegetation on this site is in good health and exceeds the species diversity of the adjacent control site (SPR 9). Rehabilitation age is approximately three years and vegetation is regenerating naturally. The site is well vegetated and soil surface is stable. Large tree stumps, logs, branches and leaf litter is present in the ground layer.

Similar to the other rehabilitation sites, no problematic erosion is apparent and material retention is likely to increase as vegetation becomes more established. No further soil surface management is required. Rehabilitation works will be required should the existing bore top, concrete pad and chain mesh fence around Bore 3 be removed.

SPR 8

The native vegetation on this site is in good health and has the same species diversity of the respective control site (SPR 4). The vegetation appears to be approximately five years old and contains a dense layer of juvenile eucalypt species growing to around 2 to 5 m tall. The soil surface appears stable and contains subshrubs, eucalypt seedlings, grasses and herbs.

Similar to the other rehabilitation sites, no problematic erosion is apparent and material retention is likely to increase as the vegetation becomes more established. No further soil surface management is required.

8.3. Agreed Post-Rehabilitation 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.

8.4. Rehabilitation Maintenance

8.4.1. East Wolgan Swamp

East Wolgan Swamp was impacted over a period of years by a combination of regulator approved mine water discharge and potential subsidence effects.

The East Wolgan Swamp major slump and the piping area were rehabilitated in accordance with the s95 Certificate issued by OEH with major works completed through 2014 by The Bush Doctor swamp rehabilitation specialist. A joint inspection with OEH, Bush Doctor and Centennial was undertaken on the 10th of December 2014 as per the s95 Certificate. Work continued with final brush-matting activities in January 2015. Since that time reporting requirements have been adhered to and weed control activities by The Bush Doctor have been undertaken. Summer and Winter 2017 monitoring was completed during this current Annual Review period. During 2017 maintenance works on existing rehabilitation areas with refurbishment of the treatments was also undertaken through further brush matting and jute material application, to provide enhanced conditions for plant establishment and growth. Early results indicate the rehabilitation effort is having some success. Centennial Coal is in further discussions with OEH regarding further potential hydration and revegetation opportunities in East Wolgan Swamp.

8.4.2. Bore 8

As noted during the Annual Review inspections and the annual rehabilitation monitoring report, the Bore 8 rehabilitation site contains a number of large diameter logs and a thick cover of woody debris. While the site still exhibited growth in 2017 with native plants establishing, Springvale will target reducing the number of large diameter logs and woody debris with the rehabilitation area in 2018.

8.5. Renovation/Removal of Buildings

No permanent buildings were removed during the reporting period.

An office extension was approved by the Lithgow City Council on the 3rd of July 2017, with the issuing of Development Approval DA082/17 and Construction Certificate CC066/17. A concrete base was poured during the reporting period, however no further works have been completed.

8.6. Rehabilitation Sign Off from the DRE

No rehabilitation areas received formal sign-off from DRE that they were completed to a standard suitable for lease relinquishment during the reporting period.

8.7. Variations in Activities from the MOP

A minor MOP amendment was submitted to DRE (now DRG) during the reporting period. The amendment was approved on the 4th of July 2017. This amendment covered changes proposed from 2017 to 2022 including:

- Capture of changes to SSD 5594 from Mod 1 approval involving manning numbers, stockpile expansion and increase of ROM production;
- Update of Water License information; and
- Details regarding the Longwall 420-422 Extraction Plan approval.

During the reporting period, a Rehabilitation Cost Estimate (RCE) was submitted to DRE (in conjunction with the MOP Amendment) and was subsequently accepted in March 2017.

8.8. Key Issues Affecting Successful Rehabilitation

The MOP identifies a number of issues that have the potential to affect rehabilitation at Springvale. These included:

- Greater than anticipated subsidence impacts;
- Erosion and sedimentation;

- Poor topsoil quality;
- Subsidence impacts on steep slopes; and
- Bushfire.

Minor erosion was observed during the reporting period at the Vent Shaft and Booster Pump Station sites. Maintenance work was conducted at these sites throughout the reporting period. No other issues were encountered during the reporting period.

8.9. Next Reporting Period

Rehabilitation at Springvale will be undertaken progressively and will involve partial rehabilitation of the following disturbed areas after completion of construction on Newnes Plateau. Rehabilitation and disturbance in 2017 is summarized in Table 43, and includes:

- 2.9 ha of disturbance associated with construction of the Bore 10 Dewatering Facility and associated infrastructure corridor; and
- Additional 1.4 ha of rehabilitation associated with the Booster Pump Station 1, Booster Pump Station 2 and associated infrastructure corridors.

In 2018 work is planned to continue re-hydration and revegetation of East Wolgan Swamp with a commitment to working on the most severely affected areas of the upland swamp community in alignment with the s95 Certificate issued in response to the s91 condition: The rehabilitation works will also include a significant commitment to ongoing monitoring and maintenance. This work will include the monitoring and where required, maintenance of structures used as part of the works, removal of weeds, and where appropriate redesign and implementation of further structures, coir logs and associated materials. Restoration works will be performed in accordance with the 'Save Our Swamp' soft engineering solutions for swamp remediation (SOS 2010).

9. COMMUNITY

9.1. Community Engagement

9.1.1. Community Consultative Committee

A Community Consultative Committee (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 Angus Place, Springvale and Western Coal Services CCC aims to facilitate a single channel of communication regarding current operations in the area.

The committee is composed of:

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

Three CCC meetings were held during the reporting period (4th of April, 9th of August 2017 and 7th of November 2017).

Minutes from the meeting are available on the Centennial Coal website.

The Western Region Consultative Committee meets on a regular basis to find the best solution(s) to the following challenges:

- Respecting the local and regional environment;
- Minimising adverse impacts of mine operations on people, homes, and businesses;
- Supporting the economic, social and cultural life of the area; and
- Maintaining profitable and efficient mine operations that meet regulatory requirements.

Meetings will continue to be held during 2018.

9.1.2. Community Contributions and Activities

Centennial continued to support local community projects/events/citizens during the reporting period and participate in local community activities. In 2017 this included but was not limited to:

- Lithgow Chamber of Commerce;
- Rydal Show (Rydal A, H & P Society);
- Local school presentation and fetes at Wallerawang Public School, Portland Central School and Coerwell Public School; and
- Twenty-six local sporting associations ranging from Little Athletics to the Dragon Boat Club.

9.1.3. Community Enhancement

As required under Schedule 2, Condition 15 of SSD 5594, Centennial shall pay a community contribution to Lithgow City Council (LCC) of \$0.03 per saleable tonne of coal produced from Springvale, Angus and Airly mines, capped at \$200,000. This contribution is due by the 31st of March each year commencing on the 31st of March 2016.

For operations undertaken during 2017, the Springvale community contribution has been calculated to be \$110,989.05. Payment will be made to LCC in accordance with SSD 5594. This annual community contribution will be allocated for long term community activities and projects.

9.2. Community Complaints

Four community complaints were received during the reporting period. One complaint was received in relation to the movements of empty haul trucks travelling from Springvale Coal Services to Springvale. Springvale Mine was temporarily hauling ROM coal to Springvale Coal Services via the Castlereagh Highway.

The three other complaints received were in relation to the operation of machinery on the Springvale stockpile. Subsequent to each complaint received, actions were completed to reduce the noise being emitted. During the reporting period, Springvale commenced a project to install noise attenuation measures on the stockpile dozer. These works are scheduled for completion during April 2018.

The Springvale Complaint Register for the reporting period is included as Appendix 6 and is also available on the Centennial Springvale website. The Register details the complaint type, investigation and actions being implemented to address the issue.

Trends in community complaints are documented in Table 44.

Table 44. Community Complaint Trends

	2014	2015	2016	2017
Number	2	1	1	4
Category	Low Frequency Noise	Traffic	Noise	Noise

10. INDEPENDENT AUDIT

Independent Audits are required three-yearly under SSD 5594 Schedule 6 Condition 13. An Independent Audit was conducted by MCW Environmental in 2016 with the final audit report submitted to DPE in December 2016.

An update on the 2018 Independent Environmental Audit Correction Actions has been included as Appendix 8.

The next Independent Audit will be commissioned prior to the 30th of June 2019.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

The following tables provide a summary of non-compliances identified in Section 1 of the Annual Review.

Table 45. Non-Compliance No 1 - Summary

Nature of the incident/non-compliance	Non-compliance with L2.4 (EPL 3607) pH results recorded at LDP001 on the 27/06/2017 and 28/11/2017 were 9.06 and 9.2 respectively, exceeding the EPL criteria upper limit of 9
Date of incident/ non-compliance (if known; if not known state not known)	27/06/2017 and 28/11/2017
The location of the incident/ non-compliance (include a figure if appropriate), if known	LDP001
Detail the cause of the incident/non-compliance	Low pH levels in existing water structures. No failure of pH dosing system during either exceedance. Low flow preceding recorded non-compliance results may have caused an increase in pH level in LDP001 discharge pond (due to low discharge and standing water).
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/ non-compliance	No environmental harm likely due to low level exceedance. Subsequent pH samples were within EPL compliance criteria limits. Springvale has in place an acid-dosing system above the LDP001 discharge point to maintain pH levels of discharged water within the EPL criteria limit range for LDP001. The dosing system is automatic and dosing levels are controlled by a pH sensor upstream of LDP001. The system is inspected weekly and maintained as required by a contracted water treatment service provider, with maintenance reports provided weekly to Springvale.
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	The dosing system continues to be inspected weekly and maintained as required. The automatic dosing system was upgraded in December 2017 to enable dosing following a no-flow event (following a no-flow event, the system requires a manual re-start to commence dosing again). A new webpage portal and alarm system has

	been implemented for LDP001 whereby a high pH alarm is set (below the EPL criteria level to enable reaction) and sent to the Environmental Coordinator for action.
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Table 46. Non-Compliance No 2 - Summary

Nature of the incident/non-compliance	Non-compliance with L2.4 (EPL 3607)
Date of incident/ non-compliance (if known; if not known state not known)	TOG result recorded at LDP001 on the 01/08/2017 was 13mg/L, exceeding the EPL criteria limit of 10gm/L
The location of the incident/ non-compliance (include a figure if appropriate), if known	LDP001
Detail the cause of the incident/non-compliance	Likely cause of exceedance was contaminated underground water captured in dewatering system. Oil boom installed at LDP001 did not effectively control contamination.
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/ non-compliance	Due to the non-compliance event being a one-off short term event, no adverse environmental impacts are likely. Subsequent TOG samples were within EPL compliance criteria limits.
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	The oil containment boom at LDP001 was replaced and a further containment boom installed on the upstream dam (Fire Dam) where underground water reports to the surface. An inspection/maintenance schedule has been implemented for all oil booms on-site to ensure boom integrity.

Table 47. Non-Compliance No 3 - Summary

Nature of the incident/non-compliance	Non-compliance with L2.4 (EPL 3607) 25 exceedances of Electrical Conductivity EPL criteria limit of 1200uS/m					
Date of incident/ non-compliance (if known; if not known state not known)	Date	Result (mg/l)		Date	Result (mg/l)	
	10/01/2017	1236		8/08/2017	1240	
	14/02/2017	1231		15/08/2017	1407	
	28/03/2017	1236		22/08/2017	1233	
	9/05/2017	1267		29/08/2017	1263	
	30/05/2017	1208		12/09/2017	1202	
	6/06/2017	1233		26/09/2017	1218	
	13/06/2017	1214		10/10/2017	1211	
	20/06/2017	1289		17/10/2017	1254	

		27/06/2017	1308		5/12/2017	1203
		4/07/2017	1259		12/12/2017	1244
		11/07/2017	1230		19/12/2017	1251
		18/07/2017	1253		27/12/2017	1238
		1/08/2017	1206			
The location of the incident/ non-compliance (include a figure if appropriate), if known	LDP009					
Detail the cause of the incident/non-compliance	Increased exposure of mine water make with goaf material.					
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/ non-compliance	Various specialist assessments have been undertaken as part of the Springvale Mine Extension project which conclude that there are no adverse impacts from elevated EC levels.					
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	On 19 th June 2017, the Springvale Water Treatment Project (SWTP) was approved by the Planning Assessment Commission (under delegation from the Minister of Planning). The SWTP involves construction of a mine water transfer system to allow transfer of dewatered mine water from the Springvale Booster Station 2 to the Mt Piper Power Station (MPPS), and water treatment plant at MPPS incorporating desalination processes to reduce the salinity in mine water to a standard suitable for either industrial reuse or environmental release. The project will mean mine water will bypass LDP009 and be treated at the MPPS water treatment plant.					

Table 48. Non-Compliance No 4 - Summary

Nature of the incident/non-compliance	Non-compliance with L4.4 (EPL 3607) Exceedances at receptor S2: <ul style="list-style-type: none">- Q2 2017 daytime – result recorded 48dBA v EPL criteria limit of 43dBA- Q4 2017 night time - result recorded 47dBA v EPL criteria limit of 43dBA- Q4 2017 sleep disturbance - result recorded 57dB v EPL criteria limit of 53dB
Date of incident/ non-compliance (if known; if not known state not known)	28/06/2017 and 27/12/2017
The location of the incident/ non-compliance (include a figure if appropriate), if known	Point 12 (receptor S2) – as shown in Residential Receivers in Appendix 4: Noise Receiver Location Plan in Development Consent (SSD5594).
Detail the cause of the incident/non-compliance	Primary noise contributor during the Q2 exceedance event was track slap from the dozer operating on the stockpile as well as use of the front end loader simultaneously. Primary noise contributors during Q4

	exceedance events were engine noise and track slap from two operating dozers on the stockpile.
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/non-compliance	No lasting impacts. No complaints received.
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	<p>Following Q2 exceedance, the dozer was inspected by Westrac technicians who removed a recently installed guard around the dozer alternator, which was thought to be exacerbating noise levels.</p> <p>Springvale are progressing installing noise attenuation engineering solutions on the stockpile dozers.</p>

Table 49. Non-Compliance No 5 - Summary

Nature of the incident/non-compliance	<p>Non-compliance with L4.4 (EPL 3607)</p> <p>Exceedance at receptor S1</p> <ul style="list-style-type: none"> - Q3 2017 night time – result recorded 45dBA v EPL criteria limit of 42dBA - Q3 2017 sleep disturbance – result recorded 55dB v EPL criteria limit of 52dB
Date of incident/ non-compliance (if known; if not known state not known)	27/09/2017
The location of the incident/ non-compliance (include a figure if appropriate), if known	Point 11 (receptor S1) – as shown in Residential Receivers in Appendix 4: Noise Receiver Location Plan in Development Consent (SSD5594).
Detail the cause of the incident/non-compliance	Exceedance predominately due to engine noise and track slap from the dozer operating on the stockpile.
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/non-compliance	No lasting impacts. No complaints received.
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	Springvale are progressing installing noise attenuation engineering solutions on the stockpile dozers.

Table 50. Summary of Reportable Incidents and Regulatory Actions

Compliance Type	Agency(ies)	Number	Response
Incidents	DPE, EPA	2	Refer Tables 51 and 52.
Caution Notices	Nil		
Warning Letters	Nil		
Penalty Notices	Nil		
Prosecutions	Nil		

Note: This table includes actions taken by DPE, DRG, Resources Regulator and the EPA during the reporting period.

Table 51. Incident No 1 - Summary

Nature of the incident/non-compliance	Unauthorised disturbance to Sunnyside Swamp
Date of incident/ non-compliance (if known; if not known state not known)	1 September 2017
The location of the incident/ non-compliance (include a figure if appropriate), if known	Sunnyside Swamp – crossing of powerline between Bore 4 compound and Bore 5 compound. Powerline runs south-west to north-east, to the west of Sunnyside Ridge Road.
Detail the cause of the incident/non-compliance	Contractor engaged to conduct Asset Protection Work within the powerline corridor, entered Sunnyside Swamp (an Endangered Ecological Community – MU50 Shrub Swamp) and employed a brush cutter attached to a tractor to trim the vegetation within Sunnyside Swamp, beneath the powerline.
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/ non-compliance	The following actions have been undertaken to mitigate the effects of the non-compliance: <ul style="list-style-type: none"> - Exclusion barriers installed to prevent further access to the area affected. - Rehabilitation work plan developed to rehabilitate the affected areas as well as adjoining areas historically affected by recreational users.
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	Improvements to the Springvale process system that manages activities involving approved disturbance or activities that may result in unauthorised disturbance.

Table 52. Incident No 2 - Summary

Nature of the incident/non-compliance	Uncontrolled water discharge from Air Strip Dam
Date of incident/ non-compliance (if known; if not known state not known)	Reported 10 May 2017
The location of the incident/ non-compliance	Dam located on disused Air Strip adjacent to

(include a figure if appropriate), if known	Sunnyside Ridge Road, Newnes Plateau.
Detail the cause of the incident/non-compliance	Water is supplied to the dam via an offtake line from the Springvale Bore 6 pipeline and is fitted with a valve. The pipeline is buried adjacent to Sunnyside Ridge Road. At this stage the volume of water that has entered the dam via the offtake is unknown and the volume of water that has discharged through the overflow pipe is unknown.
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident/ non-compliance	<p>The following actions were undertaken to mitigate the effects of the non-compliance:</p> <ul style="list-style-type: none"> - Valve excavated to permanently cap valve. - Overflow pipe blocked (within dam) so no further water could discharge through the pipe. - Water cart used to reduced dam water level by approximately 300mm. - Inspections of the area undertaken by ecologist to determine any remediation work required.
Detail action that has been, or will be, taken to prevent recurrence of the incident/ non-compliance	<p>The following actions were undertaken to prevent the recurrence of the incident:</p> <ul style="list-style-type: none"> - Valve excavated to permanently cap valve. - Overflow pipe blocked (within dam) so no further water could discharge through the pipe.

12. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following activities (and associated timings) are planned to be undertaken by Springvale in 2018:

- Completion of the Extraction of Longwall 421.
 - Scheduled to be completed June 2018.
- Extraction Plan approval for Longwalls 424 – 427.
 - Submission of Longwalls 424 – 427 Extraction Plan documents scheduled for May 2018, following consultation process with relevant stakeholders as per SSD 5594.
- Commencement of Longwall 425.
 - Extraction commencement scheduled for July 2018.
- Approved exploration and construction activities.
 - Joint exploration and stygofauna monitoring borehole program scheduled to commence in late April/early May, pending approval process. Up to four locations are proposed.
 - Bore 10 dewatering facility (pending review and approvals);
 - Installation of groundwater monitoring locations as per the Longwall 420 – 422 Extraction Plan requirements; and
 - Installation of subsidence lines and any further environmental monitoring points as determined by the development and approval of the Longwall 424 – 427 Extraction Plan.
- Review and submission of the Springvale Mining Operations Plan to reflect updated mining schedule and related activities.



Centennial Coal

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