Castlereagh Coal

CULLEN VALLEY MINE
ANNUAL REVIEW 2023

1 JANUARY 2023 TO 31 DECEMBER 2023

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Annual Review Title Block

Name of operation:	Cullen Valley Mine
Name of operator:	Shoalhaven Coal Pty Ltd (trading as Castlereagh Coal)
Development consent:	DA-200-5-2003 (as modified)
Name of holder of development consent:	Shoalhaven Coal Pty Ltd
Mining leases:	EL 5712, EL 6007, EL 8618, EL 8619, ML 1455, ML 1488, ML 1556, ML 1557
Name of holder of mining leases:	Shoalhaven Coal Pty Ltd
Water licence:	80WA706148
Name of holder of water licence:	Shoalhaven Coal Pty Ltd
RMP start date:	30 September 2022
RMP end date:	N/A
Annual Review start date:	1 January 2023
Annual Review end date:	31 December 2023

I, Kim Nguyen, certify that this audit report is a true and accurate record of the compliance status of Cullen Valley Mine for the period 1 January 2023 to 31 December 2023, and that I am authorised to make this statement on behalf of Shoalhaven Coal Company Pty Limited.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(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.

b) 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).

Name of authorised report officer:	Kim Nguyen
Title of authorised report officer:	Chief Executive Officer
Signature of authorised report officer:	
Date:	11/06/2024

1.0 Statement of Compliance

This Annual Review provides a summary of the Cullen Valley Mine (CVM) operations environmental performance over the period 1 January to 31 December 2023 (referred to hereafter as the reporting period).

Table 1.1 provides a statement of compliance against CVM's relevant approvals. A summary of the non-compliances recorded during the report period are included in **Table 1.3**.

Table 1.1 Statement of Compliance

Relevant approval	All conditions complied with?
Development Approval DA-200-5-2003	No – Refer to **Table 1.3**
Environmental Protection Licence EPL 10341	No – Refer to **Table 1.3**
Exploration Licence (EL) 5712	Yes
EL 6007	Yes
EL 8618	Yes
EL 8619	Yes
Mining Lease (ML) 1455	Yes
ML 1488	Yes
ML 1556	Yes
ML 1557	Yes
Water Access Licence 27898	Yes
Water Supply Work Approval (80WA 706148)	Yes

Table 1.2 Compliance Status Key

Risk Level	Colour Code	Description
High	**Non-compliant**	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	**Non-compliant**	Non-compliance with: • Potential for serious environmental consequences, but is unlikely to occur; or • Potential for moderate environmental consequences, but is likely to occur
Low	**Non-compliant**	Non-compliance with: • Potential for moderate environmental consequences, but is unlikely to occur; or • Potential for low environmental consequences, but is likely to occur
Administrative non-compliance	**Non-compliant**	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Source: Annual Review Guideline (NSW Government, 2015).

Table 1.3 Non-Compliances During the Reporting Period

Relevant Approval	Condition No.	Description (Summary)	Compliance Status	Comment and Proposed Action	Where Addressed in Annual Review
DA-200-5-2003 **EPL 10341**	Schedule 4 Condition 27 L6.1	Four odour complaints associated with sub-surface heating areas at CVM.	Low Non-compliant	Four subsurface heating complaints were received by CVM during the report period (refer to **Section 9.2**). Shoalhaven Coal has implemented a number of management measures and undertake regular inspections of the area. During 2023 CVM continued with a program to trial an irrigation methodology agreed to with the Resources Regulator, to extinguish the worst affected area, whilst also considering compaction methods where appropriate, and further capping of areas of lower concern with overburden rehabilitation materials existing, and liberated from the remnant mining area.	**Section 6.6.2.4** and **Section 9.2**
DA-200-5-2003	Schedule 4 Condition 25	Unable to provide monthly depositional dust data.	Low Non-compliant	On the 14th of February 2023, contractors conducting depositional dust monitoring on behalf of CVM, notified that an error had occurred during analysis of the January depositional dust samples resulting in loss of all results for the month of January 2023. An investigation carried out by the contractors determined that miscommunication between the contracted reporting officer and training lab technician resulted in the depositional dust samples being analysed and burned at 105 and then burned at 850 without being weighed back rendering the depositional dust results unattainable for the month of January. The contractor completed a toolbox talk on the topic. The lab technician was to be retrained on correct procedure and to receive further buddy training until deemed competent.	**Section 6.3**
DA-200-5-2003	Schedule 4 Condition 25	HVAS PM10 and TSP not monitored.	Low Non-compliant	Due to contractual issues, technicians did not attend site to carry out collection and routine filter changes after some scheduled HVAS runs between July and October 2023. A review of contractual obligations and consultation between Castlereagh Coal and the contractors was conducted to remedy the situation and avoid future non compliances. Resumption of routine collection and filter changes by the monitoring contractor resumed relative to the HVAS scheduled run of the 20 October 2023, and has continued in accordance with the run schedule without further issue.	**Section 6.3**

Relevant Approval	Condition No.	Description (Summary)	Compliance Status	Comment and Proposed Action	Where Addressed in Annual Review
DA-200-5-2003	Schedule 4 Condition 25	No results received for HVAS monitoring	Low Non-compliant	On the 3rd, 9th, 15th and 21st of August 2023 and 8th September, Cullen Valley HVAS operated as per schedule, with the next scheduled run due on the 27th of August 2023. Following collection of the filter papers from the HVAS for these dates, they were forwarded to the laboratory for analysis. The laboratory later reported the filter papers having arrived were found to be faulty / brittle having broken into several parts. The laboratory was unable to perform effective analysis on the faulty filter papers. Inability to analyse the filter papers resulted in PM10 & TSP data as unable to be determined for the dates above. The laboratory reported that the issue appeared to be associated with the age of the filter papers supplied and assured that filters fit for purpose would be used in future.	**Section 6.3**

2.0 Introduction

Shoalhaven Coal Pty Ltd owns the Cullen Valley Mine (CVM), an open cut coal mine located approximately 30 kilometres (km) north-west of Lithgow in New South Wales (NSW) ((refer to **Appendix 1, Figure 1**). Cullen Valley Mine is Operated by Castlereagh Coal a wholly owned subsidiary of Shoalhaven Coal Pty Ltd.

Underground mining commenced at CVM formerly Tyldesley Colliery around 1904 and continued up until the 1960s when the workings were abandoned. Open cut operations were conducted on the site between 1948 and 1953. Modern open cut operations began at CVM after 19 August 1999 when the Lithgow Coal Company was granted Mining Lease (ML) 1455 by the then Minister for Mineral Resources. Mining commenced on site in May 2000 following a four month construction phase.

Following the identification of additional open cut coal reserves, a further Environmental Assessment and Development Application was lodged for an extension of the mine in April 2003 (i.e. DA-200-5-2003). The lease extension area lies along the western side of Tyldesley Hill adjacent to the main western railway line. Approval of the Development Application was granted by the then Department of Planning and Infrastructure (DPI) on 19 August 2004.

CVM has previously supplied coal under contract to the Mount Piper Power Station. However, with the failure of the mine to secure a supply contract in 2007, it was proposed to place the operation on a care and maintenance program until such time as sufficient contracts were awarded that would make the operation of the mine viable once again. Coalpac Pty Ltd purchased the Lithgow Coal Company Pty Ltd, which owned the CVM, in January 2008 and the previous plans to place the mine on care and maintenance were d iscarded. Recommencement of the open cut mining operations occurred in February 2008. Mining of the available approved area at CVM was completed in early December 2012. Any remaining stockpiled ROM coal was transported to the Invincible Colliery during February 2013 and processed through the Invincible Coal Crushing Plant. The CVM was then placed under care and maintenance.

Shoalhaven Coal purchased the mine from Coalpac's administrators in May 2015. In November 2021 Shoalhaven Coal Pty Ltd was sold via a 100% share transaction to an all-Australian locally based ownership team who continued to operate the Colliery under a care and maintenance arrangements until mining recommenced in May 2022.

2.1 Mine Contacts

The Shoalhaven Coal Chief Executive Officer (CEO) is responsible to the regulatory authorities for all aspects of environmental management and compliance. The CEO's contact details are included in **Table 2.1**.

Table 2.1 Key Personnel Responsible for Environmental Management

Name	Role	Company	Contact details
Kim Nguyen	Chief Executive Officer	Shoalhaven Coal Pty Ltd, trading as Castlereagh Coal	Invincible Colliery Castlereagh Highway Cullen Bullen, NSW 2790 M 0414 335 529
Tim Haig	General Manager	Shoalhaven Coal Pty Ltd, trading as Castlereagh Coal	Invincible Colliery Castlereagh Highway Cullen Bullen, NSW 2790 M 0400 653 241

2.2 Annual Review Requirements

Condition 5 of Schedule 6 of the CVM Development Approval-200-5-2003 (as modified) requires an Annual Review (AR) to be prepared and submitted to the Director General of the Department of Planning, Infrastructure and Environment (DPIE) and relevant agencies. This report has been prepared in accordance with the *NSW Government Annual Review Guidelines* (NSW Government, 2015) and details the operational and environmental management activities at CVM during the reporting period. The reporting obligations contained in the Development Approval along with an explanation of where each requirement is addressed within this document are provided in Error! Reference source not found..

Table 2.2 Development Approval (200-5-2003) Conditions for the Annual Review

Conditions		Addressed in Section
Schedule 6 – Environmental Management, Monitoring, Auditing and Reporting: Annual Report		
5.	The Proponent shall submit an AEMR to the Director- General and relevant agencies. This report must:	This document
	a) identify the standards and performance measures that apply to the project;	Relevant sections throughout **Section 6.0**
	b) include a detailed summary of the complaints received during the past year, and compare this to the complaints received in the previous 5 years;	**Section 9.2**
	c) include a detailed summary of the monitoring results for the project during the past year;	Relevant sections throughout **Section 6.0**
	d) include a detailed analysis of these monitoring results against the relevant: • impact assessment criteria/limits; • monitoring results from previous years; and • predictions in the EA;	Relevant sections throughout **Section 6.0**
	e) identify any trends in the monitoring results over the life of the development;	Relevant sections throughout **Section 6.0**
	f) identify any non-compliance during the previous year;	**Section 1.0, Section 11.0**

Conditions		Addressed in Section
	g) describe what actions were, or are being, taken to ensure compliance.	**Section 6.0, Section 11.0**

3.0 Approvals

3.1 Status of Leases, Licences and Approvals

CVM operates in accordance with the approvals listed in **Table 3.1**.

Table 3.1 Environmental Approvals Held by CVM

Approval	Date Granted	Expiry Date	Status
Development Approval (DA-200-5-2003)	19 August 2004	19 August 2025	Current
Environment Protection Licence (EPL) 10341	10 December (anniversary date)	Annually	Current
Exploration Licence (EL) 5712	10 April 2000	10 April 2019	Relinquished 2023
EL 6007	8 October 2002	8 October 2024	Current
EL 8618	12 July 2017	12 July 2023	Relinquished 2023
EL 8619	12 July 2017	12 July 2026	Current
ML 1455	19 August 1999	19 August 2027	Current
ML 1488	21 June 2001	20 June 2033	Current
ML 1556	20 September 2004	19 September 2025	Current
ML 1557	20 September 2004	19 September 2025	Current
Water Supply Work Approval 80WA 706148	16 January 2012	5 July 2025	Current

Environmental Management Plans

Environmental Management Plans (EMPs) have been prepared and approved for the CVM in accordance with the conditions of DA-200-5-2003. The current versions approved by DPIE are available on the Castlereagh Coal website (https://ccoal.com.au).

- Environmental Management Strategy. Approved April 2022.
- Air Quality Management Plan. Approved April 2022.
- Coal Haulage Vehicle Management Plan. Approved April 2022.
- Erosion and Sediment Control Plan. Approved April 2022.
- Fire Management Plan. Approved April 2022.
- Flora and Fauna Management Plan. Approved April 2022.
- Noise Management Plan. Approved April 2022.
- Site Water Management Plan. Approved April 2022.
- Pollution Incident Response Management Plan (revised), December 2023.

3.2 Amendments to Approvals/Licences during the Reporting Period

Table 3.2 lists approvals and amendments that were granted during the reporting period.

Table 3.2 Amendments to Approvals/Licences

Licence/Approval	Amendment type	Date of amendment
EL 8619	Renewed	26 September 2023
ML 1455	Renewed	31 May 2023
EL 5712	Relinquished	31 January 2023
EL 8618	Relinquished	12 July 2023

4.0 Operations Summary

4.1 Mining Operations

A summary of operations (Production) during the preceding and current period as well as forward forecast for the next reporting period is provided in **Table 4.1**.

Table 4.1 Production Summary

Material	Approved Limit (specify source)	2022 Previous reporting period (Actual)	2023 This reporting period (Actual)	2024 Next reporting period (forecast)
Waste rock/overburden (Mbcm)	Not specified	0.532	0.277	1.0
Coal works/Coal mining (Mt)	0-2 Mtpa Coalworks (EPL) 0.5-2 Mtpa Mining for Coal (EPL) 1 Mtpa (DA)	0.132	0.207	0.1
Coarse reject	Not specified	0	0	0
Fine reject	Not specified	0	0	0
Saleable coal (Mt)	Not specified	0.128	0.207	0.1

Total saleable product coal for the 12-month reporting period was 207,171 tonnes. 277,566 BCM of waste rock/overburden was mined from the CVM during the reporting period.

4.2 Other Operations

During the reporting period, other works undertaken included works to treat subsurface heating which included the excavation and compaction of surface material (refer to **Section 6.8**).

4.3 Section 240 Notice

During 2023 activities continued to address Notice NTCE0008974 (directing an assessment of rehabilitation materials, quantities, changes in inventories and shortfall projections at completion of mining activities and a report demonstrating how the directions have been met) and Notice NTCE0008975 (directing an assessment of surface water management systems associated with the final landform, including an assessment of the adequacy of the current systems, capacity, construction methods and effectiveness of materials used for rock armouring and a report demonstrating how the directions have been met).

Consultant specialists from Umwelt and Golder were engaged at the end of 2021 to undertake technical investigations and provide advice on longer term recommendations to address the matters associated with the Section 240 Notices. The final report completed in May 2022 recommended a program of works to be implemented to establish long term stability of landforms. Following completion of the Umwelt/Golder report and recommended program of works, Shoalhaven Coal consulted with the NSW Resources Regulator to develop an action plan to address the recommendations.

Detailed desktop and field work was undertaken by specialist consultants in late 2022 to develop long term actions meeting the requirements of the proposed actions and targets identified in the plan developed in

consultation with the Resources Regulator. Actions resulting from the recommendations have been ongoing throughout 2023 and the recommended works will continue during the 2024 reporting period.

4.4 Next Report Period

Mining is expected to continue at CVM during the next reporting period to extract the remaining remnant coal. Shoalhaven Coal are currently working towards an extension to the current life of mine approval.

5.0 Actions Required from Previous Annual Review

Following submission of the 2022 Annual Review, DPIE advised in correspondence dated 2 May 2023, that the Annual Review was considered to generally satisfy the requirement of the Approval in relation to Annual Reviews. It was also noted reported non-compliances with the Consent as outlined in the Annual Review but indicated no further information was required. Additionally, DPIE requested that the Annual Review be made publicly available on the company website. A copy of the 2022 Annual Review is available on the Castlereagh Coal website.

6.0 Environmental Performance

In accordance with the Annual Review Guidelines (DPE, 2015), this section describes the environmental monitoring and management measures undertaken at CVM during the report period.

A range of environmental monitoring is required to be undertaken by the Development Consent, EPL and CVM management plans. **Appendix 1, Figure 3,** shows the CVM environmental monitoring locations.

6.1 Summary of Performance Against EIS Predictions

CVM has been the subject of two Environmental Impact Statements (EIS) in the last 20 years of operations. The results of environmental monitoring conducted during the reporting period are compared to the predictions of these EIS's.

The Feldmast Coal Project for open cut and underground operations to the north-east and north-west of Cullen Bullen was assessed in the EIS dated February 1997 (International Environmental Consultants, 1997). The CVM Lease Extension Project involved expanded operations further to the north-west of the original mining area adjacent to the Wallerawang-Gwabegar Railway line and was assessed in the EIS dated April 2003 (International Environmental Consultants, 2003).

Environmental monitoring undertaken includes noise, air quality, surface water and groundwater quality, and biodiversity. Below is a summary of predictions from the two EIS's completed for the site. **Table 6.1** provides a summary of CVM environmental performance against the EIS predictions for the reporting period. It is noted that modelling undertaken for the respective EIS's assumed mining operations were being undertaken. As noted previously, CVM was in care and maintenance until May 2022 after which mining operations recommenced.

6.1.1 Noise Predictions

The Feldmast EIS (1997) predicted that with construction of the noise bund, noise from open cut operations was expected to result in an increase in existing background levels measured at the Hillcroft property (Hillcroft) of no more than 5 dB(A). The construction of a private access road between the mine and Mudgee Road to bypass Cullen Bullen was completed during the construction phase and was expected to minimise truck noise. The bypass around Cullen Bullen and noise bund were constructed, significantly reducing traffic and noise impacts on the town and nearby properties.

In the 2003 EIS and approved extension to mining operations, noise exceedances of 2-4 dB(A) were predicted to occur at Red Springs during temperature inversion conditions. Noise exceedances of 4-7 dB(A) were also predicted at Hillcroft during temperature inversion conditions. At Forest Lodge, exceedances of 1 dB(A) (calm), 5dB(A) (south wind) and 5dB(A) (temperature inversion) were predicted in Years 9 and 10 of the extension operations. Exceedances of 3 dB(A) (calm), 10dB(A) (south wind) and 5dB(A) (temperature inversion) were also predicted during years 9 and 10 at the 25 acre allotments to the north of the mine. *NB: These are exceedances of the 35 dB(A) criteria.*

6.1.2 Air Quality Predictions

The Feldmast EIS (1997) predicted annual average TSP concentrations from background levels plus mine emissions to be 48 µg/m^3 at the closest residences to the mine, which is well below the 90 µg/m^3 annual average goal. Predicted PM_{10} concentrations were 24 µg/m^3 (background plus mine emissions) and this is well below the annual average goal of 30 µg/m^3. $PM_{2.5}$ concentrations from mine emissions were predicted to be 0.5 µg/m^3 at the closest residence.

Modelling of dust deposition in the worst-case scenario predicted that no long-term adverse air quality impacts at the closest residential area as a result of mine operations.

The 2003 EIS predicted that nearby residences and those in Cullen Bullen were unlikely to experience unacceptable long-term impacts on air quality from the mine extension operations. It was predicted that short-term impacts could occur if emissions from the mine extension operations were combined with elevated levels from other sources.

6.1.3 Water Quality Predictions

Given the water management system contains and treats water within storage ponds prior to discharge, the Feldmast EIS (1997) predicted that EPA discharge criteria would be met. All water within the Lithgow Seam was proposed to be drained within the mining area. Groundwater systems below the Lithgow Seam were expected to be unaffected by the project.

The 2003 EIS predicted that the water management system for containment and reuse of all runoff from disturbed areas would ensure that EPA licence criteria for surface water quality would be met. The project was expected to use underground water within the old Tyldesley underground workings which collects subsurface water contained within the coal measures. Groundwater systems below the Lithgow Seam were expected to be unaffected by the project.

6.1.4 Groundwater Predictions

During 2017 a review of the groundwater regime in the vicinity of CVM was undertaken which resulted in the development of a standalone CVM Water Management Plan (Umwelt, 2017b). A new CVM Site Water Management Plan (SWMP) (JBA, 2022c) was developed and approved during 2022 prior to the recommencement of mining. The SWMP adopts the same groundwater trigger levels from the 2017 WMP. For the purposes of this report, the results of the 2023 groundwater monitoring have been compared to the groundwater trigger levels contained in the CVM SWMP (JBA, 2022c).

6.1.5 Biodiversity Predictions

Only one threatened plant species, Capertee Stringybark, was found to occur in the study area during the Feldmast EIS (1997). The EIS predicted that no local population of Capertee Stringybark would be placed at risk of extinction as a result of the proposed mining operations. The 2003 EIS made similar predictions and concluded that there would not be a significant effect on Capertee Stringybark as a result of the expansion.

The 1997 EIS predicted that the mining operations were unlikely to cause a significant impact on threatened fauna species found in the study area. Similarly, the 2003 EIS predicted that the expansion was unlikely to have a significant impact on threatened fauna.

A summary of the environmental performance of CVM during the report period as compared to predictions made in the EIS's is provided in **Table 6.1**.

Table 6.1 Summary of Environmental Performance During 2023

Aspect	Development Approval criteria/ EA prediction	Performance during the report period	Trend/key management implications
Noise	Refer to **Section 6.1.1**	Noise performance is compliant with Development Approval criteria and conforms to EIS predictions. Refer to **Section 6.5**.	No noise exceedance recorded during 2023. Historic trends are shown in **Section 6.5**.
Air Quality	Refer to **Section 6.1.2**	Air Quality monitoring conforms to EIS predictions. All results complied with the air quality performance criteria. Refer to **Section 6.3**.	A comparison to historic trends for air quality are shown in **Section 6.3** and **Appendix 2**.
Water Quality	Refer to **Sections 6.1.3** and **6.1.4**	Surface water quality performance is compliant with Development Approval criteria and conforms to EIS predictions. Refer to **Section 6.4.2**. Groundwater monitoring has been compared to trigger levels developed during 2017 in **Section 6.4.2**.	Surface water and Groundwater monitoring was undertaken and is discussed in **Sections 6.4.1** and **6.4.2** and **Appendix 2**.
Biodiversity	Refer to **Section 6.1.5**	Rehabilitation areas are generally progressing towards satisfactory completion.	The Biodiversity Monitoring Program continued during 2024

6.2 Meteorological Monitoring

Meteorological monitoring is undertaken at CVM. The CVM weather station (CMET2) is located at the training centre adjacent to the compensatory habitat area (**Appendix 1, Figure 3**). A summary of monthly meteorological monitoring results is provided in **Table 6.3**.

6.2.1 Rainfall

CVM received 548.0 mm of rainfall over 138 rain days during the report period. The highest rainfall occurred during January (92.0mm), while the lowest rainfall was recorded during May (6.2mm). A summary of monthly rainfall data is provided in **Table 6.3**.

6.2.2 Temperature

Air temperature is measured at 2 m and 10 m above ground level. The maximum temperature recorded during the report period was in January (21.8°C @ 2m) and the lowest temperatures occurred in June (-6.6°C @ 2m), -5.6°C @ 10 m). No 10m temperature data is available for January, February and March 2023 due to a faulty sensor. The minimum and maximum monthly temperature data is provided in **Table 6.3.**

6.2.3 Humidity

The CMET2 humidity sensor was faulty and repaired in April 2023, therefore no valid data is available for January to April. The minimum humidity of 22.9% was recorded in October and a maximum humidity of 98.6% was recorded in May 2023.

6.3 Air Quality

6.3.1 Environmental Management Measures

CVM's Environmental Management Plan (JBA, 2022), includes an Air Quality Management Plan (AQMP), which defines mitigation measures and monitoring procedures for the management of dust.

The air quality monitoring network at CVM consists of five dust deposition gauges (i.e. CDD1 to CDD5) and one High Volume Air Sampler (HVAS) measuring particulate matter <10 µm (PM_{10}) (**Appendix 1, Figure 3**).

6.3.2 Performance Criteria

The air quality performance criteria specified in DA 200-5-2003 are reproduced in **Table 6.2**.

Table 6.2 Air Quality Performance Criteria

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual average	90 µg/m^3
Particulate matter <10µm (PM_{10})	Annual average	30 µg/m^3
	24-hour average	50 µg/m^3
Deposited dust	Annual average (maximum total)	4 g/m^2/month
	Annual average (maximum increase)	2 g/m^2/month

Table 6.3 CVM Weather Station Summary

Month	Rainfall (mm)	Cumulative Rainfall (mm)	No of rain days	Air temp @ 2m		Air temp @ 10m		Humidity (%)	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
January 2023	92	92	16	8.91	18.47	NA	NA	69	NA
February 2023	20.4	112.4	10	8.91	18.07	NA	NA	58.1	NA
March 2023	85.6	198	11	4.81	21.78	NA	NA	45.3	NA
April 2023	57.2	255.2	13	3.17	13.67	3.76	13.54	67.9	NA
May 2023	6.2	261.4	9	-3.68	13.49	-2.54	13.56	34.1	98.6
June 2023	22.4	283.8	12	-6.59	10.98	-5.64	11.51	62.8	98.3
July 2023	19.2	303	13	-5.26	10.37	-4.89	10.04	60.6	98.2
August 2023	37.4	340.4	14	-2.27	7.87	-1.38	8.26	75.8	98.2
September 2023	23.2	363.6	6	-1.33	13.13	-0.45	14.09	60.1	98.4
October 2023	34.4	398	8	3.28	20.93	4.18	21.22	22.9	94.9
November 2023	87.2	485.2	15	3.8	18.73	4.7	19.27	53.7	98.4
December 2023	62.8	548	11	10.21	20.86	10.69	20.99	69.4	96.1
Total	**548.0**	-	**138**	-	-	-	-	-	-

NA = Faulty humidity sensor - no valid data

10m temp gauge fault - no valid data for Jan, Feb, Mar

6.3.3 Environmental Outcomes

6.3.3.1 Dust Deposition

Deposited dust is monitored on a 30± 2-day cycle. The annual average criterion for deposited dust (4 g/m^2/month) was not exceeded at any of the dust deposition gauges during the reporting period (contaminated results excluded from average calculation). The annual average increase in dust levels for all locations was less than 2 g/m^2/month and therefore complied with air quality performance criteria. January deposited dust results were not recorded due to a laboratory error. Details of the non-compliance are included in **Table 1.3**.

The monthly deposited dust monitoring results for 2023 are shown in **Table 6.4** and is compared with historical results in **Appendix 2**.

Table 6.4 Deposited Dust Monitoring Results

Date	Total Insoluble Solids (g/m^2/month)				
	CDD1	CDD2	CDD3	CDD4	CDD5
January 2023	--	--	--	--	--
February 2023	1.1	0.5	0.8	0.8	0.5
March 2023	0.4	0.2	0.9	0.6	0.4
April 2023	0.9	1.1	1.5	1.3	0.2
May 2023	0.7	0.9	0.6	1.7	0.9
June 2023	0.1	0.1	0.1	0.3	0.6
July 2023	1.2	0.2	0.2	0.2	0.1
August 2023	0.3	0.5	0.6	0.5	0.3
September 2023	0.8	1.1	1.0	1.4	1.4
October 2023	0.1	0.4	0.3	0.0	0.9
November 2023	0.2	0.1	0.4	1.2	0.2
December 2023	0.8	0.4	0.9	2.0	0.7
Annual Average 2023	**0.6**	**0.5**	**0.7**	**1.0**	**0.6**

** – No results available due to laboratory error*

6.3.3.2 Particulate Matter

Monitoring of particulate matter was conducted during 2023. Total suspended particulates are estimated from the PM_{10} concentrations. The annual average criteria for PM_{10} (30 $\mu g/m^3$) and TSP (90 $\mu g/m^3$) were not exceeded during the report period.

The PM_{10} annual average results for the report period are shown in **Table 6.5**.

Table 6.5 Particulate matter (PM_{10}) and Total Suspended Particulates (TSP) Annual Average Results

Annual Average	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)*
Annual Average Criterion	30	90
Annual Average 2023	9.0	22.6

** Total suspended particulates are estimated from the PM_{10} concentrations.*

A graph of the PM_{10} and TSP monitoring data for 2023, as well as historical data trends, is shown in **Appendix 2**.

6.3.4 Trends in Data

6.3.4.1 Dust Deposition

Table 6.6 presents the dust deposition annual averages from 2018 to 2023. Graphs of the long-term dust deposition levels are included in **Appendix 2**. The annual averages for depositional dust recorded at CVM during 2023 are well below the performance criteria.

Table 6.6 Annual Averages for Dust Deposition 2018-2023

Reporting period	Total Insoluble Solids (g/m^2/month)				
	CDD1	CDD2	CDD3	CDD4	CDD5
Criteria	4	4	4	4	4
2018	0.8	0.9	1.0	1.2	1.5
2019	1.3	1.1	1.3	1.7	1.9
2020	0.8	0.9	1.0	1.1	1.9
2021	0.2	0.4	0.3	0.2	0.9
2022	0.4	0.3	0.3	0.8	0.5
2023	0.6	0.5	0.7	1.0	0.6

The 2023 annual average dust deposition levels were consistent with the range of averages since 2018. The 2023 annual averages at all monitoring locations are at the lower end of the historical range over the previous five years.

6.3.4.2 Particulate Matter

Table 6.7 presents the particulate matter annual averages from 2018 to 2023. The PM_{10} and TSP 2023 annual averages are within the range of results over the previous five years. The 2023 annual averages for PM_{10} and TSP are at the mid range of averages over the previous five years. Some HVAS data is unavailable for the reporting period. Refer to **Table 1.3** for non-compliance details.

Table 6.7 Annual Averages for PM_{10} and TSP 2018-2023

Annual Average	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)*
2018	13.7	34.3
2019*	23.4	58.5
2020	11.0	27.5
2020^	9.0	22.0
2021	5.6	14.1
2022	4.0	10.0
2023	9.0	22.6

* Annual average significantly influenced by bushfire activity (refer 2019 Cullen Valley Annual Review)

^ Excluding results influenced by extraordinary events

6.3.5 Proposed Improvements

Monitoring of air quality will continue to be conducted during 2024 in accordance with the Air Quality Management Plan (AQMP).

6.4 Water Management

The current CVM Site Water Management Plan (SWMP) was approved by DPIE in April 2022. Water management is undertaken at CVM in accordance with the approved SWMP.

6.4.1 Surface Water Quality

6.4.1.1 Environmental Management Measures

The surface water management system at CVM utilises a series of settlement dams. The system is primarily operated as a closed loop system. The CVM Water Management System (WMS) incorporates a range of infrastructure to manage clean water runoff from upslope undisturbed catchments, dirty water runoff from disturbed catchments and mine water (i.e. groundwater extracted from former underground workings or water that has come into contact with coal). Mine water at CVM is predominately utilised for dust suppression. Where mine water is utilised for dust suppression it is captured and managed within the dirty water management system. The fundamental principle of the WMS is to minimise interaction of clean, dirty and mine waters and to capture dirty water for re-use and provide controls to treat captured dirty water to a standard suitable for discharge off-site.

The Tyldesley Mine underground workings are also used to store excess water from the WMS. The primary source of water for site use (when required) is from the abandoned and flooded Tyldesley Mine underground workings via the Tilley's Bore (GW01) in accordance with Water Access Licence WAL27898. When required, water is pumped from the workings via the Tilley's Bore to two 150,000 L tanks at CVM. Site water is transferred between site dams through gravity fed water mains.

CVM operates under EPL 10341. The EPL provides water quality criteria and water quality monitoring requirements for water discharges from the two CVM Licensed Discharge Points (LDP's) being LDP001 and LDP004, refer to **Appendix 1, Figure 3**. Further discussion regarding water management and erosion and sediment control measures is included in **Section 7.0**.

6.4.1.2 Performance Criteria

Water may be discharged from LDP001 and LDP004 at CVM in accordance with EPL and Development Approval requirements. A discharge event is deemed to occur when water leaves the site either through the overflow channel of either Dam 3 (LDP001) or Dam 4 (LDP004), or as a result of actively pumping water. **Table 6.8** presents the EPL discharge criteria for these discharge points.

Table 6.8 Water Quality Concentration Limits for LDP001 and LDP004 During Discharge

Parameter	Concentration Limit
Oil & Grease	10 mg/L
pH	6.5 – 8.5
Total suspended solids	50 mg/L

6.4.1.3 Environmental Outcomes/Trends in Data

There were nil discharge events from LDP001 during the reporting period. Samples were collected on a monthly basis for due diligence purposes only. LDP004 was discharging during all monthly sampling events

with the exception of June, October and November 2023. Water samples were collected and analysed weekly from LDP004 during discharge. The majority of results were below the concentration limits for pH, TSS and Oil & Grease. Exceptions were a recorded pH slightly below (5.9) the lower pH limit (6.5 on 7 June 2023) and two exceedances of the TSS limit of 50mg/L (57mg/L on 10 November 2023 and 74mg/L on 21 December 2023. On both occasions the TSS limit was back down to below the TSS concentration limit during the following weeks sampling. Additionally, the pH was within the limits during the week following the low recorded pH concentration.

6.4.1.4 Proposed Improvements

Monitoring of water quality at the Cullen Valley Mine will continue to be conducted during 2024.

6.4.2 Groundwater Quality

6.4.2.1 Environmental Management Measures

CVM is located on the western escarpment of the Sydney Basin. Aquifers in this area are typically limited to the Lithgow Seam and the Marangaroo Sandstone which underlies the Lithgow Seam. Despite their proximity, there is little observed movement between these aquifers in the Marangaroo Sandstone and the Lithgow Seam (AGE, 2012).

Past open cut and highwall mining at CVM has targeted the Irondale, Lidsdale and Lithgow seams. Underground mining in the area has been largely limited to the Lithgow seam. The Lithgow Seam can be seen in the highwalls faces at CVM (some of which are now covered by overburden). Outcrop areas north of the open cut workings represent local recharge points for the Lithgow seam.

Figure 4, Appendix 1 shows the general dip in the strata of the Lithgow seam to the east - northeast and the location of underground workings in the Lithgow seam in the area. The open cut workings in the southern parts of the CVM are hydraulically connected to the former Tyldesley Colliery workings which extend to the east of the southern part of CVM. The water in the Tyldesley Colliery workings is sourced from groundwater inflows (i.e. recharge areas) located up-dip, ingress from areas at CVM where the open cut operations are hydraulically connected to the Tyldesley workings, and infiltration through subsidence cracking associated with pillar extraction and pillar failure in the former workings. Water quality in these workings is monitored at GW01 (East Tyldesley Bore) (refer to **Figure 4, Appendix 1.**

As can be seen from **Figure 4**, **Appendix 1** the CVM is located up-dip of the Lithgow seam groundwater monitoring bores of CP116, CP115 and CP132 and operates as a recharge point for the Lithgow seam in this area. As mining at CVM extended to the base of the Lithgow Seam and as CVM represents an up-dip recharge point of this aquifer, the open cut at CVM do not intercept any natural groundwater aquifers. Therefore, there are limited depressurisation impacts associated with the CVM open cut pits and any impacts would be associated with interactions with the recharge regime; these impacts are expected to be limited due to the low recharge rates and the generally benign nature of the overburden emplaced adjacent to the outcropping coal seams (Umwelt, 2017b).

6.4.2.2 Performance Criteria

There are no pollutant concentration limits for groundwater specified in the Development Approval or EPL for CVM. The CVM SWMP (JBA, 2022c) includes trigger values against which groundwater monitoring results are compared. For the purposes of this Annual Review, the groundwater results obtained during the reporting period have been compared to these trigger values.

The CVM 2017 WMP (Umwelt, 2017b) reviewed the location and target seam for each groundwater monitoring bore and considers the CP115, CP116 and GW01 groundwater monitoring bores are suitable to assess any potential offsite groundwater impacts associated with the operation of CVM. These bores are

located down dip of CVM and are also located within appropriate seams. **Table 6.9** shows the trigger level/range for key groundwater monitoring parameters that are specific to bores CP115, CP116 and GW01. Results outside of these ranges are triggers for further investigation. The results of CP115, CP116 and GW01 are also compared to reference bores which are bores that are considered to be representative of background groundwater quality (refer to **Section 6.4.2.4**).

Table 6.9 Groundwater Quality and Level Triggers

Bore	Groundwater Level (mAHD) Trigger Range	Analyte			
		pH	EC (us/cm)	Sulphate (mg/L)	Hardness (mg of $CaCO_3$/L)
CP115	**892 - 896**	Range 6.26 - 7.3	Upper limit 970	Upper limit 380	Upper limit 376
CP116	**890 - 894**	Range 5.82 - 7.2	Upper limit 840	Upper limit 140	Upper limit 210
GW01[1]	N/A as bore is located in workings	Range 6.14 - 6.82	Upper limit 939	Upper limit 338	Total Alkalinity[2] Upper limit 100 mg of $CaCO_3$

[1] Baseline data was collected for GW01 over 11 monitoring events in 2016-17 and it is expected trigger level ranges will be reviewed in future to be consistent with those adopted for other bores.

[2] Total Alkalinity is used as a trigger for this bore until sufficient baseline data for hardness has been collected.

Baseline groundwater monitoring programs and associated trigger levels when developed in accordance with ANZECC recommendations require the utilisation of 24 contiguous monthly samples (ANZECC, 2000). The trigger levels for groundwater monitoring at CVM have been developed utilising the groundwater data set which is a limited data set of between nine and eleven annual groundwater samples at each location between the period 2011 – 2017. Monitoring results outside of the values presented in **Table 6.9** will be used for further investigation by CVM personnel. It is noted that monitoring results outside of these values do not necessarily reflect an environmental impact associated with CVM operations, as variations within these bores may be influenced by other factors not associated with site activities. These trigger levels will be reviewed on an annual basis as further monitoring data is collected for each bore.

6.4.2.3 Environmental Outcomes

During the reporting period, groundwater monitoring was conducted on two occasions. A discussion of the 2023 groundwater monitoring results is included below.

During the reporting period groundwater monitoring was disrupted by various issues associated with access to bore sites. CP116 was unable to be accessed during the May and November 2023 monitoring rounds. CP116 is located in National Park (NP) and heavy rainfall damaging multiple tracks has rendered the site inaccessible. CVM personnel have liaised with NP personnel regarding reinstatement of tracks. CVM personnel will continue to liaise with NP regarding this issue. Bore CP132 is blocked and was unable to be sampled during 2023. Hosing inside the bore was removed by previous monitoring contractors becoming stuck and blocking access into the bore. Attempts by a plumber to fix the bore have been unsuccessful. CP131 was damaged by fire in 2019 hence no sample has been collected from this bore since. Damage to CP131 bore is being investigated by site personnel toward reestablishment where practical, noting that CP131 was dry from 2015 prior to damage.

Trends in Data

The groundwater monitoring program at CVM consists of:

- Impact bores – bores with the potential to identify potential groundwater impact from CVM, specifically CP115, CP116 and GW01; and
- Reference bores – bores that are considered to be representative of background groundwater quality (i.e. are unlikely to be impacted by CVM operations), specifically CP114, CP131, CP132 and LD001. These bores provide a baseline for comparison with the impact bores.

Standing Water Level

The standing water level in the impact bores during the report period are within the trigger level range, as shown in **Table 6.10**.

Table 6.10 Impact Bores Standing Water Levels and Triggers

Bore	Groundwater Level (mAHD) Trigger Range	May 2023 Groundwater Level (mAHD)	November 2023 Groundwater Level (mAHD)	Complied with Trigger Level?
CP115	892 - 896	894.46	894.18	Yes
CP116	890 - 894	NR	NR	NR
GW01	N/A as bore is located in workings	N/A	N/A	N/A

NR = No access to CP116 in 2022 due to damaged track

The long-term standing water level trend in both impact bores (CP116 and CP115) has shown little variation since monitoring commenced in February 2012. Since February 2012, the standing water level has gradually increased until November 2016 after which time it has gradually declined and is increasing slightly since May 2019, as shown graphically in **Appendix 2**. The reference bores of LD001, CP132 and CP131 show slightly greater variability in the long-term standing water level trends, as shown graphically in **Appendix 2**.

pH

The pH results for impact bores CP115 and GW01, during the report period, were within the trigger level range, as shown in **Table 6.11**. The pH levels at CP115 and GW01 were similar to the historical averages.

In November 2019, pH levels generally decreased at CP116, CP115 and GW01 and have remained at these levels, as demonstrated in **Appendix 2**. pH levels of all reference bores also decreased during this period and are showing similar trends. As such, these results are considered to be reflective of a wider regional trend and not the result of CVM activities.

The pH trend across both impact and reference bores is generally consistent over time, with isolated spikes and declines observed for individual sampling dates shown graphically in **Appendix 2**.

Table 6.11 Impact Bores pH Levels and Triggers

Bore	pH Trigger Range	May 2023 pH Level	November 2023 pH Level	Complied with Trigger Level?
CP115	6.26 – 7.3	6.5	6.1	Yes
CP116	5.82 – 7.2	NR	NR	N/A
GW01	6.14 – 6.82	6.6	6.8	Yes

NR = No Result. No access to CP116 in 2022 due to damaged track.

Electrical Conductivity

The electrical conductivity (EC) results for the impact bores during the reporting period are below the trigger level, as shown in **Table 6.12**.

Table 6.12 Impact Bores Electrical Conductivity Levels and Triggers

Bore	Electrical Conductivity (µS/cm) Trigger Level	May 2023 EC Level (µS/cm)	November 2023 EC Level (µS/cm)	Complied with Trigger Level?
CP115	Upper limit 970	733	690	Yes
CP116	Upper limit 840	NR	NR	N/A
GW01	Upper limit 939	555	421	Yes

NR = No Result. No access to CP116 in 2022 due to damaged track.

The long-term trend in EC values across the reference bores is mixed, as shown graphically in **Appendix 2**:

- LD001 has shown slight variability with a minimum of 120 µS/cm recorded in 2013 and a maximum of 330 µS/cm recorded in November 2017. LD001 was not sampled during the reporting period. EC results recorded during the previous reporting period were consistent with historical results and similar to results recorded from 2018 to 2021.
- CP114 has shown some slight variability with results during the reporting similar to historical results.
- CP132 was unable to be sampled during the reporting period due to a blockage in the bore.
- CP131 was destroyed by bushfire activity in 2019 and was unable to be sampled. It is noted that dry conditions have been observed at this location since 2015.

The long term trend in EC values in the impact bores shows greater variability than reference bores, as shown graphically in **Appendix 2**:

- CP116 monitoring results continued to increase from April 2014 to 2021.
- CP115 monitoring results exhibit greater variability. The results since February 2011 have ranged from 370 µS/cm (August 2011) to 970 µS/cm (April 2014). EC levels were consistent with historical results and below the trigger level in May 2023 and November 2023 respectively.
- GW01 EC levels in May 2023 (555 µS/cm) and November 2023 (421 µS/cm) decreased from the previous reporting period and results remain below groundwater trigger levels.

Sulphate

The sulphate levels in the impact bores during the report period are below the trigger level, as shown in **Table 6.13**.

Table 6.13 Impact Bores Sulphate Levels and Triggers

Bore	Sulphate (mg/L) Trigger Level	May 2023 Sulphate Level (mg/L)	November 2023 Sulphate Level (mg/L)	Complied with Trigger Level?
CP115	Upper limit 380	379	354	Yes
CP116	Upper limit 140	NR	NR	N/A
GW01	Upper limit 338	<1	<1	Yes

NR = No Result. No access to CP116 in 2022 due to damaged track.

The long-term sulphate values for the reference bores ranges from 10-25 mg/L at LD001 and 12-28 mg/L at CP114. CP132 shows greater variability with results ranging between 5 mg/L - 145 mg/L. There is a variability of up to 70 mg/L between consecutive samples, as shown graphically in **Appendix 2**.

As discussed within the groundwater study completed for CVM in 2017 (Umwelt, 2017e), the recorded sulphate levels are all well within the ANZECC criteria for drinking water for domestic stock which provide:

> *No adverse effects to stock are expected if the concentration of sulphate in drinking water does not exceed 1000 mg/L. Adverse effects may occur at sulphate concentrations between 1000 and 2000 mg/L, especially in young or lactating animals or in dry, hot weather when water intake is high. These effects may be temporary and may cease once stock become accustomed to the water. Levels of sulphate greater than 2000 mg/L may cause chronic or acute health problems in stock.*

As the sulphate results from CP115 are relatively stable and within ANZECC guidelines, there is no indication of any environmental harm associated with these results. The long-term sulphate values for impact bore CP115 range from 78 mg/L to 396 mg/L. The CP115 May and November 2023 sulphate results (379 & 354 mg/L) were within this historical range. In accordance with the CVM SWMP (JBA, 2022c) CVM will continue to monitor sulphate levels however no specific investigation of sulphate levels is required to be undertaken.

The long-term sulphate values for impact bores range from 20 mg/L to 140 mg/L at CP116 and <1 to 315 mg/L at GW01. The GW01 May and November 2023 sulphate results (both <1 mg/L) decreased significantly from the historical values as demonstrated in **Appendix 2**.

Hardness

The hardness level in impact bore CP115 during the reporting period is slightly above the trigger level. An analysis of water licenses in the region completed during May 2017 identified that there were no bore users in the area down-dip of CVM and therefore there are no groundwater bores which would be impacted by increased hardness levels if it were to occur.

Table 6.14 Impact Bores Hardness Levels and Triggers

Bore	Hardness (mg/L) Trigger Level	May 2022 Hardness Level (mg/L)	November 20212 Hardness Level (mg/L)	Complied with Trigger Level?
CP115	Upper limit 376	355	368	Yes
CP116	Upper limit 210	NR	NR	N/A
GW01	Total Alkalinity Upper limit 100 mg of $CaCO_3$	238*	165*	No

NR = No Result. No access to CP116 in 2022 due to damaged track.

* GW01 has not been monitored for Hardness as part of groundwater quality baseline monitoring. Total Alkalinity has been used as a proxy for Hardness and will be utilised as a trigger for this bore until sufficient baseline data for hardness has been obtained for this bore to develop a trigger value.

The long-term trend in hardness values for the reference bores is mixed, as shown graphically in **Appendix 2**:

- Hardness results obtained from LD001 during the previous reporting period are similar to historical data.
- CP114 shows small variability around 100 mg/L before a result of 350 mg/L in December 2017. Since this time, monitoring results have returned to levels that are typical of the pre-December 2017 spike with a result of 108 mg/L and 105 mg/L observed for May and November 2023 respectively.

- CP132 initially was consistent around a level of 150 mg/L (April 14 to Nov 15), before spiking at 200 mg/L on November 2016 and declining to 46 mg/L in December 2017. Results increased to 210 mg/L in November 2018 with results in November 2019 (213 mg/L) representing a new historical maximum, slightly above the previous maximum of 210 mg/L. The November 2020 monitoring results returned to levels that are more typical of pre-2016 levels, declining to 187 mg/L and remaining at a similar level in November 2021 (180 mg/L). No samples have been collected since 2021 due to a blockage in the bore.

The impact bores also show different long-term trends in hardness as shown in **Appendix 2**:

- CP116 has declined from an initial level of 210 mg/L before stabilising in April 2014 to a range of 98 mg/L to 128 mg/L (2017). Concentrations increased during November 2018 (134mg/L) and 2019 monitoring (176 mg/L) with a decrease observed in November 2020 (146 mg/L). A slight increase was observed in 2021 with results consistent with historical data. No samples have been collected from CP116 since 2021 due to access restrictions.

- CP115 shows an overall increasing trend, from 130 mg/L in August 2011, increasing to 350 mg/L in July 2014 after which the results have remained around 375 mg/L ±25 mg/L. During 2018, CP115 decreased in hardness to 338 mg/L in November, before spiking again to 399mg/L in November 2019 which is slightly above the historical maximum. In November 2020, monitoring results returned to pre-2019 levels (368 mg/L). 2023 results were consistent with historical data (355 mg/L in May and 368 mg/L in November) Monitoring will continue to be undertaken at this bore to monitor hardness.

- GW01 results for hardness were consistent with historical data. Monitoring will continue to be undertaken at this bore to monitor hardness.

Given the restricted baseline dataset, the values for EC and hardness at GW01 were possibly within the range of likely expected values for the bore and are not necessarily indicative of groundwater impact. An analysis of water licences in the region during May 2017 identified that there were no registered bore users in the area down-dip of CVM and thus there are no users which would be impacted by this result.

Other Analytes (not required for trigger level assessment as described in the WMP)

Nitrate

Results for 2023 monitoring together with the long-term trends show that both impact and reference bores have very low levels of nitrate. The levels of nitrate are typically less than the laboratory detection limit (shown graphically at **Appendix 2**).

Metals

Results of monitoring undertaken during 2023 for dissolved metals within the impact bores are highly variable. Metals are usually analysed for trends as a group (or groups of metals) rather than on an individual metal basis. This is usually completed where sufficient baseline information is available to analyse potential trends. Given the restricted available dataset, the ability to meaningfully analyse metal results obtained during 2023 and trends in data is therefore limited.

6.4.2.4 Proposed Improvements

Shoalhaven will continue groundwater monitoring during 2024. CVM personnel will continue to liaise with National Park and personnel and other relevant parties regarding reinstating access to bores that have been inaccessible. CVM personnel will continue to liaise with monitoring contractors regarding sample analysis requirements.

6.5 Noise

6.5.1 Environmental Management Measures

CVM's Noise Management Plan (NMP) details mitigation measures and monitoring procedures for noise management. Quarterly attended noise monitoring was conducted at five locations around CVM in accordance with the CVM NMP. Noise controls and mitigation measures are implemented to ensure compliance with noise impact assessment criteria.

6.5.2 Performance Criteria

Noise criteria is specified in the Development Approval and EPL 10341. **Table 6.15** and **Table 6.16** summarises the criteria across the Development Approval and EPL 10341.

Table 6.15 Noise Criteria in DA 200-5-2003

Location	Day – L_{Aeq} (15 minute) (dB)	Evening – L_{Aeq} (15 minute) (dB)	Night – L_{Aeq} (15 minute) (dB)	Night - L_{A1} (1 minute) (dB)
Red Springs (east of rail line)	37	35	35	45
Red Springs (west of rail line)	43	38	35	45
Hillcroft (east of rail line)	35	35	35	45
Hillcroft (west of rail line)	43	38	35	45
Forest Lodge	40	40	38	45
Doble Gate	43	38	35	45
Tilley	43	38	35	45

Table 6.16 Noise Criteria in EPL 10341

Location	Day – L_{Aeq} (15 minute) (dB)	Evening – L_{Aeq} (15 minute) (dB)	Night – L_{Aeq} (15 minute) (dB)	Night - L_{A1} (1 minute) (dB)
Red Springs (east of rail line)	35	35	35	45
Red Springs (west of rail line)	43	38	35	45
Hillcroft (east of rail line)	35	35	35	45
Hillcroft (west of rail line)	43	38	35	45
Forest Lodge	40	40	40	45
Doble Gate	43	38	35	45
Tilley	43	38	35	45

6.5.3 Environmental Outcomes

There were no exceedances of the Development Approval or EPL criteria during the report period as shown in **Table 6.17**. On all monitoring occasions, the noise from CVM was inaudible. There was one complaint received regarding noise during the reporting period. The complaint was regarding a noisy car entering site prior to the start of morning shift.

Table 6.17 2023 Quarterly Noise Monitoring Results

Location	Consent Criterion (dB)	EPL Criterion (dB)	Quarter 1 ($L_{Aeq\ 15min}$) (dB)	Quarter 2 ($L_{Aeq\ 15min}$) (dB)	Quarter 3 ($L_{Aeq\ 15min}$) (dB)	Quarter 4 ($L_{Aeq\ 15min}$) (dB)
Red Springs (N07)	37	35	IA	IA	IA	IA
Hillcroft (N08)	35	35	IA	IA	IA	IA
Forest Lodge (N10)	40	40	IA	IA	IA	IA
Doble Gate (N09)	43	43	IA	IA	IA	IA
Tilley (N06)	43	43	IA	IA	IA	IA

IA – noise from CVM was inaudible

6.5.4 Trends in Data

The quarterly noise monitoring results for the period 2011 – 2023 are summarised in **Appendix 2**. The results show CVM has largely been inaudible at each noise monitoring location since CVM entered care and maintenance and continued to be inaudible since operations recommenced in May 2022.

6.5.5 Proposed Improvements

Current management measures will continue to be undertaken for care and maintenance activities. Noise monitoring will continue to be undertaken quarterly.

6.6 Biodiversity

6.6.1 Environmental Management Measures

Biodiversity monitoring commenced at CVM in 2012. The 2023 Biodiversity Monitoring was undertaken in accordance with the approved CVM Environmental Monitoring Program (EMP) (JBA, 2022), and the CVM Flora and Fauna Management Plan (FFMP) (JBA, 2022b).

Existing vegetation communities and fauna habitat have been previously characterised during the Ecological Impact Assessment (Cumberland Ecology, 2014). Ongoing monitoring aims to document the condition of vegetation and habitats throughout the CVM Compensatory Habitat Areas and Rehabilitation Zones.

6.6.2 Monitoring

The 2023 biodiversity monitoring was undertaken at the CVM Compensatory Habitat Areas and Rehabilitation Zone monitoring sites as shown on **Figure 5, Appendix 1**. The biodiversity monitoring for CVM was undertaken in accordance with the CVM EMP and FFMP. A summary and comparison of the 2023 Rehabilitation monitoring against the performance indicators and completion criteria are provided in **Table 8.2**.

6.6.2.1 Environmental Outcomes/Trends in Data

CVM Compensatory Habitat Areas Flora Monitoring Observations

The CVM Compensatory Habitat Areas contains eight monitoring plots located across following three vegetation types:

- Tablelands Dry Woodland – CH1, CH2, CH3, CH5, CH6 and CH8
- Sandstone Dry Ridgetop Woodland – CH7

- Tablelands Sheltered Valley Forest – CH4

The results of the 2023 monitoring of each of these communities is presented, in summary, below.

Tablelands Dry Woodland

The Tablelands Dry Woodland community is situated on the mid to upper slopes across the Cullen Valley Compensatory Habitat Area. This community accounts for over 45 ha of naturally regenerating Woodland habitat within the CH Area. Tall Eucalyptus species dominate the canopy where species such as Red Stringybark (*Eucalyptus* macrorhyncha), Broad-leaved Peppermint (*Eucalyptus dives*), Blakely's Red Gum (*Eucalyptus blakelyi*), Silvertop Ash (*Eucalyptus sieberi*), Narrow-leaved Stringybark (*Eucalyptus sparsifolia*), Blaxland's Stringybark (*Eucalyptus blaxlandii*), Sydney Peppermint (*Eucalyptus piperita*), Broad-leaved Peppermint (*Eucalyptus dives*), and Inland Scribbly Gum (*Eucalyptus rossii*) are recorded throughout this woodland community.

The midstory features patches of dense Sifton Bush (*Cassinia sifton*) while other native shrub species are generally scattered along lower slopes and in medium density patches along sheltered slopes. Monitoring common shrub species recorded throughout the CH Area included Silver Wattle (*Acacia dealbata*), Prickly Shaggy Pea (*Podolobium ilicifolium*), Narrow-leaved Geebung (*Persoonia linearis*), Box-leaved Wattle (*Acacia buxifolia*), Daphne Heath (*Brachyloma daphnoides*), Broad-leaved Hickory (*Acacia falciformis*), Blunt Beardheath *(Leucopogon muticus*), Sydney Golden Wattle (*Acacia longifolia*), Sunshine Wattle (*Acacia terminalis*), Hoary Guinea Flower (*Hibbertia obtusifolia*), and Small-leaved Boronia (*Boronia microphylla*).

The diverse understory is dominated by frequent patches of native grasses and herbs in low to medium density. Native ground layer species such as Forest Hedgehog Grass (*Echinopogon ovatus*), Weeping Grass (*Microlaena stipoides*), Silvertop Wallaby Grass (*Rytidosperma pallidum*), Small St John's Wort (*Hypericum gramineum*), Ivy Goodenia (*Goodenia hederacea*), Poverty Raspwort (*Gonocarpus tetragynus*), Wattle Matt-rush (*Lomandra filiformis*), Pale Mat-rush (*Lomandra glauca*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*), Blueberry Lily (*Dianella revoluta*), Small Poranthera (*Poranthera microphylla*), Hairy Apple Berry (*Billardiera scandens*), Snowgrass (*Poa sieberiana*), Silky Purple-flag (*Patersonia sericea*) and Trailing Speedwell (*Veronica plebeia*).

Exotic species such as Lamb's Tongue (*Plantago lanceolata*), Sweet Briar (*Rosa rubiginosa*), Blackberry (*Rubus fruticosus spp.* aggregate), St. Johns wort (*Hypericum perforatum*), Catsear (*Hypochaeris radicata*), Common Centaury (*Centaurium erythraea*) and Hawthorn (*Crataegus monogyna*) generally occurred in low abundance throughout the CH Area.

Sandstone Dry Ridgetop Woodland

This vegetation type occurs on hills of Narrabeen Sandstone associated with the western fringes of sandstone country surrounding the site location within Wollemi National Park and Gardens of Stone National Park. Approximately 0.4 ha of Sandstone Dry Ridgetop Woodland occurs within the Compensatory Habitat Area where exposed, rocky areas support open heath vegetation. One monitoring plot (CH7) is located within this community.

The dominant canopy species of this community include Inland Scribbly Gum (*Eucalyptus rossii*), Blaxland's Stringybark (*Eucalyptus blaxlandii*), Broad-leaved Peppermint (*Eucalyptus dives*), Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Stringybark (*Eucalyptus sparsifolia*). Few mistletoe (*Amyema* spp.) were recorded in proximity to the plot location.

The understory comprises of a shrub layer of medium density and a ground layer of low density. Common shrub species include Prickly Moses (*Acacia ulicifolia*), Sydney Golden Wattle (*Acacia longifolia*), Prickly Shaggy Pea (*Podolobium ilicifolium*), Pink Beard-heath (*Leucopogon ericoides*), Narrow-leaved Geebung

(*Persoonia linearis*), Sunshine Wattle (*Acacia terminalis*), Blunt Beard-heath (*Leucopogon muticus*) and *Dillwynia phylicoides*.

Native ground layer species include Silky Purple-flag (*Patersonia sericea*), Wattle Mat-rush (*Lomandra filiformis*), Wiry Panic (*Entolasia stricta*), Silvertop Wallaby Grass (*Rytidosperma pallida*), Rock Fern (*Cheilanthes sieberi*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*) and *Pomax umbellata*.

Tablelands Sheltered Valley Forest

There are two patches of Tablelands Sheltered Valley Forest community within the CH Area giving a total of 5.5 ha. This forest community occurs in areas where sheltered gullies and deep soils support a tall canopy (trees >20 meters in height) and a moderately dense understory. One monitoring plot (CH4) is located within this community.

The tall, mature canopy was dominated by Broad-leaved Peppermint (*Eucalyptus dives*), Silvertop Ash (*Eucalyptus sieberiana*), Blaxland's Stringybark (*Eucalyptus blaxlandii*), Narrow-leaved Stringybark (*Eucalyptus sparsifolia*) and Sydney Peppermint (*Eucalyptus piperita*).

The midstory was comprised of native shrubs and small trees of low to medium densities. Dominant species included Hickory Wattle (*Acacia falciformis*), Prickly Shaggy Pea (*Podolobium ilicifolium*), Sifton Bush (*Cassinia sifton*), Narrow-leaved Geebung (*Persoonia linearis*), White Dogwood (*Ozothamnus diosmifolius*), Blunt Beard- Heath (*Leucopogon muticus*), River Lomatia (*Lomatia myricoides*), Hoary Guinea Flower (*Hibbertia obtusifolia*), and *Leucopogon lanceolatus*.

The native understorey included Bracken Fern (*Pteridium esculentum*), Purple Wiregrass (*Aristida ramosa*), Weeping Grass (*Microlaena stipoides*), Snowgrass (*Poa sieberiana*), Ivy-leaved Violet (*Viola hederacea*), False Sarsaparilla (*Hardenbergia violacea*), Poverty Raspwort (*Gonocarpus tetragynus*), Pale Mat-rush (*Lomandra glauca*), Blueberry Lily (*Dianella revoluta*), Hairy Apple Berry (*Billardiera scandens*), Trailing Speedwell (*Veronica plebeia*), and Headache Vine (*Clematis glycinoides*).

Exotic species are limited to Catsear (*Hypochaeris radicata*), Spear Thistle (*Cirsium vulgare*), Flaxleaf Fleabane (*Conyza bonariensis*), and Fireweed (*Senecio madagascariensis*) in low abundance.

CVM Compensatory Habitat Areas Fauna Monitoring Observations

The 2023 monitoring recorded a decrease in overall species diversity throughout the Cullen Valley Mine Compensatory Habitat Areas with a total of 48 species recorded, compared to 82 species recorded during the 2022 monitoring. However, the results of the 2024 monitoring are consistent with those of the 2021 monitoring that recorded 45 fauna species in this area.

Within the Cullen Valley Compensatory Habitat Areas, 68% of fauna diversity is represented by birds with 38 species recorded. The remaining 17 species recorded in the 2023 monitoring include eight mammal species, four reptile species, five frog species, and one crustacean Common Yabby (*Cherax destructor*).

Three threatened species were recorded in January/February 2024 in the Cullen Valley Mine Compensatory Habitat Area during the 2023 monitoring including the Greater Glider (*Petauroides volans*) listed as Endangered under both the BC Act and EPBC Act, the Scarlet Robin (*Petroica boodang*) listed as vulnerable under the BC Act, and the Powerful Owl (*Ninox strenua*) listed as vulnerable under the BC Act. This species was heard calling from monitoring sites CH2 and CH7 in response to a call playback made from CH2. The Greater Glider (*Petauroides volans)* has been recorded in the Compensatory Habitat Area previously. Umwelt (2021) recorded the Powerful Owl (*Ninox strenua*) in their 2021 monitoring from an individual heard calling

in the distance from the Biodiversity Offset Area in the Invincible Colliery. The Scarlet Robin (*Petroica boodang*) is a new recording for the area.

Two feral pest fauna species were recorded within the Cullen Valley Mine Compensatory Habitat Areas. These were the European Red Fox (*Vulpes vulpes*) and the Brown Hare (*Lepus capensis*). These did not appear to be in high abundance and no control measures are recommended at this time.

CVM Rehabilitation Area Flora Monitoring Observations

In 2023 Rehabilitation vegetation demonstrate similar species diversity and cover to monitoring in 2022. The monitoring outcomes of rehabilitation areas indicate an overall increase in the vegetation recovery and development of ecosystem functionality established vegetation matures. Older rehabilitation vegetation were found to differentiating stratum as *Eucalyptus spp*. begin to emerge from the midstory, while mature acacias senesce and increase leaf litter and fallen timber to develop topsoil organics.

CVM Rehabilitation Area Fauna Monitoring Observations

The 2023 monitoring recorded a decrease in overall species diversity throughout the Cullen Valley Mine Rehabilitation Area with a total of 56 species recorded, compared to 62 species recorded during the 2022 monitoring. However, the 2023 results are consistent with (slightly higher) than the 2021 monitoring that recorded 52 fauna species in this area.

Within the Cullen Valley Mine Rehabilitation Area, 53% of fauna diversity is represented by birds with 38 species recorded, and 33% of fauna diversity is represented by mammals with 24 mammal species recorded. The remaining 10 species recorded in the 2023 monitoring include four reptile species, five frog species, and one crustacean Common Yabby (*Cherax destructor*).

One threatened species was recorded in February 2024 in the Cullen Valley Mine Rehabilitation Area during the 2023 monitoring: Dusky Woodswallow (*Artamus cyanopterus*) listed as vulnerable under the BC Act. The Dusky Woodswallow (*Artamus cyanopterus*) was previously recorded at monitoring site R1 in the 2021 monitoring surveys.

Four feral pest fauna species were recorded within the Cullen Valley Mine Rehabilitation Area. These species include the Feral Dog (*Canis lupus familiaris*), European Red Fox (*Vulpes vulpes*), Brown Hare (*Lepus capensis*), and for the first time a Feral Cat (*Felis catus*) was recorded near monitoring site FP11. These did not appear to be in high abundance and no control measures are recommended at this time.

6.6.2.2 Nest Box Monitoring

One cluster of nest boxes occurs in the Cullen Valley Compensatory Habitat Area, comprising six nest boxes numbered NB13 – NB18.

No fauna were recorded from any of the nest boxes in the Cullen Valley Compensatory Habitat Area, however Nest Box 17 contained evidence of bird occupation. Due to the height of the nest box it was impossible to physically access the box to collect samples or determine the species of the bird.

In the Cullen Valley Mine Compensatory Habitat Area Nest Box 16 had fallen, although the pole is still standing. The other nest boxes were in a good condition and contained wood shavings or natural nesting material.

6.6.2.3 Clandulla geebung Monitoring

There were 52 Clandulla Geebung (*Persoonia marginata*) plants located within a 20 m radius of the star picket during the survey undertaken in January 2024. A traverse beyond the plot area (approximately within 25 m of the plot boundary) resulted in another 48 plants being located, bringing the total to 100 individuals. Only the plants within the plot area were measured. Of the 52 plants within the plot, only 4 of those plants contained fruit, indicating healthy reproductive material. No flowers were recorded.

The number of plants recorded in 2024 has decreased from the 115 plants recorded in December 2022 by Travers Ecology. Earlier in that same year (February 2022), Umwelt had recorded 93 plants.

The distribution of plants within the monitoring area is similar with previous monitoring events where the population exists largely to the south of the central monitoring peg.

6.6.2.4 Subsurface Heating

The effects of sub surfaces heating have been assessed for rehabilitation areas of Cullen Valley Mine from 2015 to 2021. These were not monitored in 2022. Subsurface heating has been observed in five main areas from 2015 to 2021, being area R1, F1, F2, F3 and F4. The following details were recorded and mapped in the 2021 Annual Biodiversity Monitoring Report:

- 2015 –only hot spots at Area R1
- 2016 –the area was not necessarily showing active signs of heating at that point in time (i.e., the presence of active subsurface heating smell, smoke and /or surface cracking)
- 2017 – active subsurface heating areas were observed in F1, F2, F3, R1 and a new area F4. Signs of active heating include temperature, sulphurous smell, smoke, discoloration of the ground, vegetation die back or stress and /or surface cracking.
- 2018 – Areas were observed and mapped showing signs of active heating. During the 2018 report period, area F4 was also cleared of vegetation, excavated and compacted as a treatment measure.
- 2019 – Areas were observed and mapped showing signs of active heating. During the report period, area F3 was cleared of vegetation, excavated and compacted as a treatment measure.
- 2020 – Areas were observed and mapped showing signs of active heating. R1 was cleared of vegetation, excavated and compacted as a treatment measure. A new area adjacent to F3 demonstrated signs of active subsurface heating.
- 2021 – No new areas of active heating and only area F2 showed signs of active heating.

During the 2023 monitoring period, no targeted surveys were conducted to map subsurface heating, however one location was recorded where there was subsurface heating due to spontaneous combustion of underground coal. This was located on the opposite side of the main access track to monitoring site FP10, and to the north-west of monitoring site FP12. It was evidenced by a land slip, and sulphurous smell and smoke.

Environmental Outcomes and Further Improvements

During 2024, CVM will continue to monitor for subsurface heating and undertake treatment measures in accordance with the updated Plan of Works. In addition, CVM will continue the irrigation methodology agreed to with the Resources Regulator, to extinguish the worst affected area, whilst also considering compaction methods where appropriate, and further capping of areas of lower concern with overburden rehabilitation materials existing, and liberated from the remnant mining area.

6.7 Blasting

There was no blasting conducted at CVM during the report period.

6.8 Waste Management

During the report period only minimal oil and greases were stored on site. Any maintenance works required on machinery and equipment is undertaken within existing bunded areas.

Waste oils and grease are collected by a licensed waste recycling contractor on an as needs basis. All paper and general wastes from workshop areas is disposed of in garbage bins located adjacent to the workshop areas, which are collected by a licensed contractor on an as needs basis.

Sewage from the workshop areas are directed to a septic system which is pumped out by a licensed waste collection and disposal contractor on an as-needs basis.

6.9 Hazardous Material Management

Hazardous material kept on site include oils, grease and degreasers contained in storage tanks. Storage tanks are collected by an appropriately licenced contractor.

Up to 35,000L of diesel may be stored in the facility in an above ground self-bunded diesel tank (Transtank) if diesel is required for environmental works on site. Two EPA registered radionuclide fixed radiation gauges (No.s RR20215 and RR21832) have been decommissioned and are stored onsite.

6.10 Heritage

6.10.1 Indigenous Heritage

Previous archaeological surveys did not locate any Aboriginal artefacts or sites within the approved open cut mining area. However, two sites of significance were recorded in close proximity to the approved mining area. A campsite-stone artefact scatter (C-OS-1) and a rock shelter site (C-S-1). A further two sites were identified in surveys undertaken during 2011 and include 45-1-2542 and RSC-OS-1. These sites are located outside of the existing mining area.

6.10.2 Non-Indigenous Heritage

No mining activities were undertaken in proximity of locations of European heritage significance during the report period.

6.11 Greenhouse Gas Emissions

CVM Scope 1 and Scope 2 emissions calculated for the 2023 NGERS reporting year was 516 tCO2-e as shown in **Table 6.18**.

Table 6.18 CVM GHG Emissions 2023

	2023
Scope 1	4723
Scope 2	33
Total GHS Emissions (tCO_2-e)	**4756**

6.12 Bushfire

A CVM Fire Management Plan (2022) has been developed and includes a number of measures to minimise bushfire risk. These measures include:

- Regular inspections and maintenance of vegetation adjacent to site infrastructure, access roads and existing fire trails, as appropriate;
- Ensuring firefighting equipment is available on mobile equipment (including water carts) for the initial response to fire events on site, or to assist emergency services, if required;
- Ensuring all on site water storages are available for firefighting purposes to CVM personnel and the RFS, if required. The locations of current water management infrastructure on site are shown in Figure 2;
- All infrastructure areas, mobile and stationary plant and equipment at CVM having access to fire extinguishers;
- All infrastructure areas are regularly maintained to reduce the potential for fire occurrence or spread. Site equipment will be maintained in good working order to prevent incidents that could potentially result in a fire; and
- Ensuring that no additional impediment is caused by Castlereagh Coal to existing access tracks in the adjacent Ben Bullen State Forest which may be used for firefighting purposes by the RFS and Forests NSW.

6.13 Mine Subsidence

Mining operations at CVM ceased in 2012. There have been no subsidence management measures required to be implemented by CVM during the report period.

6.14 Public Safety

Access to working areas of the CVM open cut are controlled by locked gates. Access to CVM by members of the public is via contact at the mine office where visitors or contractors can only be escorted by site personnel around the site.

7.0 Water Usage

7.1 Water Management System

The water management system at CVM is described within the CVM SWMP (JBA, 2022c) and also within **Section 6.4** of this document.

7.2 Water Take

Licence and water take information is summarised in **Table 7.1**. During the report period, there was 28.117 ML extracted from Tyllies Bore.

Table 7.1 Water Take During 2023 Reporting Period

Water Licence No.	Water sharing plan, source and management zone (as applicable)	Entitlement	Estimated Take Previous Period – 2022 (ML)	Estimated Take Current Period – 2023 (ML)
80WA706148	Sydney Basin MDB Groundwater Source Water Sharing Plan – NSW Murray Darling Basin porous rock groundwater sources	80 units (ML)	28.117	37

7.3 Erosion and Sediment Control

Erosion and sediment control management at the CVM is described in the CVM Erosion and Sediment Control Plan (JBA, 2022).

7.3.1 Environmental Management Measures

The objective of the CVM water management system is to separate clean water and dirty/mine water. Erosion and sediment control focus on the management of 'dirty' water which is runoff from disturbed areas. The erosion and sediment controls (ESC's) were established during mining and remained in place whilst the operation was under care and maintenance. The ESC's include dirty water sediment dams, open drainage channels with established vegetation and/or rock armouring and drop structures where required.

7.3.2 Environmental Outcomes and Proposed Improvements

An indication of the effectiveness of the sediment and erosion control structures is obtained through regular visual inspections. These inspections focus on permanent erosion and sediment control structures and areas where the ground has been disturbed and soils are exposed. Recently disturbed sites are most vulnerable to erosion and loss of sediment following periods of heavy rainfall.

James Bailey & Associates (JBA) were commissioned by Castlereagh Coal to complete a review of water management and erosion and sediment control (ESC) structures located within areas of rehabilitation established at CVM. The review was based on a desktop review of related environmental management plans and recent monitoring documents completed for CVM, as well as observations made during subsequent field inspections completed by JBA in December 2022.

The review complements the work undertaken by Umwelt (2022) in response to directives provided to Castlereagh Coal from the NSW Resources Regulator in relation to ESC management within CVM as discussed in **Section 4.3**.

A summary of the key observations and recommendations from the ESC review are provided below.

- *"In general, ESC management principles are being implemented in accordance with site approvals and management documentation, with no significant failures identified. However, it is recommended that Castlereagh Coal implement a risk-based process to complete and document regular ESC inspections at both sites. This procedure should include an outline of key monitoring locations to be assessed by Castlereagh Coal personnel during ESC inspections. These inspections should be undertaken at least quarterly, with additional inspections to be completed following significant rainfall events;*
- *Localised erosion issues and deficiencies in drainage and water management structures are present within rehabilitation areas that should be scheduled for maintenance (see **Section** Error! Reference source not found.). However, it is noted that constraints exist at both CVM and Invincible that may impact on the ability to access some areas of the rehabilitation and water management systems, primarily due to with steep slopes and vegetation communities developing within the rehabilitation. It is recommended that Castlereagh Coal review each area prior to scheduling any physical work to balance these constraints against the need to complete remedial actions;*
- *Legacy issues relating to the design of and materials used for the drop structures in rehabilitation areas at both sites. Contour drains reporting to these structures is showing evidence of scouring, with the rock lining of the drop structures also showing evidence of weathering, which reduces their overall effectiveness in supporting rehabilitation development. It is noted that these structures were initially developed as temporary ESC controls for the rehabilitation establishment and development phase. Removal of these structures will be considered during detailed mine closure planning;*
- *SD3 at Invincible requires maintenance work to ensure that it is desilted, adequately sized and maintained in accordance with Blue Book (Landcom, 2004) requirements;*
- *While vegetation cover is generally present in rehabilitation areas, some areas of limited vegetation cover were identified at both sites. The relatively poor performance of vegetation growth within these areas may impact on the stability of rehabilitation areas in the long term due to a heightened risk of erosion; and*
- *A need to re-establish rehabilitated landform batters, ESC controls and vegetation in areas of CVM where subsurface heating is present, once remediation works have been completed."*

8.0 Rehabilitation

Rehabilitation of disturbed land at CVM has previously been undertaken in accordance with the approved Mining Operations Plan (MOP) (Sedgman, 2015) required under the Mining Lease conditions and Development Consent (DA-200-5-2003).

A Rehabilitation Management Plan (RMP) was prepared by CVM to satisfy the requirements of the CVM ML conditions and DA-200-5-2003 in July 2022.

An amendment to the Mining Regulation 2016 under the Mining Act 1992, commenced on 1 July 2021. The amendment provided new standard rehabilitation conditions for mining leases which replaces existing mining lease conditions. The RMP replaces the CVM Mining Operations Plan (MOP) (Sedgman, 2015). The RMP is available on the Castlereagh Coal website.

An Annual Rehabilitation Report and Forward Program (ARRFP) has also been prepared and submitted for CVM which provides details of the scheduled surface disturbance and rehabilitation activities at the CVM from 19 August 2022 to 18 August 2025.

A summary of the rehabilitation objectives, performance indicators and completion criteria relevant to the CVM rehabilitation domains is provided in the RMP. Plan 1 (Appendix A) in the RMP shows the conceptual final landform features.

8.1 Status of Mining and Rehabilitation

CVM operated on care and maintenance between December 2012 and May 2022 when the mining remnant coal resources commenced. Previously established rehabilitation areas at CVM included 132.8 ha of land mined since the commencement of open cut mining operations.

There was no tree planting or tree seeding undertaken during the report period. An assessment of the status of the existing CVM rehabilitation against the performance indicators and completion criteria is detailed in **Section 8.3**.

CVM has identified areas where further rehabilitation can potentially be undertaken. These areas are associated with:

- land that has been previously rehabilitated but requires supplementary works to improve the quality and quantity of this vegetation in line with the agreed completion criteria objectives
- infrastructure areas (e.g. coal stockpile pad) which is larger than that required for any future mining operational needs
- shaped and topsoiled emplacement dumps which have not been seeded/planted
- land which has been affected by subsurface heating and has been confirmed via further subsurface heating investigations to be completed during the life of mine term to be capable of supporting plant growth and unlikely to be subject to further subsurface heating. The viability of and timing of undertaking the rehabilitation work will in part be informed by ongoing treatment as described in the POW and the success of the trial irrigation and activities associated with the restart of mining remnant coal at CVM.

Previous rehabilitation at CVM has seen the successful germination and growth of native and local grass, shrub and tree species which are representative of the vegetation community types found in the area. Recent rehabilitation has proved successful with multiple tree species including *Eucalyptus*, *Acacia* and *Allocasuarina* being heavily represented.

The status of rehabilitation at CVM is detailed in **Table 8.1**.

Table 8.1 CVM Rehabilitation Status

Mine Area Type	Previous reporting period (actual) 2022 (ha)	This reporting period (actual) 2023 (ha)	Next reporting period (forecast) 2024 (ha)
Total Mine Footprint – Surface Disturbance	189	189.21	189.21
Total Active Disturbance	70.32	70.39	60.47
Rehabilitation – Land Preparation	0	0	0
Ecosystem and Land Use Establishment	0	0	0
Ecosystem and Land Use Development	118.69	118.82	128.74
Rehabilitation Completion	0	0	0

8.2 Post Rehabilitation Land Uses

The proposed final land use aims to emulate the pre-mining environment and will enhance local and regional ecological linkages across the site and adjacent areas. The primary objective of site revegetation and regeneration is to create a stable final landform with acceptable post-mining land use and suitability. In the long term, rehabilitation areas will become integrated with adjacent native vegetation communities. Rehabilitation areas will continue to be monitored on an annual basis and will be managed until self-sustaining. Final rehabilitation areas will achieve the rehabilitation completion criteria specified in the approved CVM RMP prior to relinquishment.

8.3 Completion Criteria Assessment

The revised rehabilitation objectives and completion criteria for CVM have been submitted to the Resources Regulator (RR) for review and approval as a requirement of the new Rehabilitation Management Plan process. At the time of submission of this report the RR are yet to provide feedback on the revision. As such the results of the 2023 biodiversity monitoring have been compared against the objectives as defined in the CVM MOP (Sedgman, 2015). Monitoring undertaken during 2023 has indicated that the CHA's within CVM are providing consistent native flora and fauna habitat compared to baseline information and previous annual monitoring results.

Table 8.2 provides a general overview of the performance of the rehabilitated area against the biodiversity and rehabilitation performance and completion criteria for CVM. It is noted that there are areas which have been disturbed by mining which are yet to be rehabilitated. These disturbed areas do not form part of the general assessment presented in **Table 8.2**.

8.4 Rehabilitation Activities

Since recommencing operations in May 2022, management and monitoring of rehabilitation areas has been undertaken in accordance with the approved CVM Flora and Fauna Management Plan (April 2022).

All mining equipment was moved from the Cullen Valley Mine site to Invincible Colliery during the reporting period. There has been no removal of buildings or other infrastructure and no new rehabilitation areas were established during the 2023 report period.

Table 8.2 Assessment of CVM Rehabilitation Against Performance Indicators and Completion Criteria

Domain Objectives	Performance indicators	Completion criteria	2023 Status Against Completion Criteria
Revegetation works are undertaken in accordance with the Flora and Fauna Management Plan.	Plant establishment	Planting/seeding is assessed during annual monitoring as becoming successfully established.	**Generally satisfied** Planting/seeding of existing rehabilitation areas has generally been successful.
Established rehabilitation areas to be monitored on an annual basis and managed until self-sustaining.	Species composition	A range of native shrubs, grasses and other understorey species have established through topsoil, seeding or recolonization.	**Generally satisfied** Exiting rehabilitation areas generally satisfy these criteria. However, it is variable across monitoring sites, with some sites containing a greater diversity of native shrubs, grasses and understory species.
	Plant health	More than 75% of trees are healthy and growing as indicated by monitoring.	**Satisfied** The general heath of the trees appears to be heavily influenced by climatic conditions and is mirroring that observed in unmined areas. More than 75% of the trees are healthy and do not show any abnormal signs of disease, pest impact or ill heath requiring intervention.
	Weed establishment	A spraying program for the control of declared plants and other weeds has been implemented on the site.	**Partially satisfied** Overall the incidence of weeds was low. However, a number of Blackberry seedlings were recorded within the monitoring sites. Monitoring site CH1 within the Cullen Valley Mine Compensatory Habitat Area requires weed management to target the Hawthorn (Crataegus monogyna) and Blackberry infestations located in the vicinity of monitoring site CH1. Further, a few Pampas Grass (Cortaderia sp.) were detected close to the main access track through the Cullen Valley Mine. A spraying program for the control of high threat and priority weeds needs to be implemented on the site.
	Soil conditions	Soil salinity is sufficiently low to allow survival and growth of plant species, soil pH levels are within the range to allow plant growth.	Not monitored as part of the 2023 biodiversity monitoring.

Domain Objectives	Performance indicators	Completion criteria	2023 Status Against Completion Criteria
	Fauna habitat structure	Fauna habitat includes a range of vegetation structural habitats, e.g. eucalypts, shrubs, ground cover and a developing litter layer.	**Progressing towards satisfactory completion.** The existing rehabilitated areas includes a range of vegetation structural habitats including eucalypts, shrubs, ground cover and a developing litter layer. The individual monitoring sites within the Cullen Rehabilitation Area have varying stages and extent of these habitats with some sites meeting the completion criteria while others are progressing towards it. It is suggested that this is a function of the age, and the rehabilitation areas would be expected to trend over time to satisfy the completion criteria. Overall, the structural habitats of the rehabilitation areas are not comparable to those within the surrounding Compensatory Habitat Areas as the they are not mature enough to contain the range of naturally forming habitats (e.g. hollow-bearing trees) that are present in the surrounding un-mined forests and woodlands. The Rehabilitated Areas are however expected to progress towards the naturally forming habitat features that exist in pre-existing or surrounding landforms over time.

Domain Objectives	Performance indicators	Completion criteria	2023 Status Against Completion Criteria
	Presence of fauna species	Vertebrate surveys demonstrate that bird, mammal, reptile and frog communities are becoming established in rehabilitated sites.	**Satisfied** The 2023 monitoring demonstrated that bird, mammal, reptile, and frog communities are becoming established in the Cullen Rehabilitation Area as a whole. However, when comparing the faunal group assemblages among the individual monitoring sites within the Cullen Rehabilitation Area, not all sites are meeting the completion criteria. This is attributed to the availability of habitats within each site that are specific faunal groups need. Fauna species diversity decreased in 2023 compared with 2022 monitoring, however it is similar to 2021 diversity levels. The total number of fauna species recorded in the Cullen Valley Mine Rehabilitation Areas in 2021 is similar to those recorded in the Cullen Valley Mine Compensatory Habitat Areas. This is most likely due to the maturity of the rehabilitated areas and continued habitat recovery following the drought breaking that has allowed for similar results between the Cullen Valley Mine Rehabilitation Area and Compensatory Habitat Area It is expected that faunal communities will continue to fluctuate as they establish towards a similar number (i.e., carrying capacity) to those recorded in the surrounding un-mined vegetation as the diversity of habitats progressively improve. Further evidence will be drawn from future monitoring events as remnant vegetation recovers from the effects of bushfire, habitat corridors continue to establish, and permanent habitat features become more frequent.

Domain Objectives	Performance indicators	Completion criteria	2023 Status Against Completion Criteria
	Biodiversity monitoring	Annual biodiversity monitoring indicates that rehabilitation areas are becoming integrated with adjacent vegetation communities	**Generally satisfied** The age of the rehabilitation area is the dominate factor for this completion criteria. The older the rehabilitation becomes, they should: • Appear to be more visually connected to the unmined land (e.g. landform) • Fauna species increasingly using the rehabilitation areas The diversity and structure of all rehabilitated areas is expected to continue to mature over time.
Final rehabilitation areas to achieve rehabilitation completion criteria	Vegetation cover	No bare areas that have obviously failed and are greater than 0.5 ha in total area.	**Progressing towards satisfactory completion.** All Rehabilitation Areas inspected were considered to meet this criteria milestone in 2023.
	Tree cover	No treeless areas greater than 0.5 ha are present.	**Generally satisfied** No treeless area greater than 0.5 ha were observed during the 2023 monitoring, with the exception of areas affected by subsurface heating.
	Shrub/grass cover	Monitoring and visual estimation show grass or shrub cover to be >50%.	**Generally satisfied** 2023 monitoring and visual estimation recorded grass and shrub cover to be >50% in the Cullen Valley Mine Rehabilitation Area. It is noted that these are a mix of native ground cover species and exotic cover crop species. It is also noted that the acacia species in the older rehabilitation areas are naturally dying back (senescence) and as such their prominence will be less in coming years. Recruitment of acacias species however was recorded in the majority of the rehabilitation monitoring sites. Many monitoring sites also recorded second generation Eucalyptus spp. Future monitoring will determine how the native species diversity of rehabilitation areas will respond following increased plant growth in response to favourable environmental conditions.

9.0 Community

9.1 CCC Meetings

Two community consultation meetings were held during the reporting period. The meetings were held in March and October 2023.

The outcomes of the CCC meetings are detailed in the meeting minutes available on the Castlereagh Coal website.

9.2 Complaints

In accordance with Condition M5 of the EPL, Shoalhaven Coal maintains a complaints register to record and respond to complaints received from the community. The register is included in the Castlereagh Coal website. Thirteen (13) complaints were received from the local community during the report period. The number of complaints was similar to the previous reporting period. A comparison of complaints received between 2019 and 2023 is outlined in **Table 9.1** below.

Table 9.1 Comparison of Complaints

Complaint Type	2019	2020	2021	2022	2023
Noise	0	0	0	0	1
Air quality	0	0	0	1	4
Blasting	0	0	0	0	0
Traffic	0	0	0	1	2
Water	0	0	0	1	0
Subsurface Heating (odour)	2	2	1	6	4
Other	0	0	0	4	2
Total	**2**	**2**	**1**	**12**	**13**

* CVM was placed on care and maintenance in December 2012. Mining recommenced in May 2022.

10.0 Audit Information

An Independent Environmental Audit (IEA) for CVM was completed and submitted on the 14 March 2022.

The IEA identified non-compliances with the EPL, Development Approval and the 2003 Environmental Impact Statement mitigation measure commitments. Non-compliances were found to be of administrative or low risk level.

Further details regarding the status of the non-compliances identified by the IEA are located in **Appendix 3**. A copy of the 2021 IEA is located on the CVM website.

11.0 Incidents and Non-Compliances During the Report Period

There were no environmental incidents causing or threatening material environmental harm at the Cullen Valley Mine during the reporting period. The CVM Pollution Incident Response Management Plan (PIRMP) was not activated during the reporting period with review of the PIRMP being undertaken in December 2023 (refer to the Castlereagh Coal website). Non-compliances which occurred during the reporting are discussed in in **Section 1.0**.

12.0 Activities to be Undertaken in the Next Reporting Period

Activities during the 2024 reporting period will include:

- Continued monitoring of subsurface heating and continue treatment of subsurface heating via backfilling surface cracks with cement and capping heating areas will be undertaken consistent with the POW (**Section 6.9**).
- Continuation of a trial irrigation methodology to determine its effectiveness as part of the wider subsurface heating treatments program at CVM.
- Implementation of the long-term management actions to address issues stemming from the Section 240 Notices ongoing consultation outcomes with the Resources Regulator.
- Attend to rehabilitation activities as per **Section 8.5**
- Completion of annual CCC meetings, as agreed with CCC members.

13.0 References

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Rapt Consulting (2023a). Cullen Valley Mine Environmental Noise Monitoring Quarter 1, 2023. Prepared for Castlereagh Coal.

Rapt Consulting (2023b). Cullen Valley Mine Environmental Noise Monitoring Quarter 2, 2023. Prepared for Castlereagh Coal.

Rapt Consulting (2023c). Cullen Valley Mine Environmental Noise Monitoring Quarter 3, 2023. Prepared for Castlereagh Coal.

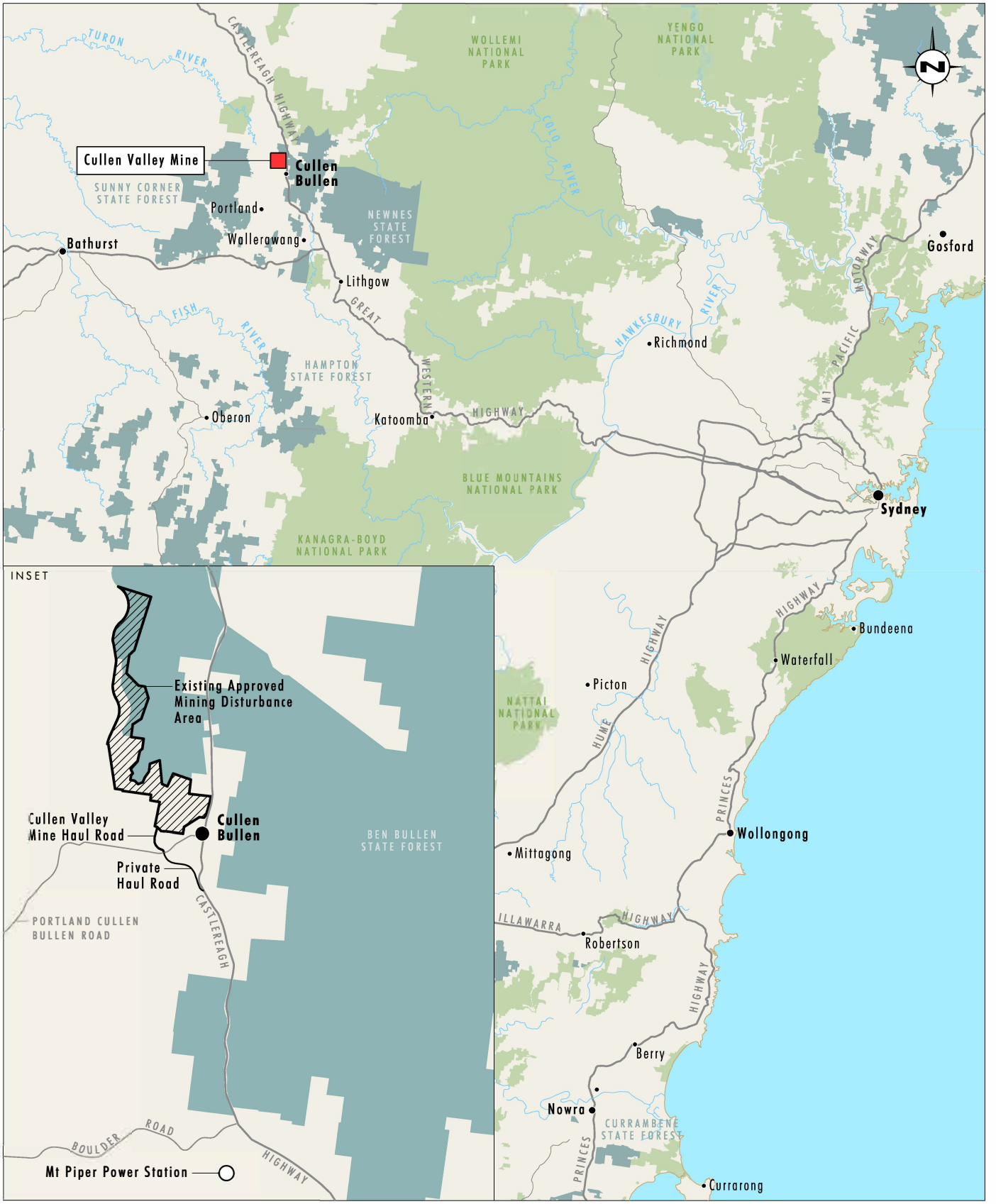
Rapt Consulting (2023d). Cullen Valley Mine Environmental Noise Monitoring Quarter 4, 2023. Prepared for Castlereagh Coal.

Cumberland Ecology (2024). 2023 Biodiversity Monitoring Report Cullen Valley Mine and Invincible Colliery.

Umwelt (2017). Water Management Plan Cullen Valley Mine.

APPENDIX 1

Plans



Data Source: Geoscience Australia (2009), OEH (2013)

FIGURE 1

Locality Plan
Cullen Valley Mine

External Border size = 277mm x 390mm on A3 paper.

221488.00

223520.00

225552.00

6315456.00

6313424.00

6311392.00

ML1557

ML1556

ML1488

ML1455

CASTLEREAGH HIGHWAY

Wallerawang - Gwabegar Railway

Red Springs Creek

Cullen Creek

CULLEN BULLEN

Mining and Rehabilitation Areas 2023
Active Mining Area
Overburden Emplacement Area
Infrastructure Area
Water Management Area
Rehabiliation Area

0 1000 2000

SCALE 1:20000

NOTES:
1) COPYRIGHT OF THIS PLAN & ASSOCIATED ELECTRONIC FILES VESTS WITH CEH SURVEY.
2) THE PLAN & ASSOCIATED ELECTRONIC FILES SHALL ONLY BE USED BY THE ADDRESSED CLIENT FOR THE PURPOSE OF THE SURVEY.
3) THIS SURVEY AND PLAN IS FOR INFORMATION / REPORTING PURPOSES ONLY.
4) THE BOUNDARIES, AREAS & DIMENSIONS OF THE LAND AND MINING LEASES, AS SHOWN, ARE BASED ON ORIGINAL DATA AND HAVE NOT BEEN SUBJECT TO REDEFINITION.
5) MINING LEASE INFORMATION HAS BEEN DERIVED FROM RECORD TRACING HELD ON FILE AT CEH SURVEY.
6) ROADS AND DRAINAGE LINES ARE DIGITIZED FROM AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
7) MINING DOMAINS AND APPROVAL LIMITS ADOPTED FROM PLAN SUPPLIED BY OTHERS VIA EMAIL DATED 20/03/2024.
8) MINING DOMAINS VERIFIED BY CASTLEREAGH COAL MINING SUPERVISOR AT SITE MEETING DATED 22/03/2024. CEH SURVEY ACCEPTS NO RESPONSIBILTY FOR ERRORS OR OMISSIONS WITH REGARDS DEFINITION OF APPROVAL AREAS OR MINING DOMAINS, AS SHOWN ON THIS PLAN.
9) SERVICES ARE NOT SHOWN. CEH SURVEY ACCEPTS NO RESPONSIBILITY FOR SERVICES NOT SHOWN. RING "BEFORE YOUR DIG AUSTRALIA" AND CONTACT RELEVANT AUTHORITIES & THE LOCAL COUNCIL FOR OTHER SERVICE LOCATIONS.
10) BACKGROUND IMAGE FROM AERIAL IMAGE HELD ON FILE AS SUPPLIED BY CASTLEREAGH COAL.
11) THESE NOTES FORM AN INTEGRAL PART OF THE PLAN AND MUST NOT BE REMOVED FROM THE PLAN.

CLIENT: CASTLEREAGH COAL
CEH REF: 3/2076 CLIENT REF: CULLEN VALLEY MINE
PROPERTY: CULLEN VALLEY COLLIERY
LOCALITY: PORTLAND CULLEN BULLEN ROAD, CULLEN BULLEN.

R.R. (@A3) - 1:20000 LEVEL DATUM: MGA ZONE 56 / GDA 94

LEGEND

- Project Approval Boundary
- Mining Lease Boundary
- Conservation & Compensatory Habitat Areas
- Roads (Approximate)
- Drainage Line
- Railway (Approximate)

CEH SURVEY
CONSULTING LAND, ENGINEERING AND MINING SURVEYORS
"Astrolabe" 1 Rutherford Lane,
LITHGOW 2790
ABN: 68 056 544 551 Office: (02) 6351 2281
Email: survey@ceh.com.au Website: www.ceh.com.au

Liability limited by a scheme approved under Professional Standards Legislation

N
GRID
(MGA ZONE 56 / GDA 94)

DATE	06/05/2024
AMENDED	
SURVEYOR	NOT BY SURVEY
DRAWN	GM
CHECKED	JWS

DRAWING No:
FIGURE 2
2023 MINING & REHABILITATION AREAS

.MJO JOB:
CVM Annual return base plan 2023 - CVM AR FIG.2 2024

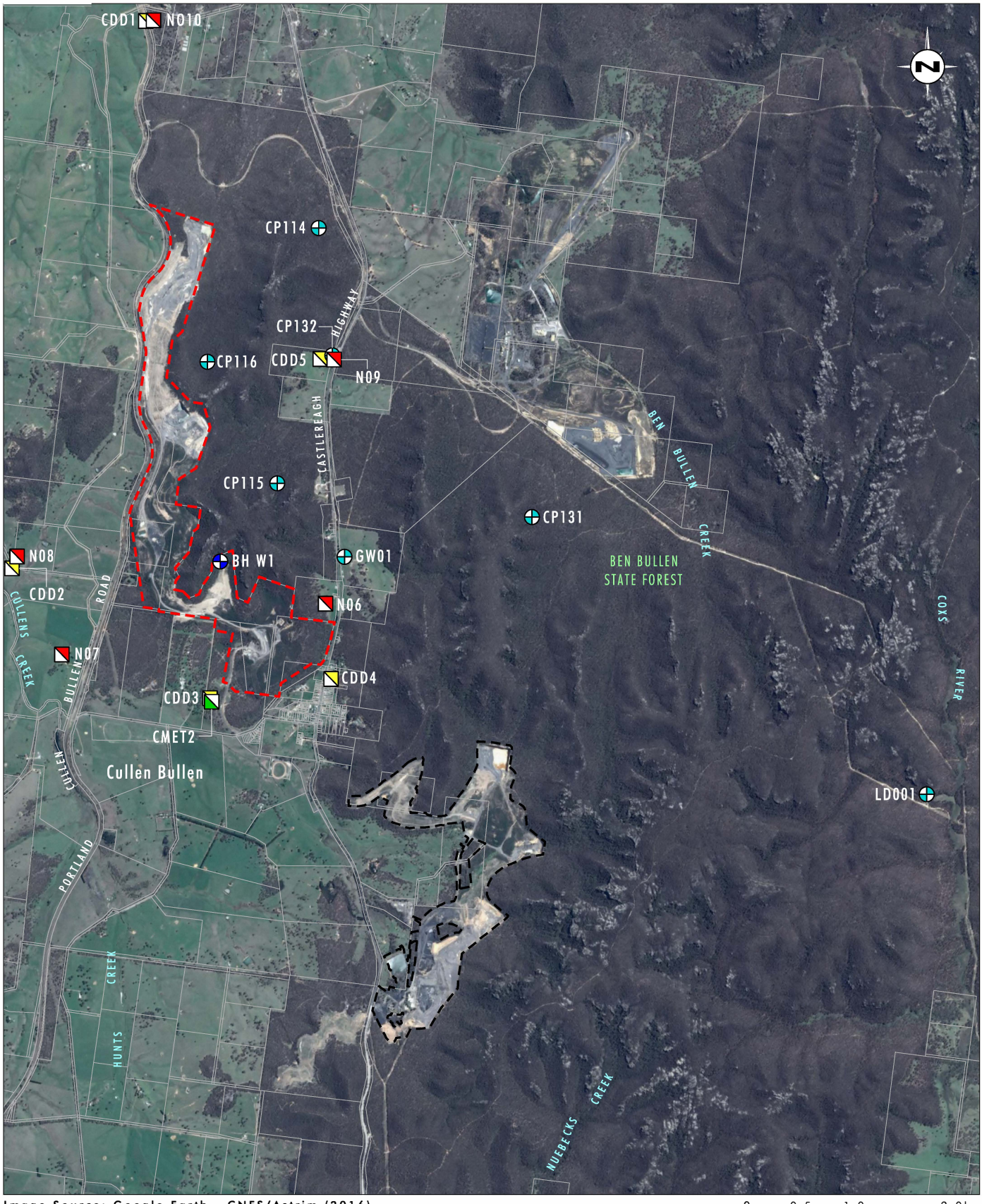


Image Source: Google Earth - CNES/Astrim (2016)

0 0.5 1.0 2.0km

1:50 000

Legend

- Existing Approved Mining Disturbance Area - Cullen Valley
- Existing Approved Mining Disturbance Area - Invincible
- Depositional Dust Monitoring Point
- Meteorological Station
- Noise Monitoring Point
- Surface Water Monitoring Point
- Groundwater Monitoring Point

FIGURE 3

Environmental Monitoring Locations Cullen Valley Mine

File Name (A4): R129/3968_163.dgn
20200311 10.36

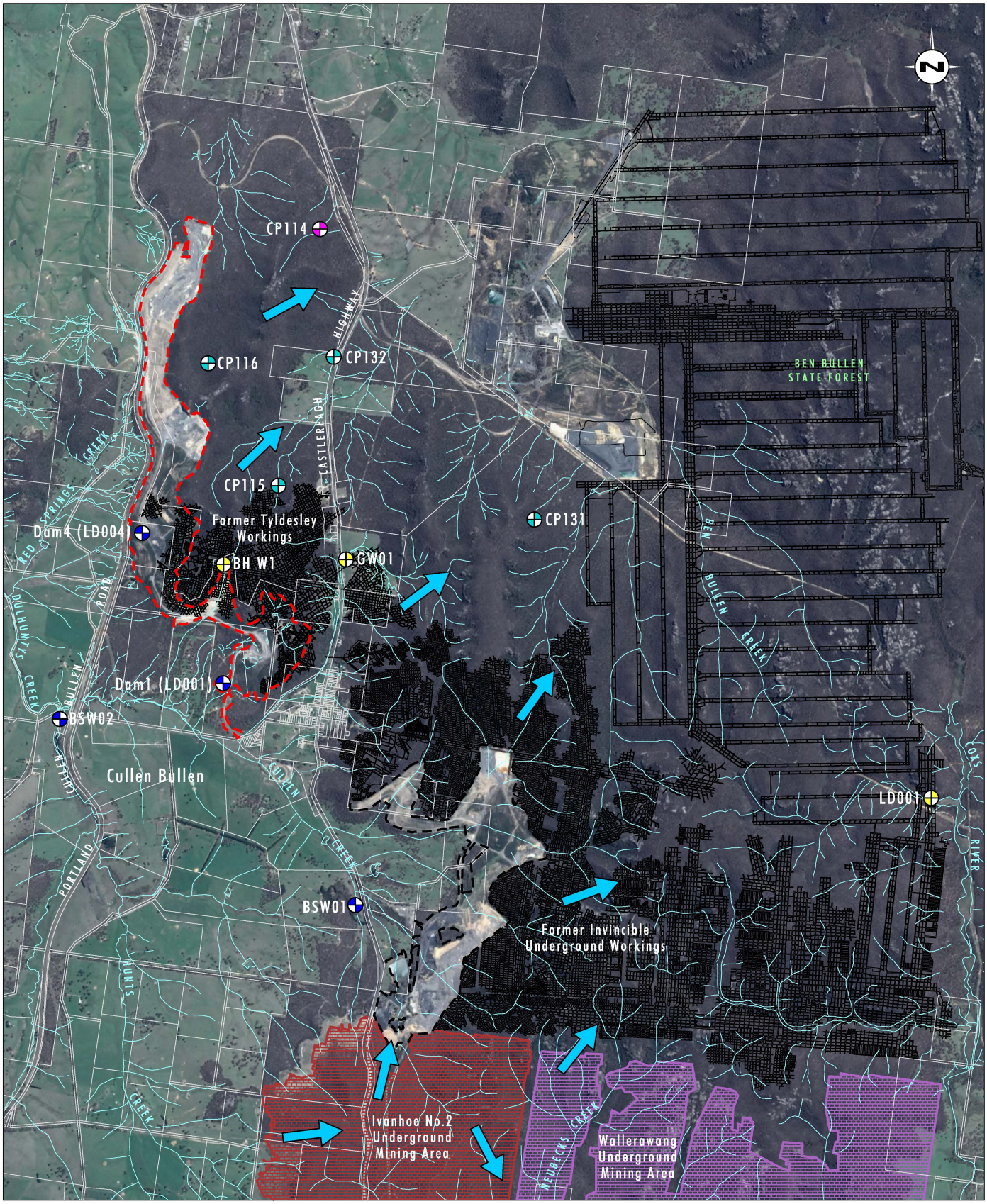


Image Source: Google Earth - CNES/Astrim (2016)
Data Source: LPI (2016), Sedgman (2014)

0 0.5 1.0 2.0km
1:50 000

Legend

- Open Cut Mining Disturbance Area - Cullen Valley
- Existing Mining Disturbance Area - Invincible
- Direction of Coal Seam Dip
- Former Invincible Underground Workings
- Invincible Project Approval Boundary
- Wallerawang Underground Mining Area
- Groundwater Monitoring Point (Lithgow Seam)
- Groundwater Monitoring Point (Marangaroo Sandstone)
- Groundwater Monitoring Point (Underground Workings)
- Surface Water Monitoring Point (Invincible)

FIGURE 4

Hydrology Context
Cullen Valley Mine

File Name (A4): R129/3968_164.dgn
20200311 10.37

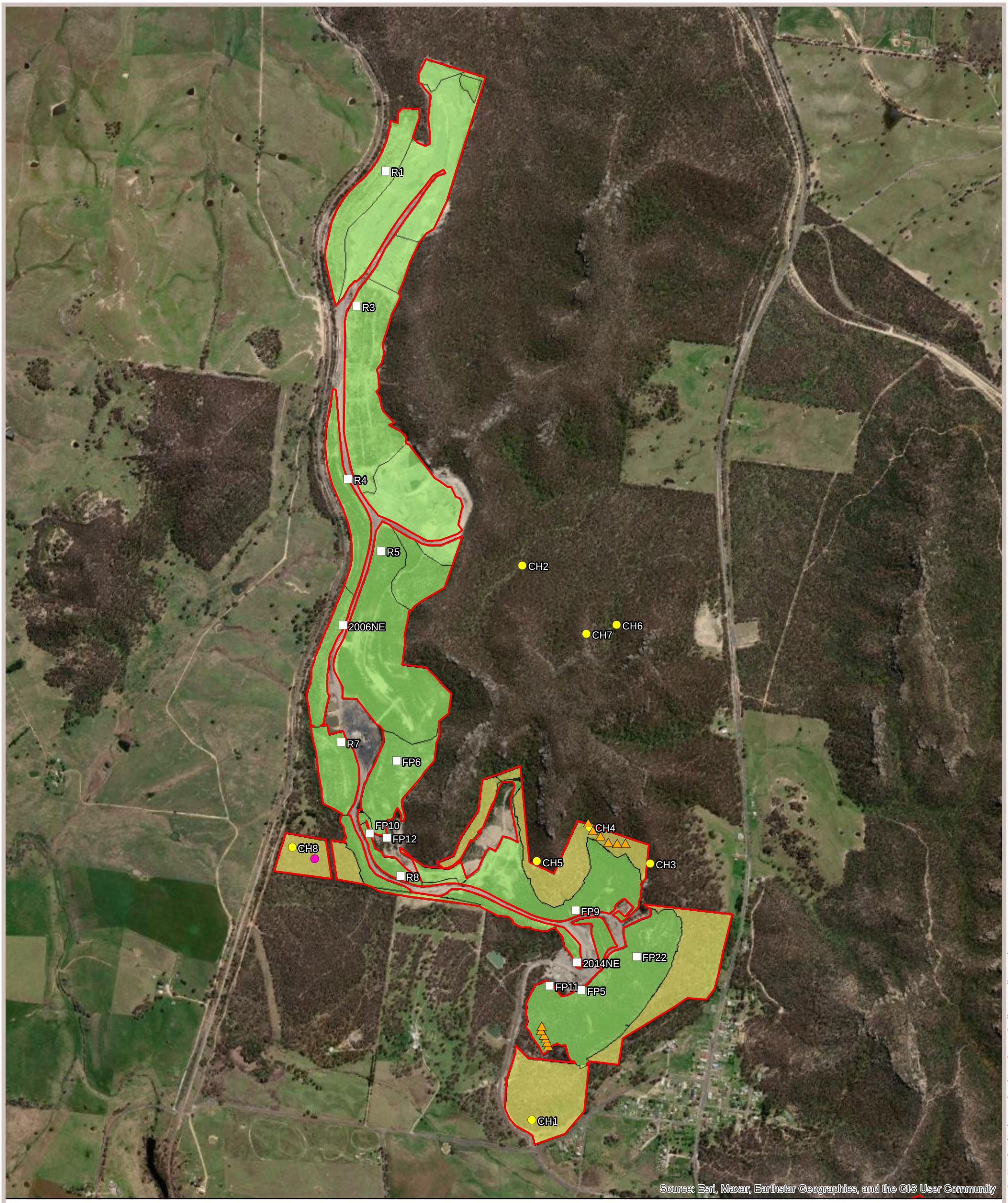
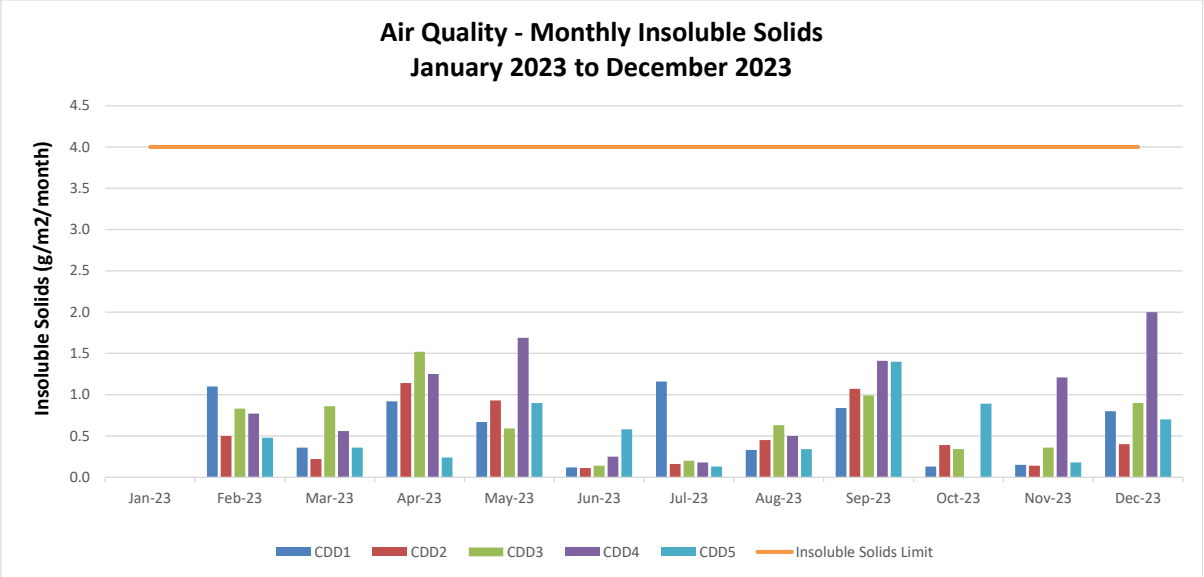
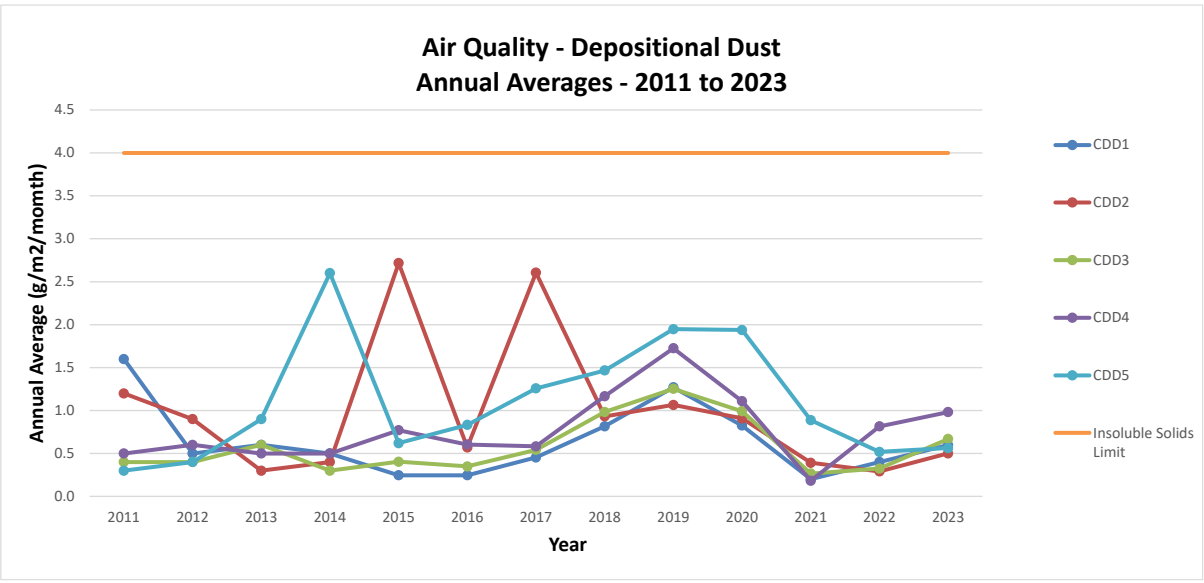


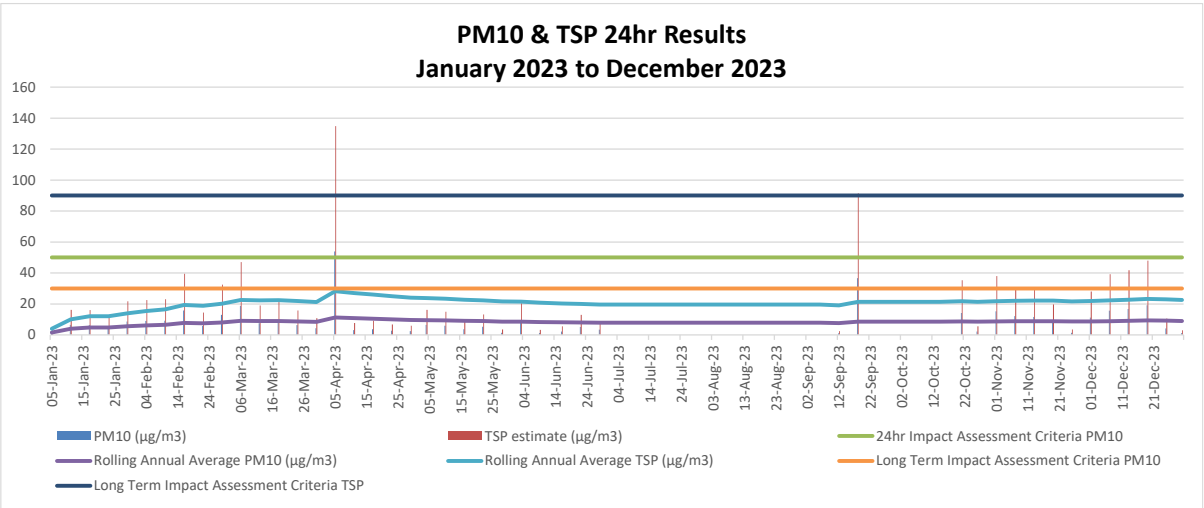
Figure 5. Ecological monitoring sites across the Cullen Valley Mine Areas

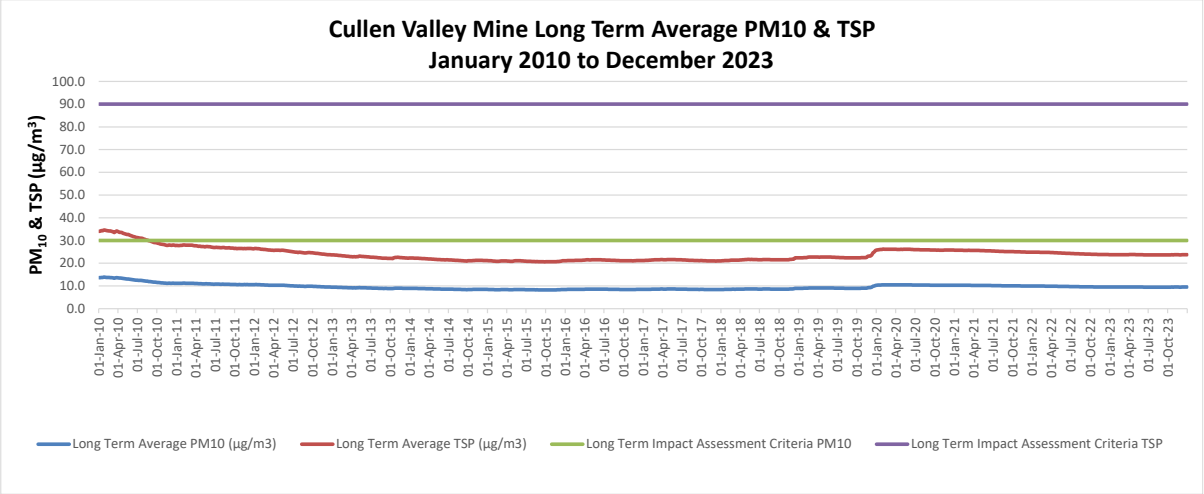
APPENDIX 2

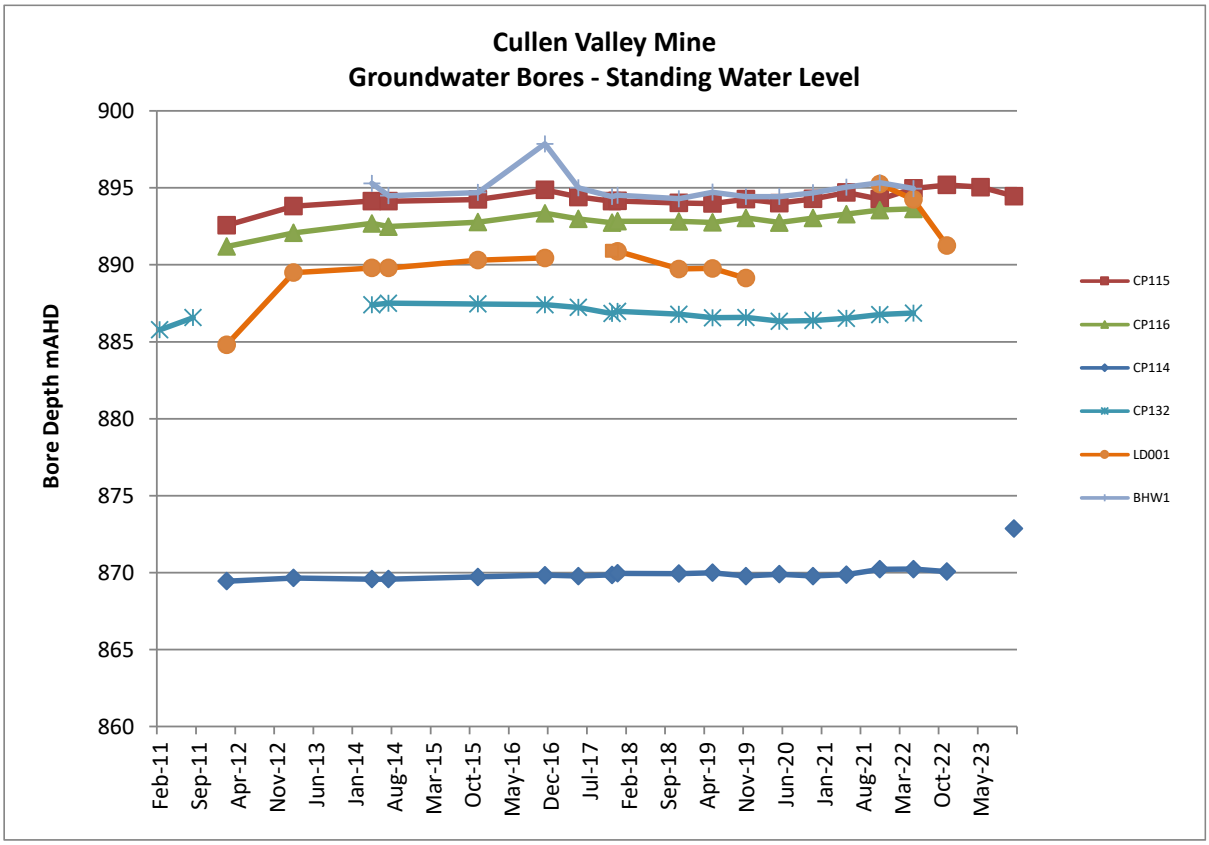
Monitoring Results

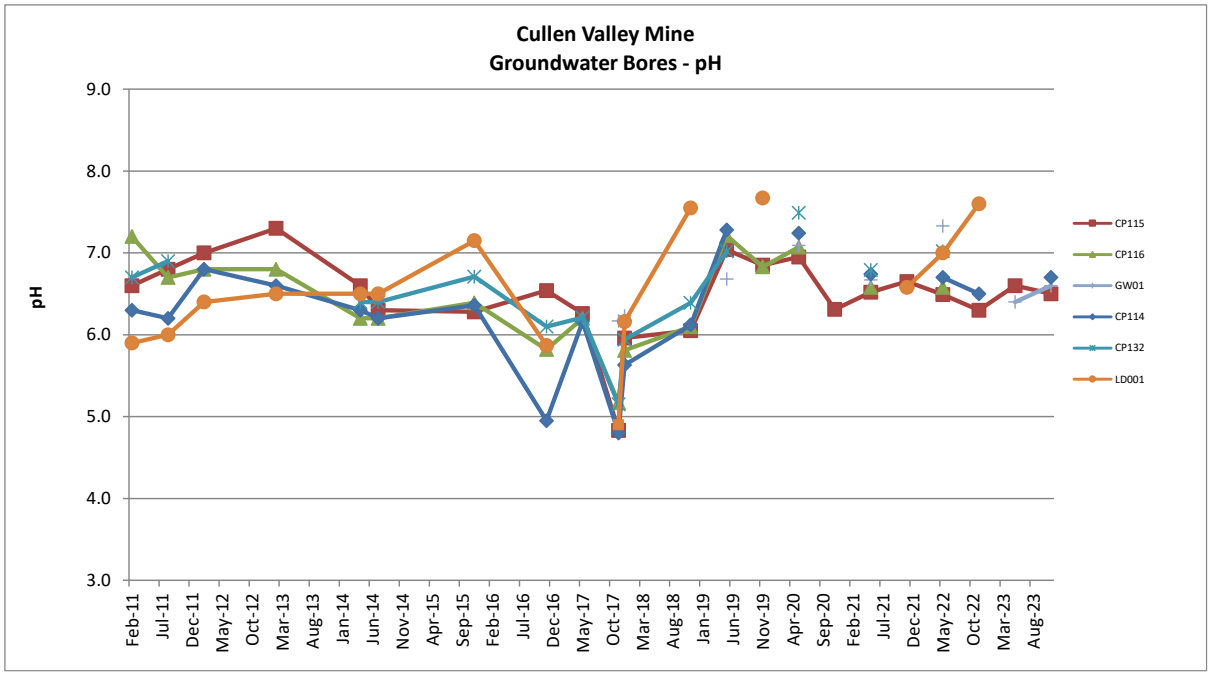

Air Quality - Monthly Insoluble Solids
January 2023 to December 2023
Insoluble Solids (g/m2/month)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
CDD1
CDD2
CDD3
CDD4
CDD5
Insoluble Solids Limit

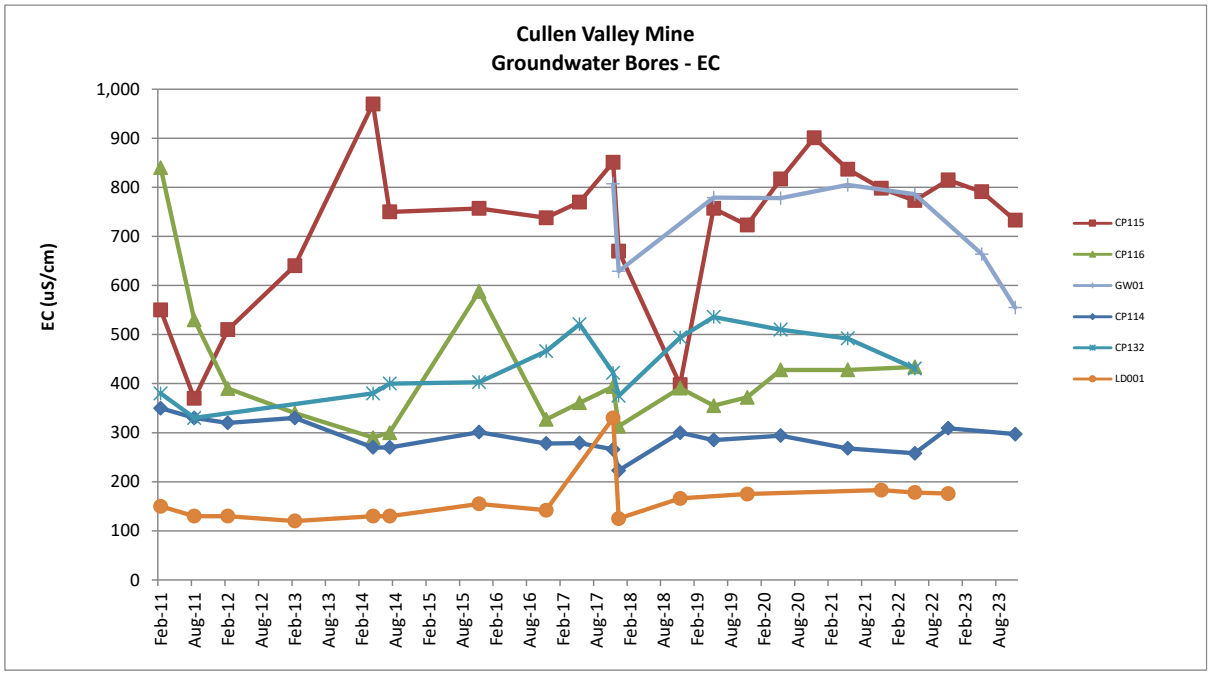

Air Quality - Depositional Dust
Annual Averages - 2011 to 2023
Annual Average (g/m2/momth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Year
CDD1
CDD2
CDD3
CDD4
CDD5
Insoluble Solids Limit

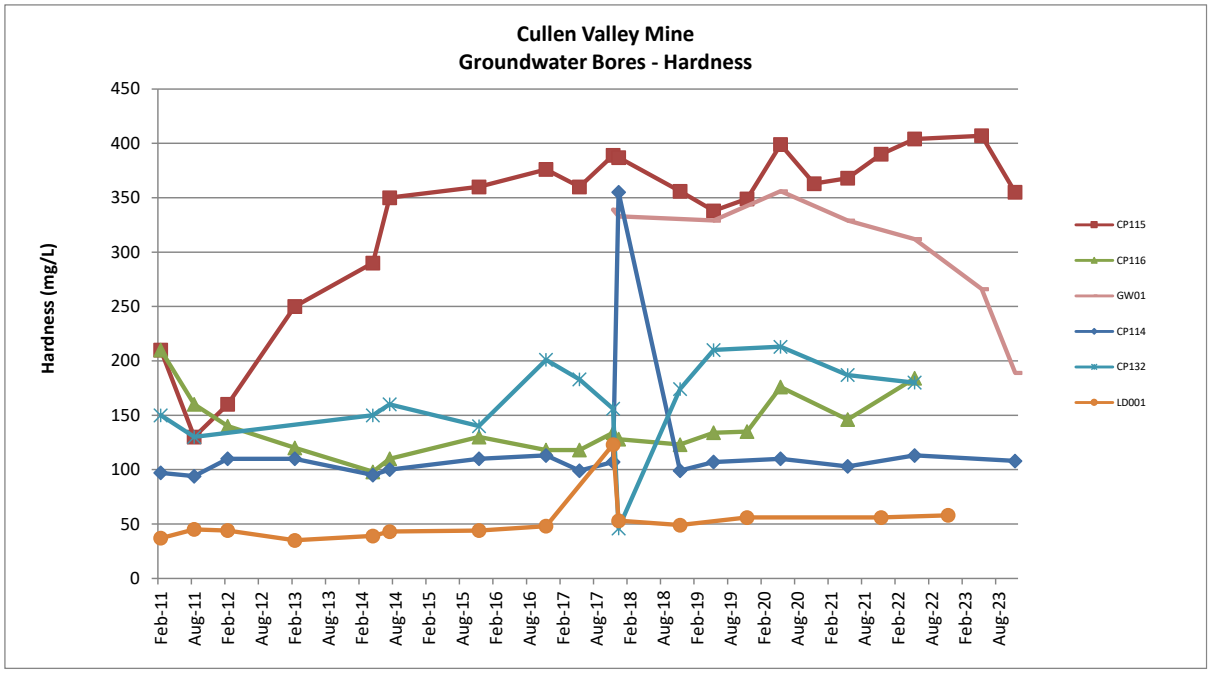

PM10 & TSP 24hr Results
January 2023 to December 2023
160
140
120
100
80
60
40
20
0
05-Jan-23
15-Jan-23
25-Jan-23
04-Feb-23
14-Feb-23
24-Feb-23
06-Mar-23
16-Mar-23
26-Mar-23
05-Apr-23
15-Apr-23
25-Apr-23
05-May-23
15-May-23
25-May-23
04-Jun-23
14-Jun-23
24-Jun-23
04-Jul-23
14-Jul-23
24-Jul-23
03-Aug-23
13-Aug-23
23-Aug-23
02-Sep-23
12-Sep-23
22-Sep-23
02-Oct-23
12-Oct-23
22-Oct-23
01-Nov-23
11-Nov-23
21-Nov-23
01-Dec-23
11-Dec-23
21-Dec-23
PM10 (µg/m3)
TSP estimate (µg/m3)
24hr Impact Assessment Criteria PM10
Rolling Annual Average PM10 (µg/m3)
Rolling Annual Average TSP (µg/m3)
Long Term Impact Assessment Criteria PM10
Long Term Impact Assessment Criteria TSP

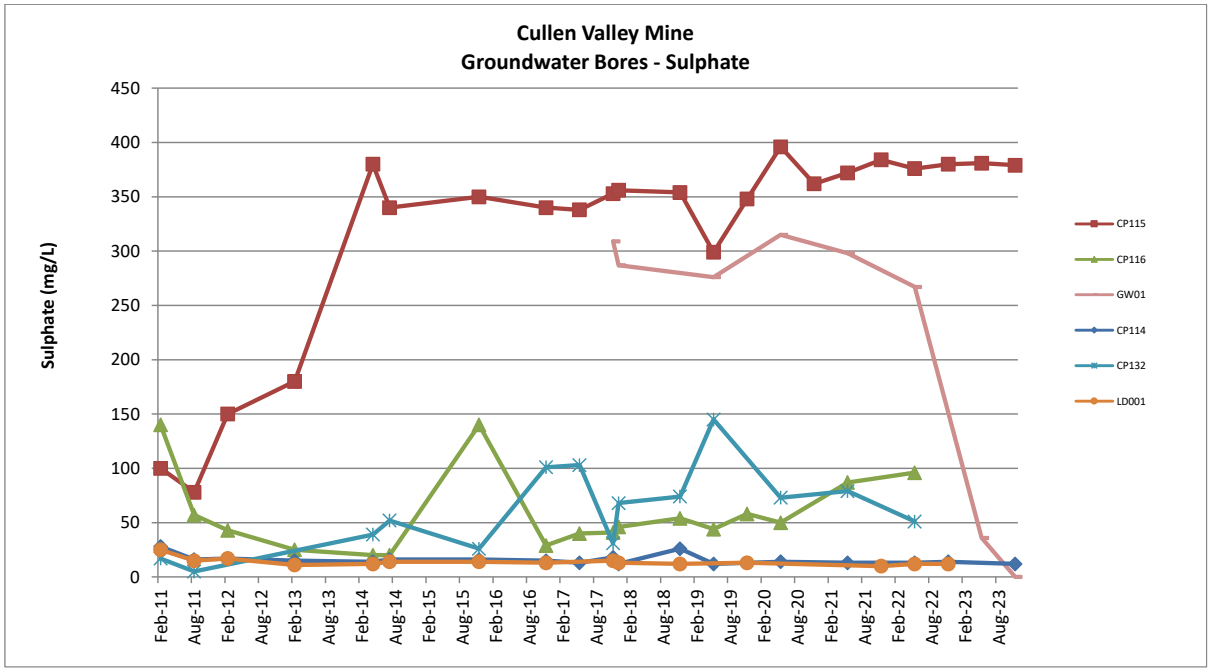

Cullen Valley Mine Long Term Average PM10 & TSP
January 2010 to December 2023
PM10 & TSP (µg/m3)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
01-Jan-10
01-Apr-10
01-Jul-10
01-Oct-10
01-Jan-11
01-Apr-11
01-Jul-11
01-Oct-11
01-Jan-12
01-Apr-12
01-Jul-12
01-Oct-12
01-Jan-13
01-Apr-13
01-Jul-13
01-Oct-13
01-Jan-14
01-Apr-14
01-Jul-14
01-Oct-14
01-Jan-15
01-Apr-15
01-Jul-15
01-Oct-15
01-Jan-16
01-Apr-16
01-Jul-16
01-Oct-16
01-Jan-17
01-Apr-17
01-Jul-17
01-Oct-17
01-Jan-18
01-Apr-18
01-Jul-18
01-Oct-18
01-Jan-19
01-Apr-19
01-Jul-19
01-Oct-19
01-Jan-20
01-Apr-20
01-Jul-20
01-Oct-20
01-Jan-21
01-Apr-21
01-Jul-21
01-Oct-21
01-Jan-22
01-Apr-22
01-Jul-22
01-Oct-22
01-Jan-23
01-Apr-23
01-Jul-23
01-Oct-23
Long Term Average PM10 (µg/m3)
Long Term Average TSP (µg/m3)
Long Term Impact Assessment Criteria PM10
Long Term Impact Assessment Criteria TSP

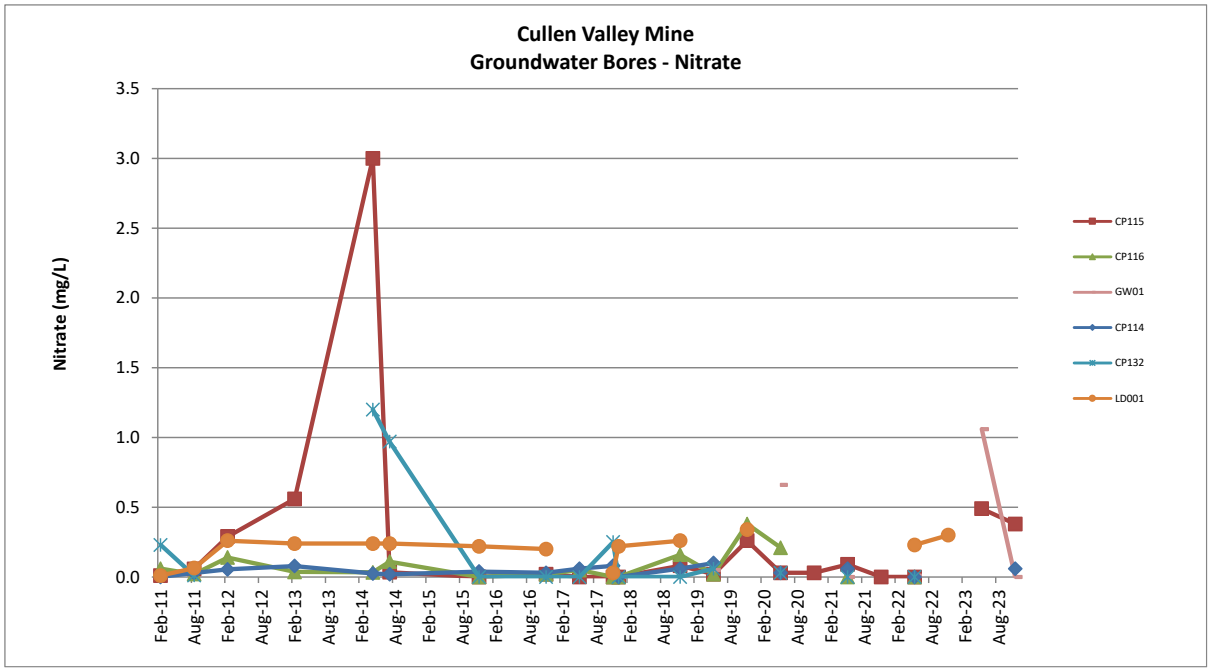

Cullen Valley Mine
Groundwater Bores - Standing Water Level
Bore Depth mAHD
900
895
890
885
880
875
870
865
860
Feb-11
Sep-11
Apr-12
Nov-12
Jun-13
Jan-14
Aug-14
Mar-15
Oct-15
May-16
Dec-16
Jul-17
Feb-18
Sep-18
Apr-19
Nov-19
Jun-20
Jan-21
Aug-21
Mar-22
Oct-22
May-23
CP115
CP116
CP114
CP132
LD001
BHW1


Cullen Valley Mine
Groundwater Bores - pH
pH
9.0
8.0
7.0
6.0
5.0
4.0
3.0
Feb-11
Jul-11
Dec-11
May-12
Oct-12
Mar-13
Aug-13
Jan-14
Jun-14
Nov-14
Apr-15
Sep-15
Feb-16
Jul-16
Dec-16
May-17
Oct-17
Mar-18
Aug-18
Jan-19
Jun-19
Nov-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21
May-22
Oct-22
Mar-23
Aug-23
CP115
CP116
GW01
CP114
CP132
LD001


Cullen Valley Mine
Groundwater Bores - EC
EC (uS/cm)
1,000
900
800
700
600
500
400
300
200
100
0
Feb-11
Aug-11
Feb-12
Aug-12
Feb-13
Aug-13
Feb-14
Aug-14
Feb-15
Aug-15
Feb-16
Aug-16
Feb-17
Aug-17
Feb-18
Aug-18
Feb-19
Aug-19
Feb-20
Aug-20
Feb-21
Aug-21
Feb-22
Aug-22
Feb-23
Aug-23
CP115
CP116
GW01
CP114
CP132
LD001


Cullen Valley Mine
Groundwater Bores - Hardness
Hardness (mg/L)
450
400
350
300
250
200
150
100
50
0
Feb-11
Aug-11
Feb-12
Aug-12
Feb-13
Aug-13
Feb-14
Aug-14
Feb-15
Aug-15
Feb-16
Aug-16
Feb-17
Aug-17
Feb-18
Aug-18
Feb-19
Aug-19
Feb-20
Aug-20
Feb-21
Aug-21
Feb-22
Aug-22
Feb-23
Aug-23
CP115
CP116
GW01
CP114
CP132
LD001


Cullen Valley Mine
Groundwater Bores - Sulphate
Sulphate (mg/L)
450
400
350
300
250
200
150
100
50
0
Feb-11
Aug-11
Feb-12
Aug-12
Feb-13
Aug-13
Feb-14
Aug-14
Feb-15
Aug-15
Feb-16
Aug-16
Feb-17
Aug-17
Feb-18
Aug-18
Feb-19
Aug-19
Feb-20
Aug-20
Feb-21
Aug-21
Feb-22
Aug-22
Feb-23
Aug-23
CP115
CP116
GW01
CP114
CP132
LD001


Cullen Valley Mine
Groundwater Bores - Nitrate
Nitrate (mg/L)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Feb-11
Aug-11
Feb-12
Aug-12
Feb-13
Aug-13
Feb-14
Aug-14
Feb-15
Aug-15
Feb-16
Aug-16
Feb-17
Aug-17
Feb-18
Aug-18
Feb-19
Aug-19
Feb-20
Aug-20
Feb-21
Aug-21
Feb-22
Aug-22
Feb-23
Aug-23
CP115
CP116
GW01
CP114
CP132
LD001

Historical Noise monitoring results for years 2011, 2012, 2015 - 2022 are shown in **Tables A to J**. Contribution from CVM was inaudible for all monitoring undertaken for 2013, and 2014.

Table A 2022 Quarterly Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	IA	IA	IA	IA
Hillcroft (N08)	35	IA	IA	IA	IA
Forest Lodge (N10)	40	IA	IA	IA	IA
Doble Gate (N09)	43	IA	IA	IA	IA
Tilley (N06)	43	IA	IA	IA	IA

Table B 2021 Quarterly Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	36 (IA)	34 (IA)	41 (IA)	35 (IA)
Hillcroft (N08)	35	36 (IA)	36 (IA)	38 (IA)	32 (IA)
Forest Lodge (N10)	40	36 (IA)	31 (IA)	36 (IA)	42 (IA)
Doble Gate (N09)	43	49 (IA)	63 (IA)	43 (IA)	50 (IA)
Tilley (N06)	43	63 (IA)	68 (IA)	48 (IA)	53 (IA)

Table C 2020 Quarterly Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	44 (IA)	35 (IA)	43 (IA)	42 (IA)
Hillcroft (N08)	35	41 (IA)	33 (IA)	30 (IA)	33 (IA)
Forest Lodge (N10)	40	44 (IA)	38 (IA)	26 (IA)	38 (IA)
Doble Gate (N09)	43	52 (IA)	52 (IA)	60 (IA)	54 (IA)
Tilley (N06)	43	61 (IA)	66 (IA)	68 (IA)	63 (IA)

Table D 2019 Quarterly Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	39 (IA)	44 (IA)	41 (IA)	43 (IA)
Hillcroft (N08)	35	40 (IA)	44 (IA)	39 (IA)	38 (IA)
Forest Lodge (N10)	40	36 (IA)	43 (IA)	43 (IA)	32 (IA)
Doble Gate (N09)	43	62 (IA)	54 (IA)	63 (IA)	59 (IA)
Tilley (N06)	43	72 (IA)	67 (IA)	64 (IA)	68 (IA)

Table E 2018 Quarterly Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	34 (IA)	38 (IA)	33 (IA)	40 (IA)
Hillcroft (N08)	35	35 (<20)	39 (IA)	40 (IA)	33 (IA)
Forest Lodge (N10)	40	50 (IA)	27 (IA)	43 (IA)	33 (IA)
Doble Gate (N09)	43	47 (IA)	49 (IA)	50 (IA)	49 (IA)
Tilley (N06)	43	66 (IA)	62 (IA)	68 (IA)	67 (IA)

Table F 2017 Quarterly Noise Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	44 (IA)	33 (IA)	34 (IA)	34 (IA)
Hillcroft (N08)	35	42 (IA)	37 (IA)	29 (IA)	29 (IA)
Forest Lodge (N10)	40	33 (IA)	34 (IA)	31 (IA)	31 (IA)
Doble Gate (N09)	43	47 (IA)	50 (IA)	45 (IA)	45 (IA)
Tilley (N06)	43	65 (IA)	68 (IA)	67 (IA)	67 (IA)

Table G 2016 Quarterly Noise Monitoring Results

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	32 (IA)	37 (IA)	36 (IA)	36 (IA)
Hillcroft (N08)	35	40 (IA)	37 (IA)	35 (IA)	35 (IA)
Forest Lodge (N10)	40	32 (IA)	33 (IA)	30 (IA)	36 (IA)
Doble Gate (N09)	43	46 (IA)	52 (IA)	49 (IA)	48 (IA)
Tilley (N06)	43	67 (IA)	66 (IA)	67 (IA)	66 (IA)

Table H 2015 Quarterly Noise Monitoring Results*

Location	Criterion (dB)	Quarter 1 (LAeq)	Quarter 2 (LAeq)	Quarter 3 (LAeq)	Quarter 4 (LAeq)
Red Springs (N07)	37	42 (IA)	32	43 (IA)	41 (IA)
Hillcroft (N08)	35	34	39 (IA) #	35	38 (IA)
Forest Lodge (N10)	40	40	28	40	42 (IA)
Doble Gate (N09)	43	64 (IA)	49 (IA) #	51 (IA) #	49 (IA)
Tilley (N06)	43	66 (IA)	69 (IA) #	66 (IA) #	69 (IA)

IA – noise from the mine was inaudible therefore criteria do not apply

 # – these measurements were affected by wind speeds > 3m/s2 therefore criteria do not apply

Table I 2012 Quarterly Noise Monitoring Results

Location	Criterion (dB)	Quarter 1 (LAeq 15min)	Quarter 2 (LAeq 15min)	Quarter 3 (LAeq 15min)	Quarter 4 (LAeq 15min)
Red Springs (N07)	37	33	35	30	32
Hillcroft (N08)	35	35	39	32	33
Forest Lodge (N10)	40	<25	30	<25	NM
Doble Gate (N09)	43	IA	IA	IA	IA
Tilley (N06)	43	IA	IA	IA	IA

IA – noise from the mine was inaudible therefore criteria do not apply NM – noise was not measurable

Table J 2011 Quarterly Noise Monitoring Results

Location	Criterion (dB)	Quarter 1 (LAeq 15min)	Quarter 2 (LAeq 15min)	Quarter 3 (LAeq 15min)	Quarter 4 (LAeq 15min)
Red Springs (N07)	37	IA	33	<20	IA
Hillcroft (N08)	35	31	37	30	<20
Forest Lodge (N10)	40	26	<30	<25	<25
Doble Gate (N09)	43	IA	IA	IA	IA
Tilley (N06)	43	IA	IA	IA	IA

IA – noise from the mine was inaudible therefore criteria do not apply

APPENDIX 3

CVM IEA 2021

Cullen Valley Mine (CVM)
Response to Recommendations

IEA Recommendations								
Condition Reference No #	Condition Detail	Condition Type	Risk Level of Non-compliance	Auditor Comments and Recommendations	CVM Response	Target Due Date	Completion Status	Comments - Status Update
Development Consent DA 200-5-2003 Non-compliance Recommendations								
Sch 3 Cond 1	The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.	Administrative	Administrative	The applicant has generally implemented practicable measures to minimise harm to the environment. However, several notices have been issued over the audit period. The applicant should implement reasonable and practical measures to investigate anomalies in the readings even if no harm has been done to the environment.	CVM accepts the recommendation. During the audit period 2016 - 2021, there was no dedicated environmental manger onsite to manage the performance and delivery of consultants undertakening monitoring and associated reporting and followup. CVM has directly employed a full time environmental manager onsite to manage these items toward establishing and maintaining compliance.	28-Feb-22	Completed	
Sch 4 Cond 25	The Applicant shall monitor the air quality impacts of the development at representative locations around the site, using the specified averaging period, frequency, and sampling method in Table 12 to the satisfaction of DEC and the Director-General.	Specific environmental conditions	Administrative	2018 AEMR – A power outage of the HVAS unit caused by thunderstorm resulted in a failure to monitor air quality in accordance with this condition. 2019 AEMR - The 30+/- 2 day monitoring period for depositional dust was exceeded on one occasion (dec). 2020 AEMR - A mechanical fault with the HVAS unit resulted in a failure to monitor air quality in on two occasions. This item has no defined recommendation.	Power outages and mechancial failures are generally beyond control of site personnel, neverthless a dedicated environmental manger is now employed onsite to manage the operation and performance of of monitoring equipment and consultant technicians engaged to conduct monitoring toward establishing and maintaining compliance.	28-Feb-22	Completed	
Sch 4 Cond 27	The Applicant shall not cause or permit the emission of offensive odour beyond the boundary of the site in accordance with section 129 of the Protection of the Environment Operations Act 1997.	Specific environmental conditions	Low	There have been odour complaints in every year of the audit period regarding subsurface heating. 2016- 4 complaints 2017- 2 complaints 2018- 3 complaints 2019- 2 complaints 2020- 2 complaints 2021- 1 complaint 2022 - 6 complaints Continue to monitor and implement current subsurface management plan. Consult and review if the situation worsens.	CVM addressed the complaints in consultation with the complainants,whilst undertaking physical inspections and remediation activties on areas found to be the source of odours which are associated with sub-surface heatings on the CVM site. CVM consulted closely with the Resources Regulator during 2022, implementing an agreed trial irrigation methadology to address the heating issues and assist in extinguishing / management of the heatings, whilst continued treatment as per the approved spot treatment methods continued in parallel. The Ressources Regulator conducted a site inspection of the trial irrigation in (date please Almy) indicating satisfaction with the process.	2-Jul-22	Ongoing	Trial irrigation of heating areas was initiated on 14/6/2022 following close consultation with the Resources Regulator demostrating a measurable decrease in groundbased heat. A number of adverse weather conditions contributed to several odour incidents in the first half of 2022 prior to and at the initation of the irrigation program, however the sole complainant stated in a meeting on the 31 August 2022 that there was a significant improvement overall in the odour from CVM following start of the trial irrigation. Continuation of the irrigation of heating areas is proposed during 2023 in accordance with the methadology agreed with the Resources Regulator in addition to compaction methods to help extingusih / manage heatingscontinuing treatment as per the approved methods in addition to further capping / sealing of heating areas with overbruden / rehabilitation materials as remnant mining occurs at CVM.
Sch 4 Cond 31a	describe the immediate and long-term compensatory habitat proposal, and demonstrate how this proposal would be integrated with the proposed rehabilitation of the site and surrounding areas of remnant vegetation;	Specific environmental conditions	Administrative	An explicit plan covering expected short, medium and long-term should be summarised in AEMR.	CVM will provide an account in the AR of the Annual Biodiversity Monitoring Report outcomes which includes assessment of the Compensatory Habitat, and further, consult with its ecologists toward and required revision if necessary of the management plan which are currently undergoing agency consultation. CVM mananement plans are curently undergoing agency consultation, and requried changes will be adopted in the appropriate plans.	21-Apr-22	Completed	The approved CVM Flora and Fauna Mgt Plan (21 April 2022) describes the compensatory habitat area establishment and management techniques to protect the land and exlcude open cut mining. The plan addresses short, medium and long term maintenance and management actions and permananet protection options to be determined prior to the cessation of approved mining and includes 2 options to be determined in consultation with the NSW Government. A dedicated area for *Persoonia marginata* has been established within the CVM approval boundary, the ongoing management of which is described within the approved CVM Special Mgt Plan. The Annual Biodivrsity Monitoring program includes assessment and reporting of the status of CHA areas.
Sch 4 Cond 31f	set completion criteria for the compensatory habitat proposal.	Specific environmental conditions	Administrative	No completion criteria were found for compensatory habitat. The criteria should be developed and reported in AEMR. Criteria should be developed in in tandem with short, medium and long-term goals.	CVM will provide an account in the AR of the Annual Biodiversity Monitoring Report outcomes which includes assessment of the Compensatory Habitat, and further, consult with its ecologists toward and required revision if necessary of the management plan which are currently undergoing agency consultation. CVM mananement plans are curently undergoing agency consultation, and requried changes will be adopted in the appropriate plans.	21-Apr-22	Completed	Completion criteria as described are outlined with the approved CVM Flor and Fauana Mgt Plan. (JB, you may want to add the some of the criteria from the mgt plans to the report).
Sch 4 Cond 36a	Within 2 years of the date of this consent, and every 5 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission, and pay the full cost of, an Independent Audit of the compensatory habitat proposal. This audit must:be conducted by a suitably qualified, experienced, and independent person whose appointment has been approved by the Director-General;	Specific environmental conditions	Administrative	Previous audit was completed on the 25 Nov 2016 by SLR Consulting Australia. An extension date was granted for the this audit to March 2022. CARAS was endorsed on 15 December 2021 to conduct the current audit period. Date of this audit was 2 February 2022. There item has no defined recommendtion.	Castlereagh Coal (CVM) wrote to DPIE on the 15th of December 2021 requesting an extension for completion of the Indepdendent Environmental Audit for CVM stating reassons as to the request. A subsequent extension was granted until 18 March 2022.	15-Mar-22	Completed	Report completed and submitted 15th March 2022.
Sch 4 Cond 42	For each monitoring/discharge point, the Applicant shall monitor (by sampling and obtaining results by analysis) the concentration of each pollutant in Table 15, using the specified units of measure, frequency, and sampling method.	Specific environmental conditions	Administrative	Monthly water quality monitoring is carried out at discharge points. Monitoring in 2019 and 2020 were affected due to bushfires. No discharge events occurred from 2016 to 2020. This item has no defined recommendation.	CVM employs an external organisation to conduct environmental sampling associated with its monitoring program. During the well documted extreme busfire condtions in late 2019 / early 2020 directly impacted environmental monitoring preventing access to monitoring sites.	NA	Completed	
Sch 4 Cond 43	Within 6 months of the date of this consent, the Applicant shall prepare (and then implement) a Site Water Management Plan for the development, in consultation with DEC and DPI, and to the satisfaction of the Director-General. This plan must include: (a) the predicted site water usage; (b) a Surface Water Monitoring Program; and (c) an Erosion and Sediment Control Plan.	Specific environmental conditions	Administrative	In 2017 a revised WMP has been sent to DPE for approval, however this is still pending. Monitoring and usage is outlined in AEMRs however they are very brief. Surface Water Monitoring program and Erosion and Sediment control plan are in place. This item has no defined recommendation.	CVM submitted an entire suite of new management plans to DPIE (and other agencies) for agency stakeholder consultation in February 2022 including a Site Water Management Plan. Additional plans / information includes predicted site water usage, surface water monitoring program and a standalone erosion and sediment control plan.CVM will work with agencies to finalise approval of these plans toward the restart of mining remnant coal rsources at CVM in early 2022.	21-Apr-22	Completed	Matters addressed in CVM Erosion and Sediment Control Plan and Site Water Mgt Plans as approved on the 21 April 2022.
Sch 4 Cond 44	The Surface Water Monitoring Program shall include: (a) detailed baseline data on surface water flows and quality; (b) surface water impact assessment criteria; (c) a program to monitor surface water flows and quality; and (d) a program to monitor the effectiveness of the Erosion and Sediment Control Plan.	Specific environmental conditions	Administrative	There is a Surface Water Monitoring Program in the EMP. However, it does not provide much detail on a) and b). Additional information is required. In 2017, a standalone water management plan that included a surface water monitoring program was issued to DPE for approval.	CVM accepts this recommendtion. CVM submitted an entire suite of new management plans to DPIE (and other agencies) for agency stakeholder consultation in February 2022 including a Site Water Management Plan which includes a detailed surface water monitoring program.CVM will work with agencies to finalise approval of these plans toward the restart of mining remnant coal resources at CVM in early 2022.	21-Apr-22	Completed	Matters addressed in CVM Site Water Mgt Plan as approved on the 21 April 2022.
Sch 4 Cond 45	The Erosion and Sediment Control Plan shall: (a) comply with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual; (b) identify activities that could cause soil erosion or discharge sediment or water pollutants from the site; (c) describe the location, function and capacity of all erosion and sediment control structures, and nominate which, if any, of these structures would be used as water sources for the development; and (d) describe the measures to minimise soil erosion and the potential migration of sediments to downstream waters.	Specific environmental conditions	Administrative	There is no discussion of compliance with requirements set by Department of Housing's Managing Urban Stormwater. b) Activities that cause erosion are identified in Section 5. c) The locations of structures are outlined but not described in detail. d) Measure to minimise soil erosion are covered in Section 5. This item has no defined recommendation.	CVM submitted an entire suite of new management plans to DPIE (and other agencies) for agency stakeholder consultation in February 2022 including an Erosion and Sediment Control Plan which includes reference to the Blue Book (Landcom), 2004 in Sections 2.4 and 2.5, Structures in Section 2.4 and measures to minimise soils erosion in Sections 2.4 and 2.6. CVM will work with agencies to finalise approval of these plans toward the restart of mining remnant coal rsources at CVM in early 2022.	21-Apr-22	Completed	Matters addressed in CVM Erosion and Sediment Control Plan as approved on the 21 April 2022.
Sch 4 Cond 59	The Applicant shall not cause, permit or allow any waste generated outside the mine to be received at the mine for storage, treatment, processing, reprocessing or disposal, or any waste generated at the mine to be disposed of at the mine, except as expressly permitted by a DEC licence. Note: This condition only applies to the storage, treatment, processing, reprocessing, or disposal of waste that requires a licence under the Protection of the Environment Operations Act 1997.	Specific environmental conditions	Administrative	VENM/ENM dirt have been received at CVM in 2018 and 2019 to help with rehabilitation works. DPE requires an approval and modification of current development consent.	CVM accepts the recommendation. A small quantity spoil from a major infrastructure project in the Sydney Metropolitan Region was imported to assist with rehabilitation works. The spoil was characterised as VENM or ENM in accordance with the NSW EPA Waste Guidelines. The import of all materials from offsite was stopped following correspondence / consultation with DPIE and the Resources Regulator. Should the import of VENM or ENM materials be considered in future, CVM will seek the appropriate approvals / modification in consultation with DPIE and other regulatory agencies.	NA	Completed	
Sch 6 Cond 8	The Applicant shall ensure that there is a Community Consultative Committee to oversee the environmental performance of the development. This committee shall: (a) be comprised of: • 2 representatives from the Applicant, including the person responsible for environmental management at the mine; • 1 representative from Council; and • 4 representatives from the local community, whose appointment has been approved by the Director-General in consultation with the Council; (b) be chaired by an independent person whose appointment has been endorsed by the Director-General; (c) meet at least twice a year; and (d) review and provide advice on the environmental performance of the development, including any environmental management plans, monitoring results, audit reports, or complaints.	ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING & REPORTING	Administrative	Only one CCC meeting were held per year in 2019 and 2020. DPIE noted this is a technical non-compliance. During 2018 CCC, it was agreed that one CCC meeting held annually while on care and maintenance Table 1.3. Intent to start biannual once mine operations commence. This item has no defined recommendation.	It is anticipated that Cullen Valley Mine will be move from care and maintenance to operational status in early 2022. As such, it is the intent to restart the twice yearly CCC meetings covering both CVM and INV. This matter will be raised with the CCC members at the next meeting on the 15 March 2022.	15-Mar-22	Completed	CC Meeting of 15 March 2022 unanimously supported restart of the twice yearly meetings.
Environment Protection Licence EPL 10341 Recommendations								
L4.4	For the purpose of condition L4.3: a) Data recorded by the meteorological station as EPA Licence Point 5 must be used to determine meteorological conditions; and b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.	Limit Conditions	Administrative	Meteorological data was sourced from the Bureau of Meteorology's Bathurst weather station in 2016 and 2017. This station is located 45km away and unlikely to be representative of onsite weather conditions. However, a new monitoring system was installed on site in 2018 and carries out the requirements of this condition.	As described, a new met station was installed at the CVM site in 2018. Monitoring data from that site now informs the CVM Met requirements.	NA	Complete	
L6.1	No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997. Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.	Limit Conditions	Low	Complaints regarding odours has been made every year of the auditing period.	CVM accepts the recommendation. During the audit period, CVM addressed the complaints in consultation with the complainants,whilst undertaking physical inspections and remediation activties on areas found to be the source of odours which are associated with sub-surface heatings on the CVM site. Following issue of a 240 Notice by the Resources Regulator regading heatings (the cause of the adours), CVM responded with an updated MOP and Plan of Works which was approved. CVM has since (Feb 2022) consulted closely with the Resources Regulator to add further measures to address the heating issues at CVM, including trial irrigation and compaction methods to help extingusih / manage heatings, and continued treatment as per the approved methods in addition to further capping / sealing of heating areas with overbruden / rehabilitation materials as remnant mining occurs at CVM.	Ongoing	Open	Trial irrigation of heating areas was intiated on 14/6/2022) following close consultation with the Resources Regulator demostrating a measurable decrease in groundbased heat. A number of adverse weather conditions contributed to several odour incidents in the first half of 2022 prior to and at the initiation of the irrigation program, however the sole complainant stated in a meeting on the 31 August 2022 that there was a significant improvement overall in the odour from CVM following start of the trial irrigation. Continuation of the irrigation of heating areas is proposed during 2023 in accordance with the methadology agreed with the Resources Regulator in addition to compaction methods to help extingusih / manage heatingscontinuing treatment as per the approved methods in addition to further capping / sealing of heating areas with overbruden / rehabilitation materials as remnant mining occurs at CVM.
Generic Recommendations Section 8 Audit Report								
8.1	Update all mgt plans			CARAS recommend that after a prolonged period of care and maintenance, all management plans should be reviewed and updated prior to recommencement of active mining.	CVM accepts this recommendation. CVM submitted an entire suite of new management plans to DPIE (and other agencies) for agency stakeholder consultation in February 2022. CVM will work with agencies to finalise approval of these plans toward the restart of mining remnant coal rsources at CVM in early 2022.	21/04/2022	Completed	All CVM management plans were updated and approved by DPE
8.2	Sub-Surface Heating Response Management Plan			The Sub-Surface Heating Response Management Plan should be included in the updated management plans for the operation of CVM. This will address the concerns in regard to nuisance odour from the Site. Our recommendation is that this plan will be implemented as part of the mine recommencement works	CVM are presently in the process of preparing the new Rehabilitation Management Plans which replace the MOP from 2 July 2022. The RMP will address the sub-surface heating at CVM. CVM has since (Feb 2022) consulted closely with the Resources Regulator to add further measures to address the heating issues at CVM, including trial irrigation and compaction methods to help extingusih / manage heatings, and continued treatment as per the approved methods in addition to further capping / sealing of heating areas with overbruden / rehabilitation materials as remnant mining occurs at CVM. These items will aslo be captrued in the RMP.	21/04/2022	Completed	

8.3	Administrative Non-compliance			The Auditor identified nine (9) administrative non-compliance events, where CVM failed to comply with the consent conditions for the reasons as discussed in Section 7 of this report. Our recommendation is that CVM should engage a dedicated Environmental Manager ('EM'), prior to recommencing of extractive mining operations to ensure the implementation of all practicable measures to prevent and/or minimise any harm that may result from the construction, operation, or rehabilitation of the development3	CVM accepts this recommendation. CVM has directly employed a full time environmental manager onsite to manage these items toward establishing and maintaining compliance.	28/02/2022	Completed	
8.4	Compensatory Habitat			Development Consent DA 200-5-2003 Non-compliance Recommendations	Issue addressed in recommendations and response in Development Consent DA 200-5-2003 Non-compliance Recommendations section above.	NA	NA	
8.5	Site Boundaries and Aboriginal Sites			The identification of the boundaries to Compensatory Habitat Areas and the locations of the Aboriginal Archaeology Sites (referenced in DA: Condition 55 and 56) may have become enveloped in regrowth during the care and maintence period. Our recommendation is that marking, and signage should be installed to clearly identify these nominated locations.	CVM accepts this recommendation. CVM will investigate existing signage and replace and / or refurbish as requried.	30/06/2022	Completed	New signs have been purchased and the installation of sign have started

Department of Planning, Housing and Infrastructure

NSW Planning ref: DA200-5-2003-PA-35

Kevin Reed
Director
SHOALHAVEN COAL PTY LTD
63 MAIN STREET
LITHGOW 2790

18/07/2024

Subject: Cullen Valley Coal - Annual Review 2023

Dear Mr Reed

Reference is made to your post approval matter, DA200-5-2003-PA-35, Annual Review for the period 1 January 2023 to 31 December 2023, submitted as required by Schedule 6, Condition 5 of DA200-5-2003 as modified (the consent) to the NSW Department of Planning, Housing and Infrastructure (NSW Planning) on 12 June 2024.

NSW Planning has reviewed the Annual Review and considers it to generally satisfy the reporting requirements of the consent and the NSW Planning Annual Review Guideline (October 2015). Please make publicly available a copy of the 2023 Annual Review on the company's website within 30 days.

Please note that the NSW Planning's acceptance of this Annual Review is not an endorsement of the compliance status of the project.

Should you wish to discuss the matter further, please contact Michael Wood, on 0459890661 or email compliance@planning.nsw.gov.au

Yours sincerely

Katrina O'Reilly
Team Leader - Compliance
Compliance

As nominee of the Planning Secretary