YANCOAL
兖煤澳大利亚有限公司
MOOLARBEN COAL

MOOLARBEN COAL COMPLEX ANNUAL REVIEW 2023

Document	Version	Issue	Author	Approved
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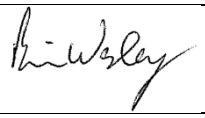
Name of operation	Moolarben Coal Complex
Name of operator	Moolarben Coal Operations Pty Ltd
Development consent / project approval #	05_0117 and 08_0135
Name of holder of development consent / project approval	Moolarben Coal Mines Pty Limited
Mining lease #	ML 1605, 1606, 1628, 1691, 1715
Name of holder of mining leases	Moolarben Coal Mines Pty Ltd, Yancoal Moolarben Pty Ltd and Kores Australia Moolarben Resources Pty Ltd
Water licence #	Refer Table 6
Name of holder of water licence	Moolarben Coal Operations Pty Ltd
Forward Work Program start date	01 January 2023
Forward Work Program end date	31 December 2025
Annual Review start date	1 January 2023
Annual Review end date	31 December 2023

I, Brian Wesley, certify that this audit report is a true and accurate record of the compliance status of Moolarben Coal Complex for the period January 1 2023 to December 31 2023 and that I am authorised to make this statement on behalf of Moolarben Coal Operations.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 9.39 of the Environmental Planning and Assessment Act 1979. Section 9.42 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 reporting officer	Brian Wesley
Title of authorised reporting officer	General Manager
Signature of authorised reporting officer	
Date	29 March 2024

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1.0 STATEMENT OF COMPLIANCE

A summary of compliance with relevant approval conditions from 1 January 2023 to 31 December 2023 (the reporting period) is provided in **Table 1** and **Table 2**. A compliance table key is provided in **Table 3**.

Table 1: Statement of compliance

Approval	Compliance Status (Including Administrative Non-compliances)	Approval	Compliance Status (Including Administrative Non-compliances)
PA 05_0117	No	WAL36340	Yes
PA 08_0135	No	WAL37582	Yes
ML 1605	Yes	WAL37583	Yes
ML 1606	Yes	WAL39799	Yes
ML 1628	Yes	WAL41888	Yes
ML 1691	Yes	20BL173935	Yes
ML 1715	Yes	-	-

Table 2: Non-compliances

Approval	Condition Number	Condition description (summary)	Compliance status	Comment	Where addressed
PA 08_0135	Sch. 2. C. 2	Terms of Approval	Non-Compliant	Disturbance beyond approved disturbance boundary	12
PA 05_0117	Sch. 3. C. 33	Water Management Plan	Non-Compliant	Discharge Point 01 not sampled in required time frame	7.3.2 and 12
PA 08_0135	Sch. 3 C. 29				

Table 3: Compliance Table Key

Risk	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-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)

2.0 INTRODUCTION

The Moolarben Coal Complex (MCC) is located approximately 40 kilometres north of Mudgee in the Western Coalfield of New South Wales **(Figure 1)** within the Mid-Western Regional Local Government Area. Local relevant land ownership within the immediate vicinity of the MCC is provided in **Appendix 1**.

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the MCC on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Yancoal Moolarben Pty Ltd (YM) and a consortium of Korean power companies). MCO, MCM and YM are wholly owned subsidiaries of Yancoal Australia Limited (Yancoal).

Current mining operations undertaken across the MCC have approval until 31 December 2038. All mining operations are conducted in accordance with NSW Project Approval (05_0117) (Moolarben Coal Project Stage 1) as modified, and NSW Project Approval (08_0135) (Moolarben Coal Project Stage 2) as modified.

The current mining operations are undertaken in accordance with Approval Decisions (EPBC 2007/3297), (EPBC 2013/6926), (EPBC 2008/4444) and (EPBC 2017/7974) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Mining operations and exploration activities at the MCC are also conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1605, ML 1606, ML 1628, ML 1691, and ML1715 and Exploration Licences (EL) EL6288, EL7073 and EL7074 granted under the *Mining Act 1992*.

2.1 SCOPE

This Annual Review (AR) has been prepared by MCO (with input from experienced and qualified experts) to satisfy the reporting requirements of NSW Project Approval (05_0117) (as modified), NSW Project Approval (08_0135) (as modified), and water licences. The report presents a summary of the regulatory compliance, environmental performance, and community engagement activities for MCO.

The following key agencies and committees shall be provided with a copy of this report:

- NSW Department of Planning, Housing, and Infrastructure (DPHI) (For Approval)
- NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW)
- NSW Environment Protection Authority (EPA)
- Mid-Western Regional Council (MWRC)
- Members of the MCC Community Consultative Committee (CCC).

In addition, an electronic copy will be made publicly available on the Moolarben Coal website (http://www.moolarbencoal.com.au/) in accordance with Schedule 5, Condition 11 (a) of PA05_0117 and Schedule 6, Condition 11 (a) of PA08_0135.

2.2 STRUCTURE OF THIS ANNUAL REVIEW

The remainder of the AR is structured as follows and is based on the *Annual Review Guidelines – Post-approval requirements for State significant mining developments* (NSW Department of Planning and Environment, 2015):

Section 3: Outlines the relevant statutory approvals.

Section 4: Outlines the activities undertaken at Moolarben Coal Complex for the period and those proposed for the next period.

Section 5: Actions required from previous Annual Review.

Section 6: Outlines environmental performance including meteorological, noise, blasting, air quality, biodiversity, heritage, bushfire and waste.

Section 7: Outlines the water management performance.

Section 8: Outlines subsidence performance.

Section 9: Outlines the rehabilitation management performance.

Section 10: Outlines the community performance.

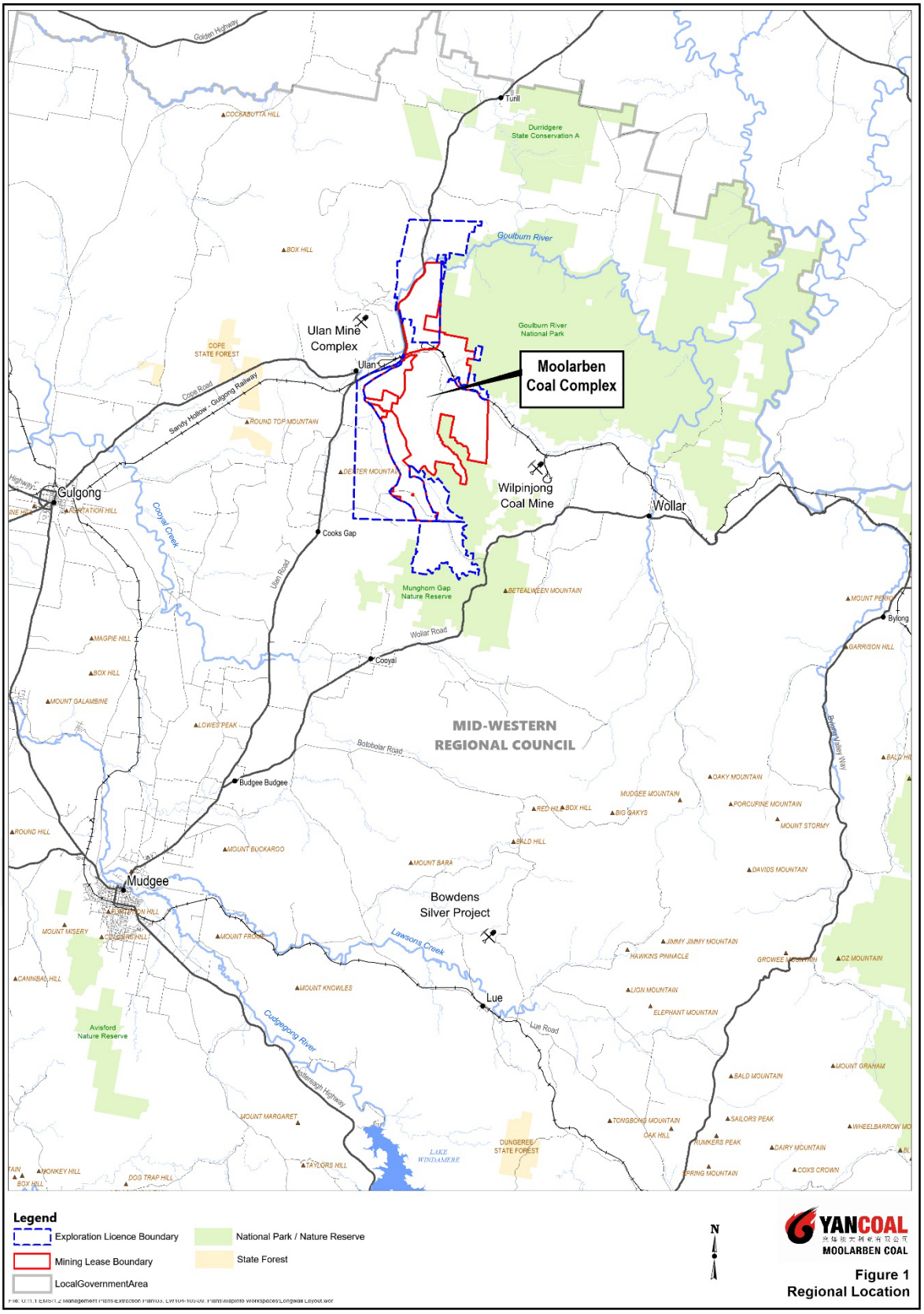
Section 11: Describes independent audit requirements.

Section 12: Provides a summary of incidents and non-compliances.

Section 13: Outlines activities to be completed in the next reporting period.

Appendices: Supporting information and monitoring data.

Figure 1 Moolarben Coal Complex – Site Location



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2.3 PROJECT DESCRIPTION

The MCC comprises the Moolarben Stage 1 and Stage 2 Projects. An overview of the complex is provided in **Figure 2**. The Stage 1 and Stage 2 operations are summarised in **Table 4** below.

Stage 1 at the Moolarben Coal Complex has been operating for several years and is at full development comprising of three open cut mines (OC1, OC2, and OC3), a longwall underground mine (UG4), and mining related infrastructure (including coal processing and transport facilities).

Stage 2 at the Moolarben Coal Complex has commenced and at full development will comprise one open cut mine (OC4), two longwall underground mines (UG1 and UG2), and mining related infrastructure.

Table 4: Moolarben Coal Complex production overview

Relevant Approval Component	Moolarben Coal Project	
	Stage 1 **Project Approval (05_0117)**	**Stage 2** **Project Approval (08_0135)**
Operational Mine Life	Mining operations can be carried out until 31 December 2038.	
Hours of Operation	Mining operations can be carried out 24 hours a day, 7 days a week.	
Coal Extraction Limits	Up to 10 Mtpa of ROM coal can be extracted from the open cut mining operations in any calendar year from Stage 1.	Up to 16 Mtpa of ROM coal can be extracted from the open cut mining operations in any calendar year from Stage 2.
	Up to 8 Mtpa (total) of ROM coal can be extracted from the underground mining operations at the Moolarben Coal Complex in any calendar year.	
Coal Processing and Offsite Transport	Up to 16 Mtpa (total) of ROM coal from the Moolarben Coal Complex can be washed in the calendar year. Not more than 8 laden trains on average or 11 laden trains maximum to leave the complex per day.	
	All coal is to be transported from the Moolarben Coal Complex by rail.	All coal extracted from the site is sent to the Moolarben Stage 1 mine surface infrastructure area for processing and/or transport to market.

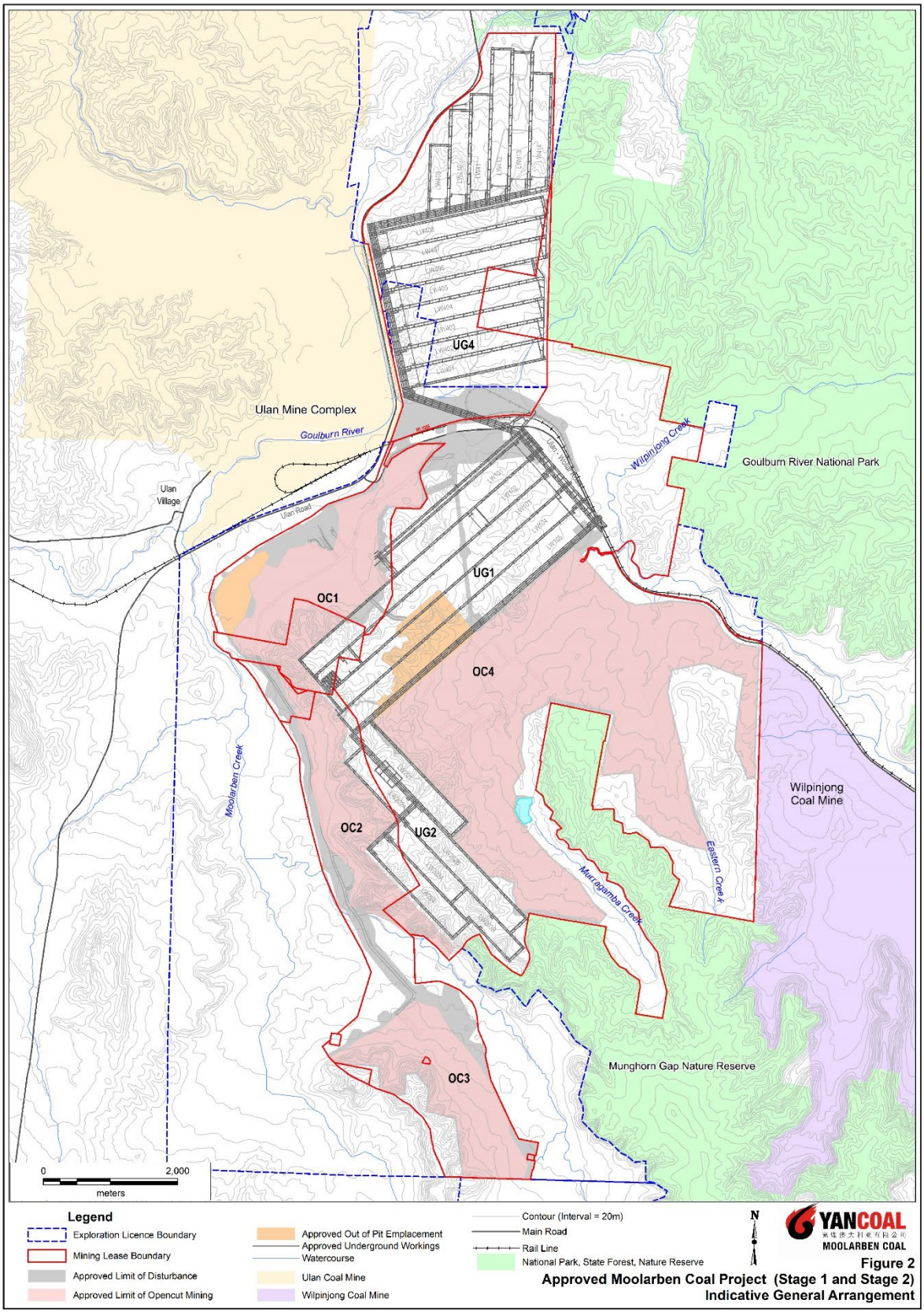
2.4 KEY MINE CONTACT PERSONNEL

The following table provides contact details for key personnel responsible for environmental management across the Moolarben Coal Complex.

Table 5: Mine Contact Personnel

Position/Area of Responsibility	Name	Contact Number(s)	Email Address
General Manager	Brian Wesley	02 6376 1500	brian.wesley@yancoal.com.au
Environment and Community Manager	Trent Cini	02 6376 1436	trent.cini@yancoal.com.au
Environment and Community Superintendent	Rebecca Shanks	02 6376 1492	rebecca.shanks@yancoal.com.au
Environment and Community Complaints Line	1800 556 484		
Postal Address	Locked Bag 2003, Mudgee, NSW, 2850		

Figure 2: Project General Arrangement



3.0 APPROVALS

3.1 SUMMARY OF APPROVALS

Project Approvals, Mining Leases, and other Licences relevant to MCO are provided in **Table 6**. Current Project Approvals, EPBC Approvals, Exploration Licences, and Mining Leases are available at www.moolarbencoal.com.au

Table 6: Relevant Approvals, Leases and Licences

Approval	Description	Expiry Date
Project Approval – NSW Department of Planning and Environment		
05_0117	Stage 1 as modified	31 December 2038
08_0135	Stage 2 as modified	31 December 2038
Mining Lease – NSW Department of Regional NSW – Resources Regulator		
ML1605	Underground 4, CHPP and infrastructure areas	20 December 2028
ML1606	OC1, OC2, UG1 and associated infrastructure	20 December 2028
ML1628	OC1, OC2, OC3, UG1 and UG4	24 February 2030
ML1691	OC2, OC3, UG1, UG2 and associated infrastructure	23 September 2034
ML1715	OC2, OC4, UG1, UG2 and associated infrastructure	31 August 2036
Moolarben Coal Forward Program – NSW Department of Regional NSW – Resources Regulator		
FWP0001052	Stage 1 and Stage 2 operations	30 June 2025
Exploration Licences – NSW Department of Regional NSW – Resources Regulator		
EL6288	Coal Exploration Licence	23 August 2029
EL7073	Coal Exploration Licence	12 February 2026
EL7074	Coal Exploration Licence	12 February 2026
Environment Protection Licence – NSW Environment Protection Authority		
EPL12932	Licence authorising the carrying out of scheduled activities	N/A
Environment Protection and Biodiversity Conservation Act – Commonwealth Department of Climate Change, Energy, the Environment and Water		
2007/3297	Stage 1 coal mines and associated infrastructure	31 December 2027
2008/4444	Stage 2 coal mines	31 December 2065
2013/6926	Modify and extend the Stage 1 Moolarben Coal Project.	31 December 2064
2017/7974	Modify and extend the Stage 1 and Stage 2 Moolarben Coal Project	31 December 2050
Water Licences – NSW Department of Planning and Environment – Water		
WAL19424	Wollar Creek Water Source	N/A
WAL36340	Wollar Creek Water Source	N/A
WAL37582	Upper Goulburn River Water Source	N/A
WAL19052	Upper Goulburn River Water Source	N/A
WAL37583	Wollar Creek Water Source	N/A
WAL39799	Sydney Basin - North Coast Groundwater Sources	N/A
WAL41888	Upper Goulburn River Water Source	N/A
20BL173935	Monitoring Bore Licence	N/A

During the reporting period the following amendments to approvals were granted:

- Modification to Project Approval 08_0135 for longwall extension to UG2 mining area
- Renewal of EL6288 until 2029
- Environment Protection Licence EPA variation to remove Additional Temporary Discharge Points.

3.2 ANNUAL REPORTING

Table 7 provides a checklist of AR requirements and performance conditions along with the relevant sections within this report.

Table 7: Annual Review Requirements

Approval Type & Reference		Annual Review Section
Project Approval 05_0117 Condition 4 Schedule 5	*By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:*	
	a. describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;	4.2 & 4.3
	b. include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the	6 to 10
	• *the relevant statutory requirements, limits or performance measures/criteria;*	
	• *the monitoring results of previous years; and*	
	• *the relevant predictions in the EA;*	
	c. identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	1, 6 to 10 & 12
	d. identify any trends in the monitoring data over the life of the project;	6 to 10
	e. identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	6 to 10
	f. describe what measures will be implemented over the next year to improve the environmental performance of the project.	6 to 10 & 13
Project Approval 08_0135 Condition 4 Schedule 6	*By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:*	
	a. describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;	4.2 & 4.3
	b. include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the	6 to 10
	• *the relevant statutory requirements, limits or performance measures/criteria;*	
	• *the monitoring results of previous years; and*	
	• *the relevant predictions in the EA;*	
	c. identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	1, 6 to 10 & 12
	d. identify any trends in the monitoring data over the life of the project;	6 to 10
	e. identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	6 to 10
	f. describe what measures will be implemented over the next year to improve the environmental performance of the project.	6 to 10 & 13

4.0 OPERATIONS SUMMARY

4.1 MINING OPERATIONS

Details of production and associated waste generated by the site for the reporting period and next reporting period are provided in **Table 8**.

Table 8 : Production Summary

Material	Approved Limit (PA 05_0117 & 08_0135)	Reporting Period		
		Previous Period (actual)	Current Period (actual)	Next Period (forecast)
Waste Rock/ Overburden (BCM)	N/A	48,384,347	59,190,366	66,614,041
Open Cut ROM Coal (t) (OC1, 2 & 3)	10,000,000	2,608,110	3,790,532	4,551,203
Open Cut ROM Coal (t) (OC4)	16,000,000	8,073,076	11,891,040	11,448,796
Open Cut ROM Coal (t)	16,000,000	10,681,187	15,681,572	16,000,000
Underground ROM Coal (t)	8,000,000	6,207,429	4,767,152	6,076,432
Coal Washing (t)	16,000,000	10,881,108	14,381,017	16,000,000
Rejects (Co Disposal)	N/A	1,935,690	3,050,201	2,789,890
Product Coal (t)	N/A	14,887,453	16,737,623	19,286,543

4.2 REPORTING PERIOD ACTIVITIES

This section provides further detail on the activities undertaken in the reporting period. **Figure 3** presents the areas of activity.

4.2.1 EXPLORATION

Exploration activities were undertaken in EL6288, EL7074, ML1605, ML1606, ML1691 and ML1715 during the reporting period. This consisted of a total of 23 exploration holes within EL6288, three exploration holes within EL7074, 11 exploration holes within ML1605, one exploration hole within ML1606, 11 exploration holes within ML1691, and eight exploration holes within ML1715.

4.2.2 LAND DISTURBANCE

During the reporting period 157ha was disturbed taking the total mine footprint to 2,187ha with the majority of the increased land disturbance associated with the progression of mining. The areas disturbed this reporting period are shown in **Figure 3**.

All land disturbance is undertaken in accordance with the Ground Disturbance Permit (GDP) process. This includes pre-clearance surveys, heritage clearance, erosion and sediment control plans, confirmation of land ownership and disturbance extents reviewed to ensure compliance with relevant management plans (Surface Water, Heritage, Biodiversity and Rehabilitation Management Plans) and approvals.

Topsoil, mulch and select salvageable hollows were reclaimed and stockpiled for future use.

4.2.3 CONSTRUCTION

Construction works undertaken during the reporting period included the progression of mining infrastructure for Open Cut 3 (OC3) and Open Cut 4 (OC4). Mine infrastructure works included water management infrastructure and ancillary works. Construction activities commenced or undertaken in the period included:

- Completion of the upgrade to the Water Treatment plant and associated infrastructure
- Completion of the upgrade works associated with the CHPP
- Construction of water management infrastructure.

4.2.4 MINING OPERATIONS

Mining activities were undertaken in accordance with relevant project approvals and the Forward Program (FWP). During the reporting period general mining activities included:

- Overburden removal from OC1, OC3 and OC4 using excavator and truck fleets
- Overburden removal from OC3 and OC4 using cast and dozer push
- Coal extraction from OC3 and OC4
- Drilling and blasting select overburden and coal
- Spoil emplacement in-pit in OC1, OC2, OC3, and OC4
- Bulk spoil reshaping and rehabilitation
- Construction and operation of water management works
- Continued underground development in UG4 and UG1
- Extraction of UG1 LW402 and UG4 LW403.

4.2.5 COAL PROCESSING AND TRANSPORT

Open Cut ROM coal for washing was transported from the ROMs via conveyor to the CHPP for processing. ROM coal was transported from the UG ROM to the product stockpile via conveyor. Washed product coal was transported to the product coal stockpile prior to railing. Coarse rejects were co-mingled with dewatered fine rejects and transported by conveyor to the Rejects Bin and trucked back to the open pit for selective placement with mine spoil.

All product coal was loaded onto trains via the Train Load-out in the Moolarben rail loop and transported via rail to port. MCO monitors the amount of coal transported from site each year and the date/time of each movement. During the period, the maximum number of train movements per day was 9 with an average of 4.79 per day.

4.2.6 REHABILITATION

Rehabilitation works during the reporting period were undertaken within OC2, OC3, OC4, maintenance of existing rehabilitated areas, and progressive rehabilitation of construction areas. More detail of rehabilitation activities during the reporting period is provided in **Section 9.0**.

4.3 NEXT REPORTING PERIOD

The proposed mining areas for 2024 is detailed in the 2024 – 2025 FWP dated 28 March 2024. The status of proposed activities at the end of 2023 are provided in **Figure 3**.

MCO will continue to operate 24 hours per day, 7 days per week with blasting limited to the hours and frequency detailed in PA 05_0117 Schedule 3, Condition 9 & 10 and PA 08_0135 Schedule 3, Condition 10 & 11.

4.3.1 EXPLORATION

Proposed exploration activities during 2024 will focus on EL6288 and EL7073, ML1605, and ML1715. All exploration carried out on MCO Exploration Licence areas will adhere to the relevant regulatory requirements which may include approval through the Resource Regulator's application to undertake Assessable Prospecting Operations.

4.3.2 LAND DISTURBANCE

During the next reporting period, approximately 180ha will be disturbed for open-cut mining across OC3, OC4, and UG4 surface infrastructure and ancillary activities. The areas to be disturbed are shown in **Figure 3.**

4.3.3 CONSTRUCTION

Proposed construction works during the next reporting period includes mine sustaining infrastructure. Construction activities include:

- Construction of dewatering bores and associated infrastructure
- Construction of water management infrastructure
- Construction of the UG2 Remote Services Infrastructure Area.

4.3.4 MINING OPERATIONS

Mining operations for the next period are shown in **Figure 3** and include:

- Drilling and blasting select overburden and coal
- Overburden removal from OC1, OC3 and OC4 using dozer, excavator and truck fleets
- Spoil emplacement in-pit in OC1, OC2, OC3 and OC4
- Coal extraction from OC1, OC3, and OC4
- Bulk spoil reshaping and rehabilitation
- Construction and operation of water management works
- Continued underground development within UG4 and UG1
- Continued longwall mining operations in UG4 LW401-LW408

4.3.5 COAL PROCESSING AND TRANSPORT

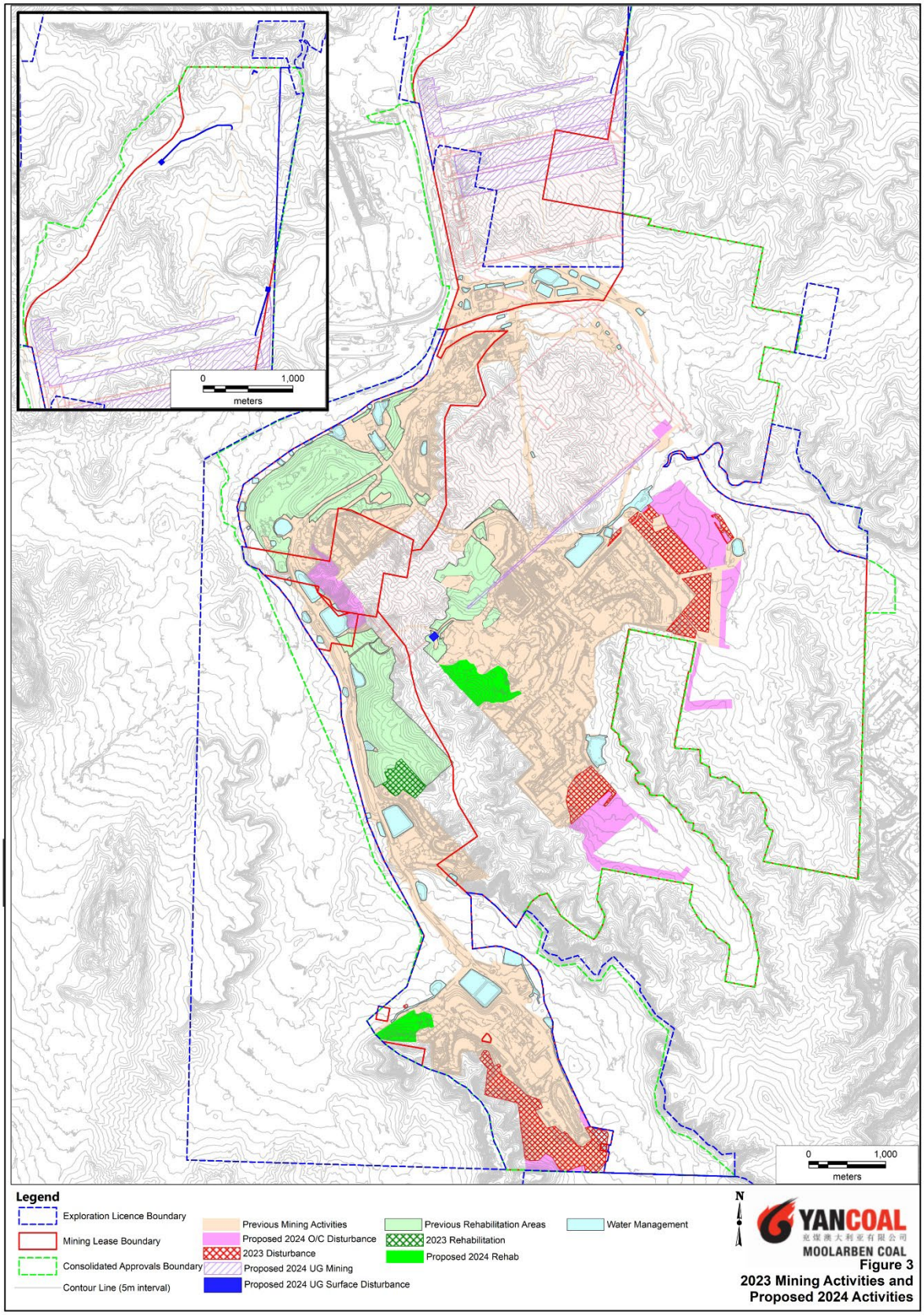
Open Cut ROM coal for washing will be transported from the ROMs via conveyor to the CHPP for processing. Underground coal and open cut bypass coal will be transferred with the UG coal handling system. Product coal will be stored on the product coal stockpile prior to transport. Coarse rejects will be co-mingled with dewatered fine rejects and transported by conveyor to the Rejects Bin from where it will be trucked back to the open pit for selective placement within mine spoil.

All product coal will be loaded onto trains in the MCC rail loop and transported via rail. All train movements will be conducted in accordance with the conditions of approval.

4.3.6 REHABILITATION

Rehabilitation on mined areas proposed for the next reporting period will be undertaken in OC3 and OC4. Rehabilitation activities may include landform establishment, growth medium development, ecosystem and landform establishment and rehabilitation maintenance if required.

Figure 3: 2023 Mining Activities and Proposed 2024 Activities



5.0 ACTIONS REQUIRED FROM PREVIOUS REPORTING PERIOD

The 2022 AR was submitted to the Department of Planning and Environment (DPE) on 28 April 2023 in accordance with Schedule 5 Condition 4 of PA05_0117 and Schedule 6 Condition 4 of PA08_0135. The 2022 AR was accepted and approved by the DPE on 30 May 2023.

There were no actions issued to MCO regarding the 2022 AR, and the 2022 AR was placed on the MCO website within one month of approval.

Actions outlined by MCO in the 2022 AR are provided in **Table 9**.

Table 9 : Actions from Previous Annual Review

Action Required from previous Annual Review	Requested by	Action Taken by MCO	Section of AR addressing this action
Review and revise all environmental management plans as necessary	MCO	Complete	Sections 6 to 9
Consider decommissioning of PZ058A as part of next Groundwater Management Plan Review	MCO	Action Ongoing	Section 7.4
Continued progressive rehabilitation.	MCO	Action Ongoing	Section 9
Establishment and baseline monitoring associated with UG4 where not completed.	MCO	Action Ongoing	Section 8

6.0 ENVIRONMENTAL PERFORMANCE

In accordance with the MCC Project Approvals, MCO has developed a series of Environmental Management Plans in consultation with the relevant government agencies. Current approved plans are available for review via the MCO website - http://www.moolarbencoal.com.au

To measure compliance with the project approvals, various licences, and site management plans, MCO undertakes a comprehensive environmental monitoring program. The locations of environmental monitoring undertaken during the 2023 reporting period are identified in **Appendix 2**. This section provides summary details on:

- **Section 6.1** - Meteorological overview
- **Section 6.2** - Noise
- **Section 6.3** – Blasting
- **Section 6.4** – Air quality
- **Section 6.5** – Biodiversity
- **Section 6.6** – Heritage.

Water, subsidence, rehabilitation and community aspects are reported in **Sections 7.0, 8.0, 9.0** and **10.0** respectively.

6.1 METEOROLOGICAL SUMMARY

Meteorological monitoring is undertaken at Automatic Weather Station (WS) WS03 (Ulan Road) in accordance with NSW Project Approval and EPL requirements. Additional weather stations may be used to supplement weather data as required including WS04 located near OC2, and WS05 located near OC3. The localities of the stations are illustrated in **Appendix 2** Meteorological parameters recorded by WS03 include:

- wind speed at 10 m
- wind direction at 10 m
- sigma theta
- temperature at 2 m and 10 m
- relative humidity at 2 m
- solar radiation at 2 m
- Rainfall.

WS03 rainfall and temperature records for 2023 are summarised in **Table 10**. A total of 510.8mm of rainfall was recorded in 2023, with November the wettest month (94.0mm) and May the driest (5.0mm). The total rainfall at MCO for 2023 was 143.5mm below the annual average rainfall of 654.3mm at the Gulgong Post Office and was below the MCO rainfall total of 1182.8mm in 2022.

Temperature recorded at WS03 ranged from -6.0°C in June to 39.8°C in December. The lowest minimum temperature of -6.0°C was below the lowest minimum of -3.4°C recorded in 2022. The highest maximum temperature of 39.8°C was above the highest maximum temperature of 33.7°C recorded in 2022.

From January to April and then November and December, northeast and easterly winds were predominant with south westerly and southerly winds predominant from May through to October. Meteorological data and monthly wind roses are presented in **Appendix 3A**.

Table 10: Meteorological Summary (WS03)

Month	Rainfall (mm)	Cumulative Rainfall (mm)	Long-term average Rainfall (mm)	Max Temp (°C) @ 2m	Min Temp (°C) @ 2m
Jan-22	85.8	85.8	74.6	36.3	8.2
Feb-22	28.2	114	62.6	36.9	5.6
Mar-22	36.6	150.6	95.9	38.2	5.0
Apr-22	46	196.6	44.0	25.3	2.9
May-22	5	201.6	41.9	21.5	-3.1
Jun-22	30.8	232.4	48.0	22.4	-6.0
Jul-22	28.6	261	60.6	22.1	-4.3
Aug-22	28	289	37.5	23.2	-2.1
Sep-22	19.6	308.6	51.9	31.2	-1.6
Oct-22	36.2	344.8	71.4	34.0	4.7
Nov-22	94	438.8	63.6	34.6	10.5
Dec-22	72.0	510.8	73.6	39.8	13.0
Total		**510.8**	**654.3**		

6.2 NOISE

MCO manages noise in accordance with the MCO Noise Management Plan (NMP) (Version 5). The NMP was most recently revised and approved in October 2020. The NMP was developed by MCO with advice from experienced and qualified experts (SLR Consulting Australia Pty Ltd) to satisfy Condition 7, Schedule 3 of PA 05_0117 (as modified) and Condition 8, Schedule 3 of PA 08-0135.

During the reporting period, major noise producing activities included operations within:

- OC1, OC2, OC3, and OC4.
- Surface operations associated with UG4.
- The CHPP and rail load-out facilities.
- Construction activities.

Operational processes for MCO to reduce noise emissions included:

- Use of sound attenuated major equipment.
- Operation of some support fleet during the daytime only.
- Use of shielded areas in adverse weather conditions.
- Use of real-time noise monitoring data and Mine Production Environmental Assistants to assist operational personnel in proactive and reactive management of noise impacts.
- Use of predictive noise models to assess predicted noise risks associated with meteorological influences.
- Sound power testing equipment.

- Routine maintenance of equipment, including sound attenuation components.

6.2.1 REAL- TIME NOISE MONITORING

The NMP identifies response triggers for real-time noise via four monitoring stations (refer **Appendix 2** for localities). When a trigger has been reached, an SMS alarm is sent to operational personnel and members of the Environment and Community Department. The real-time monitoring network operated throughout the reporting period.

6.2.2 ATTENDED NOISE MONITORING

During the 2023 reporting period, attended environmental noise monitoring was conducted monthly (NA1, NA6 & NA12), with additional sites monitored quarterly (NA11), and Munghorn Gap Nature Reserve (MGNR) and Goulburn River National Park (GRNP) annually. The purpose of attended noise monitoring is to quantify and describe the acoustic environment around MCO's operations and compare noise contribution from the MCC to the project Noise Criteria.

Noise Criteria are specified for day, evening, and night period for the amenity of neighbouring residences. Noise Criteria are expressed as $LAeq_{(15min)}$ and $LA1_{(1min)}$. **Table 11** provides a summary of project noise criteria and noise performance based on attended noise monitoring for 2023, together with management implications and proposed actions.

MCO complied with the project specific noise criteria at all monitoring sites during attended noise monitoring in the reporting period. A summary of results from attended noise monitoring undertaken during the period in accordance with the NMP is provided in **Appendix 3B**.

6.2.3 ATTENDED VALIDATION NOISE MONITORING

In accordance with the NMP, attended monitoring was undertaken during the reporting period at four locations (i.e. NA2, NA3, NA10 & NA12) to verify the results of real-time noise monitoring.

Validation monitoring continues to confirm that the current real-time monitors overestimated the MCO LAeq during the validation periods. The real-time data appeared to be routinely influenced by extraneous low frequency noise sources such as road traffic, aircraft, frogs, insects, and wind. Due to the inability to distinguish between contributing noise sources, the real-time data is not suitable for compliance purposes and cannot be relied upon to provide an accurate estimate of mine generated noise. Real-time monitoring remains suitable for management purposes.

6.2.4 COMPARISON AGAINST PREVIOUS YEARS

Attended noise monitoring results were reviewed against previous years to 2012. This review found a high level of variability in results. Of the results where a noise reading was determined (i.e. not inaudible and criteria applicable) there is some correlation between monitoring results and the distance of the receiver from the operations.

Attended noise monitoring undertaken at NA1 Ulan school between 2012 and 2023 during the daytime period shows that MCO was inaudible during 82% of the samples, with no exceedances of criteria. Monitoring at NA6 Lower Ridge Road between 2012 and 2023 during the night period shows that MCO was inaudible during 14% of the samples, with no exceedances. Attended noise monitoring completed at NA12 Winchester Crescent between 2012 and 2023 during the night period shows that MCO was inaudible during 39% of the samples, with no sustained exceedances of criteria.

Annual attended noise monitoring results at the Goulburn River National Park and the Munghorn Gap Nature Reserve indicate that MCO was inaudible, with no exceedances recorded during monitoring.

Table 11 : Attended Noise Monitoring Summary

Aspect	Approved Criteria					Performance During the Reporting Period	Key Management implications	Implemented/ proposed management Actions
Attended Noise Monitoring	**Land No.**	**Day** [1] L_{A1eq} **(15min).**	**Evening**[2] L_{A1eq} **(15min).**	**Night**[3] L_{A1eq} **(15min).**	**Night**[3] L_{A1eq} **(1min).**	Monthly attended monitoring was undertaken at the three required noise compliance locations (NA1, NA6 & NA12) throughout 2023 as required by the NMP. Quarterly monitoring was completed at NA11 during 2023 as required by the NMP. Annual monitoring was undertaken at the two required noise compliance locations (GRNP & MGNR) during 2023 as required by the NMP. There were no recorded noise exceedances during the 2023 reporting period at the five noise compliance monitoring locations NA1, NA6, NA12, GRNP & MGNR. MCO continued to coordinate noise management with neighbouring mines. ***Note*** *approved noise compliance monitoring locations were selected as representative of residences* and are shown in **Appendix 2**.	Noise management controls effective.	Continue the implementation of the NMP. MCO will review, and if necessary, revise the NMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively.
	70	37	37	37	45			
	75	36	36	36	45			
	All other privately owned residences	35	35	35	45			
	Ulan Primary School	35 (internal) when in use			-			
	Ulan Anglican Church	35 (internal) when in use			-			
	Goulburn River National Park Munghorn Gap Nature Reserve	50 when in use			-			

1 Day is defined as the period between 7am-6pm Monday to Saturday, and 8am-6pm on Sundays and Public Holidays
2 Evening is defined as the period 6pm-10pm
3 Night is defined as the period from 10pm-7am Monday to Saturday, and 10pm-8am on Sundays and Public Holidays.

6.2.5 COMPARISON TO PREDICTED LEVELS

Predicted noise levels from Year 2021 of the Open Cut Optimisation Modification (Stage 1 Modification 14 and Stage 2 MOD 3) were compared against actual noise levels during 2023. The 2023 results indicated that MCO was generally lower than the predicted levels where meteorological conditions were relevant.

Measured operational levels are compared to predicted levels in **Table 12**. In this table, a 'positive' difference is where the measured level is greater than the predicted level. A 'negative' difference is where the measured levels are less than the predicted levels. Where the meteorological conditions (primarily wind direction and temperature gradient) during the attended monitoring do not correspond with those that are modelled, no further analysis is undertaken. Attended noise monitoring results are included in **Appendix 3B.**

Table 12: EA Predictions – Attended Noise Monitoring, Various Weather Conditions

	$dB(A)_{Leq\ (15min)}$[1]			$dB(A)_{LA1(1min)}$[1]		
	NA1 Ulan School	**NA6 Lower Ridge Rd**	**NA12 Winchester Cres**	**NA1 Ulan School**	**NA6 Lower Ridge Rd**	**NA12 Winchester Cres**
	Day	**Night**	**Night**	**Day**	**Night**	**Night**
January	NC	NA	NA	NA	NA	NA
February	NA	NA	-9	NA	NA	-10
March	NA	NC	NC	NA	NC	NC
April	NA	NA	-16	NA	NA	-18
May	NA	NA	NC	NA	NA	NC
June	NC	NA	NA	NA	NA	NA
July	NA	-5	-8	NA	-7	-8
August	NA	NC	NC	NA	NC	NC
September	NC	NC	NC	NA	NC	NC
October	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA
December	NA	NC	NC	NA	NC	NC

[1.] NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison. NC indicates measured MCO noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

6.3 BLASTING

MCO manages blasting in accordance with the Blast Management Plan (BMP). The BMP was developed by MCO with advice from experienced and qualified experts (SLR Consulting Australia Pty Ltd) to satisfy Condition 15, Schedule 3 of PA 05_0117 (as modified) and Condition 16, Schedule 3 of PA 08-0135 (as modified). The BMP was most recently revised and approved in November 2023 (Version 7).

Blasting criteria, blasting hours, blasting frequency, property inspection requirements and operating conditions are provided in Conditions 8 to 14, Schedule 3 and Conditions 7 to 15, Schedule 3 of the NSW Project Approvals (05_0117) and (08_0135) respectively.

The blast monitoring locations are identified in **Appendix 2**. During the reporting period blast monitoring included airblast overpressure and ground vibration at locations representative of privately owned residences, schools and aboriginal rock shelters.

6.3.1 SUMMARY OF BLAST MONITORING RESULTS

Blast monitoring compliance for the reporting period is presented in **Table 13** and a summary of blast monitoring results for the period is provided in **Table 14**. Individual blast results are provided in full at **Appendix 3C**. One exceedance of the blasting criteria occurred during the reporting period.

No blasting was undertaken within 500m of any public road, railway line, 330kV powerline or private land.

Table 13 : Blast Monitoring Summary (BM1, BM5, BM8)

Blast Summary	Number	Compliance (% Of Blasts)
Total Blasts	181	Compliant
Days with >2 blasts (PA05 Sch 3 C 10)	0[1]	Compliant
Annual average blasts per week	3.5	Compliant
Blasts outside blasting hours	0	Compliant
Airblast Overpressure >115 dB(Lin Peak) [2]	1[3]	Compliant (0.5%)
Airblast Overpressure >120 dB(Lin Peak)	0	Compliant (0%)
Ground Vibration >5 mm/s [2]	0	Compliant (0%)
Ground Vibration >10 mm/s	0	Compliant
Reportable Fume Events	0	Compliant

[1] *Misfires excluded as per PA05_0117 Sch 3 Con. 10 and PA08_0135, Sch. 3, Con. 11.*
[2] *Allowable exceedances of 5% of total blasts over a period of 12 months.*
[3] *One blast event recorded in exceedance of 115dBL during the reporting period – one at BM5 located on Ridge Road.*

Table 14 : Blast Monitoring Summary

<table>
<tr><th>Aspect</th><th colspan="4">Approved Criteria</th><th>Performance During the Reporting Period</th><th>Trend/ Key Management Implications</th><th>Implemented/ proposed actions</th></tr>
<tr><td rowspan="4">Blast</td><td>Receiver</td><td>Air Blast Overpressure Level dB (Linear Peak) dBL[1]</td><td>Peak Particle Velocity – Ground Vibration mm/s[2]</td><td>Allowable Exceedance</td><td rowspan="4">Compliance monitoring was undertaken at the following representative locations for the 2023 reporting period
• <u>BM1 – Ulan School</u>
○ <u>Max. Overpressure</u> = 111.7 dBL
○ <u>Max Ground Vibration</u> = 0.37 mm/s
○ <u>Average Ground Vibration</u> = 0.13 mm/s
• <u>BM5 – Ridge Road</u>
○ <u>Max. Overpressure</u> = 115.6 dBL
○ <u>Max Ground Vibration</u> = 0.91 mm/s
○ <u>Average Ground Vibration</u> = 0.16 mm/s
• <u>BM8 – Moolarben Road</u>
○ <u>Max. Overpressure</u> = 114.6 dBL
○ <u>Max Ground Vibration</u> = 0.47 mm/s
○ <u>Average Ground Vibration</u> = 0.12 mm/s

A full blast summary is contained at Appendix 3C.</td><td rowspan="4">In accordance with condition 13 (c), Schedule 3 of project approval 05_0117 and condition 14 (d), schedule 3 of project approval 08_0135 MCO co-ordinates the timing of blasting onsite with the timing of blasting at Ulan and Wilpinjong mines to minimise cumulative impacts.

Air blast over pressure and peak particle velocity continue to remain stable over the life of the operation at BM1 Ulan School and BM5 Ridge Road.</td><td rowspan="4">MCO will review and if necessary, revise the BMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively.

During the reporting period MCO continued to maintain the blast monitoring network.</td></tr>
<tr><td>Residence Privately Owned</td><td>120</td><td>10</td><td>0%</td></tr>
<tr><td>Residence Privately Owned</td><td>115</td><td>5</td><td>5% of the total number of blasts over a period of 12-months</td></tr>
<tr><td>All Public Infrastructure</td><td>-</td><td>50[3]</td><td>0%</td></tr>
<tr><td colspan="8">Notes - [1]- dB (Linear Peak) dBL = decibel linear peak [2]- mm/s = millimetres per second [3] - These criteria do not apply if the Proponent has a written agreement with the relevant owner, and has advised the Department in writing of the terms of this agreement. MCO has written agreements with TransGrid and Australian Rail Track Corporation (ARTC) to undertake blasting within 500 metres (m) of the Wollar-Wellington 330 kV transmission line and within 500 m of ARTC infrastructure, respectively.</td></tr>
</table>

6.3.2 COMPARISON TO PREVIOUS BLAST MONITORING AND PREDICTED LEVELS

A comparison of the 2023 blast results to the 2022 results and predications in the Environmental Assessment (EA) for Stage 1 Modification 14 and Stage 2 Modification 3 (Year 2019) are outlined in **Table 15** below.

Table 15 : Comparison to Blasting Results - BM1 & BM5 2022, 2023 and EA

Site	EA Vibration Predictions (mm/s) [2]	2022 vibration range (mm/s)	2023 vibration range (mm/s)	Comment on results
BM1 Ulan School	2.1	0.02 – 0.41	0.03 – 0.37	Generally consistent with previous results and lower than predictions.
BM5[3] Ridge Rd	3.0	0.01 – 2.12	0.01 – 0.91	Slightly lower than previous results and lower than predictions.
BM8 Moolarben Rd	3.7	0.00 – 0.76	0.00 – 0.47	Generally consistent with previous results and lower than predictions.
Site	**EA Overpressure (dBL) [2]**	**2022 Overpressure range (dBL)[1]**	**2023 Overpressure range (dBL)[1]**	**Comment on results**
BM1 Ulan School	112	79.3 – 116.2	82.3 – 111.7	Generally lower than previous results and consistent predictions.
BM5[3] Ridge Rd	114	71.3 – 124.1	72.1 – 115.6	Generally lower than previous results and consistent with predictions.
BM8 Moolarben Rd	115	75.7 – 119.2	78.8 – 114.6	Generally consistent with previous results and predictions.

[1] Excludes environmental influenced results.
[2]Overburden blast design MIC 4,500 kg, 5% exceedance prediction.
[3]Modelled predictions taken from nearest private receiver ID No.70 adjacent from BM5

Blast Monitoring 80%ile and 50%ile trends since 2012 are depicted below in **Figure 4** and **Figure 5**. The monitoring data indicates a correlation between monitoring results and distance of the receiver from the blast locations. Within the graphs the five percent and maximum limit has been included for the blast overpressure graph and the five percent limit has been included within the ground vibration graph. Results have generally been below these criteria.

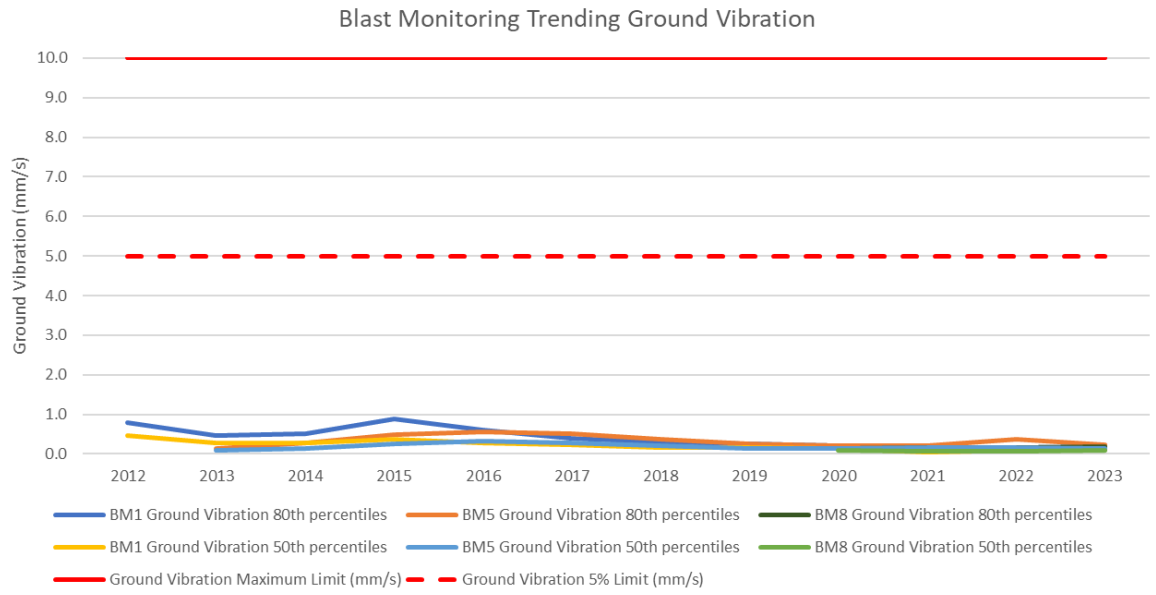


Figure 4 Blast Monitoring Trending Ground Vibration

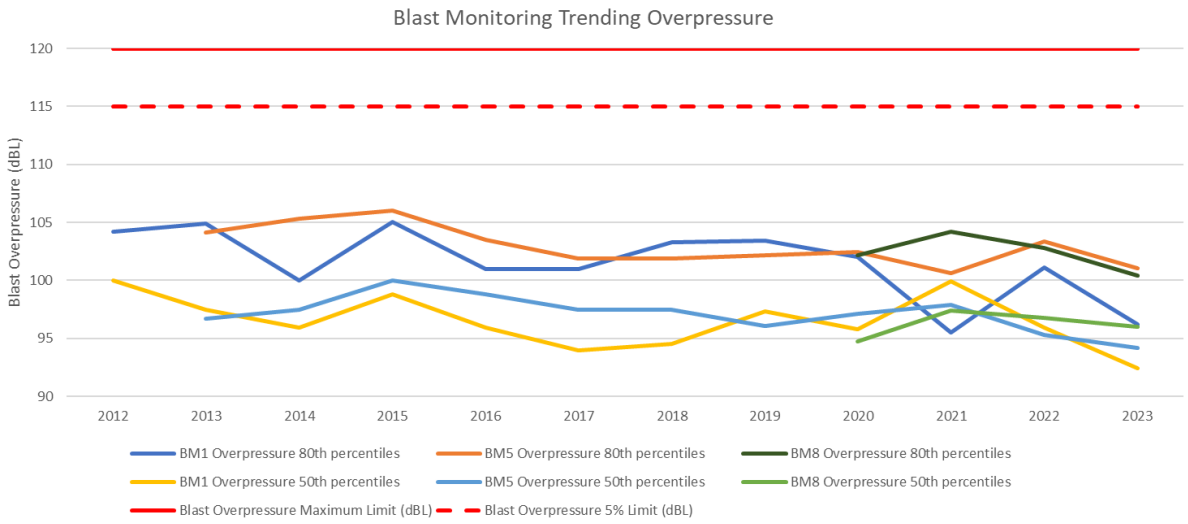


Figure 5 Blast Monitoring Trending Overpressure

6.4 AIR QUALITY

MCO manages air quality in accordance with Air Quality Management Plan (AQMP). The AQMP was most recently revised and approved in November 2023. The AQMP was developed by MCO with advice from experienced and qualified experts (Todoroski Air Sciences) to satisfy Condition 20A, Schedule 3 of PA 05_0117 and Condition 22, Schedule 3 of PA 08_0135.

During the reporting period, MCO undertook air quality monitoring in accordance with the approved AQMP (Version 7). This included:

- Deposited particulate matter monitoring with Dust Depositional (DD) gauges at four locations around the Moolarben Coal Complex.
- PM_{10} – High Volume Sampling (HVAS) monitoring at two sites – Ulan Village (PM01) and south-west of Open Cut 1 and west of Open Cut 2 (PM02).
- PM_{10} – Real Time Monitoring via Tapered Element Oscillating Microbalance's (TEOMs) at three permanent locations around the Moolarben Coal Complex representative of private residences and one upwind of operations when winds towards private residences.
- $PM_{2.5}$ - Real Time Monitoring via a dual function Tapered Element Oscillating Microbalance's (TEOMs) at one location around the Moolarben Coal Complex representative of private residences.
- Total Suspended Particulate (TSP) matter calculated from TEOM PM_{10} monitoring results.
- Meteorological monitoring is undertaken via Automatic Weather Stations (AWSs), with WS03 (located on Ulan Road) the principal station for reporting purposes.

The AQMP monitoring locations are identified in **Appendix 2**. The air quality monitoring program is outlined in **Appendix 3D**. A summary of air quality monitoring results for the reporting period is provided in **Table 16**, **Table 17** and **Appendix 3D**.

Table 16: Air Quality Monitoring Summary

Aspect		Approved Criteria	Performance during the Monitoring Period	Trend/ Key Management Implications	Implemented/proposed Management Action
	Monitoring Form				
Air Quality	**Dust Deposition**	4 g/m^2/month (max total)[1]	Annual averages for each dust depositional gauge are reported in **Table 18**. All dust depositional results for the reporting period were below the 4/g/m^2/month criterion. The 2g/m^2/month criterion was not triggered.	Annual average dust depositional results for the operation indicate a generally consistent trend over the period and remain well below the criteria.	MCO will review and if necessary, revise the AQMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively. During the reporting period MCO continued to maintain the air quality monitoring network.
		2 g/m^2/month above background average (Incremental increase)[2]			
	PM_{10}	50 µg/m^3 (24hr average)[2, 3]	All PM_{10} results were within criteria. Results due to extraordinary events are excluded from the dataset.	24-Hour average PM_{10} results for the operation indicate a slight increasing trend over the period and remain well below the criteria.	
		25 µg/m^3 (Annual average) [1, 3]	The average PM_{10} results for the reporting period are presented in **Table 19**. All sites were below the Annual average criteria.	Annual average PM_{10} results for the 2023 reporting period indicate a continued increasing trend over the period remaining below the criteria.	
	$PM_{2.5}$	25 µg/m^3 (24hr average) [2, 3]	All $PM_{2.5}$ results were within criteria. Results due to extraordinary events are excluded from the dataset.	24-Hour average PM2.5 results for the operation indicate an increasing trend over the period remaining below the criteria.	
		8 µg/m^3 (Annual average) [1, 3]	The annual average $PM_{2.5}$ results for the reporting period are presented in **Table 20**. All results were within criteria.	Annual average $PM_{2.5}$ results for the 2023 reporting period a slightly increasing trend when compared to 2022.	
	Total Suspended Particulate (TSP)	90 µg/m^3(Annual average) [1]	TSP results are presented in **Table 21.** TSP is calculated using the approved AQMP methodology based on PM_{10} constituting 40% of the total TSP. During the reporting period, all sites were calculated as being below the 90µg/m^3 criterion.	Annual average TSP results for the 2023 reporting period indicate an increase in results when compared to 2022 with all sites increasing during the period.	

[1] Cumulative (i.e. incremental increase in concentrations due to the Moolarben mine complex plus background concentrations due to all other sources);
[2] Incremental impact (i.e. incremental increase in concentrations due to the Moolarben mine complex on its own) with up to 5 allowable exceedances over the life of the project
[3] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary.

6.4.1 DATA CAPTURE RATE

The following table (**Table 17**) provides details on the data capture rates for the reporting period. Data capture was impacted by maintenance, power loss and equipment failures.

Table 17 Data Capture Rate for PM_{10} & $PM_{2.5}$ Annual Averages

Location	2023 Data Capture Rate
TEOM 01 (Ulan School)	97.7%
TEOM 04 (Ulan Road)	93.7%
TEOM 06 (Ulan-Wollar Road)	98.4%
TEOM 07 (Ulan Road)[1]	97.9%
PM 01 (Ulan Village)	98.4%
PM 02 (Ridge Road)	100%

[1] TEOM monitors for both PM_{10} and $PM_{2.5}$

6.4.2 COMPARISON TO PREVIOUS AIR QUALITY MONITORING AND BACKGROUND LEVELS

Dust Deposition

A comparison of the 2023 dust deposition results with previous results from 2012 and predications in the Environmental Assessment (EA) for Stage 1 Modification 14 and Stage 2 Modification 3 (Year 2021) is provided in **Table 18.**

All deposition results are within criteria and were generally consistent with predicted results (**Table 18**). Data trends are presented in **Appendix 3D.**

Table 18: Comparison of Depositional Dust results

Dust Gauge		Annual Average (g/m2/month) (Criteria = 4 g/m²/month)												
	Back-ground	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	EA Prediction[1]
DG01[#]	1.2	0.3	0.5	0.8	0.6	0.5	0.6	0.9	1.3	0.9	0.5	0.6	0.4	0.6
DG04^	2.0	1.3	1.3	1.6	1.0	1.2	1.0	1.4	1.8	1.0	0.5	1.0	0.9	0.9
DG05^	1.8	0.8	1.0	2.0	0.8	1.3	1.5	1.8	1.5	1.3	0.9	0.7	0.5	1.1
DG09^	-	0.4	0.7	2.0	0.6	0.6	0.9	1.9	1.5	1.3	0.4	0.4	0.9	0.7

[1] EA predictions for 2021
[#] Background monitoring
^Representative of nearest non-mine owned residence

PM_{10}

A comparison of the 2023 PM10 results with previous results from 2012 and predications in the Environmental Assessment (EA) for Stage 1 Modification 14 and Stage 2 Modification 3 is provided in **Table 19.**

Results are all within criteria and generally consistent with or slightly above predicted results (**Table 19**) indicating that current air quality management practices are effective. Data trends are presented in **Appendix 3D.**

Table 19: Comparison of annual average PM_{10} Results

Unit		Annual Average (µg/m³)[4] (Criteria = 25 µg/m³)												
	Back-ground	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	EA Prediction[5]
Ulan School (TEOM01)	15.1	10.2	12.4	11.4	13.2	13.0	12.3	15.1	17.3	15.1	12.3	11.3	16.8	17
Ulan Road (TEOM04)	-[1]	8.9	10.8	12.7	9.0	11.6	15.1	18.7	20.0	14.1	11.4	10.6	14.6	114.5
Ulan-Wollar Road (TEOM06)	-[1]	-[2]	-[2]	-[2]	9.0	11.5	12.5	15.7	19.7	16.6	12.0	11.1	20.2	*
Ulan Road (TEOM07)	-[1]	-[2]	-[2]	-[2]	-[2]	-[2]	11.2[3]	16.5	15.6	11.4	8.0	6.8	10.8	10.4
Ulan Village HVAS (PM01)	17.9	11.9	12.2	13.8	13.2	11.5	13.0	16.9[6]	18.9	11.8	7.9	7.1	12.5	16.7
Ridge Road HVAS (PM02)	-[1]	9.7	10.0	11.7	10.8	9.9	13.5	18.1[6]	18.7	12.4	8.5	7.4	11.5	11.7

[1] No background values as site established after 2009.
[2] No previous data as site not established.
[3] Calculated on 5 months of data.
[4] Annual Averages exclude extraordinary events such as bushfires and prescribed burns.
[5] EA predictions based on the Open Cut Optimisation Modification 2021 Scenario
[6] 2018 values previous reported including extraordinary events
*No EA prediction was made for TEOM06 as it is representative of conditions 'upwind' of MCO (ie not a private residence)

$PM_{2.5}$

A comparison of the 2023 PM2.5 results with previous results and predications in the Environmental Assessment (EA) for Stage 1 Modification 14 and Stage 2 Modification 3 (Year 2021) is provided in **Table 20.**

Results are within criteria and generally consistent with predicted results, with 2023 results being higher than previous years and predicated results (**Table 20**). Data trends are presented in **Appendix 3D.**

Table 20: Comparison of annual average $PM_{2.5}$ Results

Unit		Annual Average (µg/m³)[4] (Criteria = 8 µg/m³)												
	Back-ground	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	EA Prediction[5]
Ulan Road (TEOM07)	-[1]	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	5.8[3]	5.6	4.4	3.5	5.1	5.3

[1] No background values as site established after 2009.
[2] No previous data as site not established.
[3] Calculated on 6 months of data.
[4] Annual Averages exclude extraordinary events such as bushfires and prescribed burns.

[5] EA predictions based on the Open Cut Optimisation Modification 2021 Scenario.

Total Suspended Particulates

TSP results (**Table 21**) are all within criteria and slightly higher than predicted results due to drier weather, several bushfires and regional event.

Table 21: Comparison of annual average TSP results

Unit		Annual Average Calculated TSP (µg/m3) (Criteria = 90 µg/m3)												
	Back-ground	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	EA Predictions[4]
TEOM01 (Ulan School)	37.75	25.5	31	28.5	33	32.6	30.7	37.7	43.2	37.8	30.8	28.3	41.8	33.2
TEOM04 (Ulan Road)	0	22.25	27	31.75	22.5	29.0	37.9	46.8	50.1	35.3	28.5	26.5	36.6	29.0
TEOM06 (Ulan-Wollar Rd)	-[1]	-[2]	-[2]	-[2]	22.5	28.8	31.4	39.3	49.3	41.5	30.0	27.8	49.3	
TEOM07 (Ulan Road)	-[1]	-[2]	-[2]	-[2]	-[2]	-[2]	27.9[3]	41.3	39.0	28.5	20.0	17.0	27.0	21.5
PM01 (Ulan Village HVAS)	44.75	29.75	30.5	34.5	33	28.8	32.4	49.0[5]	47.3	29.5	19.8	17.8	23.0	32.7
PM02 (Ridge Road HVAS)	-[1]	24.25	26.25	29.25	27	24.8	33.7	45.3[5]	46.7	31.0	21.3	18.5	21.3	23.9

[1] No background values as site established after 2009.
[2] No previous data as site not established.
[3] Calculated on 5 months of data.
[4] EA predictions based on the Open Cut Optimisation Modification 2021 Scenario
[5] 2018 values previous reported including extraordinary events
*No EA prediction was made for TEOM06 as it is representative of conditions 'upwind' of MCO (ie not a private residence).

6.4.3 SPONTANEOUS COMBUSTION

During the reporting period MCO continued to manage spontaneous combustion within Open Cut emplacement areas in accordance with the Air Quality Management Plan. Operational actions to manage instances of spontaneous combustion included:

- Restricting access to identified areas
- Reviewing the risk to personnel, environment, community, and operations
- Watering to cool known heating
- Exposure, spreading, and excavation of the heating material
- Applying further water
- Cover with inert material, track roll and reshape
- Monitoring of area to identify any further areas of heating

6.4.4 REVIEW OF PARTICULATE CONTROL EMISSIONS

MCC currently apply a number of air quality management measures designed to minimise the impact on the surrounding environment due to on-site activities. A review of particle control emissions at the

MCC against industry best practice was completed by Todoroski Air Sciences on behalf of MCO in 2023. The review investigated the range of potential best practice dust controls applicable to the MCC and concluded, the air quality controls applied continue to be considered equivalent with industry best practice.

6.4.5 GREENHOUSE GAS

Yancoal's operations reported under the National Greenhouse and Energy Reporting Scheme for the 2022-23 financial year. MCC Scope 1 and Scope 2 emissions calculated for the 2022-23 financial year were 318,996t CO_2-e. MCC Scope 1 and Scope 2 emissions calculated for the 2021-22 financial year were 291,463t CO_2-e. The approximate 9% increase in emissions can be attributable to an increase in production fleet and diesel use. Scope 1 and Scope 2 emissions attributable to the MCC are generally consistent with Environmental Assessment predictions.

The Stage 2 Preferred Project Report Environmental Assessment (EA) for the facility prepared in 2008 is the most relevant EA to review the 2023 MCC Scope 1 and Scope 2 emissions. It estimated that the MCC would emit 265,560 t CO2e emissions. The greenhouse gas assessment included an estimate of Scope 1 and Scope 2 emissions however, the assessment did not include the increased open cut and underground production associated with Stage 1 Modification 14, and Stage 2 Modification 2. It should also be noted that the national greenhouse accounts factors are annually updated by the Department of Climate Change, Energy, the Environment and Water.

The NGER data reported by the MCC is subject to the rigour required under the NGER Act which includes third party assurance.

6.5 BIODIVERSITY

MCO manages biodiversity in accordance with the Biodiversity Management Plan (BioMP). The BioMP was developed by MCO with advice from experienced and qualified experts (EcoLogical Australia) to satisfy Condition 36, Schedule 3 of PA 05_0117 (as modified) and Condition 39, Schedule 3 of PA 08-0135 (as modified). In accordance with Condition 13(a), Schedule 2 of the Project Approvals (05_0117 and 08_0135), the BioMP is being staged and revisions of the plan will be submitted on a progressive basis. Offset management is also undertaken in accordance with relevant components of the Landscape Management Plan and Biodiversity Offset Management Plan (2008-4444) and Biodiversity Offset Management Plan (2013/6926).

The objectives of the management plans are to provide procedures and strategies to be implemented during the life of the Project to minimise biodiversity impacts on site (albeit in consideration of the approved impacts) and enhance biodiversity values on the offset areas. In addition to monitoring, the management plans describe procedures for:

- Vegetation Clearance Protocol – including Ground Disturbance Permits (GDPs), Pre-clearance surveys, habitat features, identification of suitable release locations.
- Collection and use of locally sourced native seed and supplementary tubestock.
- Strategies to manage vegetation onsite and improve vegetation connectivity.
- Additional biodiversity measures – rehabilitation of the environmental bund, weed and pest management, surface water management and erosion control, management of grazing and agriculture, access restrictions, and bushfire management.

The objective of biodiversity monitoring is to evaluate the vegetation and fauna habitat condition at the Moolarben Coal Complex (including recovery and/or enhancement of native vegetation) and to identify appropriate management actions to be applied, where required. Biodiversity monitoring relating to the vegetation management zone also includes weed and vertebrate pest monitoring. Monitoring is used to measure success against the short, medium and long-term targets described in the management plans and identify the need for corrective actions.

Monitoring of mine rehabilitation areas is described in the Rehabilitation Management Plan.

6.5.1 BIODIVERSITY OFFSET SECURITY

Each biodiversity offset area (BOAs) will be secured and managed for long-term biodiversity conservation in accordance with appropriate and suitable legal instruments. Security mechanisms applicable to MCO BOAs include:

- Positive and Restrictive Covenants
- Transfer to the National Parks Estate
- Conservation Agreements
- Biodiversity Offsets Scheme Credits - Biodiversity Stewardship Agreement

The management and security mechanisms for each approval and associated BOA, including status are provided in **Table 22**.

Table 22: Security Mechanism and Management Instrument

Environmental Approval	Offset Area	Security Mechanism	Status
NSW Stage 1 and EPBC 2007	Area 1 (Sydney Basin)	Covenant	Secured
NSW Stage 1 and EPBC 2007	Portion of Area 1 (Sydney Basin)	National Park Estate*	Transferred to NPE
NSW Stage 1 and EPBC 2007 and 2017	Area 2 (Moolarben)	Covenant	Secured
NSW Stage 1 and EPBC 2007	Portion of Area 2 (Moolarben)	National Park Estate* & State Conservation Area	Transferred to NPE
NSW Stage 1 and EPBC 2007	Area 3 (Property 6)	Covenant	Secured
NSW Stage 1 and EPBC 2013	Clarke	Covenant	Secured
NSW Stage 1 and EPBC 2013	Clifford	Covenant	Secured
NSW Stage 1 and EPBC 2013	Elward	Covenant	Secured
NSW Stage 1 and EPBC 2013	Property 5	Covenant	Secured
NSW Stage 1 and EPBC 2013	Bobadeen (West and East)	Covenant	Secured

Environmental Approval	Offset Area	Security Mechanism	Status
NSW Stage 1 0nly	Moolarmoo	Covenant	Secured
NSW Stage 1 Only	Properties 24 and 25	Covenant	Secured
NSW Stage 2 and EPBC 2008	Onsite Offsets	Covenant	Secured
NSW Stage 2 and EPBC 2008	Old Bobadeen	Covenant	Secured
NSW Stage 2 and EPBC 2008	Libertus	Covenant	Secured
NSW Stage 2 and EPBC 2008	Ulan 18	Covenant	Secured
NSW Stage 2 and EPBC 2008	Dun Dun East	Covenant	Secured
NSW Stage 2 and EPBC 2008	Dun Dun West	Covenant	Secured
NSW Stage 2 and EPBC 2008	Avisford 1	National Park Estate**	Transferred to NPE
NSW Stage 2 and EPBC 2008	Avisford 2	Conservation Agreement	Secured
NSW Stage 1 and EPBC 2017	OC2/3 Rehabilitation	Rehabilitation Management Plan	Ongoing
NSW Stage 1 and EPBC 2017	Gilgal	Biodiversity Stewardship Agreement	Application submitted Ongoing

* To be managed by NPWS in accordance with the Goulburn River National Park and Munghorn Gap Nature Reserve Plan of Management (NSW National Parks and Wildlife Service).
** To be managed by NPWS in accordance with the Avisford Nature Reserve (ANR) Plan of Management (NSW National Parks and Wildlife Service).

6.5.2 BIODIVERSITY OFFSET WORKS UNDERTAKEN

During the reporting period weed and feral animal monitoring and control works were undertaken throughout the offsets. Wild dog baiting programs were undertaken within biodiversity offset properties, in conjunction with the NSW Local Land Service (LLS) and neighbouring landholders. Weed control works were undertaken throughout the offset areas focusing on Serrated Tussock, Blackberry, Blue Heliotrope, Tree of Heaven, St Johns Wort, African Lovegrass, Spiny Burr Grass and Prickly Pear. Native seed collection was continued within MCO owned lands and some offset areas.

Revegetation works continued with over 32,000 stems planted to supplement natural regeneration in the Ulan 18, Moolarmoo, Redhills and Dun Dun Biodiversity Offsets.

6.5.3 BIODIVERSITY OFFSET MONITORING

Flora and fauna monitoring during the reporting period included the Stage 1 Biodiversity Offset Areas (BOAs), Stage 1 Mod 9 offset areas, and the Stage 2 BOAs. Flora monitoring included monitoring of analogue sites located in National Parks or State Conservation Areas. Monitoring locations are provided in **Appendix 2**.

Offset monitoring included:

- Full floristic surveys.
- Rapid assessment.
- Fauna surveys targeting diurnal and nocturnal birds, reptiles, amphibians, mammals, microbats and habitat assessment.

Monitoring is undertaken across two management zones that have been mapped within the BOAs. Each of these zones have defined strategic ecological management objectives, with an overall aim to achieve a sustainable landscape with improved overall ecological quality in the long term. The management zones are:

- Management Zone 1 (MZ1/OMZ1) – Enhancement of remnant vegetation.
- Management Zone 2 (MZ2/OMZ2) – Regeneration/revegetation of grassland to forest/woodland.

6.5.3.1 Offset Monitoring Results

6.5.3.2 Stage 1 Offset Monitoring Outcomes

The Box Woodland MZ2 area within Area 1 BOA met all performance criteria outlined in the Land Management Plan (LMP).

The Red Gum Woodland MZ2 areas within Area 1 and Area 3 BOAs met most of the criteria that apply at the current stage of development and are on a trajectory to meet all criteria in the long-term or have been actively revegetated to ensure all criteria are met.

The Sedimentary Ironbark Forest MZ2 areas within Area 1 BOA met most of the criterion that apply at the current stage of development and are on a trajectory to meet all criteria in the long-term.

The Alluvial Apple Woodland MZ2 areas within Area 1 and Area 2 BOA met most of the criteria that apply at the current stage of development and have shown recent improvements in performance against the remaining criteria.

All MZ1 areas across all vegetation associations across all Stage 1 BOAs met the performance criteria outlined in the LMP (MCO 2013).

6.5.3.2.1 Trends in overall biodiversity values

BioBanking Assessment Methodology (BBAM) site values scores (SVSs) (OEH 2014) provide an integrated metric of the general biodiversity values of a zone compared to the benchmark values of the associated vegetation type. They can be used to identify whether biodiversity values are being maintained or improved. For Stage 1 MZ1 areas, an assessment of SVSs demonstrated:

- There has been a continued improvement in biodiversity values within MZ1 areas of Area 1 in 2023, with average SVS increasing for the sixth year in a row, and SVS close to analogue values.
- There has been a slight decline in the average SVS within MZ1 areas of Area 2 and Area 3 in 2023.

For Stage 1 MZ2 areas, an assessment of SVSs demonstrated:

- SVSs within MZ2 areas in Area 1 and Area 3 are relatively high and have improved slightly over time relative to analogue values due to an improvement in several structural attribute scores including native overstorey cover and native groundcover.
- The MZ2 area within Area 2 have seen a decrease in SVS in 2023. There are, however, established overstorey trees (two to three metres in height) and shrub species present within this monitoring site that are not yet contributing to cover along the transect at this time. Natural and successful assisted regeneration of overstorey and midstorey species is also occurring across the broader MZ2 area of Area 2. These are positive indications that the SVS and the vegetation condition across the MZ2 areas will improve in the long term.

6.5.3.3 MOD 9 Offset Monitoring Outcomes

6.5.3.3.1 Assessment against BOMP Completion Criteria for MZ2 areas

Completion criteria will have been achieved when the vegetation has either achieved the relevant Biometric Vegetation Type (BVT) benchmark condition (for at least one upper structural layer and one ground cover class) or it can be demonstrated that it is on a self-sustaining trend towards the relevant benchmark condition.

All MZ2 areas within Clarke BOA continued to achieve all completion criteria.

At Bobadeen BOA, the MZ2 sites within the Blakely's Red Gum – Yellow Box Grassy Open Forest vegetation community area achieved all completion criteria. Two monitoring sites did not achieve the groundcover criterion due to increased exotic cover and increased native grass cover dominating above benchmark value for the Biometric Vegetation Type respectively. All other MZ2 sites achieved native groundcover benchmark condition. Three sites are yet to achieve the native overstorey/midstorey completion criterion, however in the 2023 monitoring there was some evidence of progression towards achievement in the White Box – Yellow Box Grassy Woodland areas of the BOA.

At Moolarmoo BOA, one of two monitoring sites achieved the groundcover criterion, however this is a result of fluctuations in native forb and grass groundcover species, with no significant increase in exotic cover. All MZ2 areas have yet to reliably achieve native overstorey or mid-storey benchmark condition.

At Property 5 BOA and Property 24 & 25 BOA, all MZ2 areas within the Blakely's Red Gum – Yellow Box Grassy open Forest vegetation community achieved all completion criteria.

The Rough-barked Apple – Silvertop Stringybark – Red Stringybark Grassy Open Forest vegetation community within MZ2 areas achieved native groundcover benchmark condition. Native overstorey/mid-storey benchmark condition has not yet been achieved, however monitoring in 2023 showed some evidence of progression towards achieving the criteria.

6.5.3.4 Trends in overall biodiversity values

BBAM SVSs were used to determine whether biodiversity values are being maintained or improved. For MOD9 MZ2 areas the monitoring demonstrated that:

- MZ2 areas within Bobadeen have seen a slight increase in biodiversity values, with the

highest average SVS recorded in 2023. While the reasons for this varies between sites, it generally reflects increases in native species diversity and native groundcover observed at monitoring sites in autumn 2023.

- At all other MOD 9 BOAs containing MZ2 areas (Clarke, Properties 24 & 25, Property 5 and Moolarmoo), there has been a slight decrease in biodiversity values recorded in 2023 compared to 2022, but SVSs have generally been maintained across monitoring years.
- The condition of the vegetation at Clarke BOA is relatively high with SVSs approaching and now mirroring those of MZ1 areas. This is also reflected in performance against the BOMP completion criteria in 2023. Native overstorey cover is increasing and overall conditions have improved slightly over time relative to analogues. However, areas still require some habitat augmentation.
- The SVS at Bobadeen, Moolarmoo, Property 5 and Property 24 & 25 BOAs have remained similar across monitoring years. Recent plantings are yet to contribute towards monitoring outcome improvements.

6.5.4 STAGE 2 OFFSET MONITORING OUTCOMES

6.5.4.1.1 Assessment against Stage 2 BOMP Performance Indicators and Completion Criteria

The vegetation monitoring across the OMZ2 sites at Stage 2 BOAs in autumn 2023 was conducted in accordance with the monitoring schedule and methodology in the Stage 2 BOMP and Cluster Management Plans (CMPs). Fauna monitoring was not conducted in 2023 in Stage 2 BOAs in accordance with the required three-yearly monitoring frequency, with the next round of monitoring due to be conducted in 2025. Dun Dun East and Dun Dun West BOAs were affected by an uncontrolled bushfire in March 2023, therefore in addition to the scheduled monitoring, all sites within these BOAs, including OMZ1 sites were monitored in autumn 2023 as part of a post-event inspection required under Table 15 of the Stage 2 BOMP. The key findings from the 2023 monitoring against the Performance Indicators and Completion Criteria are summarised below.

- For Offset Outcome 1(a) (woodland/forest) areas at all relevant BOAs are:
  - Expected to meet the Performance Indicator within the six yearly assessment timeframe.
  - Currently achieving all Completion Criteria or are expected to achieve all criteria by the target date (2065).
- For Offset Outcome 1(a) (DNG) areas within:
  - Dun Dun West, Libertus, Onsite Offset and Ulan 18 had sufficient natural and/or assisted regeneration.
  - Dun Dun East did not achieve this criterion, with no overstorey species recorded at monitoring sites. Assisted revegetation that has occurred in this BOA has been impacted by the bushfire. Additional active revegetation has been planned for this BOA that will assist in achieving Completion Criteria by the target date (2065).
- For Offset Outcome 1(b) (woodland) areas at all relevant BOAs are:
  - Currently achieving or are expected to achieve all Completion Criteria by 2065.

- All Offset Outcome 1(b) (DNG) areas:
  - All relevant BOAs had sufficient natural and/or assisted regeneration recorded to meet the associated performance indicator in 2023.
  - Dun Dun East BOA is currently achieving or is on a trajectory to achieve all Completion Criteria by 2065.
  - Old Bobadeen BOA is currently achieving, or is on a trajectory to achieve, two out of four of the Completion Criteria by 2065.

6.5.5 ACTIONS FOR NEXT REPORTING PERIOD

During the next period activities to be undertaken include review of management plans and revision where necessary, continued monitoring, assisted regeneration planning and implementation, fencing, track and fire trail works, continued weed and feral animal control works, and progression of the Gilgal Biodiversity Stewardship Agreement.

6.6 HERITAGE

MCO manages heritage in accordance with the Heritage Management Plan (HMP). The current HMP (Version 9) was approved in November 2023.

During the reporting period MCO continued the salvage and management of Aboriginal heritage sites associated with the project. The results of all survey and salvage activities during the period have been included in the MCO heritage database.

Annual inspections of historic heritage conservation areas were completed during 2023, the areas continue to be managed in accordance with the HMP.

6.6.1 ACTIONS FOR NEXT REPORTING PERIOD

Further salvage and management of Aboriginal and European heritage sites associated with the project may be completed during the next reporting period. Registered Aboriginal Party (RAP) groups will continue to be consulted and involved in due diligence and salvage works in accordance with the Heritage Management Plan.

6.7 BUSHFIRE

There were five occurrences of bushfire across MCO lands during the reporting period.

On 5 March 2023 the Alpha Road bushfire started and then reached MCO's Dun Dun BOA on 8 or 9 March 2023. Approximately 76 ha of the Stage 2 Dun Dun West BOA and 1,403 ha of the Dun Dun East BOA was impacted by the fire.

On 16 October 2023 the Springwood Road bushfire started that impacted MCO's Clarke and Clifford BOAs. Approximately 219 ha of the Stage 1 MOD 9 Clarke Offset and 67 ha of Clifford was impacted by the fire.

On 31 October 2023 a fire started on the edge of Ulan Road that then spread into MCO's Libertus BOA. Approximately 3ha of the Stage 2 Libertus BOA was impacted by the fire.

On 5 November 2023 a lightning strike started a fire within MCO's Dexter Mountain BOA. The fire affected less than one hectare of the property.

On 12 November 2023 a lightning strike started a fire within MCO's Old Bobadeen BOA. The fire affected less than one hectare of the property.

MCO continued to implement the Bushfire Management Plan and conducted bushfire trail inspections and maintenance across MCO owned lands. In the next reporting period inspection and maintenance works on fire trails will continue.

6.8 WASTE MANAGEMENT

During the reporting period MCO continued to maintain a Total Integrated Waste Management Service to manage all waste streams generated on site and to maximise recycling. This includes general waste, cardboard and paper recycling, batteries, waste oil and steel. The volumes of total waste and recycled material removed from site are shown in **Table 23**. During the reporting period 74% of all waste removed from site was recycled. Waste volumes have been variable since 2013, with volumes increasing in association with the expansion of the operations, commencement of underground operations and construction works.

Table 23: Waste Removal Volumes removed during the reporting period

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Waste (t)	1379.6	1490.5	1276.7	2615.1	2612.9	2559.3	3087.1	3578.4	3485.2	3682.2	4157.8
Recycled Waste (t)	1173.1	1346.5	1058.3	1730.2	1806.0	1851.4	2178.0	2408.9	2578.4	2669	3059.9
Percentage Recycled	85%	90%	83%	66%	69%	72%	71%	67%	74%	72%	74%

7.0 WATER MANAGEMENT

MCO manages water in accordance with the Water Management Plan (WMP). The WMP (Version 7) and its component plans including Site Water Balance (SWB) (Version 4), Surface Water Management Plan (SWMP) (Version 6) and Groundwater Management Plan (GWMP) (Version 4). The WMP was revised and approved in November 2023.

During the reporting period, MCO undertook water monitoring and data review in accordance with the WMP. Surface water and groundwater monitoring sites are provided in **Appendix 2.** Surface water monitoring includes:

- Surface water quality and flow (monthly/6 monthly/event based);
- Stream health (annually);
- Channel stability (annually);
- Mine site water management structures quality (monthly); and
- Licensed discharge points.

Groundwater related monitoring includes:

- Groundwater levels/pressure (monthly);

- Groundwater quality (6 monthly);
- Groundwater take; and
- Potential seepage from mine water storages.

The groundwater monitoring includes the following lithological units:

- Quaternary alluvium;
- Tertiary aged unconsolidated sediments;
- Triassic sandstones;
- Permian coal measures;
- Ulan seam coal;
- Marrangaroo formation; and
- Basement units (consisting mostly of granites and metavolcanics).

During the period MCO continued to maintain and construct water storages (mine, brine, and sediment storages), extended the dewatering and transfer network and installed operational and construction related erosion and sediment controls.

Details of water licensing and associated take are provided in **Section 7.1**. A summary of the site water balance is provided in **Section 7.2**. A summary of surface water monitoring and groundwater monitoring results for the reporting period are provided in **Section 7.3** and **Section 7.4** respectively. Detailed surface water and groundwater monitoring results for the reporting period are provided at **Appendix 3F** and **Appendix 3G** respectively.

7.1 WATER LICENCES

A summary of water take and available water under water access licences for the reporting period (1 January to 31 December 2022), as well as a prediction for the next reporting period (1 January to 31 December 2023) is provided in **Table 24**. Water take is provided in six monthly periods to coincide with the water year (i.e. 1 July 2023 to 30 June 2023).

Table 24: Water Licences and Take

Water Access Licence	Description	Available Water (Units) [1]	2023 Estimated Water take (ML)[2]			2024 Forecast Water Take (ML)
			Jan – Jun	Jul - Dec	Total	
36340, 37583	Wollar Creek Water Source	436	91	58	149	140
37582, 19052, 41888	Upper Goulburn River Water Source	416	133	86	219	180
39799	Sydney Basin - North Coast Groundwater Sources	5,365	2,484[3]	1,601[3]	4,085[3]	3,719

[1] One unit equivalent to 1.0 ML as per the *Available Water Determination Order for Various NSW Unregulated and Alluvial Water Sources (No. 1) 2018* and *Available Water Determination Order for the North Coast Coastal Sands and the North Coast Fractured and Porous Rock Groundwater Sources 2018 for the 2020/21 water year. Available water is reported in IWAS including carry-over and temporary transfers.*

[2] Groundwater Model and water balance used to estimate water take by water source.

[3] No water was directly extracted from WAL 39799 tagged groundwater extraction bores.

Water take is estimated as part of the Annual Review after the end of the calendar year. MCO determines water take in accordance with the approved WAMP. Water take is either groundwater inflow removed from the operation, water extracted from licenced bores or modelled take from surface and alluvial aquifers. The review estimate incorporates site water balance reconciliations, recirculation to underground and water take for the period. Indirect or passive take is based on modelling predictions for the relevant period.

Water take by water source has been determined in consideration of the most recent Groundwater Model associated with the UG4 Extraction plan. The estimated water take during the 2023 calendar year has been summarised in **Table 24**.

The available water for 2022/23 water year for all water sources was greater than the water take. MCO will continue to take necessary action to ensure that it holds sufficient water entitlements.

7.2 WATER BALANCE

MCO monitors the water balance for the operation to assist forecasting and management of site water. The site water balance (**Table 25**) for the reporting period was prepared with input from suitably qualified and experienced consultants Hydro balance and AGE. Site water storage reduced by 1,441ML during the reporting period due to a reduction in rainfall during the reporting period. The main demands were coal processing and dust suppression. The Balance includes a variance of 545ML (10.3%).

During the Period, no water was extracted from licences Production Bores.

Table 25: Site Water Balance

Water Sources (Inflows)	Volume (ML)
UCML Water	0
Groundwater Extraction (bores)	0
Rainfall / runoff	981
Groundwater inflows	4,454
Total	5,454
Water Loss (Outflows)	
Evaporation	1188
Seepage	0
Construction & dust suppression	1685
Licensed Discharge	3,438
CHPP Demand	896
Underground demand	213
Total	7,421
Water Balance	
Inflows minus outflows	-1986
Change in inventory	-1441
Balance	-545 (10.3%)

7.3 SURFACE WATER

7.3.1 SURFACE WATER QUALITY AND FLOWS

7.3.1.1 Surface Water Flows

The MCC is within the Upper Goulburn River and Wollar Creek catchments. Moolarben Creek and Sportsmans Hollow Creek are the primary tributaries of the upper Goulburn River catchment with Bora Creek a minor tributary. Wilpinjong Creek and its minor tributaries (Eastern and Murragamba Creeks) drain to the Wollar Creek. Most of the adjacent watercourses are ephemeral in nature.

In accordance with the SWMP, stream flow gauges have been installed in the ephemeral Wilpinjong, Murragamba, and Eastern Creeks. Stream flow gauges were also installed in Goulburn River during the reporting period in accordance with the UG4 Extraction Management Plan and recommendations from the Independent Advisory Panel for Mining. Creek flow is heavily influenced by rain events. Data has been supplemented with data from Ulan Coal Mines as required. The recorded stream gauging is provided in **Appendix 3F**.

7.3.1.2 Surface Water Quality

Surface water monitoring was undertaken in the Goulburn River, Moolarben Creek, Wilpinjong Creek, Murragamba Creek, and Eastern Creek in accordance with the SWMP. Results varied both spatially and temporally consistent with fluctuations associated with rainfall events in ephemeral watercourses.

Monitoring results during the reporting period were influenced by below average rainfall. The findings are described in **Section 7.3.1.3** below. Water quality data for the period is presented in **Figure 6, Figure 7, Figure 8 and Figure 9**. Monitoring data is provided in **Appendix 3F**.

Figure 6: Goulburn River Water Quality

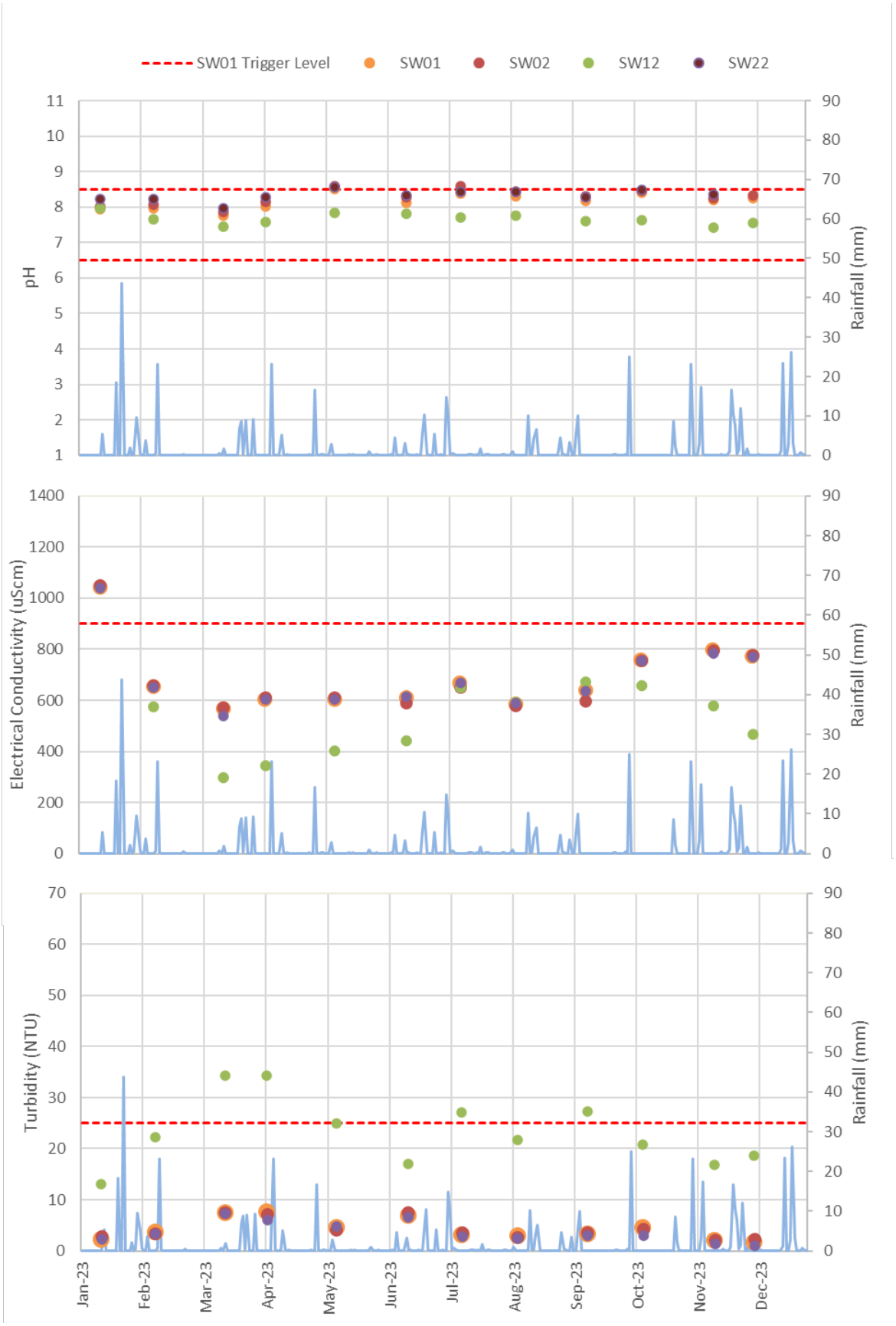


Figure 7: Moolarben and Lagoon Creek Water Quality

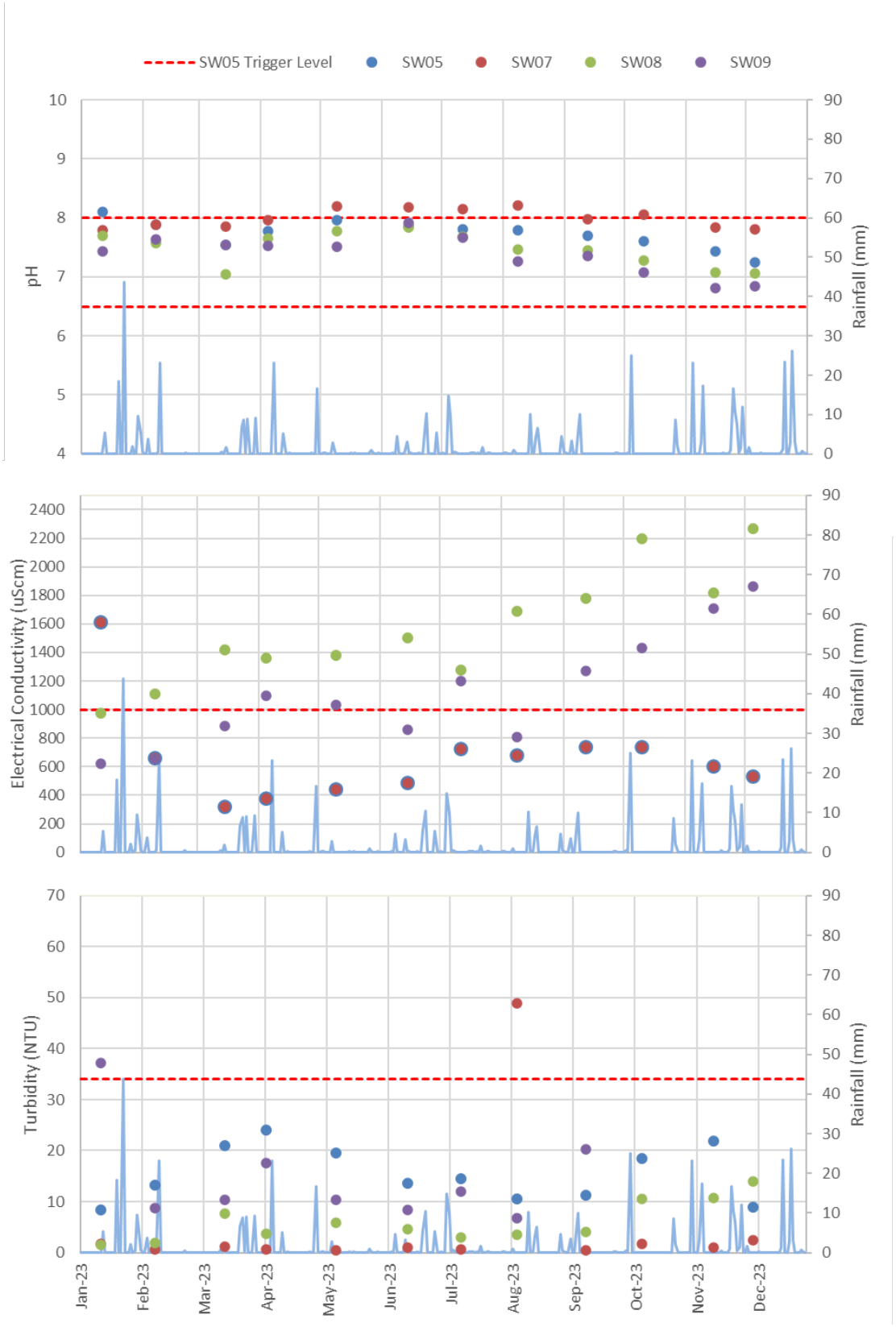


Figure 8: Murragamba, Eastern and Wilpinjong Creek Water Quality

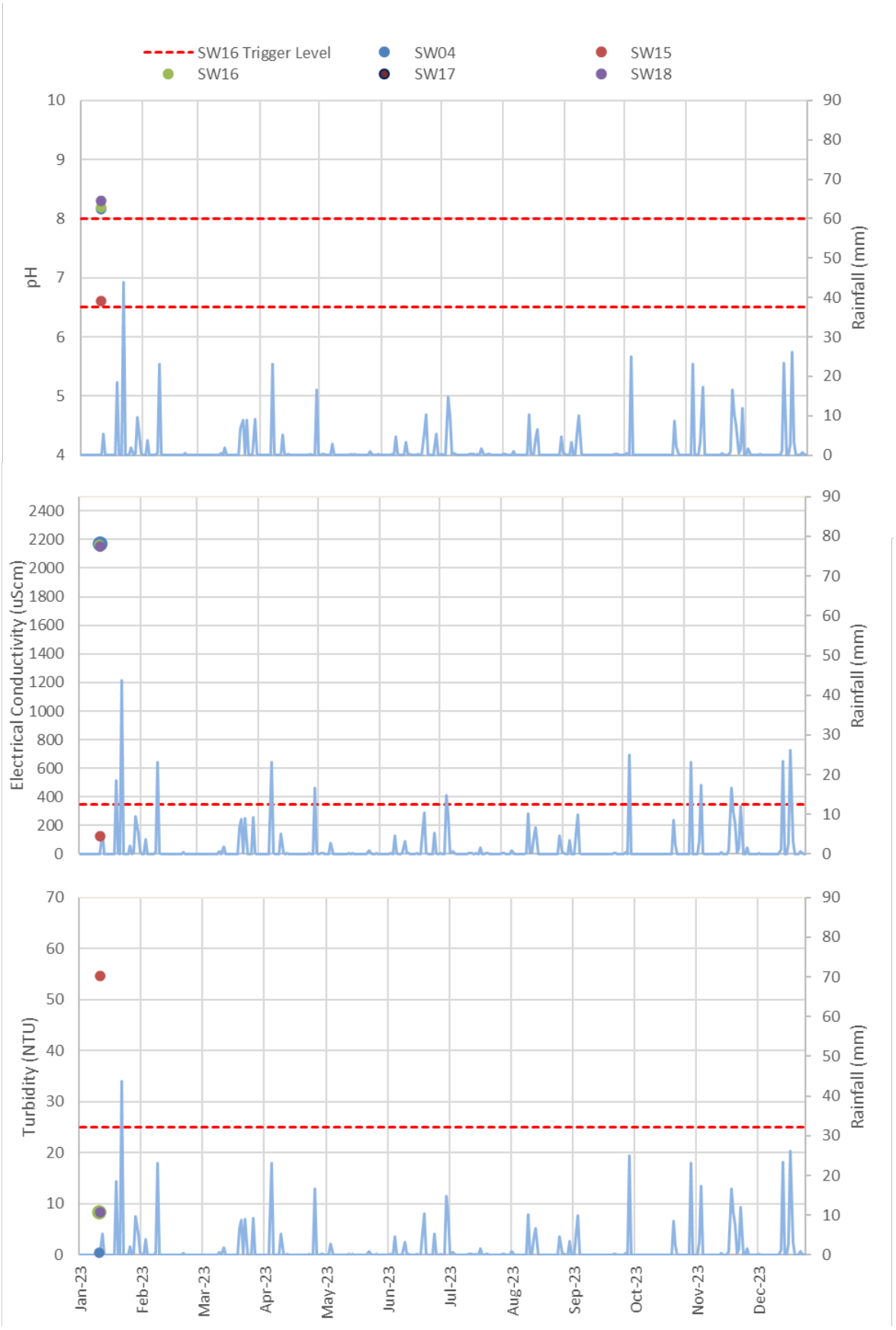
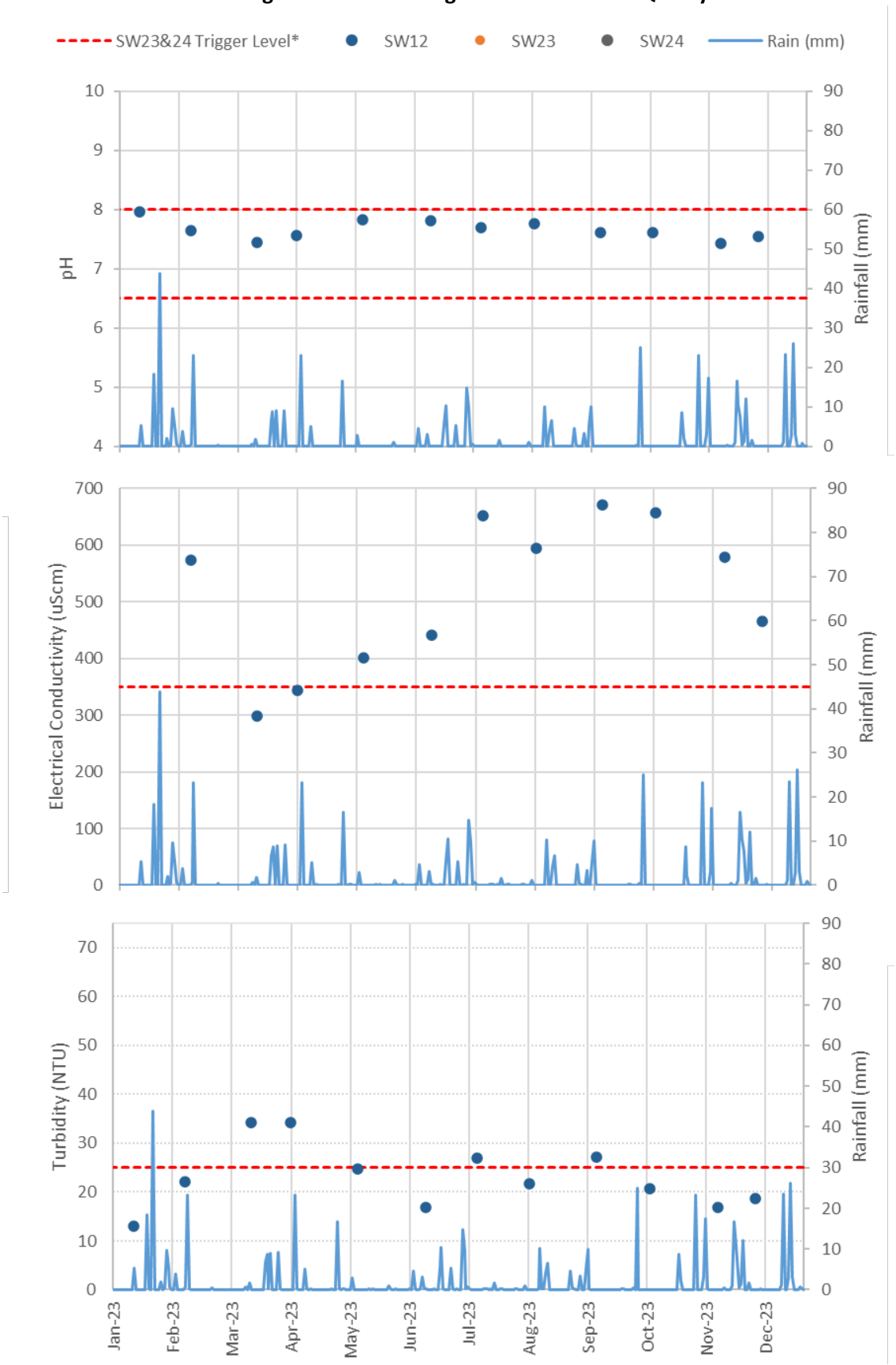


Figure 9: UG4 Drainage Line 1 & 2 Water Quality



** Triggers not applicable as mining has not commenced in LW406.*

7.3.1.3 Comparison to baseline and trends

Location	Trigger Investigation Values (20th / 80th %ile or ANZECC Guideline)		Performance during the Monitoring Period (01/01/2023 – 31/12/2023)	Trend/ Key Management Implications (Monitoring Period 01/01/2019 – 31/12/2023)	Implemented / proposed Management Action
Surface Water Quality					
Goulburn River Sites; SW01* SW02 SW12 SW22	PH	*6.5 – 8.5*	Surface water pH in the Goulburn River at SW01 ranged from 8.0 to 8.4 (20th and 80th percentiles) during 2023, which is within the SW01 trigger levels (6.5 – 8.5). Surface water pH in the Goulburn River at SW02, SW12 and SW22 ranged from 7.6 to 8.4 (20th and 80th percentiles) during 2023. These values are marginally higher than the historical data from previous years.	pH readings range between 7.4 and 8.4 (20th and 80th percentiles) for SW01, SW02 and SW22, between 6.8 and 7.6 (20th and 80th percentiles) for SW12. There has been a slight upward trend in pH at SW01, SW02 and SW22 over the last year.	Continue the implementation of the SWMP. MCO will review, and if necessary, revise the SWMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively.
	EC	*900*	The EC readings in the Goulburn River at SW01 were generally consistent with the samples over the last five years. EC readings at SW01 ranged from 600 to 769 µS/cm (20th and 80th percentiles) and all samples were less than the SW01 trigger level (900 µS/cm), except for a single sample in January 2023. In early January, EC levels at all Goulburn River monitoring locations were influenced by the Temporary Emergency Release (TER). EC readings in the Goulburn River at SW02, SW12 and SW22 ranged from 409 µS/cm to 773 µS/cm (20th and 80th percentiles) during 2023.	EC readings range between 556 and 779 µS/cm (20th and 80th percentiles) for SW01, between 310 and 782 µS/cm (20th and 80th percentiles) for SW02, SW12 and SW22.	

Location	Trigger Investigation Values (20th / 80th %ile or ANZECC Guideline)		Performance during the Monitoring Period (01/01/2023 – 31/12/2023)	Trend/ Key Management Implications (Monitoring Period 01/01/2019 – 31/12/2023)	Implemented / proposed Management Action
	Turbidity	*25*	The turbidity readings in the Goulburn River at SW01 were generally consistent with the historical data. Turbidity readings at SW01 ranged from 2.3 to 6.4 NTU (20th and 80th percentiles) and all samples were below than the SW01 trigger level (25 NTU). Similarly, the turbidity samples over 2023 in SW02, SW12 and SW22 in the Goulburn River were generally consistent with historical data.	Turbidity readings range between 1.1 and 10.2 NTU (20th and 80th percentile) for SW01, between 1.3 and 29.9 NTU (20th and 80th percentile) for SW02, SW12 and SW22.	
Moolarben and Lagoons Creek Sites; SW05* SW07 SW08 SW09	PH	*6.5 – 7.7*	Surface water pH in Moolarben Creek at SW05 ranged from 7.6 to 7.9 (20th and 80th percentiles) during 2023, which is within the SW05 trigger levels (6.5 – 8.0). All samples were less than the SW05 trigger level, except for a single sample in January 2023 (8.1). pH at the other Moolarben and Lagoon Creek locations was consistent with the historical data.	pH at SW05 was neutral to slightly alkaline ranging from 7.0 to 7.7 (20th and 80th percentiles) and generally remained within the trigger levels of 6.5 to 8.0 defined for this location. Most readings are within the trigger levels, however there are several low readings in 2020 and two high readings in September 2022 (8.33) and January 2023 (8.11). There were several low pH readings in SW08 in 2020. These readings occurred during very low to no-flow conditions. There was a slight increase in pH levels across all monitoring locations in Moolarben Creek during 2022 in comparison to the previous year, but this trend has somewhat reversed over 2023.	

Location	Trigger Investigation Values (20th / 80th %ile or ANZECC Guideline)		Performance during the Monitoring Period (01/01/2023 – 31/12/2023)	Trend/ Key Management Implications (Monitoring Period 01/01/2019 – 31/12/2023)	Implemented / proposed Management Action
	EC	*1,000*	Surface water EC in Moolarben Creek at SW05 ranged from 451 to 733 µS/cm (20th and 80th percentiles) during 2023, with one reading exceeding the SW05 trigger level (1,000 µS/cm) in January. The EC readings at SW05 in January was above the SW05 trigger level (1,676 µS/cm), coinciding with the TER release in January. Upstream (non-mine impacted) EC readings continued to be elevated, although less than historical records.	EC readings at SW05 range between 551 and 939 µS/cm (20th and 80th percentiles) and are generally lower than the SW05 trigger level. All of the samples in SW05 between June and November 2021 exceeded the SW05 trigger level. An investigation into the exceedances was undertaken by HEC (2021), which concluded that they were caused by spillway overflows, releases and seepage from Moolarben Dam. Moolarben Dam contained higher EC water from the upstream catchment which contributes higher EC water as evidence by the historical EC readings at SW07, SW08 and SW09.EC is naturally elevated in these watercourses, with EC often higher at the upstream locations than the downstream locations.	
	Turbidity	*34*	The turbidity readings in Moolarben Creek SW05 were less than the SW05 trigger level (34 NTU). Turbidity readings at the other Moolarben Creek and Lagoon Creek locations were all consistent with the historical data with elevated readings associated with flow from recent rainfall events.	The 20th percentile turbidity readings for all four monitoring locations ranges between 0.6 and 6.7 NTU, while the 80th percentile ranges between 7.9 and 37.6 NTU. There are several recordings that exceed the trigger level between 2019 and 2023, however they are generally consistent with historical recordings. The elevated turbidity readings are associated with rainfall events or during low flow conditions.	

Location	Trigger Investigation Values (20th / 80th %ile or ANZECC Guideline)		Performance during the Monitoring Period (01/01/2023 – 31/12/2023)	Trend/ Key Management Implications (Monitoring Period 01/01/2019 – 31/12/2023)	Implemented / proposed Management Action
				Turbidity readings at SW05 range from 6.1 to 20.7 NTU (20th and 80th percentile) and are below the trigger level of 34 NTU defined for this location (with the exception of two exceedances in May 2019 and February 2020). Turbidity readings after a significant rainfall event (>30 mm in 24 hours) at SW05 are often above the trigger level with rainfall events also being more frequent in 2022. There is no discernible trend in turbidity at these locations over the last five years.	
Murragamba, Eastern and Wilpinjong Creek Sites; SW04 SW15 SW16* SW17 SW18	PH	*6.5-8.0*	The single surface water pH reading in Wilpinjong Creek at SW16was 8.2, which is above the SW16 trigger levels (6.5 – 8.0), coinciding with the TER release in January.	The pH readings range between 6.7 and 7.2 (20th and 80th percentiles) for downstream Murragamba Creek (SW04). Eastern Creek has pH ranging between 5.7 and 7.2 (20th and 80th percentiles) for SW17. Wilpinjong Creek has pH ranging between 6.4 to 7.0 (20th and 80th percentiles) for SW15 and 6.4 to 7.1 for SW18. The pH values at SW16 range from 6.7 to 7.2 and are within the trigger levels for Wilpinjong Creek defined at this location (6.5 – 8.0). The pH readings at each of the gauges show a slight increase from 2020 through to 2022.	
	EC	*714*	The single surface water EC reading in Wilpinjong Creek at SW16 was 2,160 µS/cm, which is above the SW16 trigger level (714	The EC in Murragamba Creek ranges between 218 and 446 µS/cm (20th and 80th percentiles) for SW04. Eastern Creek has EC	

Location	Trigger Investigation Values (20th / 80th %ile or ANZECC Guideline)		Performance during the Monitoring Period (01/01/2023 – 31/12/2023)	Trend/ Key Management Implications (Monitoring Period 01/01/2019 – 31/12/2023)	Implemented / proposed Management Action
			µS/cm). The single EC readings at SW15 and 12 readings at SW21 were generally consistent with the historical data. The single EC readings at SW4 and SW16 were elevated above historical data. All exceedances coincided with the TER in January.	ranging between 206 and 513 µS/cm (20th and 80th percentiles) for SW17. Wilpinjong Creek has EC ranging between 125 to 188 µS/cm (20th and 80th percentiles) for SW15 and 180 to 440 µS/cm at SW18. The EC reading at SW16 range from 137 to 225 µS/cm and are within the trigger levels of 714 µS/cm defined at this location.EC results at Murragamba Creek and Eastern Creek show a slight reduction across the 2018 to 2022 period. EC at SW16 is generally within the EC trigger level, with exception of two readings in December 2022 and January 2023. During this period, releases associated with the TER have influenced monitoring results.	
	Turbidity	*25*	The single turbidity reading in Wilpinjong Creek at SW16 was 5 NTU, which is below the SW16 trigger level (25 NTU). All other turbidity readings were consistent with historical data.	Murragamba Creek has turbidity readings between 10.0 and 50.1 NTU (20th and 80th percentiles) for SW04. Eastern Creek has turbidity readings between 24.7 and 69.3 NTU (20th and 80th percentiles) for SW17. Wilpinjong Creek has a turbidity ranging between 12.5 to 48.4 NTU (20th and 80th percentiles) for SW15 and 9.2 to 50.3 NTU at SW18. The turbidity readings at SW16 range from 9.7 to 31.1 NTU. Several readings at	

Location	Trigger Investigation Values (20th / 80th %ile or ANZECC Guideline)		Performance during the Monitoring Period (01/01/2023 – 31/12/2023)	Trend/ Key Management Implications (Monitoring Period 01/01/2019 – 31/12/2023)	Implemented / proposed Management Action
				SW16 exceed the trigger level set for this location. High readings in turbidity are tied to the extended dry periods followed by the intermittent flows. There is a slight reduction in turbidity at these locations over the last five years.	
Drainage Line 1 & 2 SW23* SW24*	pH	*6.5 – 8.0***	Due to being dry during the reporting period no sample was taken.	ND	
	EC	*350***	Due to being dry during the reporting period no sample was taken.	ND	
	Turbidity	*25***	Due to being dry during the reporting period no sample was taken.	ND	

* Monitoring site associated with trigger investigation levels
** Triggers will be applicable from the commencement of LW406
ND No data (i.e. less than 24 monitoring points)

7.3.1.4 Rainfall Event Sampling

As per MCO's approved SWMP, rainfall sampling is undertaken where rainfall exceeds 30mm in 24 hours. During the reporting period, there were two occasions where rainfall events triggered the requirement to collect additional water samples. All samples were collected within the prescribed timeframes.

7.3.2 WATER DISCHARGES

MCO is licensed to discharge water in accordance with its Environment Protection Licence (EPL 12932) subject to various water quality and rainfall criteria.

During the reporting period MCO released water from EPA Licenced Discharge Points 1, 53 and 54. A total of 3,438 megalitres of water were released from MCO during 2023. All compliance limits were met during releases. Discharge results are presented in **Figure 12** to **Figure 24**. A summary of discharge results is provided in **Appendix 3F**.

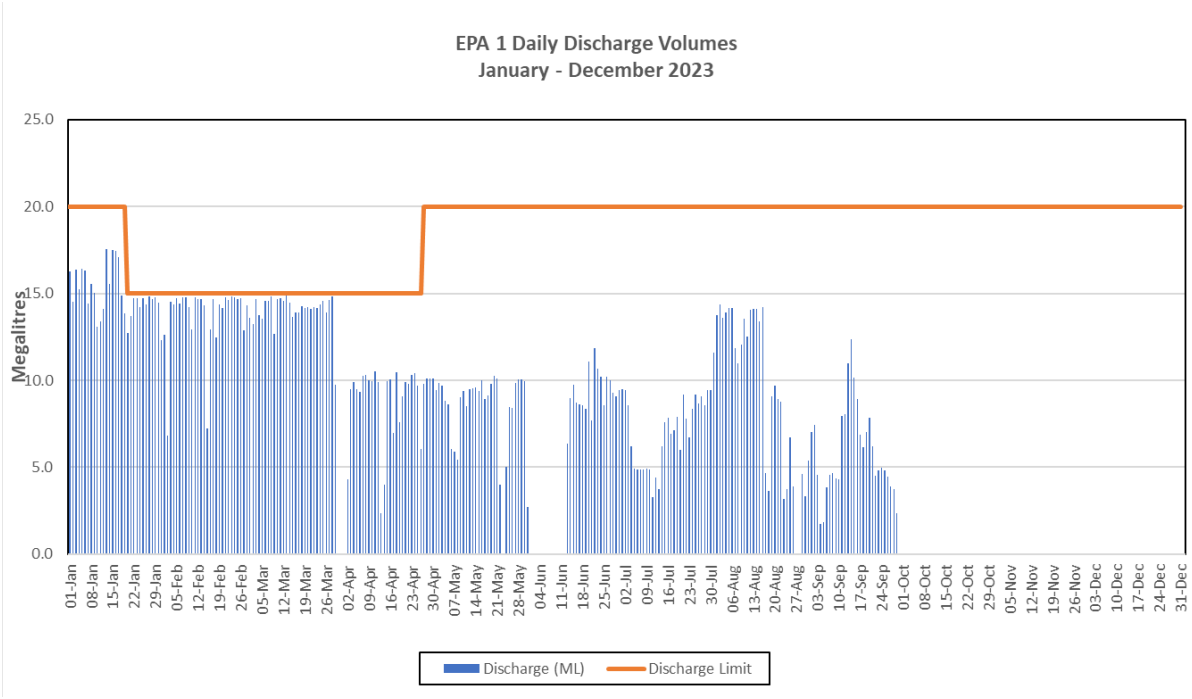


Figure 10 Daily Discharge Volumes[1] EPL LDP 1

1 As per the EPL 12932 variation approved 27 April 2023 the daily discharge volume limit increased to 20 ML/d.

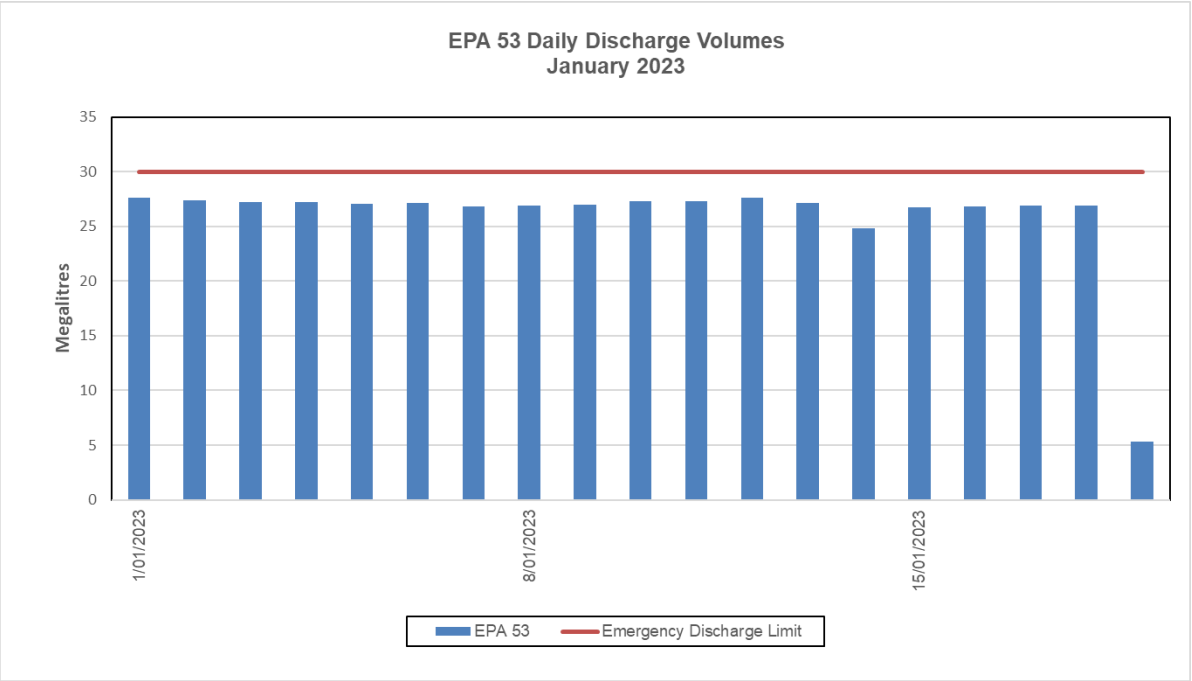


Figure 11 Daily Discharge Volumes EPL LDP 53

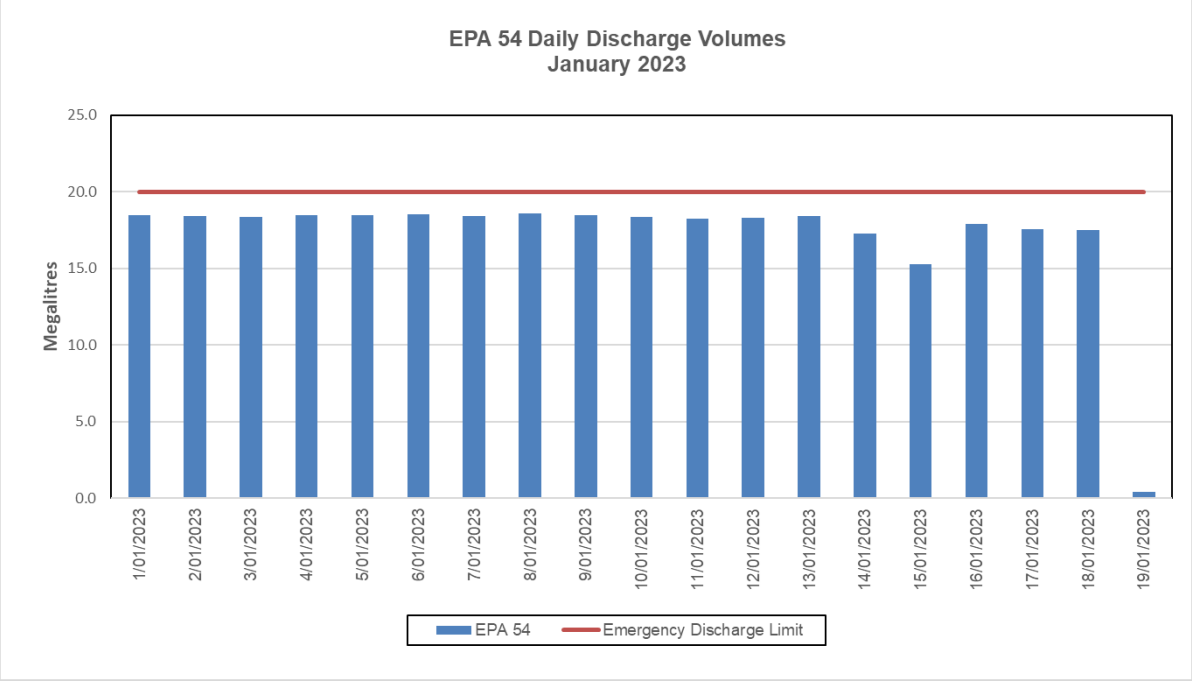


Figure 12 Daily Discharge Volumes EPL LDP 54

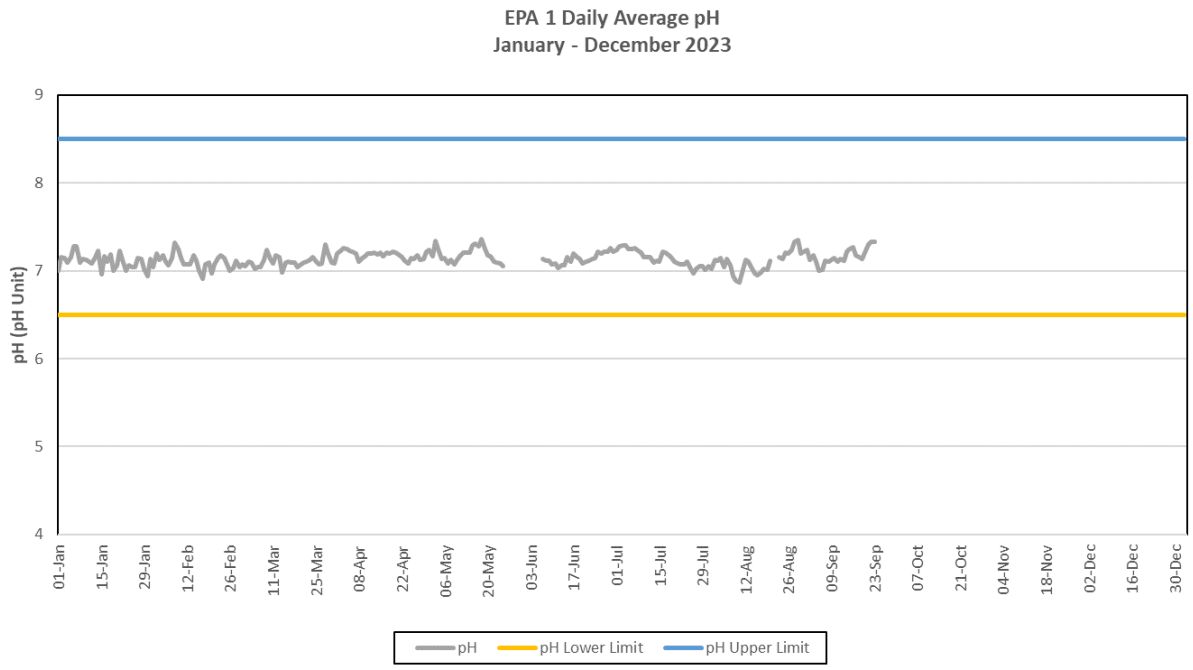


Figure 13: EPL LDP 1 Daily Average pH

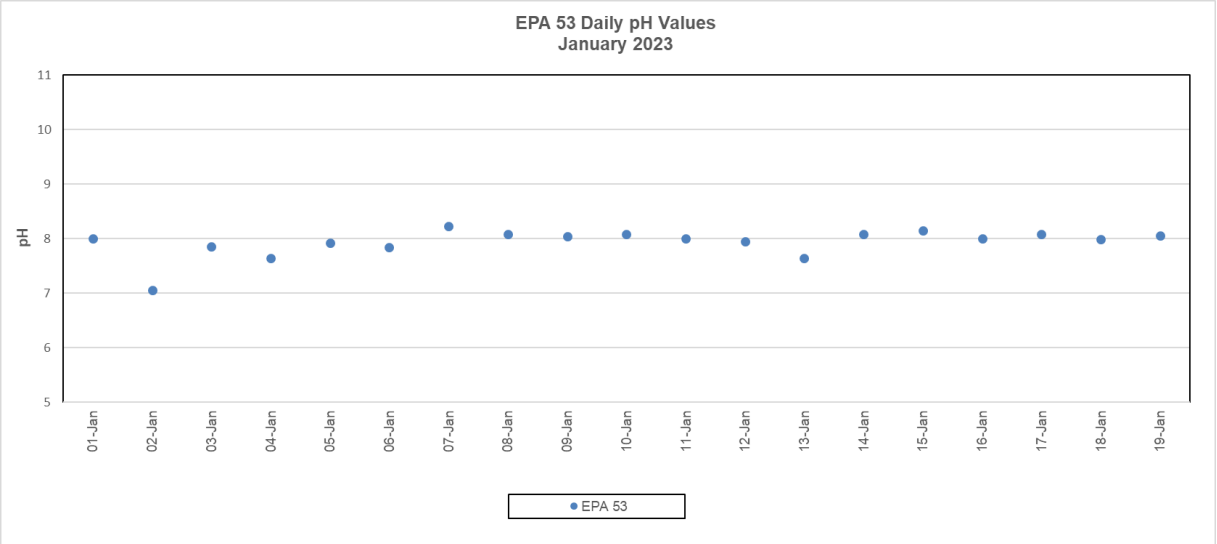


Figure 14: EPL LDP 53 Daily pH

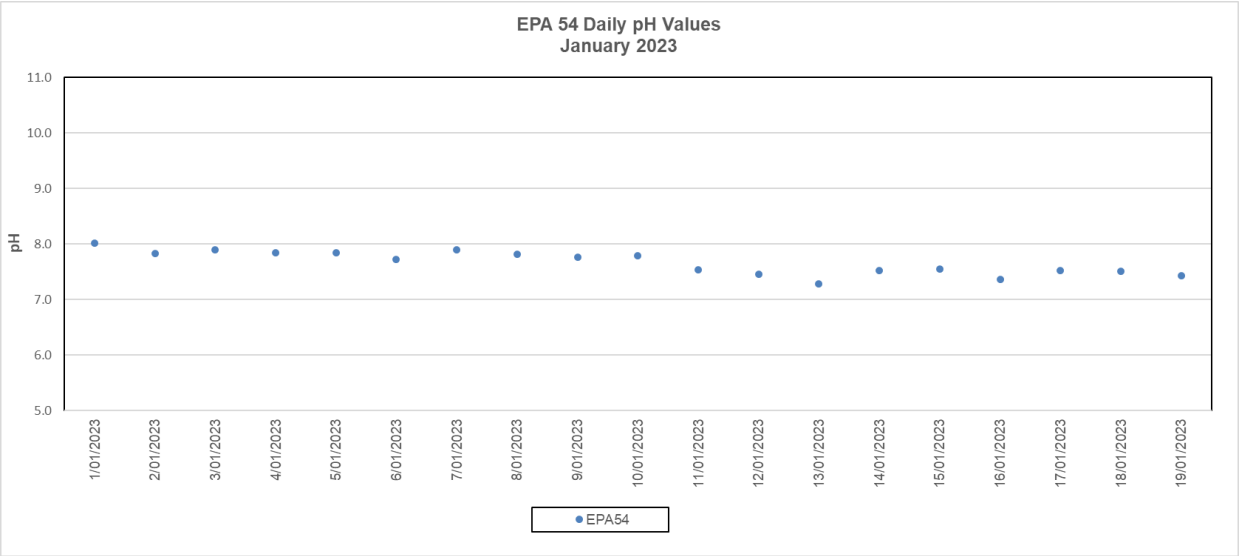


Figure 15: EPL LDP 54 Daily pH

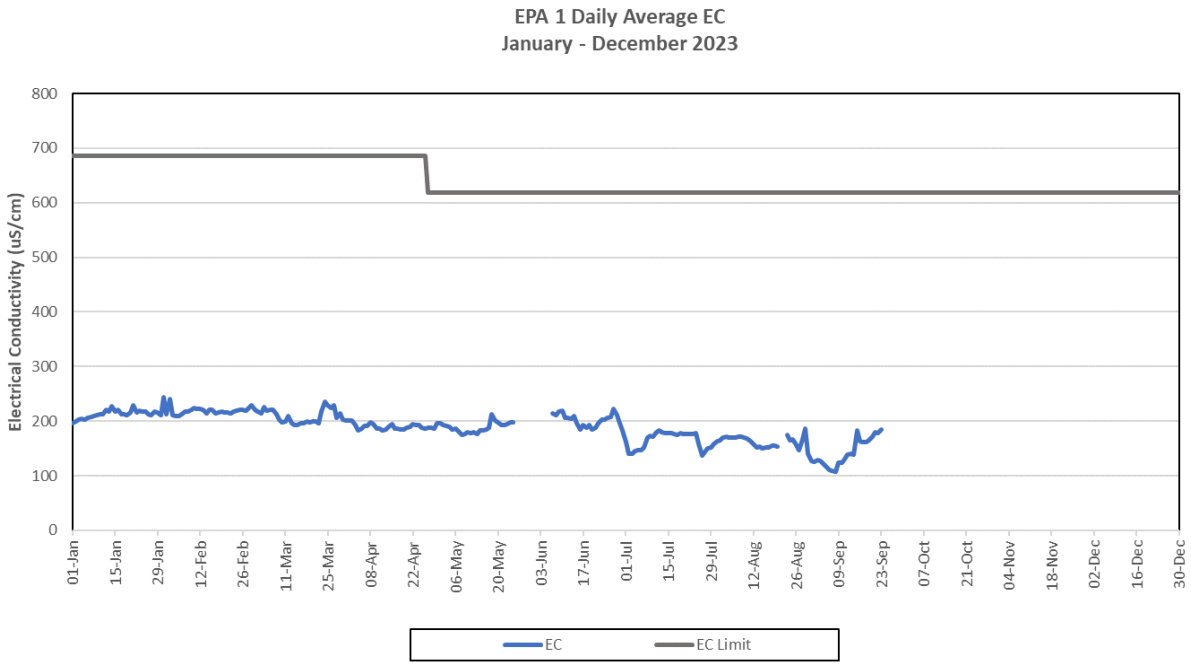


Figure 16: EPL LDP 1 Daily Average EC[2] (µs/cm)

[2] As per the EPL 12932 variation approved 27 April 2023 the Electrical Conductivity limit reduced in accordance with the Independent Water Quality Assessment.

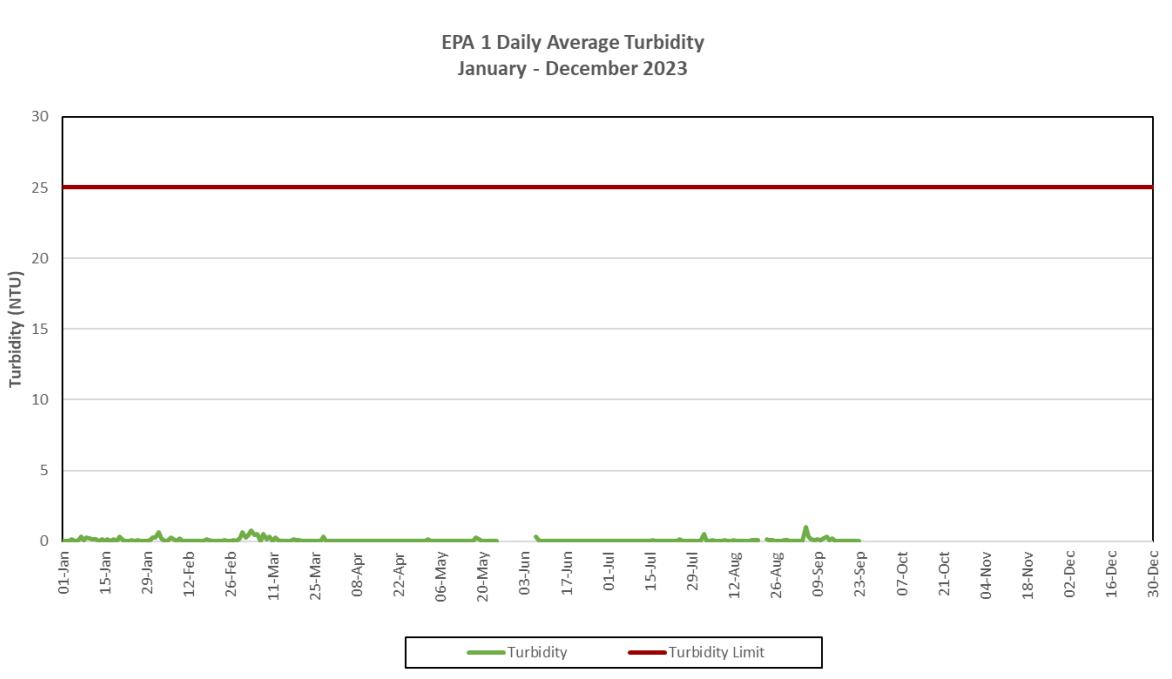


Figure 17: EPL LDP 1 Daily Average Turbidity (NTU)

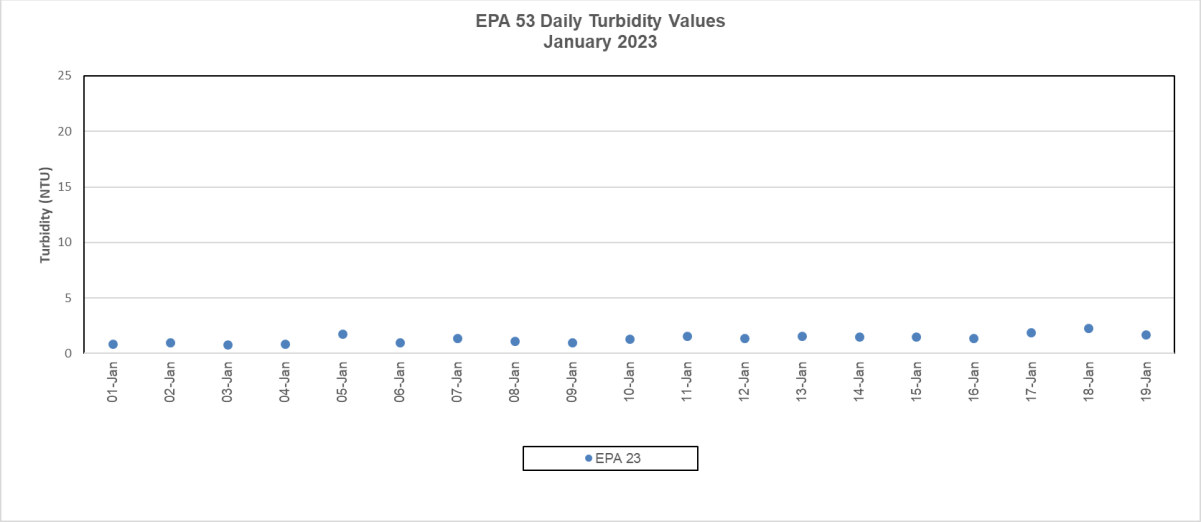


Figure 18: EPL LDP 53 Daily Turbidity (NTU)

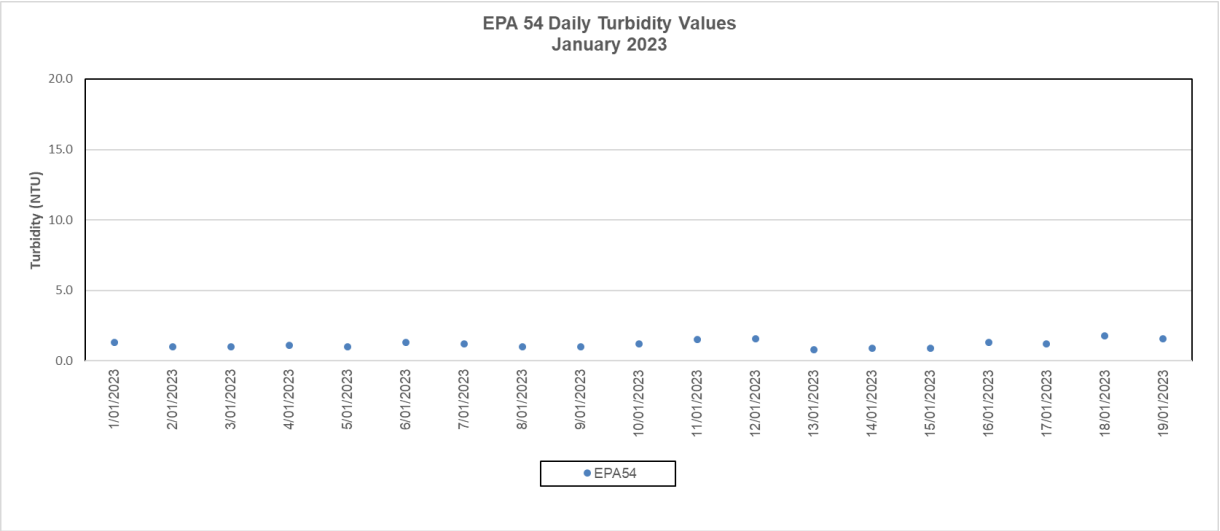


Figure 19: EPL LDP 54 Daily Turbidity (NTU)

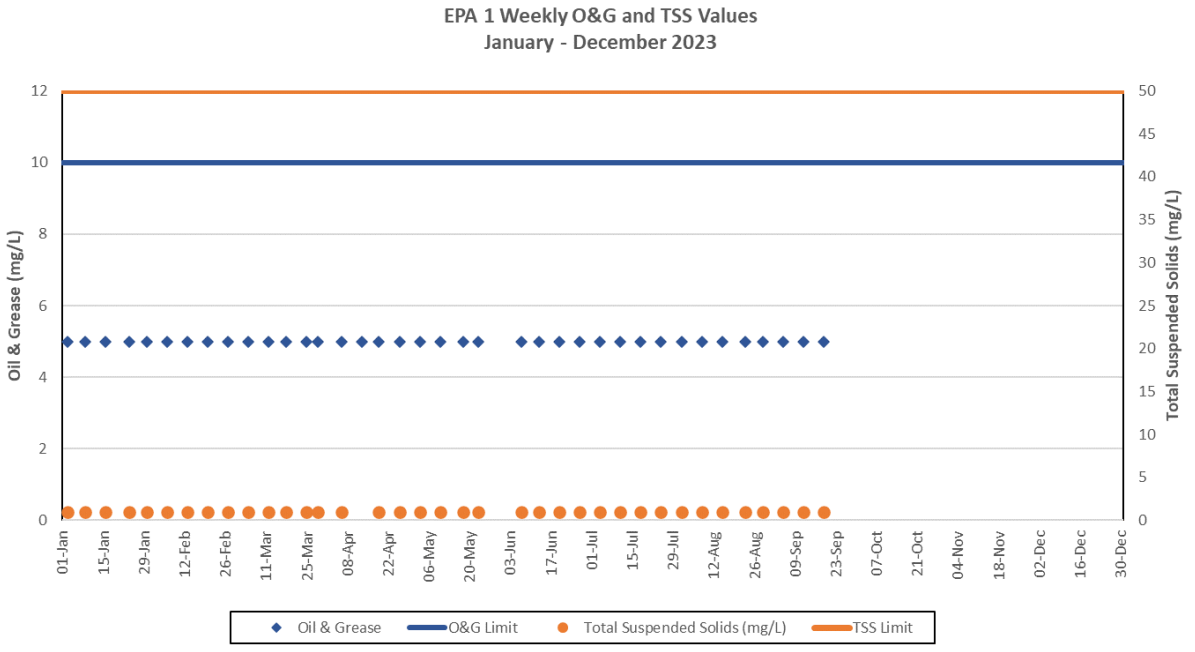


Figure 20: EPL LDP 1 Weekly Oil & Grease and Total Suspended Solids (mg/L)

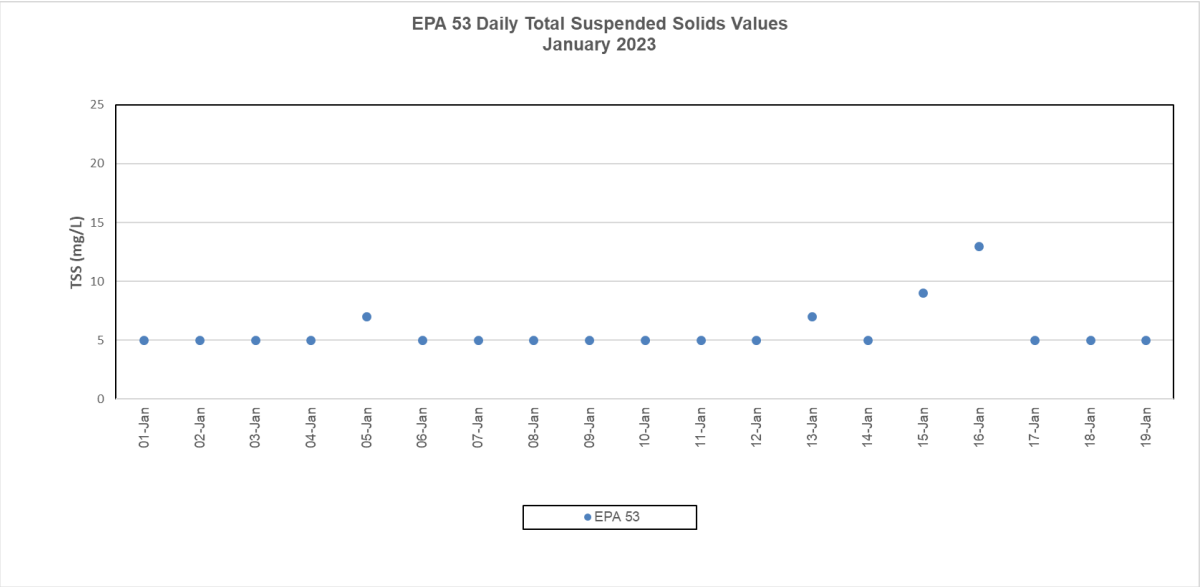


Figure 21: EPL LDP 53 Total Suspended Solids (mg/L)

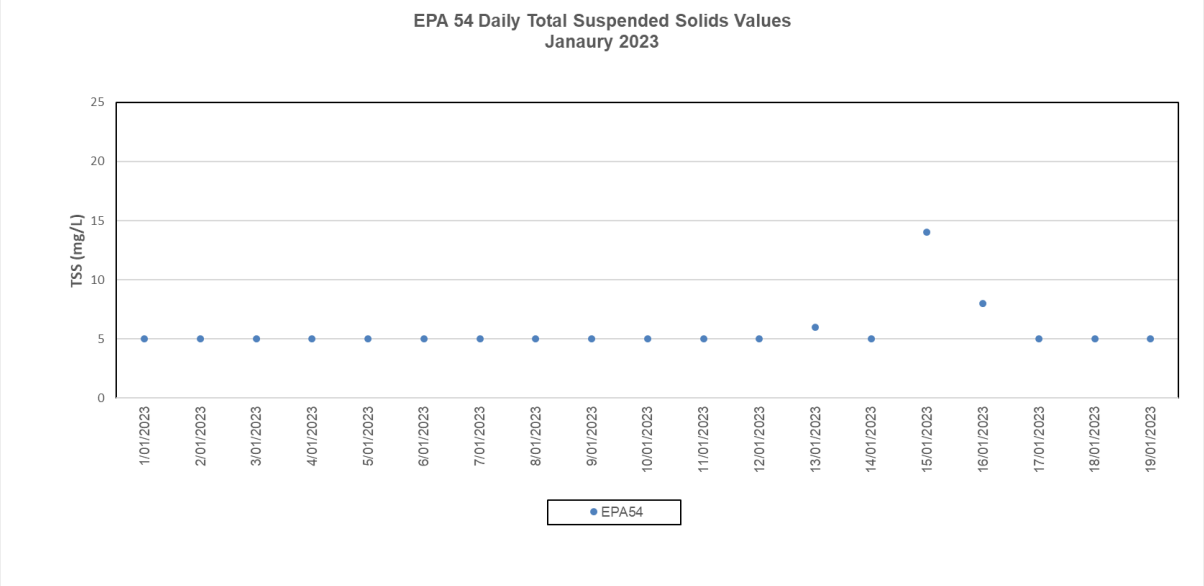


Figure 22: EPL LDP 54 Total Suspended Solids (mg/L)

7.3.3 STREAM HEALTH MONITORING

Stream health monitoring was undertaken in autumn and spring 2023 including Aquatic Habitat Condition (RCE Index), Aquatic Macroinvertebrate Diversity and Pollution Tolerance SIGNAL2 Scores. Trigger investigation values have been incorporated into the SWMP with investigations triggered when values fall below the trigger value. Scores from the autumn and spring monitoring programs all identified above these values.

The MCO Stream Health autumn 2023 field survey was undertaken between the 3rd and 6th April and the spring 2023 survey between the 17th and 20th October. The 2023 sample year was characterised by a shift in the prevailing wet weather patterns experienced in 2022 to below average rainfall and prolonged dry conditions in 2023. The October 2022 to January 2023 period produced consistent rain

events totalling 422mm (well above the combined average total of 254mm), however the following two months leading into the autumn 2023 survey were generally dry with only 61mm rain recorded.

Eastern Creek site SH16 in the Wilpinjong Creek catchment was dry for both surveys in 2023 which is the first time this site had been dry since the spring 2019 survey was undertaken during the peak of the drought. Whilst upper Moolarben Creek site SH21 supported surface flows in autumn 2023, the site was completely dry for the spring 2023 survey.

Surface water in Bora Creek site SH04 (a tributary to the Goulburn River) and Wilpinjong Creek catchment sites SH15 and SH14 was limited to isolated refuge pools for both surveys, and for the latter two sites the extent of surface waters receded significantly over consecutive surveys in 2023. Each of the remaining site samples supported continuous surface flows throughout their respective site reaches for both surveys.

Summaries of stream health index results for all monitoring are provided below.

7.3.3.1 Autumn 2023

Aquatic Habitat Condition (RCE Index) – The autumn 2023 RCE values ranged between 47% and 81% over all monitoring sites (**Figure 3-e**). In comparison to the previous spring 2022 survey, there were changes to RCE category scores at eight of the 15 monitoring sites, four of which were owing to minor fluctuations in the relative levels of filamentous green algae between surveys only. Bora Creek site SH01B recorded the overall highest change to RCE score in autumn 2023, due to improvements in channel sediment related categories; 'channel sediment accumulations', 'stream bottom' and 'stream detritus', and indicative of a continued recovery and stability of channel condition post flood impact in spring 2022. Goulburn River site SH02 and Ryans Creek site SH12 both recorded improved scores for 'stream bottom' owing to decreases in the quantities of fine sediments or silts between surveys, whereas SH13 recorded a slight decrease due to increased quantities of silts in backwater areas.

Aquatic Macroinvertebrate Diversity – The autumn 2023 site macroinvertebrate diversity values ranged between 18 taxa SH14 and 31 taxa at SH20 (**Figure 3-e**), and were above the established trigger values at SH02, SH06 and SH17. Of the nine sites for which pre-mining mean values exist, SH01B and SH02 were the only sites to record macroinvertebrate diversity values below their respective pre-mining average values in autumn 2023. Excluding the new sample sites in upper Moolarben Creek (SH21 and SH22), the autumn 2023 mean (± standard deviation SD) site taxa diversity for the long-term monitoring sites (25.4 ± 4.4 taxa per site) was lower than that recorded in spring 2023 (29.4 ± 3.6 taxa per site), which was the highest mean diversity recorded to date (since 2014).

Pollution Tolerance SIGNAL-2 Scores – The autumn 2023 SIGNAL-2 values ranged between 3.12 at SH04 and 4.42 at Ryans Creek site SH12 (**Figure 3-e**). The SIGNAL-2 values at SH02, SH06 and SH17 were above established trigger levels. All sites for which pre-mining average values exist recorded higher SIGNAL-2 scores in autumn 2023 compared to pre-mining average values, despite Bora Creek recording its lowest SIGNAL-2 value since spring 2010. Whilst the overall mean site SIGNAL-2 value for autumn 2023 (3.89 ± 0.38) was lower than the previous spring 2022 survey value (4.07 ± 0.33 - the highest to date), it remains higher than the other survey mean values recorded since autumn 2017.

7.3.3.2 Spring 2023

Aquatic Habitat Condition (RCE Index) – The spring 2023 site RCE scores ranged from 48% at SH20 and 84% at SH23 (**Figure 3-e**). When compared to the autumn 2023 survey, there were changes recorded to RCE scores at seven of the 14 sites. The majority of changes were attributable to changes in the levels of category scores for 'aquatic vegetation' (macrophytes or algae) between surveys and for the most part, the source of variation was due to decreases in the distribution of aquatic vegetation, mainly common reed (*Phragmites australis*) and cumbungi (*Typha sp*) within site reaches. There were variable causes for the observed decreases in macrophyte coverage, including drying of channel pools (SH14 and SH15), die-back or macrophyte stands (SH05, SH13 and SH20) or trampling and destruction by wild pig activity (SH10, SH20). Whilst the overall setting of new sample site SH23 is consistent with SH02 (both contained within Goulburn River National Park), SH23 recorded a slightly higher RCE score due to the higher proportions of gravels compared to sandy sediments.

Aquatic Macroinvertebrate Diversity – The spring 2023 site macroinvertebrate diversity ranged from 18 taxa at SH04 to 34 taxa at SH22 (**Figure 3-e**) and were above the established trigger values at sites SH02, SH06 and SH17 and as for autumn 2023, sites SH01B and SH02 were the only sites to record diversity values below their respective pre-mining average values for sites at which pre-mining values exist. Murdering Creek site SH22 recorded its highest diversity since its inclusion in the stream health monitoring program in autumn 2022, and new downstream Goulburn River sample site SH23 recorded the overall highest taxa diversity amongst Goulburn River catchment sites (33 macroinvertebrate taxa). For the long-term monitoring sites, the overall spring 2023 mean site taxa diversity (26.1 ± 4.3 taxa per site) was consistent with that recorded during the post-drought monitoring period in spring 2020 to autumn 2022 (range of 24.6 to 26.2 taxa per site).

Pollution Tolerance SIGNAL-2 Scores – The spring 2023 SIGNAL-2 values ranged between 3.21 at SH14 and 4.57 at SH12 (**Figure 3-e**), and were above the established trigger values at sites SH02, SH06 and SH17. Three sites recorded their highest SIGNAL-2 values to date, including SH20 (4.39), SH22 (4.13) and SH15 (3.91), however new site SH23 recorded the overall lowest SIGNAL-2 values among the inline Goulburn River sites (3.78). The spring 2023 mean site SIGNAL-2 value (3.92 ± 0.45) was consistent with the autumn 2023 survey mean value.

7.3.3.3 Trends

Following on from the consistent precipitation which produced record rainfall totals in 2022, weather patterns in 2023 were characterised by increasing frequency of dry spells and declining rainfall totals on a month-to-month basis.

The site RCE results vary between sub-catchments due mostly to the surrounding land-use with the more forested sites in the lower catchment area (Goulburn River) scoring higher than sites situated in historically agricultural zones (upper Moolarben Creek and Wilpinjong Creek). Most of the inter-seasonal variations in RCE scores over recent times have been attributed to fluctuations in the levels of aquatic vegetation between surveys or flow event impacts to channel sediments or detritus. Most of the study site RCE scores have remained fairly consistent over the five-year period.

The macroinvertebrate taxa diversity results have fluctuated at all sites over the last five years with most sites recording generally lower diversity results throughout the drier periods (2019) compared to the post drought recovery (2021 to 2022). Since 2021 all of the long-term sites have consistently recorded relatively high SIGNAL-2 values compared to the pre-mining condition.

There were no indications of MCO mine-related impacts to stream health or aquatic habitat conditions in 2023, with differences between sites generally relating to changes to the prevailing climatic conditions and its impact on the study area aquatic and riparian habitat attributes.

7.3.4 CHANNEL STABILITY MONITORING

The channel stability monitoring program occurred between 14 and 16 of November 2023 at locations in **Appendix 2**. Monitoring involved visual and written observational surveys of erosive and depositional features, cross sections at strategic locations and photographic records.

7.3.4.1 Monitoring results

Bora Creek channel stability monitoring results are comparable with previous monitoring. Continuing vegetation coverage and longitudinal morphology along Bora creek, combined with no significant flow events, have contributed to an improved average activity rating. In particular, two sites have improved from 'Potentially Stabilising' to 'Stable'.

Moolarben Creek channel stability monitoring trend is considered comparable to the results previously recorded. Continuing vegetation coverage was noted at several assessment locations along Moolarben creek. Post the January 2023 TER, no significant negative impacts appear to have occurred. In many locations, the shape of the cross-section score has increased, contributing to an improved average activity rating. In particular, one site improved from 'Stable' to 'Very Stable', three sites have improved from 'Potentially Stabilising' to 'Stable' and two sites have improved from 'Active' to 'Potentially Stabilising'.

Murragamba Creek channel stability monitoring trend is considered comparable to the results previously recorded. Minor improvements to activity scores for two sites along Murragamba Creek have resulted in a minor increase in the average activity rating. No significant changes were noted in the 2023 assessment of Murragamba Creek compared to the 2022 assessment.

Wilpinjong Creek channel stability monitoring results trend is considered comparable to the results previously recorded. A decrease in vegetation coverage was noted at many assessment locations along Wilpinjong creek, including both the creek walls and floor. Post the January 2023 TER, no significant negative impacts appear to have occurred as a result. In many locations, the shape of the cross-section score has increased. One site improved from 'Potentially Stabilising' to 'Stable', One site improved from 'Very active' to 'Active', whilst one site decreased from 'Potentially Stabilising' to 'Active', and another downgraded from 'Active to 'Very Active'. The decrease in vegetation was the only contributing factor to the lower scores.

Eastern Creek channel stability monitoring results identified continuation of morphological processes identified in previous monitoring. Whilst some improvement in longitudinal morphology along Eastern creek was noted, contributing to a minor increase in the average activity rating, neither of the two sites had a change in their overall status.

7.3.4.2 Trends

Channel stability within each creek was variable during the period. Locations vulnerable to erosion were characterised by steep banks, little vegetative cover and exposed dispersive subsoil, situated in historically agricultural zones (upper Moolarben Creek and Wilpinjong Creek). More stable locations were characterised by vegetated banks with low gradient slopes in more forested areas. Fluctuations in trends can be attributed to changing climatic conditions with consecutive above annual average

rainfall throughout 2020 until 2022, with 2023 characterised by increasing frequency of dry weather and declining rainfall totals on a month-to-month basis. The average activity score for the monitoring locations along each reporting program has had a category change in the average activity rating in the previous four years.

7.3.5 EFFLUENT

During the period MCO continued to operate four sewerage treatment plants. Discharge quantity was within design limits during the period. Discharge quality is presented in **Appendix 3F**.

7.4 GROUNDWATER

MCO monitors a network of piezometers comprising standpipe bores and vibrating wire piezometers (VWPs) in accordance with the Groundwater Management Plan (GWMP). The monitoring program includes monthly monitoring of standing water level in standpipes, and daily pressure readings for vibrating wire piezometers (VWPs) which are downloaded each month. Groundwater level and quality trigger values have been established that when exceeded determine the need for investigation and possible response actions. Groundwater level triggers are assigned in the Alluvial and Triassic sandstone aquifers. The Permian coal measures does not include water level triggers as it is already extensively affected by past mining and is predicted to undergo further impact from ongoing mining and contains groundwater of generally poor quality. Water quality triggers are assigned in standpipes in major strata units.

The Environmental Assessments of the Moolarben Coal Mine predict impacts to groundwater due to MCOs operations. Response triggers for groundwater levels within Quaternary alluvium and Triassic Sandstone aquifers take account of the minimal impact considerations in the Aquifer Interference Policy (DPI, 2012). Monitoring frequency and response triggers have been implemented to identify trends that could potentially lead to a private bore being impacted above the Aquifer Interference Policy considerations (i.e. greater than 2 m drawdown).

7.4.1 GROUNDWATER LEVELS

During the reporting period MCO continued to observe mining impacts to groundwater levels for approved MCO open cut and underground operations and regional depressurisation due to neighbouring operations. During the reporting period there was below average rainfall for most of the year except for November – December 2023, which contrasts with the above average rainfall experienced for the previous three years. This is represented by the decreasing Cumulative Rainfall Departure (CRD) trend for most of 2023 compared to a rising trend for 2020 – 2022 as shown on **Figure 23**. The rainfall data used in **Figure 23** is SILO drill data (interpolated rainfall quantities) at the Moolarben mine site (Latitude -32.30; Longitude 149.80).

MCOs mining operations during the period included mining in open-cuts OC1, OC2, OC3, and OC4 and secondary extraction in UG4 LW402 and LW403 and development of first workings in UG4 (**Figure 3**). There is a long history of mining at the neighbouring Ulan Coal Open-cut and Underground, and at the Wilpinjong Coal Mine. Mining operations continued at both mines during the period.

Standing water level/pressure elevations for all piezometers within hydrogeological units for the period are presented as time-series plots in **Appendix 3G**. Water levels of trigger piezometers with exceedance limits are also provided in **Appendix 3G**. Investigation triggers, along with monitored groundwater levels are presented in **Table 25**.

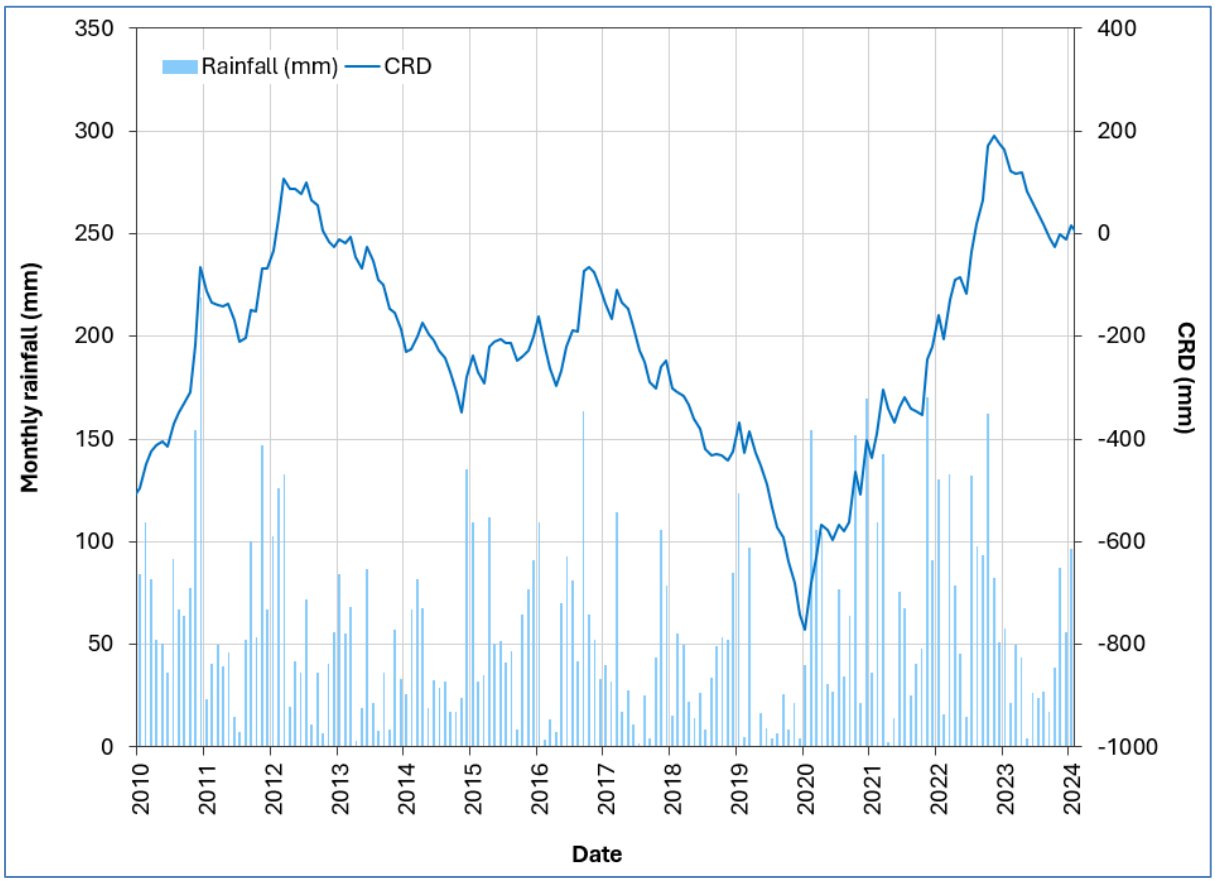


Figure 23: Rainfall and CRD (SILO interpolated data – Moolarben Coal Complex)

Groundwater levels in the Ulan coal seam and Permian coal measures are extensively affected by past mining and are predicted to undergo further impact from mining at Moolarben and neighbouring operations. During the period, the Ulan Seam levels were influenced by open cut and underground mining, neighbouring operations and in some cases rainfall recharge. The influence of UG4 secondary extraction, progressive UG4 development and open cut operations continued over the period. Apart from monitoring site PZ186, all nested piezometer sites show greater drawdowns inferred in deeper stratigraphic units (mainly monitoring from the Ulan seam) becoming smaller up through the Permian overburden which implies downward leakage from depressurisation of the Ulan Seam.

The largest groundwater drawdowns in the Ulan seam during the period are observed at close proximity to the underground operations as they progress down dip (northeast), including development of the UG4 mains on the western side of UG4 and backroads on the eastern side. This can be seen in Ulan Seam piezometers PZ105A, PZ192 and PZ193 located north of the current UG4 mining. PZ193, the closest piezometer to UG4 mining is located between panel LW406 and LW407 and provided an observed drawdown of 18 m over the period, while PZ105A located approximately 2.3 km further to the north of PZ193 provided an observed drawdown of 5.3 m over the period. Groundwater drawdown is expected to continue to propagate in an east to north easterly direction over time.

Climatic influences continued to be observed in Ulan Seam piezometers in areas in the vicinity of subcrop such as PZ003 and PZ217 located to the east of OC3 with level decreases of 1.2 m to 1.9 m which coincides with a declining CRD trend over the period. Ulan Seam piezometer PZ111 which is

located between MCO and Wilpinjong continued to decline in water level with a drawdown of 6 m over the period.

The Permian overburden exhibited a range of responses in groundwater level over the period associated with proximity to mining, strata interval monitored and location. Drawdown of the Permian overburden generally continued during the period due to underground development and OC4 progression, as observed in PZ101 and PZ186 Permian nested VWPs. Drawdown generally decreases with distance from the operations, although there are exceptions of some areas, particularly, the shallow Permian overburden cover which is influenced by rainfall recharge. Climatic influences on Permian overburden groundwater levels have been observed in several piezometers. At UG1, the coal measures are depressurised locally due to previous mining activities, although rising groundwater pressures were recorded in the shallow Permian sediments above UG1 in some piezometers (PZ 130 VWP 38.5m and PZ170) from mid-2022 to the end to early 2023. This rise in groundwater pressures is likely in response to the above average rainfall conditions recorded at the MCC leading up to the beginning of 2023. Also to the southeast of OC4 groundwater levels were observed to rise slightly in PZ106A, PZ112B and PZ137 during the second half of 2022 and then declining in 2023 which correlates to the CRD trend.

In some locations piezometers in the upper Permian overburden exhibited stable pressures while deeper piezometers were observed to decline, as was observed in the nested piezometer PZ105A at 28 m and 80 m depth. This nested piezometer is located over 2.5 km north of UG4 longwall mining. In other locations, particularly in proximity of open cut or longwall mining the decline in piezometric level has continued up to relatively shallow depths as the case of nested piezometer PZ186 with decline observed at 40, 65 and 80 m depth.

Permian overburden piezometer PZ040B, located adjacent to OC4 showed an increase in the rate of drawdown compared to previous years with a drawdown of 11 m during the period. A stepped drawdown behaviour has occurred in piezometers PZ186 and PZ189 and possibly PZ40B within the Permian overburden near UG1 since as far back as 2018. The stepped progression is likely due to the removal of each UG1 longwall panel, with the last step occurring in mid 2022 close to the time UG1 cease operations.

Groundwater levels in GWMP Triassic sandstone piezometers remained relatively stable over the period with the exception of VWP PZ192_68m which is located at northeast corner of UG4 longwall panel LW408 which continues to show a decline during this period from UG4 mining. The decline in pressure level of PZ192_68m over the period was 1.7 m. Piezometer PZ105C shows over the long-term a subdued response from climatic conditions and during the period declined by about 0.4 m which correlates with a declining trend of the CRD. No Triassic water level triggers were exceeded during the period.

In the Tertiary paleochannel sediments located northeast of UG1 groundwater levels continued to decline at PZ213, PZ214, PZ188 and PZ186A ranging from 0.7 m to 1.4 m during the period. The groundwater level in PZ213 exceeded the trigger level and an investigation by a third party was undertaken according to the GWMP Trigger Action Response Plan (TARP).

Tertiary paleochannel piezometer PZ203 long-term groundwater trend shows a correlation with climatic conditions and there was observed a decline of 0.8 m during the period which correlates to the declining CRD trend during 2023. This piezometer is located adjacent OC4.

In the Marrangaroo Conglomerate there has been observed drawdown in piezometer PZ102A which is located close to the Ulan operations and adjacent to UG4 Longwall panel LW408 which showed steady decline since 2021, departing from CRD trend, which coincides with initial mining of UG4. Piezometer PZ055 which is located west of OC1 has stable groundwater levels over the long-term.

Groundwater levels in the Ulan Granite at PZ044 exhibited a declining trend during the period consistent with the decreasing CRD trend. The decline in groundwater level at PZ044 was 3.9m during the period.

7.4.2 GROUNDWATER QUALITY

Groundwater quality monitoring is undertaken at standpipe piezometers in accordance with the GWMP. The monitoring network covers the major hydrogeological units and are broadly distributed across the project area. Parameters include physical parameters, major cations and anions, dissolved metals and nutrients. Site specific triggers for acidity (pH) and electrical conductivity (EC) have been developed for Alluvial and Triassic aquifers across the Moolarben Coal Complex. A review of the groundwater quality performance is provided in **Table 26**. Water quality results from all piezometers are provided in tabulated format and EC/pH of trigger piezometers are provided on time series plots in **Appendix 3G**.

The Ulan Seam and Permian Coal measures water quality for the period is generally consistent with previous monitoring results with no clear trends. PZ170 EC remained lower than historical data. PZ101B EC has maintained pre-2021 levels around 800µs/cm.

Triassic water quality was consistent with historical results. PZ101C EC has remained steady for the period with results similar consistent with historic level. Alluvium and Tertiary paleochannel water quality were generally consistent with historical results with the exception of PZ058A. Piezometer PZ058A measured EC levels continue to decline below the historical range of approximately 15,000-16,000 µs/cm which occurred in 2017 to April 2020 during the drier period of below average rainfall. The decline in EC at PZ058A coincided with above average rainfall which occurred between 2020 and 2022 and may be influenced by dilution from rainfall recharge. During 2023, which was a drier year with rainfall below average, the EC continued to decline. The EC at PZ058A is significantly higher than surrounding locations (including deeper stratigraphic units) and indicates a poor connection to the broader paleochannel. Water quality of the Marrangaroo Conglomerate in PZ044 and Ulan Granite in PZ055 were consistent within the range of historic levels.

7.4.3 PRIVATE GROUNDWATER USERS

MCO had negligible impact on private groundwater users during the reporting period. No compensatory water supply was required or supplied during the period.

7.4.4 POTENTIAL IMPACTS TO THE DRIP

The Drip is located over 3.5 km from current MCO mining operations. There is no evidence indicating that The Drip is being impacted by MCC operations.

7.4.5 ACTIONS FOR NEXT REPORTING PERIOD

During the next reporting period the following actions are proposed:

- Revision of water level triggers for Tertiary paleochannel piezometers PZ213, PZ214 and PZ188.
- Review, revise, and expand if required the Groundwater monitoring program as part of the next Groundwater Management Plan Review.
- Consider decommissioning of PZ058A as part of next Groundwater Management Plan Review.
- WAMP to be reviewed and revised as necessary.
- Monitoring network above UG2 and UG4 to continue be expanded.

Table 26: Water Levels – Triassic, Alluvium and Paleochannel Bore Performance

Location	Investigation Trigger Level (mAHD)	Minimum 2023 Groundwater Level/Pressure (mAHD)	Trend/ Key Management Implications	Implemented/proposed Management Action
Alluvium, Paleochannel and Marrangaroo Bores				
PZ55	418.1	423.8	Below average annual rainfall resulted in a decreasing CRD with exception of November – December 2023 which had greater than average rainfall. The previous three years (2020 – 2022) had generally above average rainfall. Piezometers in the vicinity of mining operations exhibited groundwater level reductions during the period. Groundwater level reductions continued at Tertiary paleochannel piezometers PZ213, PZ214, and PZ188 with 0.7 to 1.4 m observed since last year likely in response to MCO operations. PZ203 level declined by 1.3 m which is likely a response to below average rainfall as water level in this piezometer exhibits subdued response to rainfall trends. Overall groundwater level trends were generally consistent with groundwater model predictions, with actual drawdown occurring earlier than modelled and observed drawdown in Tertiary paleochannel above model predictions in close proximity to mining operations. Groundwater level/pressure monitoring indicate that MCO had negligible impact on private groundwater users. Groundwater monitoring results and level trends can be found in **Appendix 3G.**	Continue monitoring program. A third-party investigation was undertaken for the PZ213 trigger level in accordance with the TARP in the GWMP. MCO will revise the trigger levels of PZ213, PZ214 and PZ188 in consideration of saturated depth of paleochannel sediments. MCO will review and if necessary, revise, the GWMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively. Monitoring results to be included in the next periodic model validation and recalibration where required. During the reporting period MCO continued to maintain the groundwater monitoring network.
PZ058A	466.4	467.7		
PZ188	409.4	410.5		
PZ203	394.4	402.3		
PZ213	409.7	409.2		
PZ214	409.8	409.9		

Location	Investigation Trigger Level (mAHD)	Minimum 2023 Groundwater Level/Pressure (mAHD)	Trend/ Key Management Implications	Implemented/proposed Management Action
Triassic Bores				
PZ101C	376.8	379.7	Below average annual rainfall resulted in a decreasing CRD with exception of November – December 2023 which had greater than average rainfall. The previous three years (2020 – 2022) had generally above average rainfall. Groundwater levels in all Triassic bores remained stable with overall trends consistent with model predictions and climatic data. Groundwater level/pressure monitoring indicate that MCO had negligible impact on private groundwater users. Groundwater monitoring results and level trends can be found in **Appendix 3G**.	Continue monitoring program. MCO will review, and if necessary, revise, the GWMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively. Monitoring results to be included in the next periodic model validation and recalibration where required. During the reporting period MCO continued to maintain the groundwater monitoring network.
PZ105C	367.4	375.0		
PZ129 (VWP-35m)	385.7 (dry)	389.95		

Table 27: Water Quality Performance

Location	Lithology	Investigation Trigger Level(s)		2023 Performance	Trend/ Key Management Implications	Implemented/proposed Management Action
		pH	EC (µs/cm)			
PZ044	Ulan Granite	5.7 – 7.2	3000	PZ044 and PZ055 water quality was consistent with recent monitoring results. No investigations were triggered.	Water quality for the period was generally consistent with previous monitoring results with some influence from changes in rainfall recharge rate, i.e. dilution or concentration effects. Groundwater quality trends will continue to be monitored. Water quality results from all piezometers are provided in **Appendix 3G**.	Continue monitoring program. MCO will review, and if necessary, revise, the GWMP in accordance with Schedule 5 condition 5 and Schedule 6 condition 5 of PA05_0117 and PA08_0135 respectively. Consider decommissioning of PZ058A as part of next Groundwater Management Plan Review. During the reporting period MCO continued to maintain the groundwater monitoring network.
PZ055	Indurated Conglomerate	5.1 – 6.3	2756			
PZ058a	Tertiary Aged Sediment	2.8 – 4.7	14765	PZ058A continued to record a reduction in EC to 10,800 µs/cm below the historical range of 15-16,000 µs/cm in late 2017 – early 2020. It is possible the EC has been diluted by recharge from the above average rainfall which occurred during 2020 – 2022. No investigations were triggered. PZ188 water quality was consistent with recent monitoring results.		
PZ188	Tertiary Paleochannel	4.7 – 6.9	394			
PZ101C	Lower Triassic	6.1 – 7.7	810	Triassic water quality was consistent with recent monitoring results.		
PZ103C	Lower Triassic	5.2 – 6.8	448			
PZ105C	Lower Triassic	5.3 – 7.4	319			
PZ101B	Permian OB	6.2 – 7.7	928	Permian Coal measures water quality for the period is generally consistent with previous monitoring results.		
PZ109	Permian OB	6.3 – 8.4	1145			

8.0 MINE SUBSIDENCE

MCO undertakes secondary extraction in accordance with the UG1 Longwalls (LW) 101 to 105 Extraction Plan (2020) (the UG1 Extraction Plan) and UG4 Longwalls 401 to 408 Extraction Plan (2022) (the UG4 Extraction Plan). The UG1 Extraction Plan and associated sub-plans were prepared with input from experienced and qualified experts to satisfy Condition 5, Schedule 4 of PA 08_0135. The UG4 Extraction Plan and associated sub-plans were prepared with input from experienced and qualified experts to satisfy Condition 77(a), Schedule 3 of PA 05_0117.

Extraction during the annual 2023 reporting period from 1 January to 31 December 2023 included extraction of the full length of Longwall 402 (1921 m void length) and the full length of Longwall 403 (1996 m void length). The combined total extracted length during the 2023 reporting period was 3,917 m.

During the reporting period MCO continued to conduct monitoring of subsidence lines, flora and fauna habitats, cliffs, landscape features, and built features for LW401 to LW408. Monitoring of subsidence lines, surface water, groundwater, inflows and outflows continued. Built feature monitoring triggers were not exceeded in the period. Post mining inspections were carried out for flora and fauna above LW401 and LW402.

Subsidence monitoring included the 3D ground monitoring K, L, M, S & R lines.

The K Line is a 3D ground monitoring line located along the centreline of LW401 at the longwall finishing end. The base survey was carried out on the 09 July 2022 prior to LW401. During 2023, the monitoring line was surveyed once on 25 January 2023. The survey monitoring results represent the extraction of Longwall 401.

The L Line is a 3D ground monitoring line located along the centreline of LW401 at the longwall commencing end. The base survey was carried out on the 25 June 2022 prior to LW401. During 2023, the monitoring line was surveyed once on 27 January 2023. The survey monitoring results represent the extraction of Longwall 401.

The J Line is a 3D ground monitoring line located along the centreline of LW402 at the longwall finishing end. The base survey was carried out on the 09 July 2022 prior to LW401. During 2023, the monitoring line was surveyed once on 07 November 2023. The survey monitoring results represent the extraction of LW401 and LW402.

The S Line is a 3D ground monitoring line that is orientated transverse to the longwalls. LW402 mined directly beneath the monitoring line during 2023.

The R Line is a 3D ground monitoring line that follows the Ulan Road to the west of the UG4 longwalls. The base survey was carried out on the 29 June 2022 prior to the commencement of LW401. The monitoring line was subsequently surveyed two times during 2023, on 02 February 2023 following the completion of LW401 and on 12 October 2023 during the extraction of LW403. At the latest survey on 12 October 2023, the longwall face position was more than 1,200 m from the R Line. The latest survey results therefore represent the extraction of LW401 and LW402.

The ground movements measured during 2023 were consistent with the predictions provided in the UG4 LW401 to LW408 Subsidence Technical Report (Report No. MSEC1165), which supported the

Extraction Plans for LW401 to LW408. Subsidence impacts during the period were below predictions as shown in **Table 28.**

Table 28 Comparison of maximum observed and predicted vertical subsidence, tilt & strain for the K, L, M, S & R Line.

Survey Line	Type	Maximum vertical subsidence (mm)	Maximum tilt (mm/m)	Maximum tensile strain (mm/m)	Maximum compressive strain (mm/m)
K	Measured	1584	49	13	17
	Predicted	1800	70	> 30*	> 30*
L	Measured	1233	26	11	2.6
	Predicted	1800	35	12*	13*
M	Measured	1778	39	4	13
	Predicted	1800	50	23*	26*
S	Measured	1397	20	7.7	10
	Predicted	1800	30	9.5*	8*

* denotes that the values represent the conventional strains based on the predicted curvatures multiplied by a factor of 10.

The maximum measured vertical subsidence during 2023 is overall less than the maximum predicted values. It is considered that the ground movements measured during 2023 are consistent with the predictions provided in the UG4 LW401 to LW408 Subsidence Technical Report (Report No. MSEC1165), which supported the Extraction Plans for LW401 to LW408. A summary of performance against the relevant subsidence performance indicators and subsidence performance measures (i.e. the subsidence performance assessment), detailed in the UG4 Extraction Plan, and Condition 73, Schedule 4 of Project Approval (05_0117) is provided in **Table 29** and **Table 30.**

Table 29: Assessment of Subsidence Performance Indicators Measures for UG4 – Natural, Heritage and Built Features

Subsidence Impact Performance Measure		Subsidence Impact Performance Indicator	Indicators Exceeded?	Assessment of Subsidence Impact Performance Measures	Performance Measures Exceeded?
Natural and Heritage Features:					
The Drip and Goulburn River Gorge	*Nil impact or environmental consequences*	• Unpredicted loss of water supply to the Drip during LW401 to 408.	**No**	The drip and Goulburn River Gorge are located outside the extents of LW402 and 403 at the end of 2023, at distances greater than 3.7km. It is unlikely that this site experienced measurable ground movements due to the mining. No impacts greater than predicted recorded.	**No**
Goulburn River and the bed of the Goulburn River	*Negligible impact or environmental consequences.* *Remain outside the zone of recorded subsidence damage for longwall mining*	• Unpredicted impacts on Goulburn River (cracking and or noticeable changes in erosion or pools) during LW401 to 408. • Performance indicators for relevant groundwater monitoring sites north of LW408 will be established prior to mining LW405.	**No**	Goulburn River is located outside the extents of LW402 and 403 at the end of 2023, at distances greater than 400m. It is unlikely that the Goulburn River experienced measurable ground movements due to the mining.	**No**
Cliff Line 3	*Minimise subsidence damage*	• Cliff Line 3 impacts due to LW401-408 are less than 1.9m vertical conventional subsidence and 60mm/m conventional tilt.	**No**	Cliff C3 is located outside the mined extents of LW401 at the end of 2022, at distances greater than 1.6km. It is unlikely that this cliff experienced measurable ground movements due to the mining.	**No**
Goulburn River National Park minor cliffs	*N/A*	• Negligible impact due to longwall mining for Minor Cliffs in Goulburn River National Park.	**No**	Nearest known minor cliff CL7 is located outside the mined extents of LW402 and 403 at the end of 2022, at distances greater than 500m. It is unlikely that this cliff experienced measurable ground movements due to the mining.	**No**
Aboriginal heritage sites 264, 282, 283, 286 and 287	*Reduce the likelihood of subsidence damage to low.*	• Aboriginal heritage sites S1MC264, 282, 283, 286 and 287 are located to the north of the Study Area and the likelihood of impacts to these features is considered to be very low. Therefore, no performance indicators for S1MC264, 282, 283, 286 and 287 have been developed for LW401-408.	**No**	No observed impacts due to the extraction of LW401.	**No**

Subsidence Impact Performance Measure		Subsidence Impact Performance Indicator	Indicators Exceeded?	Assessment of Subsidence Impact Performance Measures	Performance Measures Exceeded?
Aboriginal Heritage Site 280	*Reduce the likelihood of subsidence damage to moderate.*	• Revised subsidence likelihood reduced to moderate.	**No**	No observed impacts due to the extraction of LW402 and 403. Management plan successfully implemented for Aboriginal Heritage Site 280 for the extraction of LW402 and 403.	**No**
Historic heritage sites	*No greater subsidence impact or environmental consequences than predicted in the EA*	• There are no historic heritage sites within the Study Area or within the vicinity of the Study Area. Therefore, no performance indicators have been developed for LW401-408.	-	Not applicable. There are no historic heritage sites within the Study Area or within the vicinity of the Study Area.	-
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible impact, negligible consequence or negligible loss	*To remain long-term stable and non-subsiding.*	• First workings remain long-term stable and non-subsiding.	**No**	First workings have been designed to meet the requirements of Condition 79, Schedule 3 of Project Approval (05_0117). First workings approvals were granted on the 24 March 2016, 4 May 2016, 31 August 2018 and 8 July 2019 by the Division of Resources and Geosciences, in accordance with the requirements under Condition 7, Schedule 4 of PA08_0135 and Condition 79 Schedule 3 of PA05_0117.	**No**
Second workings	*To be carried out only in accordance with an approved Extraction Plan*	• Not applicable (NA) subsidence impact performance indicators have been developed for this performance measure.	**NA**	Second workings have been carried out in LW402 and 403 in accordance with the approved *Longwalls 401-408 Extraction Plan* during the assessment period.	**No**
Key Public Infrastructure:					
Gulgong-Sandy Hollow Railway Line	*Always safe and serviceable.* *Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired*	• The performance indicators proposed to ensure that the performance measures for the Sandy Hollow Gulgong Railway in relation to subsidence induced far field movements. • No defects or deformation of the rail track and associated infrastructure due to UG4 mining; and • No visual displacement at joints or cracks in culverts due to UG4 mining.	**No**	No observed or reported defects, deformation or displacement of joints in culverts due to mining LW402 and 403.	**No**
Wollar-Wellington 330kV Transmission Line		• The Wollar-Wellington 330kV transmission line is located 725m from LW401 and the likelihood of impacts to the towers is considered to be very low.	**No**	No observed or reported impacts due to the extraction of LW402 and 403. No management measures have been developed.	**No**

Subsidence Impact Performance Measure		Subsidence Impact Performance Indicator	Indicators Exceeded?	Assessment of Subsidence Impact Performance Measures	Performance Measures Exceeded?
		• Therefore, no performance indicators have been developed for the Wollar-Wellington 330kV transmission line.		In consultation with TransGrid no BFMP was required due to no predicted impacts of the Wollar-Wellington 330kV transmission line.	
Other Infrastructure:					
Roads: *Ulan Road* *Ulan Road Bridge over the Sandy-Hollow Rail Line* *Ulan Road Bridge over the Goulburn River*	*Safe, serviceable and repairable unless the owner agrees otherwise in writing.*	• No joint displacement or cracking or other defects of the drainage structure (e.g. pipes/culverts) in excess of 5 mm (when compared against baseline condition) due to UG4 mining. • The Ulan Road Bridge over the Sandy-Hollow Rail Line and the Ulan Road Bridge over the Goulburn River are unlikely to experience subsidence related movements. Therefore, no performance indicators have been developed for the Ulan Road Bridge over the Sandy-Hollow Rail Line and the Ulan Road Bridge over the Goulburn River.	**No**	Ulan Road and bridges are located outside the Longwalls 401-408 Study Area, but may be subject to far-field horizontal movements and non-conventional ground movements. No observed or reported impacts due to the extraction of LW402 and 403.	**No**
Other built features and improvements, including fences: *Telstra optical fibre telecommunication cable* *Telstra copper telecommunication cable* *Telstra telecommunication tower*	*Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.* *Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.*	The performance indicators proposed to ensure that the performance measures for the optical fibre, copper cables and tower are achieved in relation to subsidence induced far field movements, include: • Negligible transmission loss from mine subsidence impacts; • Negligible impacts on structural integrity of the cable lines from mine subsidence; and • Negligible impacts on structural integrity of the communications tower from mine subsidence.	**No**	The telecommunication cable, optical fibre cable and tower are located outside the Longwalls 401-408 Study Area, but may be subject to far-field horizontal movements and non-conventional ground movements. No observed or reported impacts due to the extraction of LW402 and 403.	**No**
Other built features and improvements, including fences: *Essential Energy 22kV line and power poles to*	*Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.* *Damage must be fully repairable, and must be*	The performance indicators proposed to ensure that the performance measures are achieved in relation to subsidence induced far field movements, include: • The structural integrity of the 22kV powerline (power poles and transmission lines) is maintained.	**No**	The Essential Energy 22kV line and power poles are located outside the Longwalls 401-408 Study Area, but may be subject to far-field horizontal movements and non-conventional ground movements. No observed or reported impacts due to the extraction of LW402 and 403.	**No**

Subsidence Impact Performance Measure		Subsidence Impact Performance Indicator	Indicators Exceeded?	Assessment of Subsidence Impact Performance Measures	Performance Measures Exceeded?
telecommunication tower	*fully repaired or else replaced or fully compensated.*				
Other built features and improvements, including fences UCMPL Millers Dam Compound and associated infrastructure, Bridge, Bore and Monitoring Piezometers	*Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.* *Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.*	The performance indicators proposed to ensure that the performance measures for UCMPL infrastructure within 400m of Longwalls 401-408 in relation to subsidence induced far field movements, include: • Subsidence monitoring indicates subsidence is consistent with approved impacts.	**No**	The UCMPL Millers Dam Compound and associated infrastructure are located outside the Longwalls 401-408 Study Area, but may be subject to far-field horizontal movements and non-conventional ground movements. No observed or reported impacts due to the extraction of LW402 and 403.	**No**
Other built features and improvements, including fences Dronvisa Quarry	*Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.* *Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.*	The performance indicators proposed to ensure that the performance measures for Dronvisa Quarry achieved in relation to subsidence, include: • Subsidence monitoring indicates subsidence is consistent with approved impacts. • Compensation Agreement between MCO and Dronvisa in place for predicted impacts to Dronvisa infrastructure serviceability and damage to the Quarry.	**No**	Dronvisa Quarry is located above the finishing end of LW403 and LW404. No observed or reported impacts due to the extraction of LW402 and 403.	**No**
Public Safety:					
Public safety	*Negligible additional risk*	MCO will assess Longwalls 401- 408 against the following public safety performance indicator in the event that any hazard to the general public arising from subsidence impacts becomes evident: • No more than negligible additional risk to public safety.	**No**	Public safety is considered in the LW401 to 408 PSMP. No more than negligible additional risk to public safety has occurred during the assessment period, as a result of LW402 and 403. There were no incidents regarding public safety as a result of LW402 and 403 during the assessment period.	**No**

8.1.1 ACTIONS FOR NEXT REPORTING PERIOD

Activities in the 2023 reporting period include monitoring in accordance with approved subsidence management plans and remediation works, (e.g. tracks) as required.

8.1.2 SUBSIDENCE REMEDIATION

Minor subsidence management actions were required to be undertaken as a result of LW401 and LW402 extraction during the reporting period. These included maintenance of MCO managed access tracks after subsidence.

9.0 REHABILITATION

MCO manages rehabilitation in accordance with the Rehabilitation Management Plan (RMP) and Forward Program (FWP). The RMP and FWP were developed to meet the requirements of Mining Lease conditions at the MCC.

The MCC RMP describes the management of rehabilitation at the MCC for Stage 1 and Stage 2. The FWP describes the proposed Stage 1 and Stage 2 mining and rehabilitation activities for the period 1 January 2023 to 31 December 2025 (the FWP term). A description of the proposed rehabilitation activities during the term is also provided in the FWP. Planned mining and rehabilitation progression are shown on FWP Plans 2A, 2B and 2C. The FWP and RMP are available on the MCO Coal website (www.moolarbencoal.com.au).

9.1 MINING AND REHABILITATION STATUS

At the end of December 2023 MCO had a Total Mine Footprint of 2,187ha, being 48.55ha less than described in the FWP. The reduction in disturbance resulted from changes to mine planning. The area under rehabilitation preparation and active rehabilitation activities increased to approximately 463ha.

The mining and rehabilitation status is presented in **Table 30**. The land preparation activities undertaken during the period and proposed areas for rehabilitation in the next reporting period are discussed in **Section 9.5** and **Section 9.6** and presented in **Figure 3**.

During the reporting period MCO continued to undertake monitoring and maintenance activities within the existing rehabilitated areas. This included the management of spontaneous combustion areas, supplementary seeding of areas with limited cover, and weed and feral animal control activities.

Table 30: Mining and Rehabilitation Status

Mine Area Type	Previous Reporting Period (2022)	This Reporting Period (2023)	Next Reporting Period (2024)
Total Mine Footprint	2030	2187	2367
Total Active Disturbance	1619	1724	1903
Land being Prepared for Rehabilitation	53	90	43
Land under active Rehabilitation	358	373	423
Completed Rehabilitation	0	0	0

9.2 VEGETATION CLEARANCE AND TOPSOIL STRIPPING

Vegetation clearance within the OC3, OC4 and infrastructure areas during the reporting period (**Figure 3**) was undertaken in accordance with the Vegetation Clearance Protocol and GDPs. Stripped topsoil was placed in temporary stockpiles for future use. Vegetation salvaged was either mulched or retained for use as habitat features within rehabilitation areas.

9.3 SEED COLLECTION

Native seed collection continued throughout the period with seed harvested from MCO owned lands. All activities were undertaken in accordance with the requirements of the Florabank Guidelines (2000). As of December 2023, the MCO seed bank contained over 330 kgs of native seed for use in rehabilitation activities across the MCC.

9.4 REHABILITATION MONITORING

MCO undertakes a monitoring program of rehabilitation areas in accordance with the RMP. The monitoring program includes landscape function analysis, floristic monitoring, vegetation structure and growth, fauna monitoring and visual monitoring.

9.4.1 ECOSYSTEM FUNCTION ANALYSIS

EFA was undertaken at 31 EFA sites within the MCO open cut rehabilitation areas and seven analogue sites, which are located within vegetation communities equivalent to the general rehabilitation target communities.

Landscape Function Analysis
LFA assessment allows for the calculation of a Landscape Organisation Index (LOI), reflecting the proportion of a transect occupied by patches. Patches are defined by soil surface elements, such as perennial ground cover, litter, logs, or rocks that help retain soil and other resources at a site. A higher LOI implies a more stable transect that is less prone to erosion and resource loss.

At most of the Box Gum Woodland and Sedimentary Ironbark Forest sites and half of Domain D sites, the LOI was similar to that recorded at analogue sites. Box Gum Shrubby Woodland sites were less variable, with all sites recording an LOI between 83-100%. Sedimentary Ironbark Forest sites had higher variability of LOI with sites ranging from 77-100%. The lowest LOI was recorded at R20 due to a high bare soil contribution. LOI comparison to analogue sites is shown in **Figure 24**. Monitoring sites are presented in **Appendix 2**.

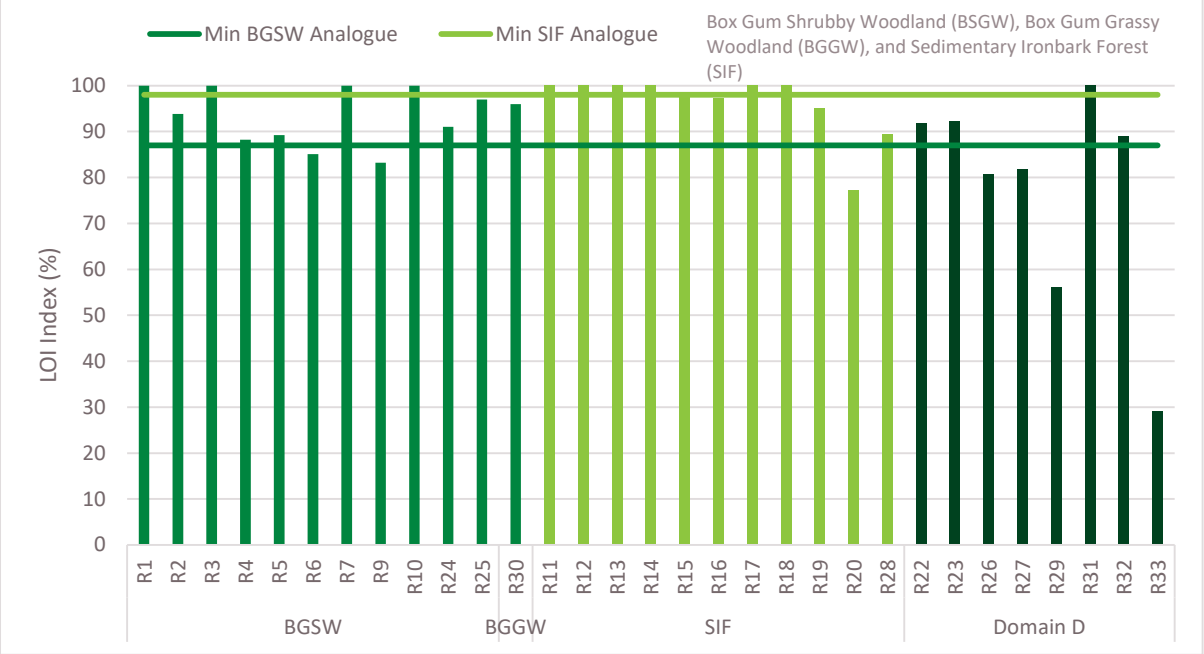


Figure 24: Landscape organisation indices (LOIs) for 2023 compared to analogue LOI values

Floristic Monitoring

During the 2023 monitoring of Box Gum Shrubby Woodland rehabilitation sites, native species richness ranged from 39 (R10) to 56 (R4) in autumn and 20 (R9) to 48 (R1) in spring. These results in autumn were comparable to analogue site results where native species richness ranged from 36 to 62. In contrast, six of the seven sites surveyed in spring were below the range of species richness across analogue sites (34 – 48 species).

Within the Sedimentary Ironbark Forest rehabilitation sites, native species richness ranged from 31 (R16) to 37 (R13) in autumn and 21 (R12) to 42 (R11) in spring. The results from analogue sites ranged from 40 to 45 species.

Within the Box Gum Grassy Woodland rehabilitation site (R30), native species richness was 34 in autumn and was nearly comparable to the Box Gum Shrubby Woodland analogue sites (36 – 62 species in autumn).

Figure 21 presents the percentage of species within rehabilitation areas that are typical of the target vegetation community. Plant Community Types (PCTs) that matched the general associations of Box Gum Shrubby Woodland, Sedimentary Ironbark Forest and Box Gum Grassy Woodlands were compiled during the development of the RMP completion criteria, and a typical species list was collated from these using the PCT profiles in BioNet Vegetation Classification.

Nine out of 11 Box Gum Shrubby Woodland sites have achieved this criterion. The two sites that are yet to achieve the criteria for percentage of species are trending towards the completion criteria as the proportion of the woody stratum species (canopy and mid-storey species) among the species typical of the target community, which is most important in characterisation of vegetation community types, was 50% at site R24 and 36% at site R25 and as such are considered representative.

All 11 Sedimentary Ironbark Forest sites have achieved this criterion. The proportion of the woody stratum species typical of the target community ranged from 25% to 59%. The Box Gum Grassy Woodland site (R30) has achieved this criterion with more than twice the target required.

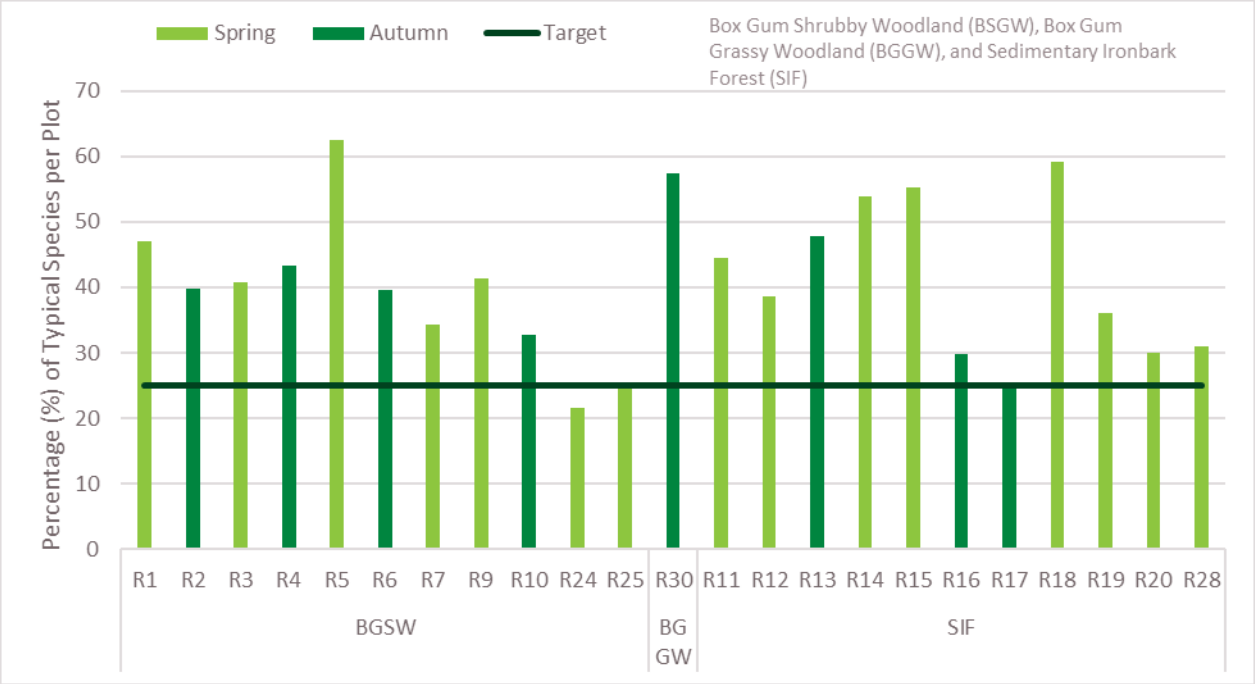


Figure 21: Percentage of typical species in the monitoring plots that are representative of the Plant Community Types during the 2023 monitoring.

Habitat Complexity

Habitat complexity was undertaken at all EFA monitoring sites using the scoring system provided in **Table 32.** This scoring system is applied to both EFA and analogue sites. Habitat complexity scores across 2023 monitoring compared to the analogue results are provided in **Figure 25.**

Table 31: Habitat complexity scoring system

Structure	Attributes and score			
	0	1	2	3
Tree canopy (%)	0	<30	30-70	>70
Shrub canopy (%)	0	<30	30-70	>70
Ground herbage	Sparse <0.5 m	Sparse >0.5 m	Dense <0.5 m	Dense >0.5 m
Logs, rocks, debris, etc (%)	0	<30	30-70	>70
Soil moisture	Dry	Moist	Permanent water adjacent	Water-logged

Most sites recorded a complexity score of four or greater which is equal to or greater than the minimum score recorded at analogue sites within both target vegetation communities, and most sites have recorded the same or increased habitat complexity scores compared to previous monitoring. The one site which recorded lower values in 2023 was R29 which is due to the lower canopy, mid-storey and groundcover recorded at the site.

Figure 25: Habitat complexity scores recorded for rehabilitation sites in 2023 compared to analogue sites

(BGSW = Box Gum Shrubby Woodland, SIF = Sedimentary Ironbark Forest and BGGW = Box Gum Grassy Woodland)

Fauna Monitoring

A total of 83 fauna species were recorded across all rehabilitation sites monitored in spring 2023. This included one amphibian species, 57 bird species, and 25 mammals including 15 microbat species and five introduced species. Five of the fauna species recorded are listed as vulnerable under the NSW *Biodiversity Conservation Act 2016* (BC Act), being the Speckled Warbler (*Chthonicola sagittata*), White-bellied Sea Eagle (*Haliaeetus leucogaster*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern Bent-winged Bat (*Miniopterus orianae oceanensis*) and the Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*). A wide range of bird guilds were recorded during 2023 monitoring across both target vegetation communities; including insectivores, nectivores and herbivores which forage at different stratum levels within vegetation, which indicates that multiple types of habitats are available within these rehabilitation areas. Bird species richness has increased since 2022.

One amphibian was recorded within Domain A OC4, a Common Eastern Froglet (*Crinia signifera*). Dam inspections were performed at three dams within OC1, however no other species were found due to a lack of water in spring 2023.

Ten mammal species were either recorded on remote cameras or opportunistically observed, including five native species, being the Common Brushtail Possum (*Trichosurus vulpecula*), Eastern Grey Kangaroo (*Macropus giganteus*), Red-necked Wallaby (*Macropus rufogriseus*), Short-beaked Echidna (*Tachyglossus aculeatus*), Swamp Wallaby (*Wallabia bicolor*) and five introduced species (Hare (*Lepus europaeus occidentalis*), Feral Cat (*Felis catus*), Pig (*Sus scrofa*), Rabbit (*Oryctolagus cuniculus*), and Red Fox (*Vulpes vulpes*).

Visual Monitoring

Visual transect monitoring results from 2023 were largely consistent with previous years, with the majority of transects recording an overall rating of 'Good' for vegetation structure composition, soil

compaction, microhabitat features and disturbance factors. 'Poor' scores were recorded for three transects (one in each of OC1, OC2 and OC4) for active erosion. Overall the cover of exotic species has reduced compared to 2022 monitoring.

Assessment of Rehabilitation Performance Indicators

Analysis of the Box Gum Shrubby Woodland, Sedimentary Ironbark Forest, Box Gum Grassy Woodland rehabilitation, and OC2/OC3 Ecosystem and species credit sites against the proposed completion criteria is presented in **Table 32**, **Table 33, Table 34** and **Table 35.**

Table 32: Box Gum Shrubby Woodland Rehabilitation Assessment

Proposed Completion Criteria	2023 Monitoring Outcome
Reconstructed landforms are stable with no evidence of slumping.	There were no signs of slumping landforms observed. **Outcome:** Proposed completion criteria achieved in 2023.
Gullies and rills occurring in monitoring transects are assessed to be limited and stabilising.	There were no signs of gullies or rills occurring along the monitoring transects in OC1, but some minor gully and rill erosion in OC4 rehabilitation. **Outcome:** Proposed completion criteria was partially achieved in 2023.
'High Threat Exotic' (HTE*) weed presence and cover is monitored regularly. Priority and HTE weeds identified through monitoring have been controlled.	There were HTE present at all monitoring sites. The level of HTE is not significant and is managed through ongoing maintenance. **Outcome:** Proposed completion criteria achieved in 2023.
Vertebrate pest species presence and impacts are recorded and controlled.	Feral pests were recorded during monitoring, and some signs of damage in OC1 and OC4, but the level of damage was not considered to be unacceptable. **Outcome:** Proposed completion criteria achieved in 2023.
Rehabilitation area at some point since seeding or final surface preparation has experienced a fire or declared drought or at least one year with annual rainfall in the first decile range and all other vegetation completion criteria have been met.	All rehabilitation campaigns have experienced an intense drought. **Outcome:** Proposed completion criteria partially achieved in 2023.
Priority weeds are controlled and HTE cover is maintained at < 15%.	At all sites, the HTE cover was below 15%. **Outcome:** Proposed completion criteria achieved in 2023.
Multiple fauna habitats are available within all rehabilitation areas.	During 2023 monitoring a ranged of fauna habitat was recorded. **Outcome:** Proposed completion criteria achieved in 2023.
Monitoring confirms multiple native fauna species are recorded utilising rehabilitation areas.	2023 monitoring confirmed that there were multiple species utilising the rehabilitation areas. **Outcome:** Proposed completion criteria achieved in 2023.
Stands[2] of *Allocasuarina* spp have been maintained within Box Gum Shrubby Woodland / Sedimentary Ironbark Forest rehabilitation areas on OC1.	There were stands of *Allocauarina spp* present during 2023 monitoring in OC1. **Outcome:** Proposed completion criteria achieved in 2023.
Revegetation areas contain flora species assemblages characteristic of or trending towards that of: Box Gum Shrubby Woodland communities[1] / Secondary Ironbark Forest communities[3] / Box Gum Grassy Woodland[1].	All sites in OC1 achieved the greater than 25% of typical species composition, two sites that did not meet the criteria in OC4 are trending towards completion criteria. **Outcome:** Proposed completion criteria partially achieved in 2023.
Median foliage cover of the ecologically dominant layers (trees/shrubs/ground cover) and developing litter cover are within the 10th-90th percentile variation range of the Box Gum Shrubby Woodland Community / Secondary Ironbark Forest community / Box Gum Grassy Woodland Community Analogue sites.	The tree and shrub cover completion criteria were achieved in OC1 but not in OC4 rehabilitation. Shrub cover, ground cover and litter cover did reach the criteria in either OC1 or OC4. **Outcome:** Proposed completion criteria partially achieved in 2023.
Rehabilitation monitoring verifies that second generation seedlings of species characteristic of Box Gum Shrubby Woodland Communities / Secondary Ironbark Forest communities / Box Gum Grassy Woodland communities are present or likely to be, based on comparable older rehabilitation sites.	In OC1 there was signs of regeneration of characteristic species observed at all sites, there were signs of first generation seedlings but no signs of second generation in OC4. **Outcome:** Proposed completion criteria achieved in 2023 in OC1 and not achieved in OC4.

Table 33: Sedimentary Ironbark Forest Rehabilitation Assessment

Proposed Completion Criteria	2023 Monitoring Outcome
Reconstructed landforms are stable with no evidence of slumping.	There were no signs of slumping landforms observed. **Outcome:** Proposed completion criteria achieved in 2023.
Gullies and rills occurring in monitoring transects are assessed to be limited and stabilising.	There were signs of gullies erosion inOC4 rehabilitation. **Outcome:** Proposed completion criteria partially achieved in 2023.
'High Threat Exotic' (HTE*) weed presence and cover is monitored regularly. Priority and HTE weeds identified through monitoring have been controlled.	There were HTE present at all monitoring sites. The level of HTE is not significant and is managed through ongoing maintenance. **Outcome:** Proposed completion criteria achieved in 2023.
Vertebrate pest species presence and impacts are recorded and controlled.	Feral pests were recorded during monitoring, and some signs of damage in OC1 and OC4, but the level of damage was not considered to be unacceptable. **Outcome:** Proposed completion criteria achieved in 2023.
Rehabilitation area at some point since seeding or final surface preparation has experienced a fire or declared drought or at least one year with annual rainfall in the first decile range and all other vegetation completion criteria have been met.	All rehabilitation campaigns have experienced an intense drought. **Outcome:** Proposed completion criteria partially achieved in 2022.
Priority weeds are controlled and HTE cover is maintained at < 15%.	At all sites, the HTE cover was below 15%. **Outcome:** Proposed completion criteria achieved in 2023.
Multiple fauna habitats are available within all rehabilitation areas.	During 2023 monitoring a range of fauna habitat was recorded. **Outcome:** Proposed completion criteria achieved in 2023.
Monitoring confirms multiple native fauna species are recorded utilising rehabilitation areas.	2023 monitoring confirmed that there were multiple species utilising the rehabilitation areas. **Outcome:** Proposed completion criteria achieved in 2023.
Stands[2] of *Allocasuarina* spp have been maintained within Box Gum Shrubby Woodland / Sedimentary Ironbark Forest rehabilitation areas on OC1.	There were stands of *Allocauarina spp* present during 2023 monitoring in OC1. **Outcome:** Proposed completion criteria achieved in 2023.
Revegetation areas contain flora species assemblages characteristic of or trending towards that of: Box Gum Shrubby Woodland communities[1] / Secondary Ironbark Forest communities[3] / Box Gum Grassy Woodland[1].	All sites in OC1 and OC4 achieved the greater than 25% of typical species composition. **Outcome:** Proposed completion criteria achieved in 2023.
Median foliage cover of the ecologically dominant layers (trees/shrubs/ground cover) and developing litter cover are within the 10th-90th percentile variation range of the Box Gum Shrubby Woodland Community / Secondary Ironbark Forest community / Box Gum Grassy Woodland Community Analogue sites.	The tree and litter cover completion criteria were achieved in OC1 in autumn The median cover was not met in OC4 rehabilitation. **Outcome:** Proposed completion criteria partially achieved in 2023.
Rehabilitation monitoring verifies that second generation seedlings of species characteristic of Box Gum Shrubby Woodland Communities / Secondary Ironbark Forest communities / Box Gum Grassy Woodland communities are present or likely to be, based on comparable older rehabilitation sites.	In OC1 there was signs of regeneration of characteristic species were observed at all sites, there were sites with signs of first generation in OC4. **Outcome:** Proposed completion criteria achieved in 2023 in OC1 and partially achieved in OC4.

Table 34: Box Gum Grassy Woodland Rehabilitation Assessment

Proposed Completion Criteria	2023 Monitoring Outcome
Reconstructed landforms are stable with no evidence of slumping.	There were no signs of slumping landforms observed. **Outcome:** Proposed completion criteria achieved in 2023.
Gullies and rills occurring in monitoring transects are assessed to be limited and stabilising.	There were no signs of gullies erosion in OC4 rehabilitation. **Outcome:** Proposed completion criteria achieved in 2023.
'High Threat Exotic' (HTE*) weed presence and cover is monitored regularly. Priority and HTE weeds identified through monitoring have been controlled.	There were HTE present at all monitoring sites. The level of HTE is not significant and is managed through ongoing maintenance. **Outcome:** Proposed completion criteria achieved in 2023.
Vertebrate pest species presence and impacts are recorded and controlled.	Feral pests were recorded during monitoring, and some signs of damage in OC4, but the level of damage was not considered to be unacceptable. **Outcome:** Proposed completion criteria achieved in 2023.
Rehabilitation area at some point since seeding or final surface preparation has experienced a fire or declared drought or at least one year with annual rainfall in the first decile range and all other vegetation completion criteria have been met.	One campaign in OC4 (represented by site R30) may have experienced intense drought conditions, but the exact time of seeding during 2020 is unknown. All other areas have experienced an intense drought. **Outcome:** Proposed completion criteria partially achieved in 2023.
Priority weeds are controlled and HTE cover is maintained at < 15%.	At all sites, the HTE cover was below 15%. **Outcome:** Proposed completion criteria achieved in 2023.
Multiple fauna habitats are available within all rehabilitation areas.	During 2023 monitoring a ranged of fauna habitat was recorded. **Outcome:** Proposed completion criteria achieved in 2023.
Monitoring confirms multiple native fauna species are recorded utilising rehabilitation areas.	2023 monitoring confirmed that there were multiple species utilising the rehabilitation areas. **Outcome:** Proposed completion criteria achieved in 2023.
Revegetation areas contain flora species assemblages characteristic of or trending towards that of: Box Gum Shrubby Woodland communities[1] / Secondary Ironbark Forest communities[3] / Box Gum Grassy Woodland[1].	Rehabilitation in OC4 achieved the greater than 25% of typical species composition. **Outcome:** Proposed completion criteria achieved in 2023.
Median foliage cover of the ecologically dominant layers (trees/shrubs/ground cover) and developing litter cover are within the 10th-90th percentile variation range of the Box Gum Shrubby Woodland Community / Secondary Ironbark Forest community / Box Gum Grassy Woodland Community Analogue sites.	Ground cover and litter cover achieved the completion criteria, whereas tree and shrub cover were below the completion criteria in OC4 rehabilitation. **Outcome:** Proposed completion criteria partially achieved in 2023.
Rehabilitation monitoring verifies that second generation seedlings of species characteristic of Box Gum Shrubby Woodland Communities / Secondary Ironbark Forest communities / Box Gum Grassy Woodland communities are present or likely to be, based on comparable older rehabilitation sites.	Due to the age of the rehabilitation, there have only been signs of first generation seedlings of species that are characteristic of Box Gum Grassy Woodland. **Outcome:** Proposed completion criteria not achieved in 2023.

Table 35: OC2/OC3 Ecosystem and Species Credit Rehabilitation Assessment

Proposed Completion Criteria	2023 Monitoring Outcome
Reconstructed landforms are stable with no evidence of slumping.	There was slumping of the landform observed in the south-eastern section of OC2 during monitoring. **Outcome:** Proposed completion criteria not achieved in 2023.
Gullies and rills occurring in monitoring transects are assessed to be limited and stabilising.	There were signs of gullies erosion in in the OC2 rehabilitation. **Outcome:** Proposed completion criteria not achieved in 2023.
'High Threat Exotic' (HTE*) weed presence and cover is monitored regularly. Priority and HTE weeds identified through monitoring have been controlled.	There were HTE present at all monitoring sites. The level of HTE is not significant and is managed through ongoing maintenance. **Outcome:** Proposed completion criteria achieved in 2023.
Vertebrate pest species presence and impacts are recorded and controlled.	Feral pests were recorded during monitoring, and some signs of damage in OC2, but the level of damage was not considered to be unacceptable. **Outcome:** Proposed completion criteria achieved in 2023.
Native Plant Species Richness is ≥ 20.5 at year 10 post mining.	Average native plant species richness was greater than 20.5. **Outcome:** Proposed completion criteria not yet assessable in 2023.
≥ 15% of the total number of trees are the regionally relevant species** within koala FBA species credit areas.	There were no trees suitable for koala use of greater than 10cm DBH in the monitoring plots, however this is expected at this stage of the rehabilitation area. **Outcome:** Proposed completion criteria not achieved in 2023.
Native Over Storey Cover between 3.75 and 80% at year 10 post mining operations.	Average native overstorey cover is 1.2%. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Native Mid-Storey Cover between 1.25 and 40% at year 10 post mining operations.	Average mid-storey cover was 2.8% across OC2 and OC3. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Native Ground Cover, Grass between 3 and 100% at year 10 post mining operations.	Native grass ground cover is 10% across OC2. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Native Ground Cover, Shrubs between 0.5 and 20% at year 10 post mining operations.	There were no sites in OC2 rehabilitation that achieved native shrub ground cover. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Native Ground Cover, Other between 2 and 80% at year 10 post mining operations.	The average native ground cover, other was 5.9% across OC2 rehabilitation. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Total Length Fallen Logs (m) is 1.25 at year 10 post mining operations.	The average length of fallen logs was greater than 1.25m. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Exotic Plant Cover is <45% at year 10 post mining operations.	The average exotic plant cover achieved the criteria of less than 45% exotic plant cover. **Outcome:** Proposed completion criteria not yet assessable in 2023.
Overall Site Value Score (OEH, 2015) (average of plots in vegetation zone) is ≥ 13.8 at 10 years post mining operations.	The overall Site Value Score for OC2 in 2022 was 23.9 and achieved the completion criteria. **Outcome:** Proposed completion criteria not yet assessable in 2023.

* HTEs as per the BAM 2020

** Under the *State Environmental Planning Policy (SEPP) (Koala Habitat Protection) 2021.*

[1.] A range of characteristic means that at least 25% of the species present in rehabilitated areas are recognised as being typical of the vegetation communities that match the Box Gum Shrubby Woodland Association (inclusive of any additional species listed in Table 16 of the RMP)

[2.] Patches of three or more individual stems

[3.] A range of characteristic means that at least 25% of the species present in rehabilitated areas are recognised as being typical of the vegetation communities that match the Sedimentary Ironbark Forest Association (inclusive of any additional species listed in Table 17 of the RMP)

[4.] A range of characteristic means that at least 25% of the species present in rehabilitated areas are recognised as being typical of the vegetation communities that match the Box Gum Grassy Woodland Association (inclusive of any additional species listed in Table 18 of the RMP)

[5.] At least 50% of the vegetative cover.

9.5 REHABILITATION WORKS

Rehabilitation of disturbed lands are undertaken sequentially (or in phases) to achieve the final land use. A description of these phases of rehabilitation relevant to the MCC are provided in the FWP. A summary of rehabilitation phases completed during the reporting period included:

Decommissioning
There were no decommissioning activities undertaken at MCO.

Landform Establishment
53.2ha of landform establishment in OC2, OC3 and OC4 was completed during 2023. Final landforms were established to the relevant completion criteria including:

- Constructed landforms consist with surrounding topography.
- Slopes were generally less than 10° to 18°
- Constructed landforms were free draining.
- No hostile overburden material in the final surface layers.

Growth Medium Development
15.5ha Opencut areas underwent growth medium development during 2023 and also transitioned to the ecosystem and landuse establishment phase.

Ecosystem and Landuse Establishment
373ha of rehabilitation is in the ecosystem and landuse establishment phase located in OC1, OC2 and OC4. These areas were maintained and further enhanced during 2023.

9.6 ACTIONS FOR NEXT REPORTING PERIOD

Rehabilitation actions to be progressed in the next period include:

- Continued progressive rehabilitation.
- Continued weed and feral animal control.
- Continued monitoring of rehabilitation areas with low cover or density with consideration of supplementary seeding or planting of tubestock.

10.0 COMMUNITY

10.1 COMMUNITY ENGAGEMENT

During 2023, MCO continued to foster positive relationships with the local community through engagement and ongoing support provided to a range of community groups and events – including, but not limited to – St Matthews Catholic School, Mudgee, Rylstone and Gulgong Show Societies, Gulgong Chamber of Commerce, Mudgee Rotary, Mudgee Lions Club, Mudgee Rescue Squad, Survivor Life Skills Program, Gulgong Hospital Auxiliary, Mudgee Touch Association and Sculptures in the Garden. In total, MCO provided over $190,000 in community donations during 2023 to 45 community groups and events through its Community Support Program and other programs (**Appendix 5**).

Community/stakeholder related activities undertaken during the reporting period include:

- Max Potential Program.
- Mudgee Running Festival.
- Mid-Western Regional Senior Festival.
- Direct engagement with nearby landholders.

Moolarben continued to provide the community with information on its website (www.moolarbencoal.com.au). Information available included project approvals, CCC meeting minutes, community complaint records, environmental monitoring information, environmental audits, environmental management plans and annual reviews.

10.2 COMMUNITY COMPLAINTS

MCO maintains a 24-hour Environment and Community Complaints Hotline (1800 556 484). This Hotline is available to receive any complaints from neighbouring residents or interested stakeholders. Details for the Hotline are available on the MCO website and in community newsletters.

MCO has developed a Community Complaints Procedure which details how to receive, respond to, record, and action any community complaint received to site. This procedure also outlines the reporting requirements relating to community complaints, including:

- Monthly reporting of community complaints on the MCO website.
- Discussion of community complaints as part of the operational performance provided during CCC meetings.
- A summary of complaints is provided in the Annual Review and Annual Return (as part of EPL reporting).

During 2023, a total of 18 complaints were received in relation to MCO Operations by nine complainants. All complaints are investigated and included in the complaints register on the Moolarben Coal website (www.moolarbencoal.com.au). 67% of complaints were received by three complainants. “Other” was the primary issue of concern (39% of complaints) followed by "Noise” (22% of complaints) and “Blasting” (22% of complaints - **Figure 26**).

A comparison of complaints to previous years is presented in **Table 34**. There has been a general decrease in complaints during the period and continues the trend since 2015. A register of complaints is provided in **Appendix 4**.

The ongoing use of Mining and Production Environmental Assistants continues to provide real-time feedback to the mining operation and to inform proactive and reactive responses. Ongoing community and stakeholder liaison and consultation has continued.

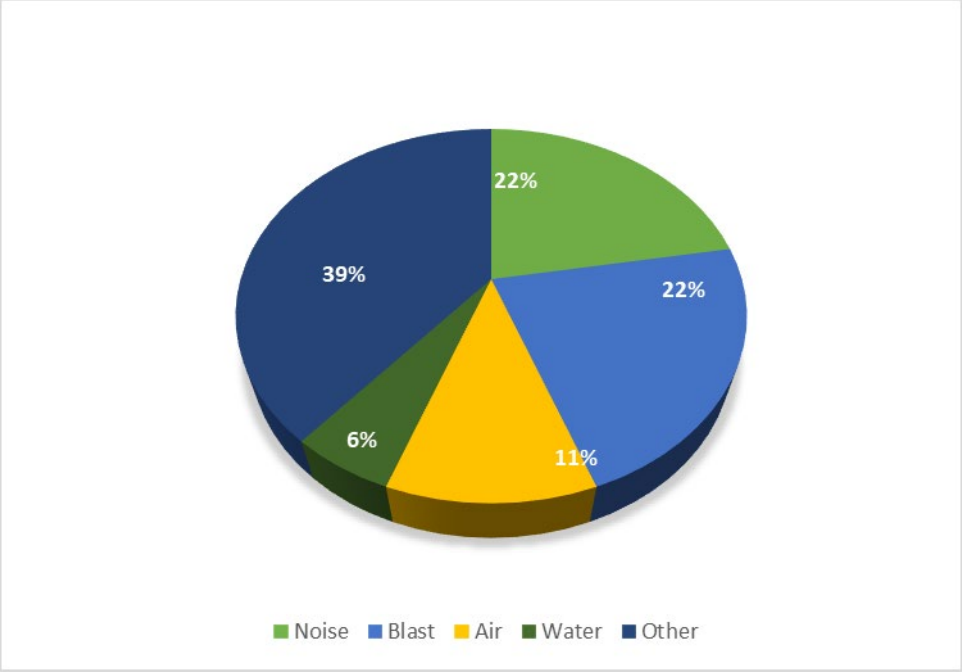


Figure 26: Community Complaints 2023 – Breakdown by Type

Table 34: Comparison of Community Complaints

Reporting Period	Noise	Blast	Air	Water	Other	Total
2013 - 2014	239	12	2	0	3	**256**
2015	274	6	2	0	4	**286**
2016	157	7	2	0	1	**167**
2017	108	3	1	2	1	**115**
2018	54	10	0	0	1	**65**
2019	33	1	4	0	0	**38**
2020	12	3	1	0	0	**16**
2021	22	1	3	0	13	**39**
2022	8	5	5	3	5	**26**
2023	4	4	2	1	7	**18**

10.3 COMMUNITY CONSULTATIVE COMMITTEE (CCC)

In accordance with Condition 6, Schedule 5 of project approval (05_0117) and Condition 6, Schedule 6 of project approval (08_0135) the Community Consultative Committee (CCC) continued to meet during the 2023 reporting period. The purpose of a CCC is to provide a forum for open discussion between MCO, the community, the local council and other key stakeholders on issues directly relating to the project, including performance against any conditions, and to keep the community informed on these matters.

Members of the MCO CCC for 2023 are presented in **Table 35**. MCO conducted four CCC meetings during the reporting period with summaries provided in **Table 36.** Meetings were chaired by an independent chairperson with the minutes being available on the MCO website.

Table 35: CCC Members 2023

Name	Representing	Name	Representing
Aleshia Lonsdale	Mudgee Local Aboriginal Land Council	Helen Ungaro	Ulan Public School and Local Landholder
Dr Julia Imrie	Local Landholder and Business Owner	David Stokes	Local resident
Bev Smiles	Mudgee District Environment Group	Ms Lisa Andrews	DPIE endorsed Independent Chair
Cr Des Kennedy	Councillor, Mid-Western Regional Council	Cr Katie Dicker	Councillor, Mid-Western Regional Council
David Lowe	Mudgee Chamber of Commerce	Brian Wesley	Moolarben Coal Operations
Trent Cini	Moolarben Coal Operations	Rebecca Shanks	Moolarben Coal Operations

Table 36: CCC Meeting Summary

Date	Meeting Summary
7 March 2023	General update on community interaction, operations and exploration, environmental monitoring, community complaints, rehabilitation, biodiversity offset management and employment. Update on the Global Navigation Satellite System (GNSS) monitors. Update on the Open Cut 3 extension project.
6 June 2023	General update on community interaction, operations and exploration, environmental monitoring, community complaints, rehabilitation, biodiversity offset management and employment. Update on the Underground 2 Modification. Update on the Open Cut 3 Extension Projects and overview of the 2022 Annual Review.
5 September 2023	General update on community interaction, operations and exploration, environmental monitoring, community complaints, rehabilitation, biodiversity offset management and employment. Update on the Independent Water Quality Study (IWQS). Update on the Underground 2 Modification. Update on the Open Cut 3 Extension Projects.
28 November 2023	General update on community interaction, operations and exploration, environmental monitoring, community complaints, rehabilitation, biodiversity offset management and employment. Update on the Underground 2 Modification. Update on the OC3 Extension Project.

10.4 ULAN ROAD STRATEGY

The Mid-Western Regional Council has continued maintenance works on Ulan Road. Moolarben continues to make financial contributions to the maintenance costs of the Ulan Road works detailed in the agreement.

11.0 INDEPENDENT AUDIT

In December 2021, an Independent Environmental Audit (IEA) was undertaken in accordance with Condition 9, Schedule 5 of PA 05_0117 (as modified) and Condition 9, Schedule 6 of PA 08_0135. The IEA was undertaken by Barnett and May. In general, operational environmental management activities observed during the site inspection were being carried out in a competent manner, with the non-compliances identified by the Auditors being the exception.

A copy of the IEA including the Audit findings can be found on MCO's Website (www.moolarbecoal.com.au)

The next Independent Audit will be required by December 2024.

12.0 INCIDENTS & NON-COMPLIANCES

There were two non-compliances during the reporting period:

- On 28 March 2023, overburden material has been inadvertently placed beyond the approved disturbance boundary in Open Cut 4. MCO self-reported the incident on 29 March 2023.

- EPL Discharge Point 01 was not sampled for Total Suspended Solids (TSS) during the week of 17 April 2023. MCO self-reported the missed sample on 26 May 2023.

13.0 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following is a summary of measures to be implemented in the next reporting period.

- Review and revise environmental management plans as necessary.
- Revision of water level triggers for Tertiary paleochannel piezometers PZ213, PZ214 and PZ188.
- Review, revise, and expand if required the Groundwater monitoring program as part of the next Groundwater Management Plan Review.
- Consider decommissioning of PZ058A as part of the next Groundwater Management Plan Review.
- Monitoring network above UG2 and UG4 to be expanded.
- Continued progressive rehabilitation.

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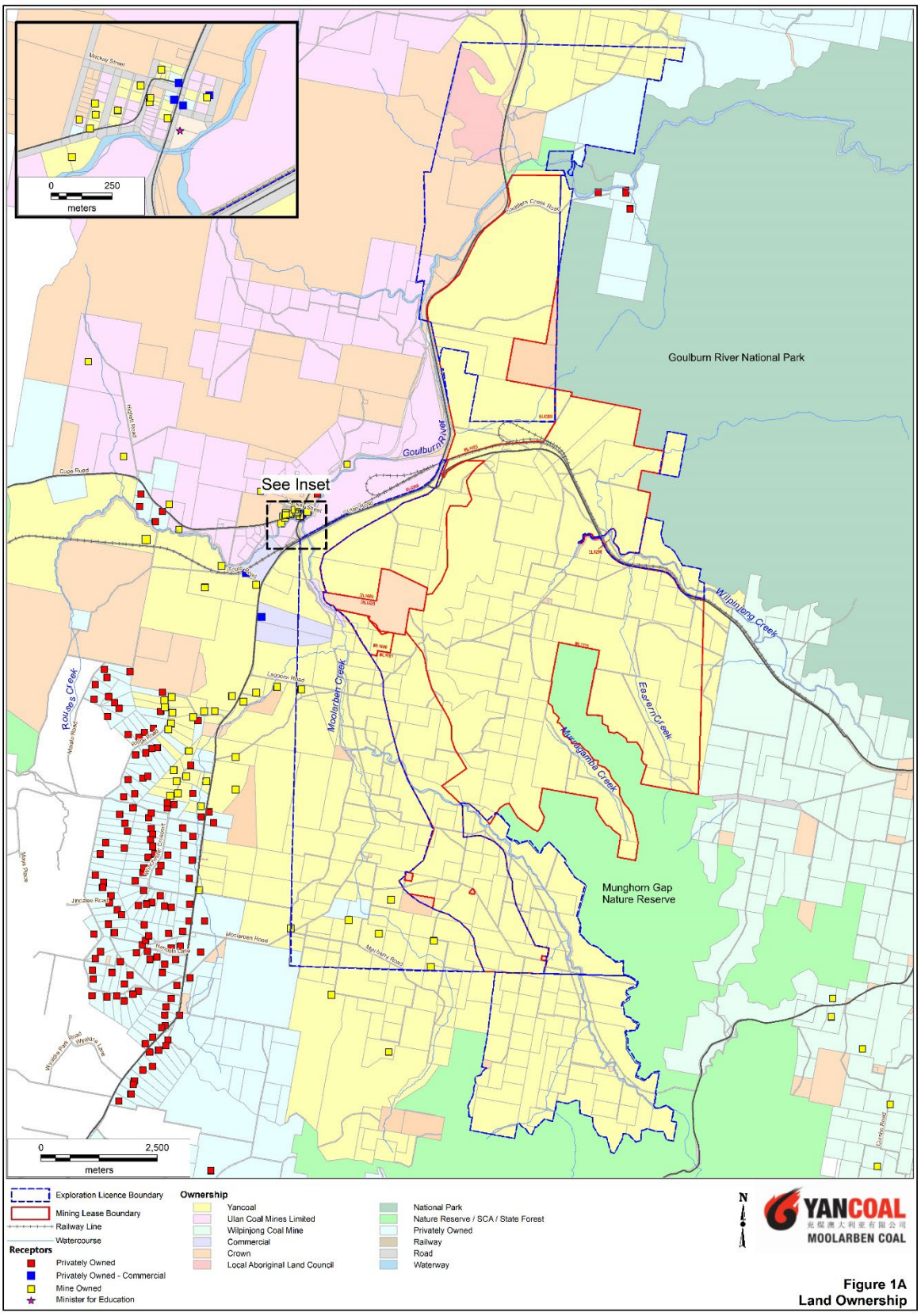
FIGURE 3-K ALLUVIUM COMPOSITE HYDROGRAPH 183

APPENDIX 1. LAND OWNERSHIP

Figure 1-a Land Ownership



APPENDIX 2. MONITORING LOCATIONS

Figure 2-a Noise Monitoring Locations

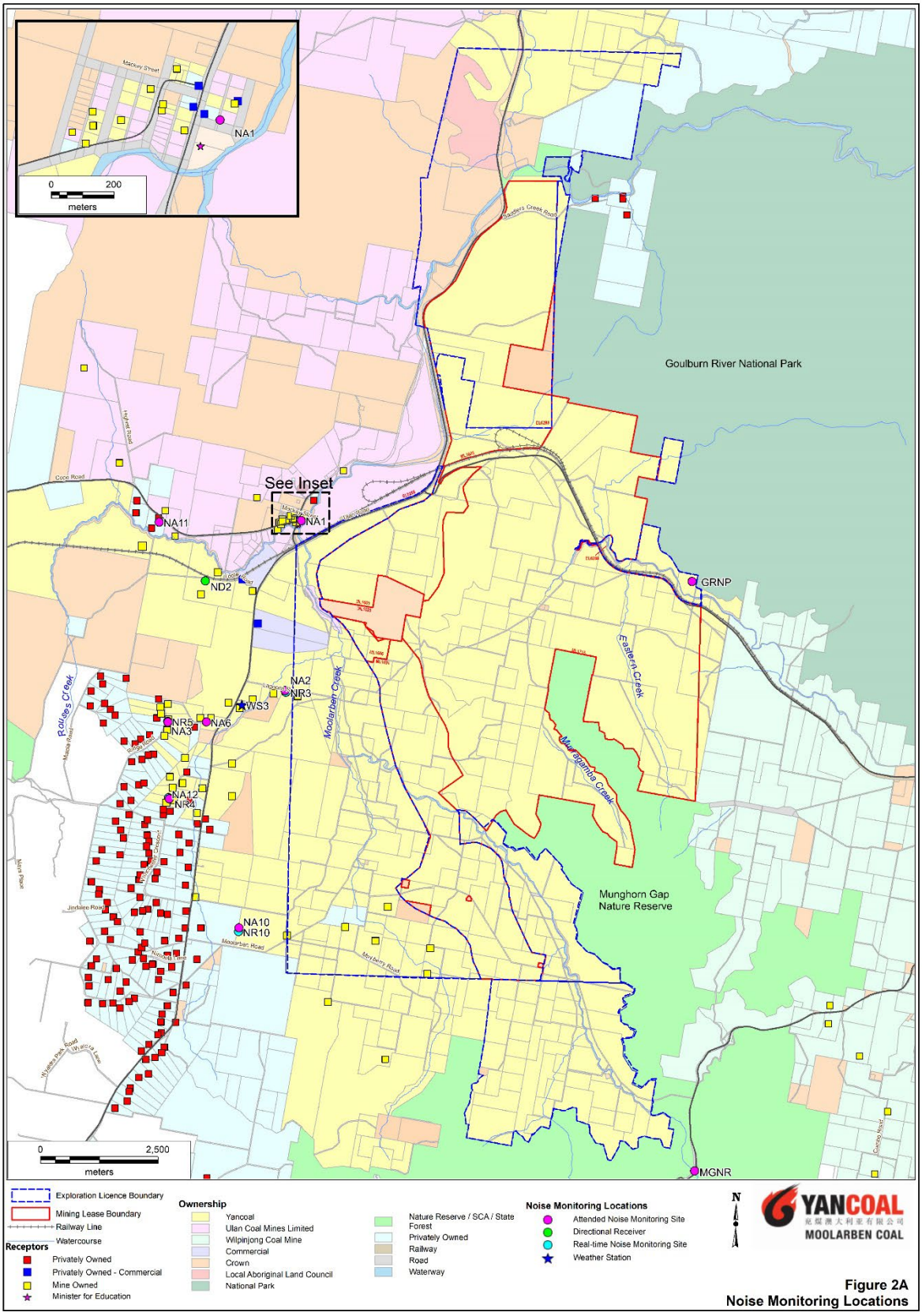


Figure 2-b Blast Monitoring Locations

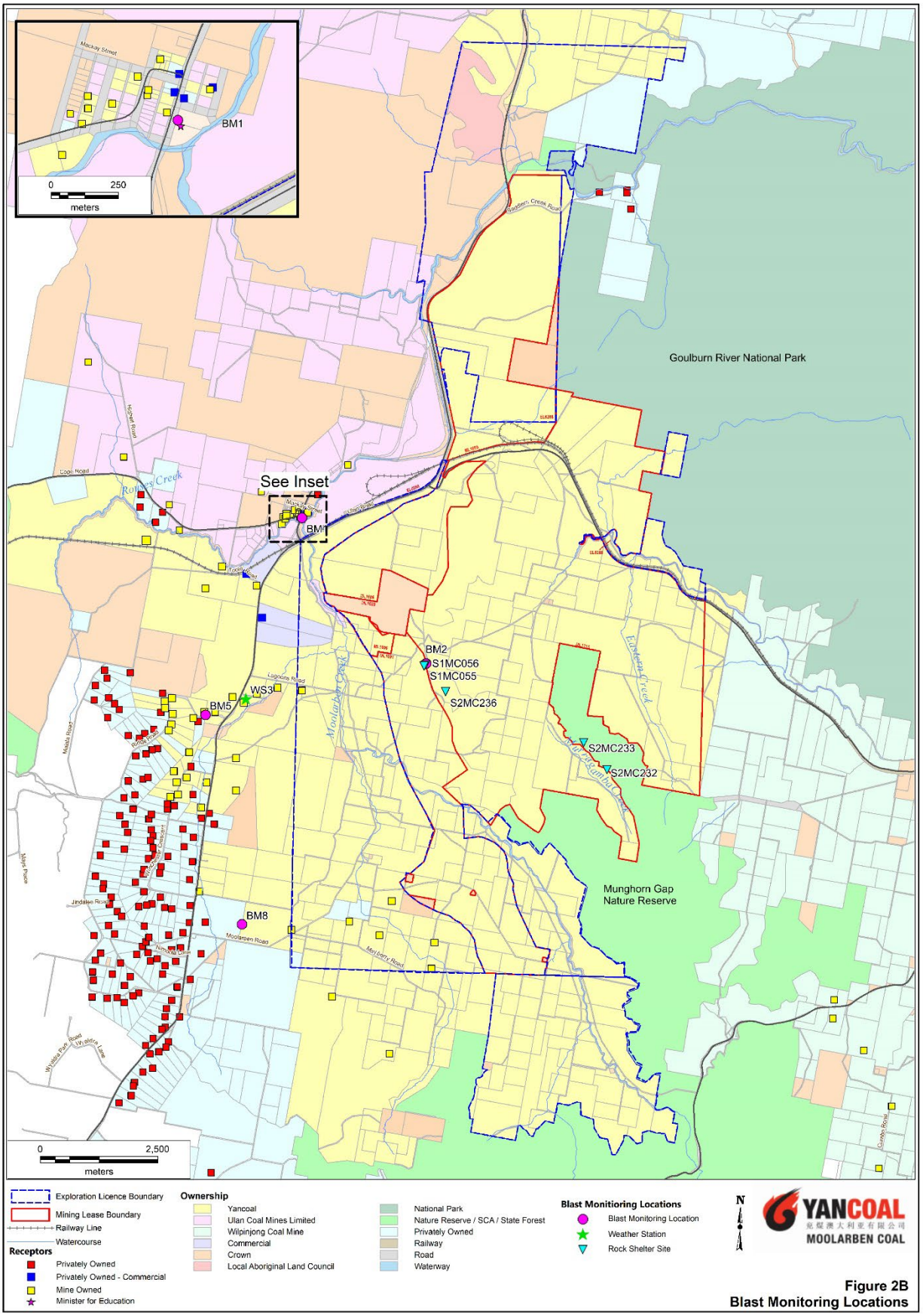


Figure 2-c Air quality Monitoring Locations

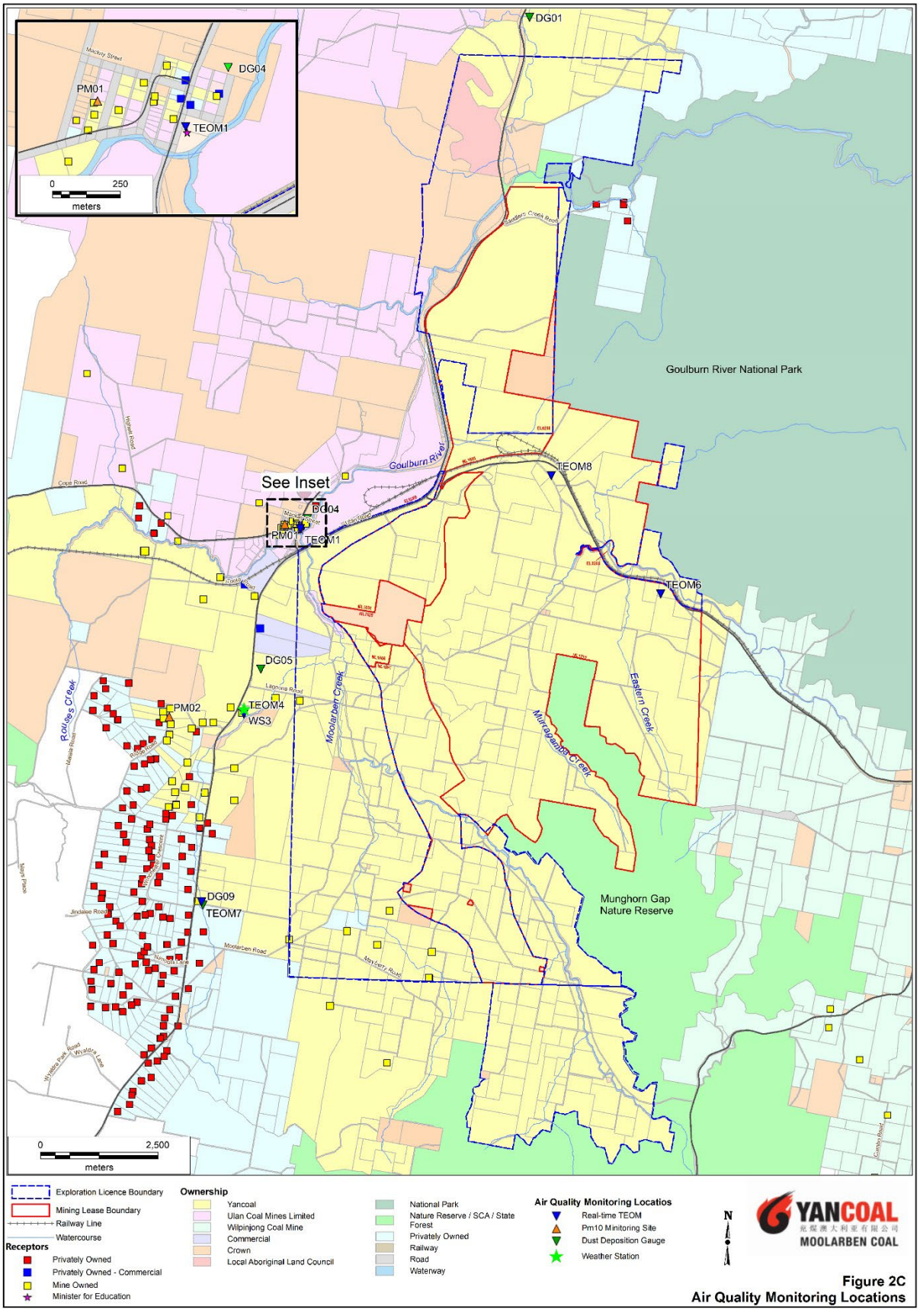


Figure 2-d MCO Northern Biodiversity Offset Area monitoring site locations

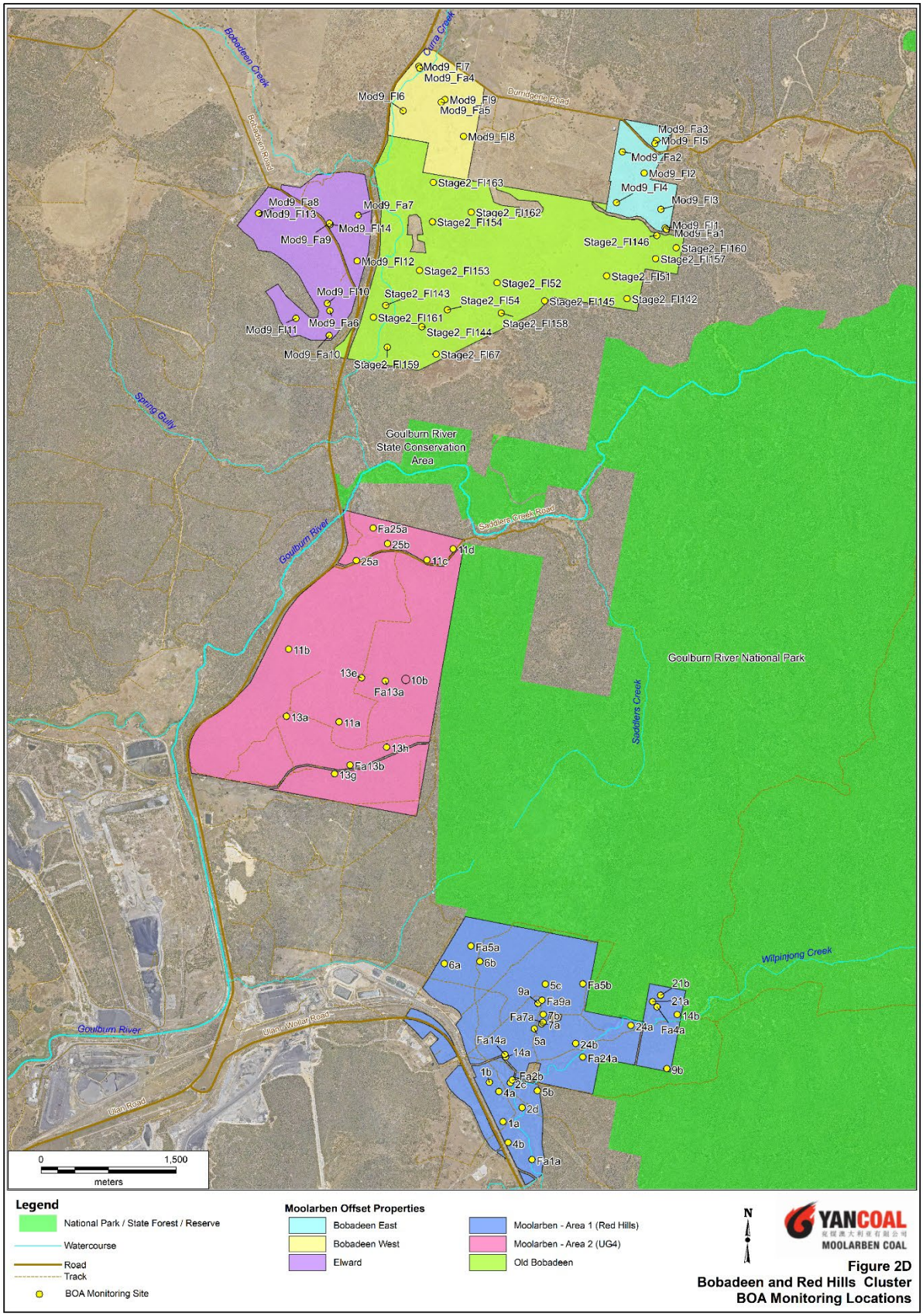


Figure 2-e MCO Western Biodiversity Offset Area monitoring site locations

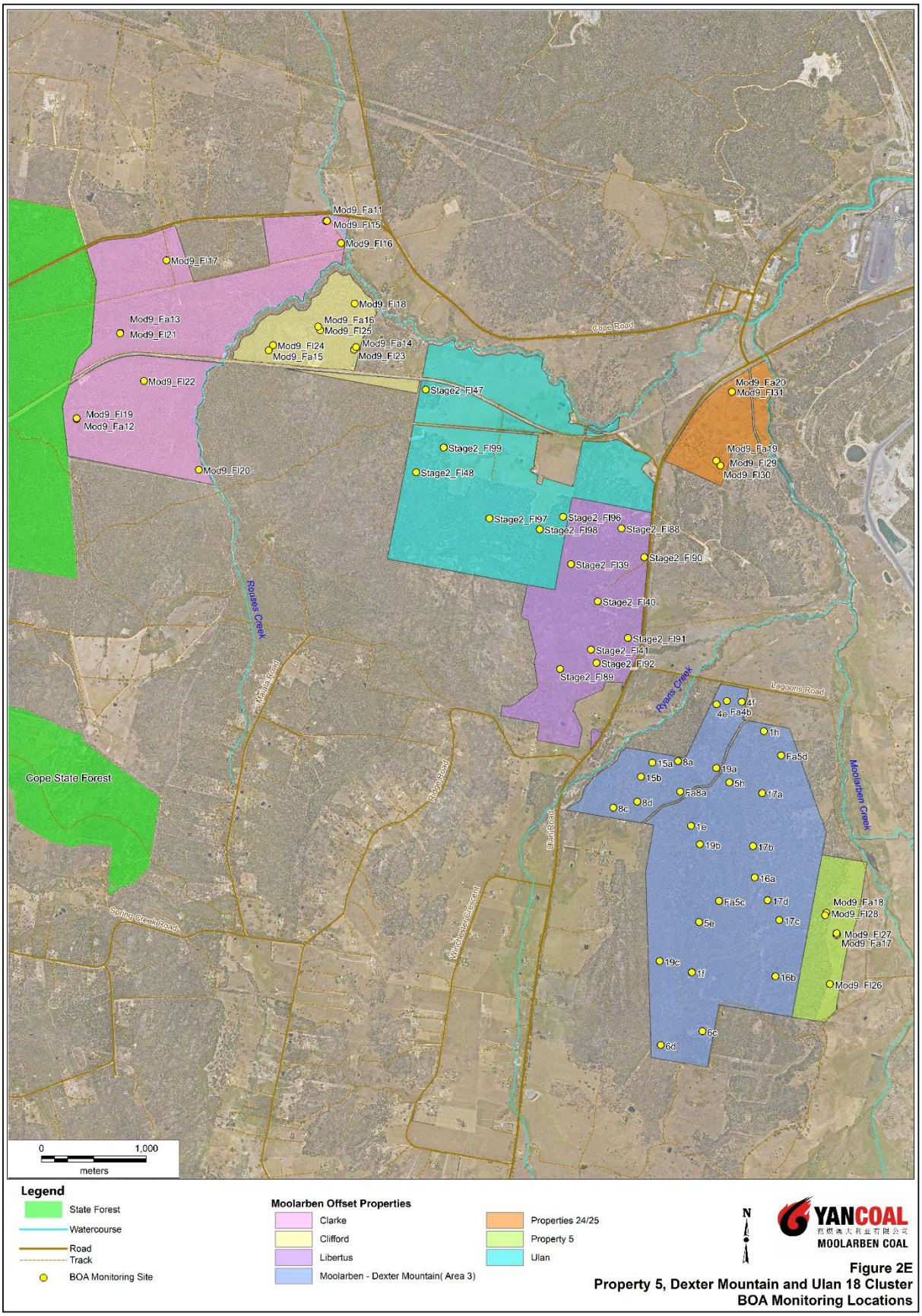


Figure 2-f MCO Southern Biodiversity Offset Area monitoring site locations

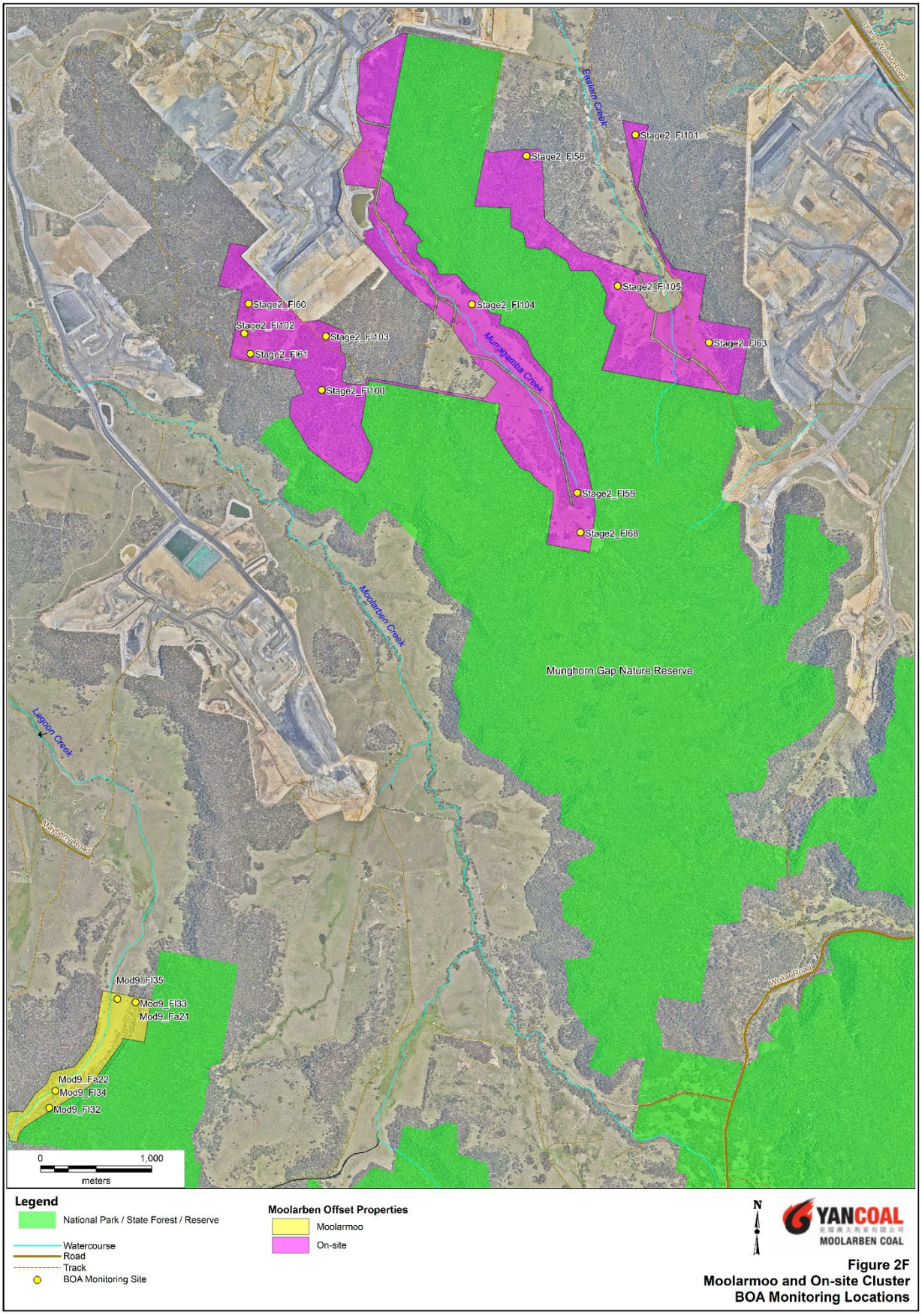


Figure 2-g MCO Remote Biodiversity Offset monitoring site locations

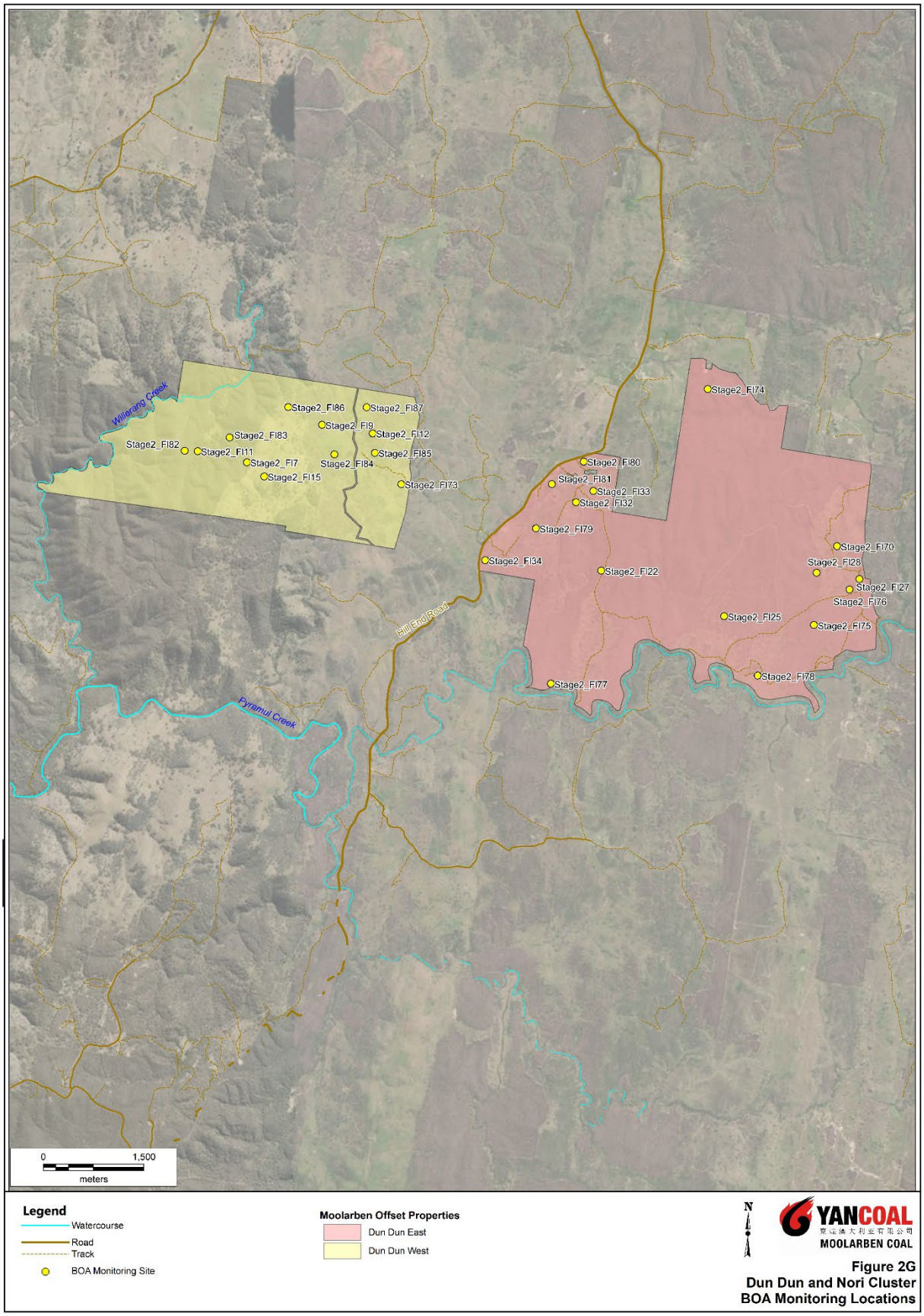


Figure 2-h MCO analogue monitoring site locations

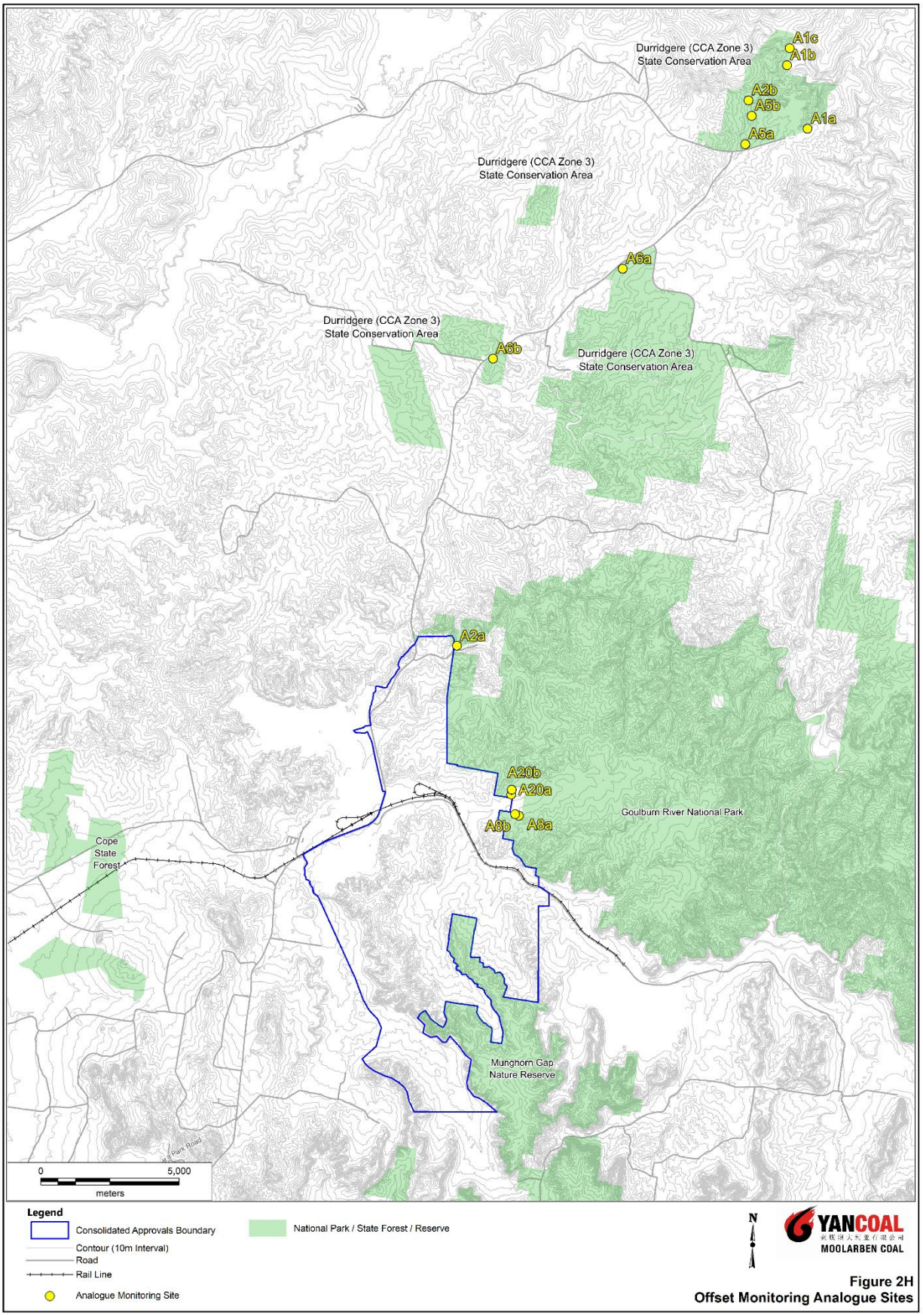


Figure 2-i Surface Water Monitoring Locations

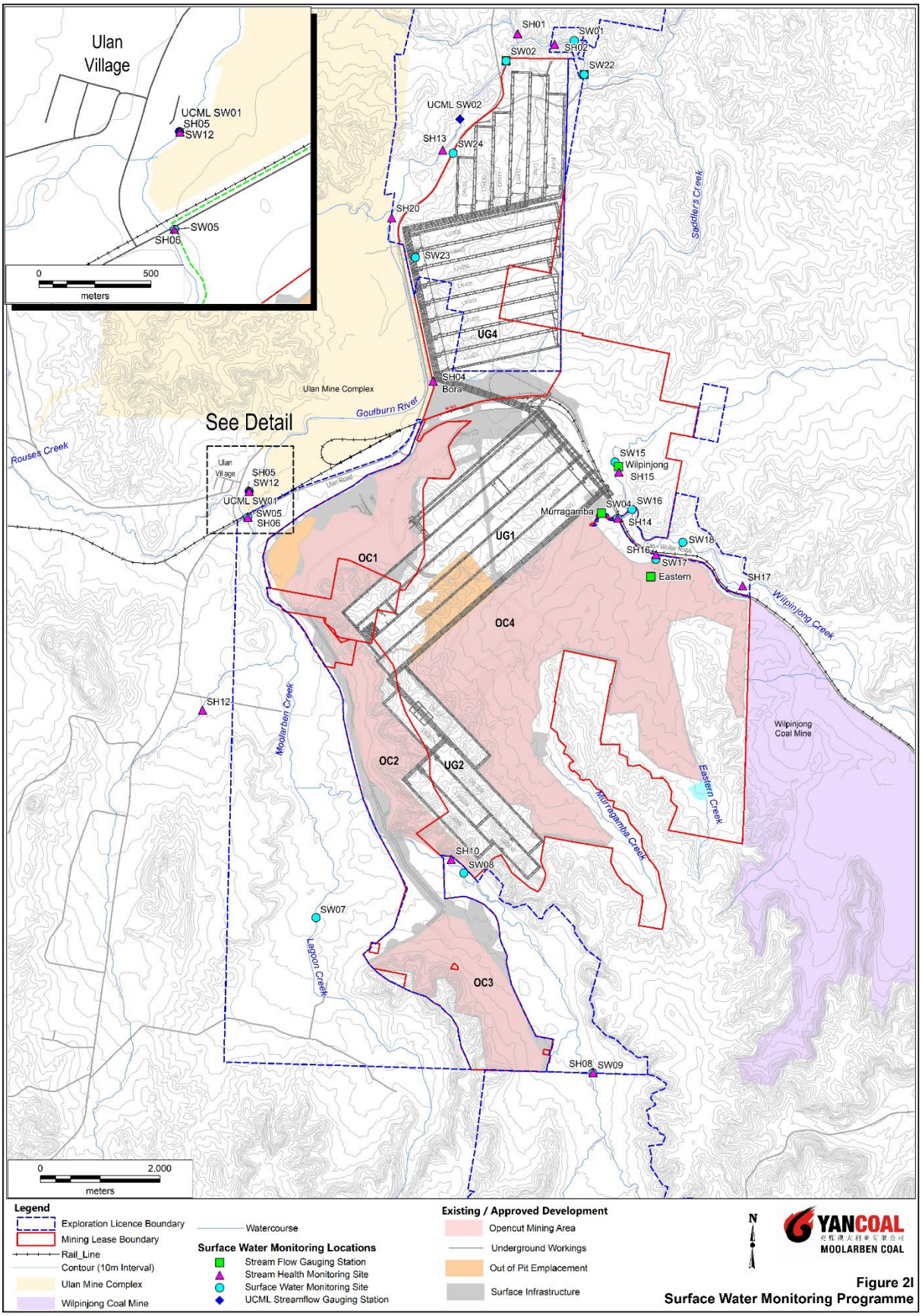


Figure 2-j Channel Stability Monitoring Locations

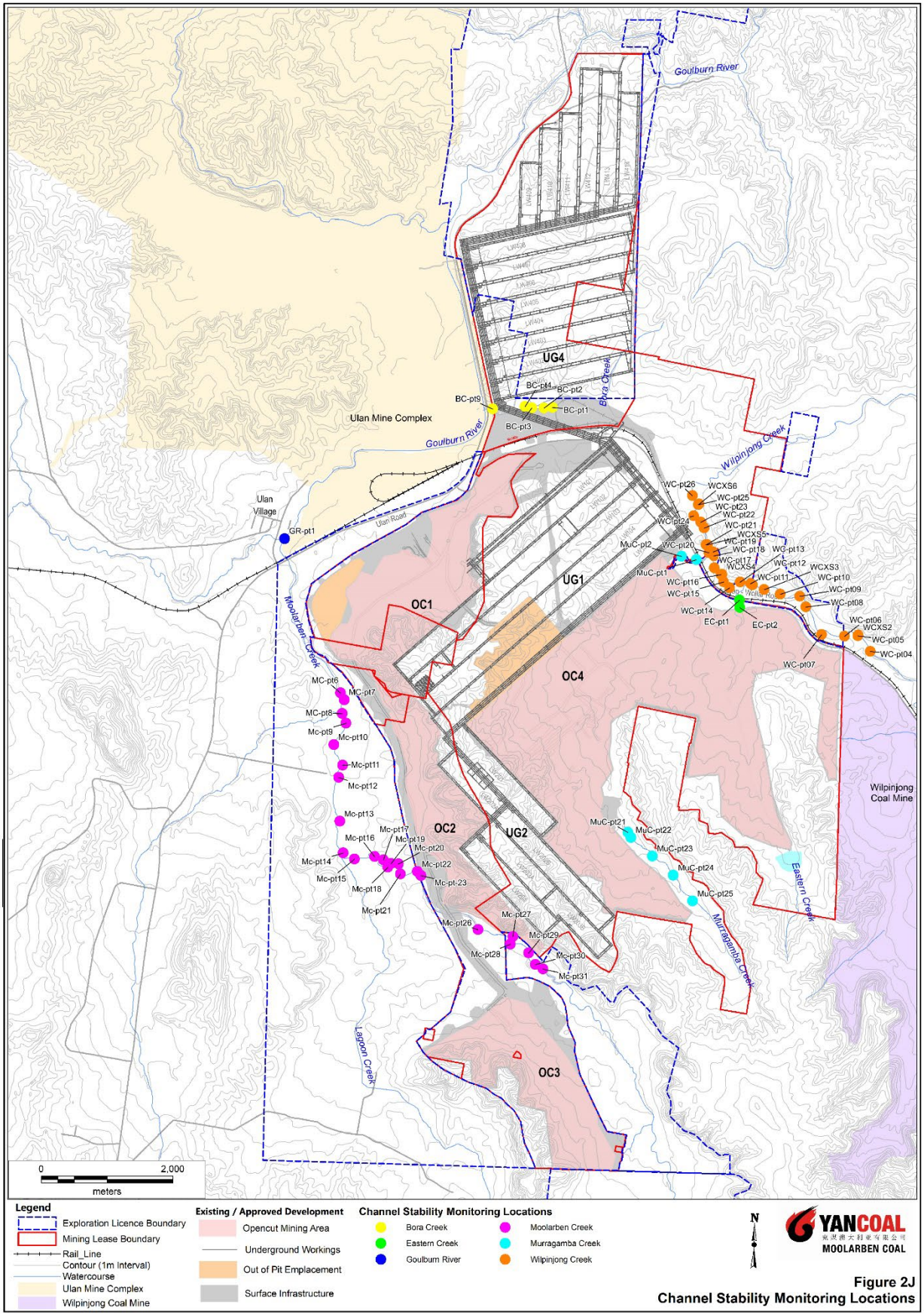


Figure 2-k Groundwater Monitoring Locations

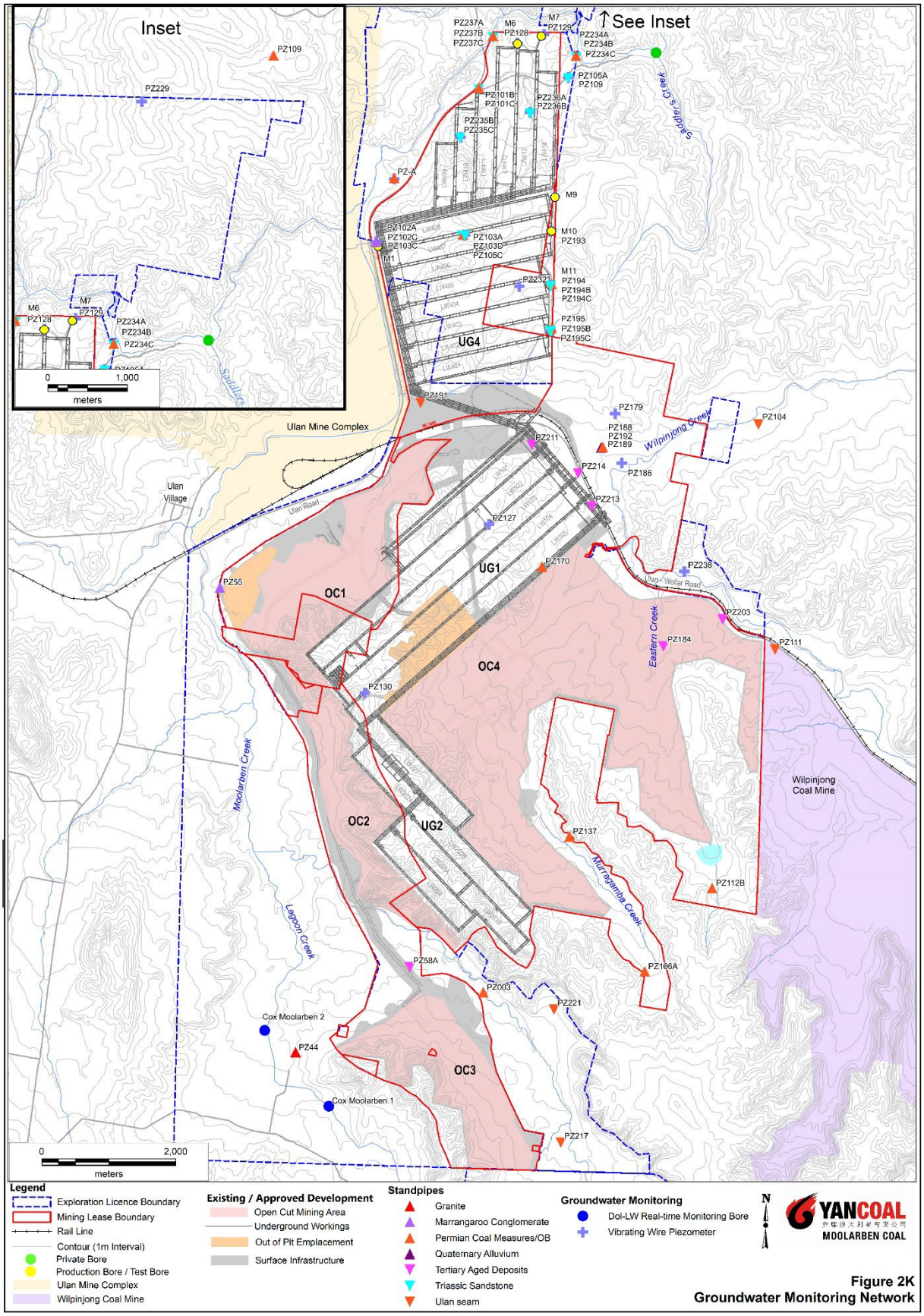
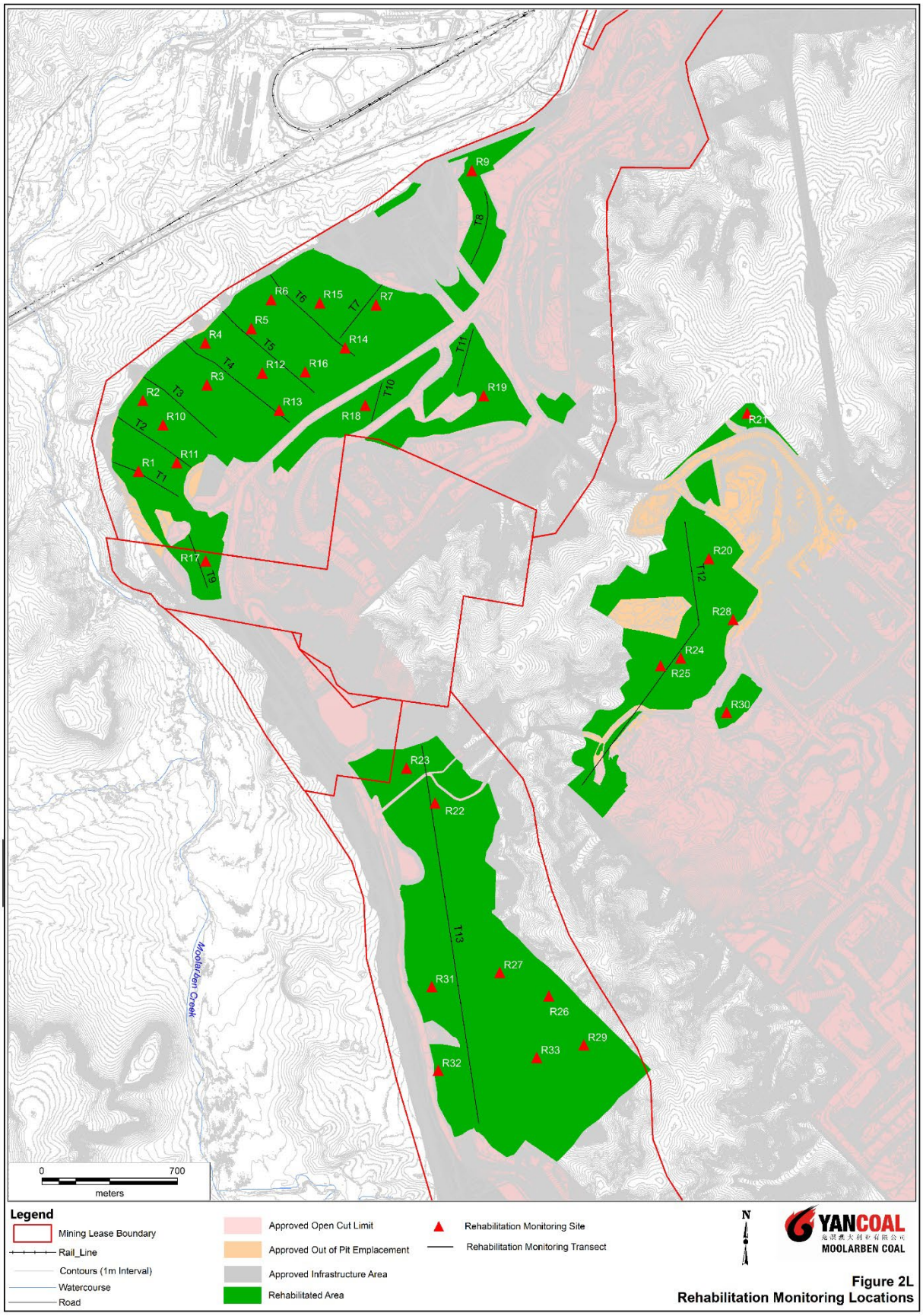


Figure 2-l Rehabilitation Monitoring Locations



APPENDIX 3. MONITORING DATA

APPENDIX 3A. DAILY METEOROLOGICAL DATA (WS03)

Date	Temperature (2m) (°C)		Temperature (10m) (°C)		Relative Humidity (%)	Rain (mm)
	Min	Max	Min	Max	Average	
1/01/2023	13.9	28.5	15.7	28.1	71.0	0
2/01/2023	13.2	30.9	14.8	30.5	63.5	0
3/01/2023	15.2	33.8	16.4	33.0	57.8	0
4/01/2023	15.8	31.7	17.4	31.0	64.8	0
5/01/2023	13.5	23.0	14.1	22.4	66.8	0
6/01/2023	8.2	24.1	9.4	23.2	66.6	0
7/01/2023	11.8	24.6	13.0	24.0	64.8	0
8/01/2023	11.4	29.7	13.0	29.2	58.8	0
9/01/2023	9.7	33.7	11.2	33.2	52.6	0
10/01/2023	11.7	31.7	13.7	31.0	53.4	0
11/01/2023	15.3	30.1	16.1	29.6	59.4	0
12/01/2023	14.4	34.3	15.3	33.7	60.5	5.4
13/01/2023	17.4	30.1	17.8	29.3	64.5	0
14/01/2023	15.2	29.5	16.2	29.1	60.1	0
15/01/2023	13.3	33.9	14.6	33.0	56.5	0
16/01/2023	17.8	29.8	19.3	29.4	58.6	0
17/01/2023	13.3	30.1	14.7	29.7	58.6	0
18/01/2023	12.3	35.3	13.6	34.0	55.7	0
19/01/2023	15.3	26.8	15.9	25.9	69.1	18.4
20/01/2023	13.9	23.7	14.6	22.8	68.6	0.2
21/01/2023	13.9	26.2	14.6	25.4	61.1	0
22/01/2023	13.8	19.6	14.3	19.6	71.6	43.8
23/01/2023	12.0	28.1	12.9	27.3	68.3	0
24/01/2023	16.5	30.7	17.4	29.9	61.2	0
25/01/2023	13.1	32.4	14.2	31.8	57.2	0
26/01/2023	13.7	36.3	15.3	35.6	59.1	2
27/01/2023	16.1	34.7	17.9	33.9	56.8	0
28/01/2023	16.0	35.1	17.1	33.9	65.8	0.4
29/01/2023	16.4	34.4	18.0	33.3	59.6	9.6
30/01/2023	18.5	23.4	19.3	23.5	72.6	5.4
31/01/2023	18.8	29.8	19.3	29.0	68.4	0.6
1/02/2023	15.5	31.7	17.3	31.2	55.8	0
2/02/2023	13.7	31.6	15.3	31.1	54.7	0
3/02/2023	14.2	24.7	15.0	24.0	48.1	3.8
4/02/2023	8.1	23.8	10.8	23.2	49.0	0
5/02/2023	5.6	31.1	7.0	30.4	54.2	0
6/02/2023	9.5	33.1	11.0	32.3	58.8	0
7/02/2023	15.0	32.8	17.1	32.2	62.6	0
8/02/2023	17.7	28.8	18.2	28.4	62.3	0.6
9/02/2023	14.9	23.6	15.6	23.1	75.9	23.2
10/02/2023	11.4	29.6	12.6	28.7	61.9	0.2
11/02/2023	13.1	34.7	14.3	34.0	57.8	0
12/02/2023	13.4	30.5	17.1	29.8	48.5	0
13/02/2023	16.8	29.3	18.1	28.3	64.8	0
14/02/2023	16.9	24.9	17.5	24.4	69.0	0
15/02/2023	15.4	28.7	16.3	28.2	57.4	0
16/02/2023	10.9	31.7	12.2	31.4	59.4	0
17/02/2023	12.3	34.4	14.0	33.8	54.5	0
18/02/2023	14.7	36.9	16.4	35.3	54.2	0
19/02/2023	14.1	30.5	15.4	30.1	64.0	0
20/02/2023	17.0	34.0	18.6	32.8	67.9	0
21/02/2023	14.7	33.4	16.0	32.3	62.2	0
22/02/2023	15.8	22.2	16.4	22.7	70.2	0.4
23/02/2023	13.9	25.0	14.7	24.4	62.8	0
24/02/2023	15.3	26.0	16.0	25.1	58.8	0
25/02/2023	8.9	27.9	10.8	27.8	60.3	0
26/02/2023	9.9	32.6	11.6	31.8	58.3	0
27/02/2023	14.7	33.7	16.7	32.6	53.7	0
28/02/2023	17.2	33.6	19.0	32.8	62.2	0
1/03/2023	12.9	32.2	14.0	31.0	57.0	0
2/03/2023	17.8	30.8	18.3	29.7	57.6	0

Date	Temperature (2m) (°C)		Temperature (10m) (°C)		Relative Humidity (%)	Rain (mm)
	Min	Max	Min	Max	Average	
3/03/2023	13.2	29.6	14.5	28.7	61.5	0
4/03/2023	16.6	29.0	17.4	27.9	59.5	0
5/03/2023	12.6	33.1	13.8	32.1	58.1	0
6/03/2023	18.0	36.5	20.3	35.8	39.3	0
7/03/2023	14.5	32.7	17.6	31.5	37.5	0
8/03/2023	10.5	29.4	12.1	28.4	40.0	0
9/03/2023	6.9	27.1	8.3	25.7	51.0	0
10/03/2023	6.2	31.2	7.6	31.0	53.0	0
11/03/2023	11.3	29.3	13.0	28.7	68.6	0
12/03/2023	14.7	30.6	15.9	29.9	69.3	0.6
13/03/2023	17.5	24.7	18.1	23.8	69.3	0
14/03/2023	17.0	24.3	17.9	24.0	76.3	1.8
15/03/2023	14.7	31.1	15.7	30.4	61.0	0
16/03/2023	11.3	34.5	12.8	33.3	52.2	0
17/03/2023	9.1	33.8	11.1	33.0	44.1	0
18/03/2023	10.4	36.5	12.4	35.6	56.1	0
19/03/2023	10.7	38.2	12.6	37.0	43.6	0
20/03/2023	13.1	29.6	15.3	28.8	60.1	0
21/03/2023	17.0	22.8	17.5	21.9	69.2	0
22/03/2023	13.3	29.4	14.2	28.5	72.8	6.8
23/03/2023	15.0	30.2	16.1	29.7	68.0	8.8
24/03/2023	12.8	29.3	13.9	28.8	64.6	0.2
25/03/2023	16.4	23.9	16.9	23.2	74.7	9
26/03/2023	15.3	26.0	16.1	25.1	72.0	0
27/03/2023	14.9	26.1	16.2	25.4	78.5	0
28/03/2023	16.2	24.9	17.3	24.8	70.7	0
29/03/2023	13.5	24.4	15.5	24.0	67.9	9.2
30/03/2023	9.6	21.4	11.3	20.4	64.0	0.2
31/03/2023	5.0	22.1	6.8	21.4	62.9	0
1/04/2023	4.7	22.8	6.0	21.8	64.3	0
2/04/2023	6.3	22.8	7.8	22.1	70.1	0
3/04/2023	8.6	24.0	10.8	23.4	70.4	0
4/04/2023	9.8	23.8	11.1	23.2	72.8	0
5/04/2023	7.4	25.6	9.1	25.1	64.4	0
6/04/2023	9.7	23.5	11.1	22.7	70.9	0
7/04/2023	12.0	20.9	13.5	20.4	73.3	23.2
8/04/2023	10.3	19.1	11.3	18.5	68.5	0.2
9/04/2023	5.4	17.8	7.4	17.1	62.6	0
10/04/2023	4.9	16.8	6.9	15.7	67.0	0
11/04/2023	3.2	19.4	5.2	18.6	66.6	0
12/04/2023	5.5	21.9	6.5	21.7	76.2	5.2
13/04/2023	10.0	20.5	11.1	20.0	72.2	0.2
14/04/2023	8.3	22.7	9.5	22.5	71.9	0
15/04/2023	5.6	24.7	6.9	23.9	70.0	0.2
16/04/2023	7.4	22.8	10.1	22.1	66.0	0
17/04/2023	2.9	21.4	4.2	21.1	68.5	0
18/04/2023	9.2	22.2	11.4	21.9	69.0	0
19/04/2023	6.4	24.1	8.1	23.7	73.6	0
20/04/2023	8.4	20.2	9.5	20.5	77.0	0
21/04/2023	5.5	21.7	7.5	21.3	70.6	0
22/04/2023	5.5	19.9	6.9	19.8	79.1	0
23/04/2023	7.2	20.8	9.4	20.8	77.0	0
24/04/2023	11.0	22.1	13.2	21.6	70.7	0
25/04/2023	9.6	22.6	11.5	22.3	73.0	0
26/04/2023	4.7	21.3	6.0	21.1	73.1	0.2
27/04/2023	7.3	23.1	9.4	23.2	70.0	0
28/04/2023	5.3	24.4	6.7	24.3	72.7	0
29/04/2023	10.5	15.2	11.0	16.6	86.6	16.6
30/04/2023	5.4	15.7	6.6	15.6	77.4	0.2
1/05/2023	3.5	15.0	5.2	15.7	83.1	0
2/05/2023	5.7	18.6	7.3	17.8	78.8	0.2
3/05/2023	4.4	19.5	6.1	18.8	68.6	0.2
4/05/2023	0.9	18.6	2.6	18.4	67.2	0
5/05/2023	-0.3	19.6	0.8	19.2	70.1	0
6/05/2023	-1.6	19.4	-0.5	19.0	69.5	0
7/05/2023	1.7	12.4	3.9	11.9	76.4	2.8

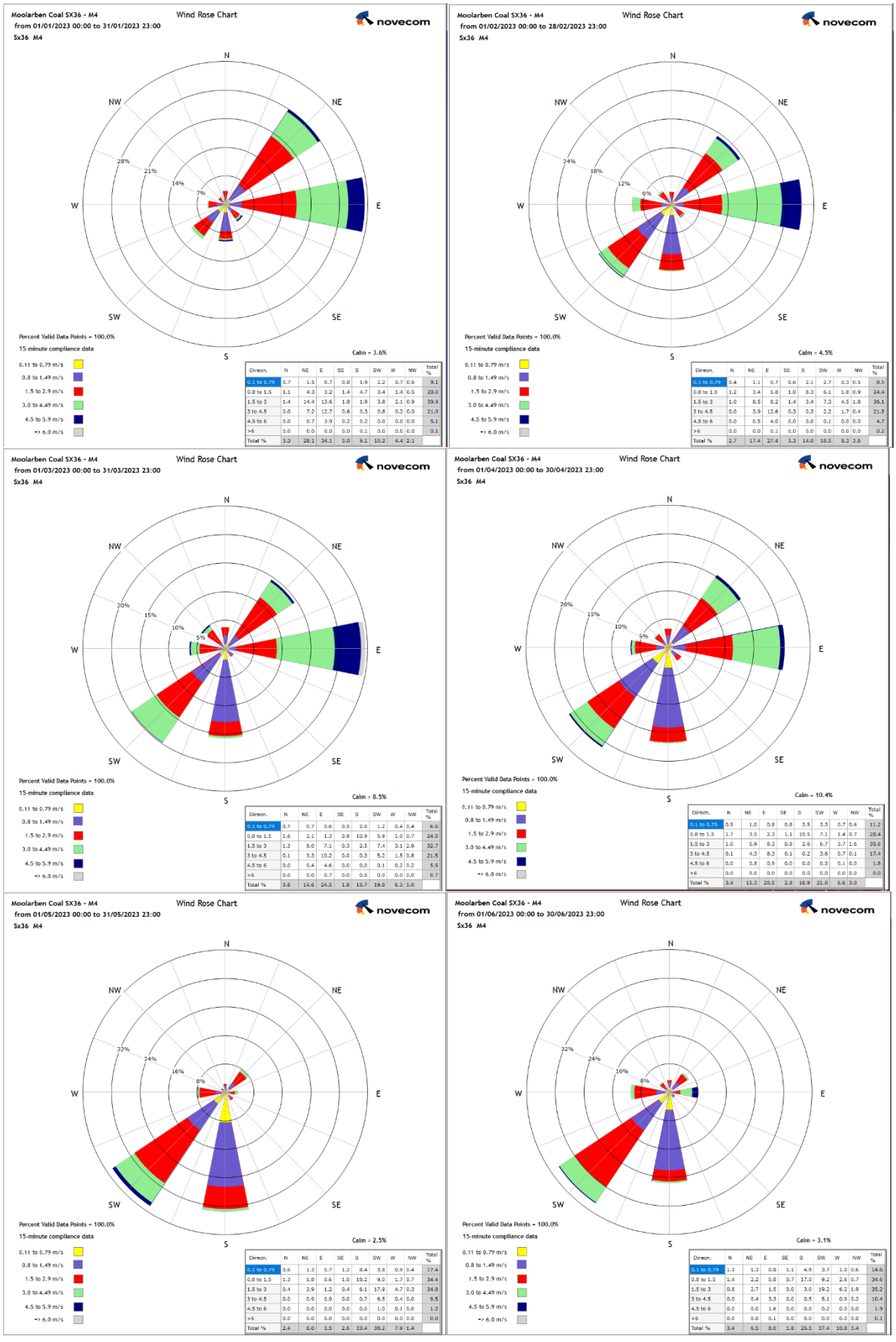
Date	Temperature (2m) (ºC)		Temperature (10m) (ºC)		Relative Humidity (%)	Rain (mm)
	Min	Max	Min	Max	Average	
8/05/2023	0.9	11.3	2.1	10.6	69.2	0
9/05/2023	-1.5	17.6	-0.2	17.2	74.3	0
10/05/2023	-1.2	17.9	0.2	17.9	75.0	0
11/05/2023	1.6	19.6	3.3	19.7	76.9	0
12/05/2023	1.8	20.9	3.0	20.7	75.5	0
13/05/2023	3.1	19.7	4.5	19.3	73.4	0
14/05/2023	3.7	17.9	5.3	17.6	81.9	0
15/05/2023	5.9	19.1	7.7	19.0	80.6	0
16/05/2023	3.4	20.9	4.6	20.4	64.1	0.2
17/05/2023	1.9	17.0	3.7	16.4	72.6	0
18/05/2023	0.2	16.0	1.8	15.4	72.8	0.2
19/05/2023	-1.9	15.8	-0.7	15.4	71.0	0
20/05/2023	-1.8	12.9	1.1	12.7	72.1	0
21/05/2023	4.2	13.9	6.7	13.9	69.1	0
22/05/2023	-1.2	18.9	1.3	18.6	68.8	0
23/05/2023	-2.9	21.5	-1.3	21.3	61.1	0
24/05/2023	-3.1	20.4	-1.6	20.3	61.0	0
25/05/2023	-2.9	21.3	-1.3	20.9	56.9	0
26/05/2023	3.1	13.0	5.0	13.6	67.1	1
27/05/2023	-3.0	13.8	-1.2	13.1	73.2	0.2
28/05/2023	-1.8	12.7	-0.4	12.1	73.5	0
29/05/2023	1.8	16.6	3.9	16.3	70.5	0
30/05/2023	1.4	17.0	4.1	16.2	78.8	0.2
31/05/2023	2.3	18.5	4.4	17.6	75.9	0
1/06/2023	4.8	21.2	6.6	20.5	72.4	0
2/06/2023	2.5	21.1	4.0	21.1	75.7	0
3/06/2023	6.1	22.4	7.9	21.7	74.8	0
4/06/2023	6.6	17.5	9.7	17.2	77.0	0
5/06/2023	11.2	15.1	11.9	15.2	70.3	0
6/06/2023	6.3	17.4	8.3	17.6	80.5	0.2
7/06/2023	4.2	19.6	5.7	19.9	83.0	0
8/06/2023	4.6	12.7	6.0	13.1	87.8	4.6
9/06/2023	7.4	15.8	7.6	15.2	73.1	0.2
10/06/2023	0.2	15.5	1.9	15.0	76.9	0
11/06/2023	-2.6	16.6	-1.3	16.7	79.9	0
12/06/2023	0.6	15.8	2.0	15.6	87.1	0.2
13/06/2023	3.7	18.0	5.2	17.9	81.3	3.2
14/06/2023	0.9	13.9	4.0	13.5	76.6	0.2
15/06/2023	0	13.8	1.3	12.8	76.2	0.2
16/06/2023	-2.8	16.4	-1.5	15.9	80.1	0
17/06/2023	-2.6	16.2	-1.1	16.0	78.7	0
18/06/2023	-2.7	16.4	-1.1	15.6	73.1	0
19/06/2023	-3.6	12.8	-1.8	12.1	73.1	0.2
20/06/2023	-3.3	13.3	-2.0	12.7	70.6	0
21/06/2023	-6.0	13.4	-4.6	13.3	69.3	0
22/06/2023	0.4	11.1	2.0	11.2	82.5	5.6
23/06/2023	4.6	14.1	6.3	13.3	75.6	10.4
24/06/2023	-1.0	15.3	0.2	15.3	72.0	0.2
25/06/2023	-0.8	16.4	1.6	15.9	65.5	0
26/06/2023	-2.8	14.7	-0.1	14.2	62.2	0
27/06/2023	-0.7	14.2	1.2	13.3	73.3	0
28/06/2023	6.0	8.0	6.8	8.7	87.9	5.4
29/06/2023	3.7	10.8	4.5	9.9	73.1	0.2
30/06/2023	3.5	10.3	4.5	9.8	71.8	0
1/07/2023	4.0	13.8	5.5	13.6	78.4	0.2
2/07/2023	-1.2	13.7	0	13.6	80.0	0
3/07/2023	1.6	14.2	3.2	14.2	80.5	0
4/07/2023	9.2	11.4	9.8	11.7	89.5	14.8
5/07/2023	9.0	13.2	9.5	13.2	83.1	9.8
6/07/2023	7.2	12.1	8.1	12.1	78.2	0.2
7/07/2023	3.0	11.4	5.6	11.2	80.2	0.6
8/07/2023	3.0	14.4	4.6	14.0	72.1	0.2
9/07/2023	5.7	14.6	6.8	14.3	68.9	0
10/07/2023	1.5	14.8	3.8	14.5	75.4	0
11/07/2023	-1.9	16.6	0.4	16.1	78.7	0
12/07/2023	-1.6	17.7	-0.4	17.8	76.5	0

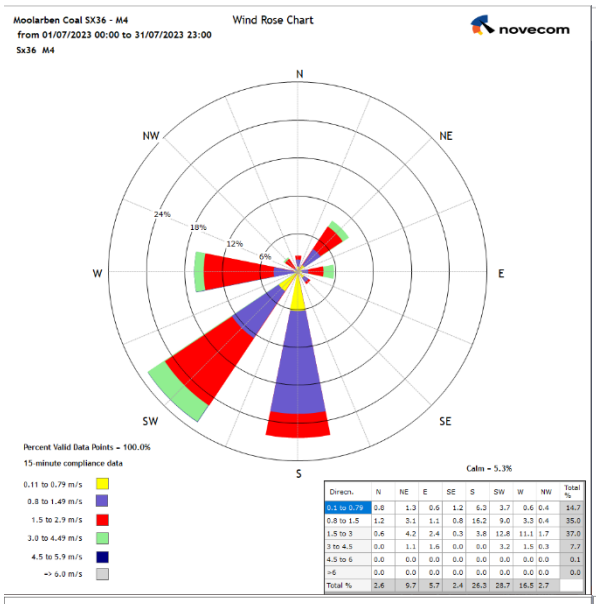
Date	Temperature (2m) (ºC)		Temperature (10m) (ºC)		Relative Humidity (%)	Rain (mm)
	Min	Max	Min	Max	Average	
13/07/2023	-2.4	18.5	-0.9	17.9	76.4	0
14/07/2023	-1.3	18.8	0.1	18.6	77.3	0
15/07/2023	1.8	19.4	3.2	19.0	75.5	0.2
16/07/2023	3.9	16.7	5.8	16.5	84.2	0.2
17/07/2023	7.2	17.5	9.1	17.4	81.9	0.2
18/07/2023	7.0	17.9	7.8	16.9	82.4	0
19/07/2023	-2.3	15.7	-0.6	15.6	75.3	0.2
20/07/2023	-4.3	17.4	-2.9	17.6	62.5	0
21/07/2023	0.2	13.3	2.3	12.8	77.7	1.6
22/07/2023	-3.0	15.1	-1.9	15.2	75.1	0
23/07/2023	-3.6	14.8	-2.3	14.8	78.2	0
24/07/2023	0.8	15.3	2.9	15.2	82.5	0.2
25/07/2023	-0.1	16.6	0.8	16.3	83.2	0.2
26/07/2023	-0.2	18.4	1.2	18.0	81.0	0
27/07/2023	-1.3	19.1	0.2	19.0	77.1	0
28/07/2023	0.3	19.9	1.9	19.7	74.5	0
29/07/2023	6.8	22.1	8.1	21.8	70.5	0
30/07/2023	7.1	19.3	8.3	18.8	80.3	0
31/07/2023	3.3	19.2	5.7	18.8	73.5	0
1/08/2023	0.1	18.6	2.3	18.4	76.6	0.2
2/08/2023	2.4	18.5	5.2	18.4	73.3	0.2
3/08/2023	1.0	20.6	2.6	20.3	78.5	0
4/08/2023	0.4	20.4	2.2	20.2	73.0	0
5/08/2023	2.1	17.3	3.5	17.0	76.7	0
6/08/2023	4.7	16.5	7.3	16.3	80.5	1
7/08/2023	2.0	16.4	3.3	16.4	79.8	0
8/08/2023	4.7	16.8	7.1	16.7	71.9	0
9/08/2023	1.0	18.7	2.7	18.7	76.1	0
10/08/2023	1.0	20.5	2.7	20.1	61.9	0
11/08/2023	-2.1	18.6	-0.7	18.2	67.4	0
12/08/2023	-1.3	19.8	-0.2	19.3	65.8	0
13/08/2023	4.9	16.4	6.2	16.2	75.6	0.2
14/08/2023	6.8	12.7	8.7	13.1	94.4	10.2
15/08/2023	3.5	16.1	3.9	15.5	82.0	0.2
16/08/2023	0.3	17.0	0.3	17.2	76.6	0.2
17/08/2023	0.1	19.3	1.3	18.6	77.8	4.2
18/08/2023	5.2	12.4	5.9	12.1	79.7	6.6
19/08/2023	2.3	12.5	3.3	11.7	72.7	0
20/08/2023	2.8	17.8	5.0	17.1	72.9	0
21/08/2023	0	20.1	1.3	19.6	75.4	0
22/08/2023	1.3	23.2	2.7	22.7	63.0	0
23/08/2023	2.3	17.1	4.0	16.6	70.9	0
24/08/2023	2.3	17.3	4.4	17.2	78.5	0
25/08/2023	0.2	22.4	1.9	22.1	67.9	0
26/08/2023	0.9	20.8	2.4	20.8	65.9	0
27/08/2023	1.7	21.0	3.7	20.8	70.5	0
28/08/2023	2.6	21.3	4.5	20.9	67.4	0
29/08/2023	1.9	23.1	3.5	22.6	67.2	0
30/08/2023	2.6	23.2	4.1	22.7	74.4	4.6
31/08/2023	3.6	19.8	4.6	18.7	73.3	0.4
1/09/2023	1.9	19.6	3.5	19.2	67.1	0.2
2/09/2023	0.5	18.0	1.9	17.9	70.7	0
3/09/2023	1.7	19.8	4.3	19.8	71.0	0
4/09/2023	3.9	23.8	6.2	24.3	75.7	3.4
5/09/2023	2.9	20.2	4.6	19.4	49.9	0
6/09/2023	-0.7	22.8	0.7	22.6	57.7	0
7/09/2023	1.2	27.6	2.7	27.2	60.8	5.4
8/09/2023	6.2	17.1	6.9	17.7	67.9	10
9/09/2023	-0.3	13.4	2.1	12.8	66.6	0.2
10/09/2023	-0.5	16.6	1.4	16.0	61.0	0
11/09/2023	-1.6	18.3	-0.2	17.9	68.8	0
12/09/2023	0.2	21.2	1.9	20.8	65.9	0
13/09/2023	1.8	23.5	3.1	22.8	62.2	0
14/09/2023	2.3	25.3	3.9	24.8	60.3	0
15/09/2023	2.9	25.8	4.2	25.3	60.4	0
16/09/2023	4.0	29.4	5.7	28.8	55.3	0

Date	Temperature (2m) (°C)		Temperature (10m) (°C)		Relative Humidity (%)	Rain (mm)
	Min	Max	Min	Max	Average	
17/09/2023	5.5	29.6	7.7	29.1	47.3	0
18/09/2023	6.2	31.2	8.0	30.6	48.2	0
19/09/2023	7.6	29.7	9.8	29.3	45.4	0
20/09/2023	9.8	30.6	13.4	30.0	39.3	0
21/09/2023	7.8	22.2	10.2	21.3	46.7	0
22/09/2023	6.3	18.1	8.1	17.7	58.5	0
23/09/2023	4.0	19.4	6.7	18.8	61.2	0
24/09/2023	3.8	21.8	5.9	21.7	60.9	0
25/09/2023	2.4	24.5	4.5	23.9	61.8	0
26/09/2023	4.1	26.9	5.6	26.1	58.9	0.2
27/09/2023	5.8	26.6	8.0	26.1	60.7	0.2
28/09/2023	6.3	25.0	7.8	24.7	67.0	0
29/09/2023	6.1	28.4	7.8	27.4	59.5	0
30/09/2023	6.1	30.1	7.7	29.8	50.2	0
1/10/2023	11.0	32.9	12.3	32.3	38.8	0
2/10/2023	17.9	33.4	19.3	32.9	39.9	0.4
3/10/2023	12.3	32.8	13.5	31.4	45.0	0
4/10/2023	9.2	23.0	9.8	23.6	64.0	25
5/10/2023	8.5	16.8	9.1	15.8	58.7	0
6/10/2023	4.7	22.3	5.2	21.4	55.7	0
7/10/2023	11.9	19.2	12.1	18.8	56.3	0
8/10/2023	9.6	22.5	10.0	21.7	53.5	0
9/10/2023	5.5	25.3	6.3	24.4	56.9	0
10/10/2023	6.4	25.7	7.4	25.1	51.2	0
11/10/2023	11.3	27.6	12.7	26.9	51.9	0
12/10/2023	6.2	30.8	7.3	30.1	43.6	0
13/10/2023	6.8	22.2	8.1	21.4	46.3	0
14/10/2023	6.8	24.6	8.0	24.2	49.6	0
15/10/2023	8.2	26.7	9.5	26.1	44.8	0
16/10/2023	8.1	23.1	9.8	22.2	46.7	0
17/10/2023	7.2	20.6	8.0	19.3	46.2	0
18/10/2023	11.7	22.1	11.8	21.6	56.6	0
19/10/2023	9.7	26.1	11.3	25.8	53.2	0
20/10/2023	7.5	30.5	8.4	29.7	50.7	0
21/10/2023	9.6	34.0	10.7	33.1	44.4	0
22/10/2023	15.3	26.9	17.3	25.9	34.6	0
23/10/2023	6.9	26.4	7.8	25.6	37.7	0
24/10/2023	6.2	33.0	7.3	32.4	33.1	0
25/10/2023	10.6	27.3	12.0	26.3	30.4	0
26/10/2023	9.3	16.0	9.3	15.2	50.8	8.6
27/10/2023	7.5	19.4	8.4	18.7	64.5	2.2
28/10/2023	6.8	21.1	8.4	20.4	58.2	0
29/10/2023	5.9	26.2	6.6	25.3	52.7	0
30/10/2023	6.4	32.1	7.5	31.1	41.1	0
31/10/2023	14.7	26.8	15.5	25.7	26.9	0
1/11/2023	12.4	25.8	12.9	25.4	53.3	0
2/11/2023	11.3	26.9	12.6	26.4	54.6	0
3/11/2023	13.6	27.9	13.9	27.2	60.7	0
4/11/2023	13.1	26.5	12.8	25.7	72.2	23.2
5/11/2023	13.0	24.1	13.9	23.3	68.0	0
6/11/2023	13.5	24.7	13.6	24.2	58.8	0
7/11/2023	10.5	26.9	11.2	26.4	56.0	0
8/11/2023	14.6	25.5	14.7	24.9	71.8	3.2
9/11/2023	13.1	28.5	13.4	27.8	81.6	17.4
10/11/2023	12.1	30.1	12.2	29.6	65.9	0.2
11/11/2023	13.0	33.4	13.6	32.7	57.8	0
12/11/2023	15.8	34.6	16.9	34.3	46.2	0
13/11/2023	12.7	31.1	14.0	30.5	49.4	0
14/11/2023	11.7	32.0	12.5	31.3	50.0	0
15/11/2023	15.9	31.5	16.8	30.7	43.0	0
16/11/2023	14.9	31.0	15.3	30.1	51.8	0
17/11/2023	15.0	25.1	15.7	24.4	52.6	0
18/11/2023	13.6	28.4	13.8	27.8	51.2	0
19/11/2023	12.7	31.4	13.3	30.7	48.3	0.4
20/11/2023	17.2	23.6	18.0	23.1	61.5	0
21/11/2023	13.2	27.9	13.9	27.3	65.1	0

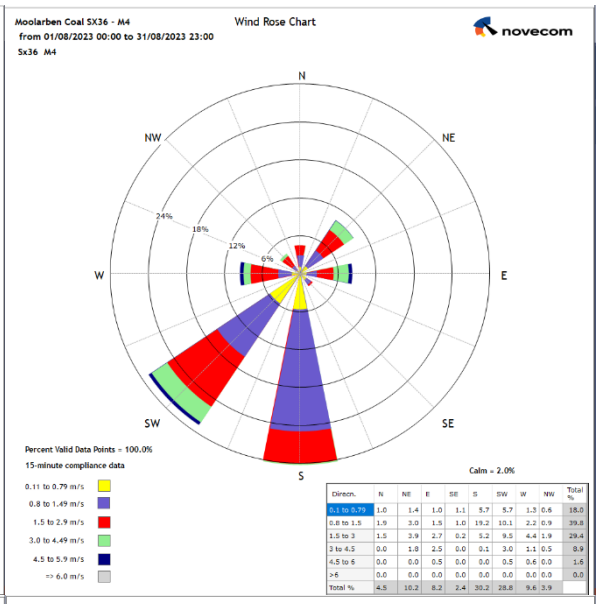
Date	Temperature (2m) (°C)		Temperature (10m) (°C)		Relative Humidity (%)	Rain (mm)
	Min	Max	Min	Max	Average	
22/11/2023	17.0	27.5	17.6	27.0	65.0	0
23/11/2023	17.5	23.4	17.6	23.6	68.9	1
24/11/2023	17.6	21.3	17.6	21.1	84.1	16.6
25/11/2023	17.7	23.1	17.9	22.4	85.1	10.6
26/11/2023	17.0	30.0	17.7	29.4	69.1	7.6
27/11/2023	13.3	31.5	13.9	30.7	65.3	0.4
28/11/2023	18.1	24.8	18.2	24.5	77.0	1.4
29/11/2023	17.0	27.0	17.3	26.1	71.0	12
30/11/2023	16.2	26.7	16.6	26.4	61.2	0
1/12/2023	15.2	28.7	16.0	28.1	52.3	0
2/12/2023	16.4	28.3	16.5	27.5	61.2	1
3/12/2023	14.0	30.1	15.0	29.4	48.9	0
4/12/2023	15.4	29.9	16.1	29.2	56.7	0
5/12/2023	13.4	35.0	14.3	34.7	49.8	0
6/12/2023	17.9	38.4	19.5	38.0	41.1	0
7/12/2023	16.0	38.5	16.7	37.6	46.4	0
8/12/2023	20.6	38.7	21.0	37.9	51.3	4
9/12/2023	19.8	39.8	20.7	38.9	44.1	0
10/12/2023	22.8	33.1	22.9	32.6	55.5	0
11/12/2023	19.9	37.4	20.4	36.7	50.4	0
12/12/2023	19.7	32.9	19.9	32.7	52.6	0
13/12/2023	19.4	37.3	19.4	36.1	50.7	0
14/12/2023	20.9	36.3	21.6	35.7	44.0	0.8
15/12/2023	17.9	34.9	18.7	34.0	39.2	0
16/12/2023	15.3	32.9	16.0	32.1	36.8	0
17/12/2023	13.6	35.8	14.9	35.0	42.1	0
18/12/2023	21.4	38.1	21.4	37.1	43.8	0
19/12/2023	20.8	33.2	21.1	33.0	51.7	8
20/12/2023	16.6	21.4	16.7	21.2	88.5	25.6
21/12/2023	15.8	23.8	15.9	22.8	73.4	0.2
22/12/2023	14.5	27.3	14.7	26.6	56.9	0
23/12/2023	14.7	28.1	14.9	27.2	67.7	4.2
24/12/2023	14.7	28.5	14.9	27.6	75.0	24.4
25/12/2023	17.3	33.0	17.3	32.2	72.4	2.2
26/12/2023	17.0	31.8	17.1	30.8	55.2	0
27/12/2023	13.0	28.3	13.8	27.7	49.1	0
28/12/2023	13.0	31.2	13.9	30.6	50.5	0
29/12/2023	15.8	30.3	16.5	29.8	60.2	1.6
30/12/2023	15.2	30.1	15.8	29.2	56.7	0
31/12/2023	18.4	22.3	18.4	21.8	69.4	0

Figure 3-a Monthly Wind Rose (WS03)

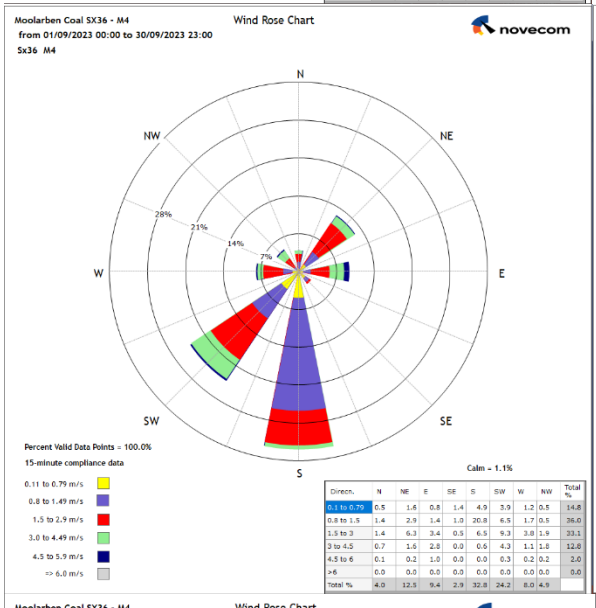




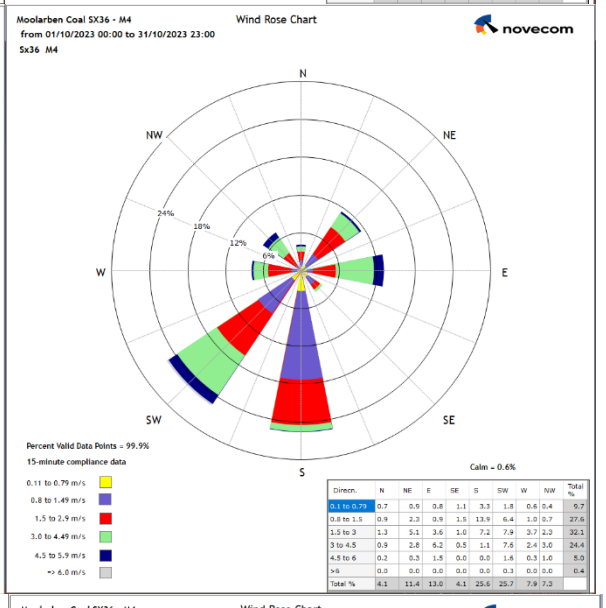
Direcn.	N	NE	E	SE	S	SW	W	NW	Total %
0.1 to 0.79	0.8	1.3	0.6	1.2	6.3	3.7	0.6	0.4	14.7
0.8 to 1.5	1.2	3.1	1.1	0.8	16.2	9.0	3.3	0.4	35.0
1.5 to 3	0.6	4.2	2.4	0.3	3.8	12.8	11.1	1.7	37.0
3 to 4.5	0.0	1.1	1.6	0.0	0.0	3.2	1.5	0.3	7.7
4.5 to 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
>6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total %	2.6	9.7	5.7	2.4	26.3	28.7	16.5	2.7	



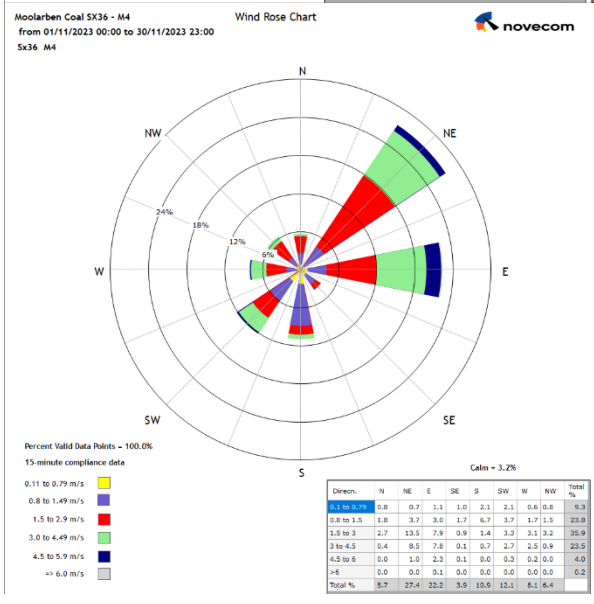
Direcn.	N	NE	E	SE	S	SW	W	NW	Total %
0.1 to 0.79	1.0	1.4	1.0	1.1	5.7	5.7	1.3	0.6	18.0
0.8 to 1.5	1.9	3.0	1.5	1.0	19.2	10.1	2.2	0.9	39.8
1.5 to 3	1.5	3.9	2.7	0.2	5.2	9.5	4.4	1.9	29.4
3 to 4.5	0.0	1.8	2.5	0.0	0.1	3.0	1.1	0.5	8.9
4.5 to 6	0.0	0.0	0.5	0.0	0.0	0.5	0.6	0.0	1.6
>6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total %	4.5	10.2	8.2	2.4	30.2	28.8	9.6	3.9	



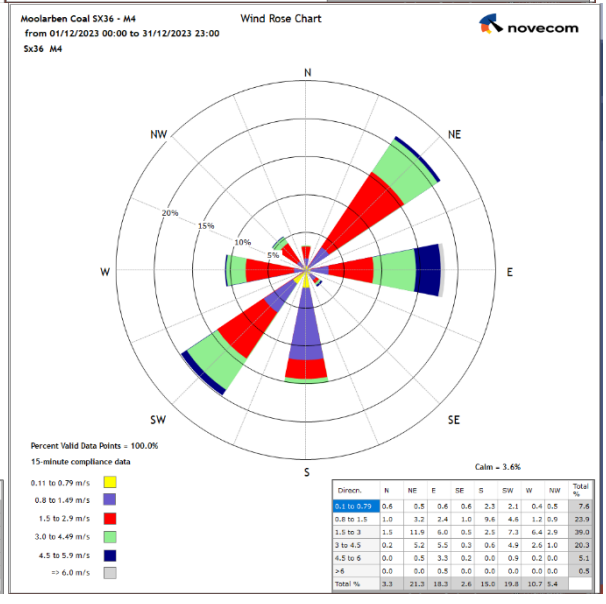
Direcn.	N	NE	E	SE	S	SW	W	NW	Total %
0.1 to 0.79	0.5	1.6	0.8	1.4	4.9	3.9	1.2	0.5	14.8
0.8 to 1.5	1.4	2.9	1.4	1.0	20.8	6.5	1.7	0.5	36.0
1.5 to 3	1.4	6.3	3.4	0.5	6.5	9.3	3.8	1.9	33.1
3 to 4.5	0.7	1.6	2.8	0.0	0.6	4.3	1.1	1.8	12.8
4.5 to 6	0.1	0.2	1.0	0.0	0.0	0.3	0.2	0.2	2.0
>6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total %	4.0	12.5	9.4	2.9	32.8	24.2	8.0	4.9	



Direcn.	N	NE	E	SE	S	SW	W	NW	Total %
0.1 to 0.79	0.7	0.9	0.8	1.1	3.3	1.8	0.6	0.4	9.7
0.8 to 1.5	0.9	2.3	0.9	1.5	13.9	6.4	1.0	0.7	27.6
1.5 to 3	1.3	5.1	3.6	1.0	7.2	7.9	3.7	2.3	32.1
3 to 4.5	0.9	2.8	5.2	0.5	1.1	7.5	2.4	3.0	24.4
4.5 to 6	0.2	0.3	1.5	0.0	0.0	1.6	0.3	1.0	5.0
>6	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4
Total %	4.1	11.4	13.0	4.1	25.6	25.7	7.9	7.3	



Direcn.	N	NE	E	SE	S	SW	W	NW	Total %
0.1 to 0.79	0.8	0.7	1.1	1.0	2.1	2.1	0.6	0.8	9.3
0.8 to 1.5	1.8	3.7	3.0	1.7	6.7	3.7	1.7	1.5	23.8
1.5 to 3	2.7	13.5	7.9	0.9	1.4	3.3	3.1	3.2	35.9
3 to 4.5	0.4	8.5	7.8	0.1	0.7	2.7	2.5	0.9	23.5
4.5 to 6	0.0	1.0	2.3	0.1	0.0	0.3	0.2	0.0	4.0
>6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Total %	5.7	27.4	22.2	3.9	10.9	12.1	8.1	6.4	



Direcn.	N	NE	E	SE	S	SW	W	NW	Total %
0.1 to 0.79	0.6	0.5	0.6	0.6	2.3	2.1	0.4	0.5	7.6
0.8 to 1.5	1.0	3.2	2.4	1.0	9.6	4.6	1.2	0.9	23.9
1.5 to 3	1.5	11.9	6.0	0.5	2.5	7.3	6.4	2.9	39.0
3 to 4.5	0.2	5.2	5.5	0.2	0.6	4.9	2.6	1.0	20.3
4.5 to 6	0.0	0.5	3.3	0.2	0.0	0.9	0.2	0.0	5.1
>6	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5
Total %	3.3	21.3	18.3	2.6	15.0	19.8	10.7	5.4	

Appendix 3B. NOISE MONITORING RESULTS

Environmental Noise Monitoring – January 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 18th & 30th January 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	2:34pm (18/1/23)	57	IA	35	IA	45	A / 0.4 / 352	Insects (57), birds (43), nearby stream (34), traffic (27), **MCO (IA)**
Winchester Crescent	10:58pm (30/1/23)	38	IA	35	IA	45	E / 1.3 / 292	Insects (38), frogs (25), traffic (21), **MCO (IA)**
Lower Ridge Road	11:18pm (30/1/23)	39	IA	37	IA	45	E / 1.6 / 285	Insects (36), frogs (35), traffic (22), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was inaudible at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
40, 41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

Environmental Noise Monitoring – February 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 27th & 28th February 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:51am (28/2/23)	53	IA	35	IA	45	C / 5.5 / 078	Traffic (53), birds (36), insects (33), mine (28), **MCO (IA)**
Winchester Crescent	10:00pm (27/2/23)	42	25	35	29	45	F / 1.3 / 083	Insects (41), traffic (35), **MCO (25)**
Lower Ridge Road	10:21pm (27/2/23)	50	24	37	27	45	F / 1.7 / 088	Traffic (50), insects (27), **MCO (24)**
Cope Road / Toole Road	10:47pm (27/2/23)	56	IA	35	IA	45	D / 2.8 / 063	Traffic (56), insects (25), mine (23), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was below the relevant noise criterion at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	NA
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	IA	IA	-	Yes	No
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	25	29	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
40, 41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	24	27	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 16th & 17th March 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:00am (17/3/23)	43	IA	35	IA	45	C / 1.5 / 022	Traffic (42), birds (34), mine (25), **MCO (IA)**
Winchester Crescent	10:00pm (16/3/23)	42	IA	35	IA	45	E / 1.0 / 185	Insects (42), dogs (23), **MCO (IA)**
Lower Ridge Road	10:21pm (16/3/23)	55	IA	37	IA	45	D / 1.0 / 196	Traffic (55), insects (37), frogs (32), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was inaudible at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No)[5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
40, 41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

Environmental Noise Monitoring – April 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 19th April 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	2:43pm	43	IA	35	IA	45	A / 2.2 / 184	Birds (41), insects (37), traffic (35), industrial (26), **MCO (IA)**
Winchester Crescent	10:07pm	37	18	35	21	45	D / 1.4 / 198	Traffic (34), train (34), insects (20), **MCO (18)**
Lower Ridge Road	10:29pm	55	IA	37	IA	45	D / 0.9 / 170	Traffic (55), frogs (30), aeroplane (29), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was below the applicable noise criterion at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	18	21	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
40, 41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

Environmental Noise Monitoring – May 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in Table 3.

Table 3
MCO Operational Noise Monitoring Results – 24th & 25th May 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:14am (25/5/23)	51	IA	35	IA	45	A / 0.6 / 052	Traffic (51), mine (35), birds (24), **MCO (IA)**
Cope Road/Toole Road	12:09am (25/5/23)	41	IA	35	IA	45	E / 0.7 / 188	Traffic (41), **MCO (IA)**
Lagoons Road	11:41pm (24/5/23)	32	28	35	32	45	D / 1.0 / 184	Traffic (30), **MCO (28)**
Winchester Crescent	10:33pm (24/5/23)	46	IA	35	IA	45	E / 1.3 / 194	Traffic (46), dogs (28), **MCO (IA)**
Upper Ridge Road	10:57pm (24/5/23)	24	IA	35	IA	45	D / 0.8 / 192	Traffic (23), dogs (18), **MCO (IA)**
Lower Ridge Road	11:18pm (24/5/23)	43	26	37	31	45	D / 1.0 / 179	Traffic (43), **MCO (26)**
Moolarben Road	10:00pm (24/5/23)	29	19	35	34	45	F / 0.8 / 202	Cows (29), **MCO (19)**
Goulburn River National Park	11:10am (25/5/23)	47	22	50	26	NA	A / 1.9 / 303	Traffic (47), **MCO (22)**
Munghorn Gap Nature Reserve	10:26am (25/5/23)	49	IA	50	IA	NA	A / 2.0 / 265	Traffic (49), birds (35), wind (24), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was compliant at all monitoring locations. All noise measurements were made under compliant meteorological conditions.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No)[5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	IA	IA	-	Yes	No
N/A	Lagoons Road	NA2	Validation - Attended	Annually	28	32	-	Yes	No
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	IA	IA	-	Yes	No
40, 41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	26	31	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	19	34	-	Yes	No
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	22	26	All periods LAeq,15minute: 50 dB	Yes	No
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	IA	IA	All periods LAeq,15minute: 50 dB	Yes	No

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

Environmental Noise Monitoring – June 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 27th June 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	2:35pm	44	IA	35	IA	45	B / 2.3 / 243	Traffic (43), birds (35), industrial (31), **MCO (IA)**
Winchester Crescent	10:12pm	27	IA	35	IA	45	D / 1.2 / 168	Traffic (26), dogs (19), **MCO (IA)**
Lower Ridge Road	10:33pm	41	IA	37	IA	45	F / 1.2 / 193	Traffic (40), aeroplanes (34), frogs (21), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was below the applicable noise criterion at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
40, 41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in Table 3.

Table 3
MCO Operational Noise Monitoring Results – 24th & 25th July 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:25am (25/7/23)	45	28	35	33	45	A / 0.9 / 041	Traffic (43), birds (38), lawnmower nearby (37), **MCO (28)**
Winchester Crescent	10:11pm (24/7/23)	34	26	35	31	45	E / 0.8 / 191	Traffic (32), aeroplanes (28), **MCO (26)**
Lower Ridge Road	10:33pm (24/7/23)	55	32	37	35	45	E / 1.0 / 186	Traffic (55), **MCO (32)**, frogs (23)

1. L1 (1 min) from MCO mine noise only.

Data from those times where MCO operations are audible are analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal or impulsive components as per definitions in the NPI. The methodology for analysing the low frequency noise modifying factor correction in the NPI is shown in extract below.

Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10– 160 Hz	Measure/assess source contribution C- and A-weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A- weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB[2]	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C2 : One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The correction applies to the mine noise component only. There are many sources of low frequency noise in the acoustic environment of each receiver area (including noise from road and rail traffic). In many cases the C minus A level is greater than 15 due to these other noise sources. In most instances the screening criteria will be the one third octave analysis. The NPI quantitative assessment of noise from MCO can only be conducted where the noise was clearly definable, which is at a level typically greater than 30 dB(A) or when there are no other significant sources.

Table 4 presents the low-frequency assessment of the mine noise measured at 32 dB(A) at Lower Ridge Road.

Table 4. Low-frequency analysis – Lower Ridge Road 10:33 pm													
Hz/dB(Z)	**One-third octave LZeq,15min threshold level**												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Lower Ridge Road, dB(Z)	--	50	48	38	42	44	42	42	38	39	39	34	29
Threshold, dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
Exceedance, dB	--	0	0	0	0	0	0	0	0	0	0	0	0

The results in the above table shows no exceedance of the low-frequency criteria.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was below the applicable noise criterion at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	28	33	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	26	31	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	32	35	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

Environmental Noise Monitoring – August 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 16th August 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	2:41pm	47	IA	35	IA	45	A / 1.9 / 009	Traffic (46), aeroplane (37), birds (32), industrial (32), **MCO (IA)**
Winchester Crescent	10:09pm	42	IA	35	IA	45	D / 1.2 / 093	Aeroplane (42), traffic (35), mine (28), dog (18), **MCO (IA)**
Lower Ridge Road	10:30pm	57	IA	37	IA	45	D / 1.2 / 191	Traffic (57), aeroplane (42), mine (34), frogs (33), **MCO (IA)**
Cope Road / Toole Road	10:57pm	34	IA	35	IA	45	D / 1.4 / 198	Mine (33), frogs (25), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was below the relevant noise criterion at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No)[5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	IA	IA	-	Yes	No
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 25th & 26th September 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:38am (26/9/23)	55	IA	35	IA	45	A / 1.9 / 272	Industrial (55), traffic (42), birds (31), **MCO (IA)**
Winchester Crescent	10:05pm (25/9/23)	30	IA	35	IA	45	D / 0.7 / 205	Birds (29), dogs (24), **MCO (IA)**
Lower Ridge Road	10:27pm (25/9/23)	54	IA	37	IA	45	D / 1.0 / 200	Traffic (54), frogs (24), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

Data from those times where MCO operations are audible are analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal or impulsive components as per definitions in the NPI. The methodology for analysing the low frequency noise modifying factor correction in the NPI is shown in extract below.

Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10– 160 Hz	Measure/assess source contribution C- and A-weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A- weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB[2]	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C2 : One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The correction applies to the mine noise component only. There are many sources of low frequency noise in the acoustic environment of each receiver area (including noise from road and rail traffic). In many cases the C minus A level is greater than 15 due to these other noise sources. In most instances the screening criteria will be the one third octave analysis. The NPI quantitative assessment of noise from MCO can only be conducted where the noise was clearly definable, which is at a level typically greater than 30 dB(A) or when there are no other significant sources.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was inaudible at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No)[5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 26th October 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:00am	53	IA	35	IA	45	D / 5.5 / 187	Train (52), traffic (46), birds (31), MCO (IA)
Winchester Cresoent	5:11am	45	IA	35	IA	45	D / 3.7 / 188	Traffic (45), birds (22), MCO (IA)
Lower Ridge Road	5:32am	62	IA	37	IA	45	D / 4.1 / 187	Traffic (62), birds (30), MCO (IA)

1. L1 (1 min) from MCO mine noise only.

Data from those times where MCO operations are audible are analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal or impulsive components as per definitions in the NPI. The methodology for analysing the low frequency noise modifying factor correction in the NPI is shown in extract below.

Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10– 160 Hz	Measure/assess source contribution C- and A-weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A- weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB[2]	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C2 : One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The correction applies to the mine noise component only. There are many sources of low frequency noise in the acoustic environment of each receiver area (including noise from road and rail traffic). In many cases the C minus A level is greater than 15 due to these other noise sources. In most instances the screening criteria will be the one third octave analysis. The NPI quantitative assessment of noise from MCO can only be conducted where the noise was clearly definable, which is at a level typically greater than 30 dB(A) or when there are no other significant sources.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was inaudible at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	NA
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	NA
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	NA
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

Environmental Noise Monitoring – November 2023

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 27th & 28th November 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:02am (28/11/23)	53	IA	35	IA	45	C / 2.6 / 065	Birds (52), traffic (42), insects (36), MCO (IA)
Winchester Crescent	10:02pm (27/11/23)	48	IA	35	IA	45	F / 1.8 / 059	Traffic (47), birds (40), frogs (31), MCO (IA)
Lower Ridge Road	10:24pm (27/11/23)	48	IA	37	IA	45	F / 2.0 / 067	Traffic (47), frogs (38), insects (32), MCO (IA)
Cope Road / Toole Road	10:50pm (27/11/23)	58	IA	35	IA	45	E / 2.9 / 062	Traffic (58), insects (34), mine (33), MCO (IA)

1. L1 (1 min) from MCO mine noise only.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was below the relevant noise criterion at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No)[5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	IA	IA	-	Yes	No
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 MCO Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
MCO Operational Noise Monitoring Results – 18th & 19th December 2023

Location	Time	dB(A), Leq	MCO Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class, Wind speed (m/s),dir	Identified Noise Sources
Ulan Public School	9:00am	53	IA	35	IA	45	A / 1.3 / 330	Industrial (51), traffic (49), birds (33), **MCO (IA)**
Winchester Crescent	10:02pm	33	IA	35	IA	45	E / 0.5 / 233	Traffic (31), aeroplane (27), insects (21), **MCO (IA)**
Lower Ridge Road	10:22pm	48	IA	37	IA	45	F / 0.0 / NA	Traffic (48), frogs (29), insects (23), **MCO (IA)**

1. L1 (1 min) from MCO mine noise only.

Data from those times where MCO operations are audible are analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal or impulsive components as per definitions in the NPI. The methodology for analysing the low frequency noise modifying factor correction in the NPI is shown in extract below.

Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10– 160 Hz	Measure/assess source contribution C- and A-weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A- weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB[2]	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C2 : One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The correction applies to the mine noise component only. There are many sources of low frequency noise in the acoustic environment of each receiver area (including noise from road and rail traffic). In many cases the C minus A level is greater than 15 due to these other noise sources. In most instances the screening criteria will be the one third octave analysis. The NPI quantitative assessment of noise from MCO can only be conducted where the noise was clearly definable, which is at a level typically greater than 30 dB(A) or when there are no other significant sources.

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from MCO was inaudible at all monitoring locations.

The noise measurements results in Table 3 (and site observations) show that noise from the operation of MCO under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at any monitoring location.

EPL ID	Location	Site ID	Monitoring Type	Frequency	Measured Level[1,2,3] LAeq dB (15min)	Measured Level[1,2,3] LA1,dB (1min)	Noise Criteria[4]	Monitoring required during the period	Exceedance (Yes/No) [5]
44	Ulan Public School	NA1	Compliance - Attended	Monthly	IA	IA	Daytime (07:00 – 18:00) LAeq,15minute: 35 dB	Yes	No
N/A	Cope Road (Receiver 258)	NA11	Management - Attended	Quarterly	-	-	-	No	-
N/A	Lagoons Road	NA2	Validation - Attended	Annually	-	-	-	No	-
42	Winchester Crescent	NA12	Compliance/Validation - Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 35 dB LA1,1minute: 45 dB	Yes	No
N/A	Upper Ridge Road (Receiver 176)	NA3	Validation - Attended	Annually	-	-	-	No	-
41	Lower Ridge Road	NA6	Compliance -Attended	Monthly	IA	IA	Night time (22:00 – 07:00) LAeq,15minute: 37 dB LA1,1minute: 45 dB	Yes	No
N/A	Moolarben Road (Receiver 28)	NA10	Validation - Attended	Annually	-	-	-	No	-
46	Goulburn River National Park	GRNP	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-
46	Munghorn Gap Nature Reserve	MGNR	Compliance -Attended	Annually	-	-	All periods LAeq,15minute: 50 dB	No	-

1. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison
2. IA is inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
3. Site-only noise levels attributed to MCO, including modifying factors where applicable

4. As detailed in the EPL, noise emission limits apply under all meteorological conditions except:
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversions
5. NA in last column means atmospheric conditions outside those specified in EPL, therefore criterion was not applicable

APPENDIX 3C. BLAST MONITORING DATA

Date	Time	BM1 Ulan School		BM5 Ridge Road		BM8 Moolarben Road	
		Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)
4/01/2023	12:52	85.3	0.08	87.5	0.31	89.2	0.05
4/01/2023	16:04	86.1	0.27	94.2	0.91	87.5	0.44
5/01/2023	12:15	93.0	0.04	102.3	0.09	97.6	0.06
6/01/2023	16:05	94.1	0.04	93.4	0.03	109.8	0.03
7/01/2023	16:12	91.5	0.37	101.3	0.24	91.5	0.15
9/01/2023	16:11	89.5	0.04	72.1	0.01	100.0	0.01
10/01/2023	12:27	92.6	0.08	93.4	0.09	84.1	0.04
14/01/2023	16:06	90.7	0.05	95.6	0.07	91.6	0.02
16/01/2023	12:16	102.7	0.24	100.8	0.41	93.9	0.20
17/01/2023	16:02	87.1	0.07	112.1	0.12	89.4	0.06
18/01/2023	16:06	101.7	0.11	99.2	0.29	92.0	0.12
20/01/2023	16:04	99.9	0.13	100.2	0.35	97.7	0.29
21/01/2023	16:07	85.0	0.05	94.1	0.08	94.9	0.05
27/01/2023	12:23	86.8	0.03	96.6	0.26	90.6	0.03
27/01/2023	13:17	85.8	0.07	85.3	0.13	92.6	0.11
28/01/2023	15:58	93.5	0.09	83.4	0.10	88.7	0.10
31/01/2023	16:13	83.4	0.04	89.5	0.04	87.9	0.02
1/02/2023	16:09	92.4	0.17	94.2	0.22	89.5	0.11
6/02/2023	12:26	91.5	0.10	85.8	0.16	84.1	0.05
11/02/2023	15:58	96.4	0.04	99.3	0.05	93.3	0.04
13/02/2023	12:11	91.3	0.06	105.7	0.14	97.6	0.08
14/02/2023	12:03	89.6	0.16	101.2	0.41	100.0	0.16
18/02/2023	12:14	90.9	0.27	98.7	0.43	99.6	0.13
18/02/2023	15:34	87.5	0.07	96.8	0.08	94.7	0.06
20/02/2023	16:11	85.3	0.06	89.3	0.09	91.2	0.05
23/02/2023	12:12	100.7	0.19	109.6	0.38	104.5	0.18
27/02/2023	16:10	85.8	0.06	104.1	0.04	104.0	0.02
27/02/2023	16:10	89.0	0.06	99.5	0.04	104.0	0.02
28/02/2023	12:00	92.8	0.08	94.1	0.16	90.3	0.10
2/03/2023	16:13	96.8	0.11	92.5	0.10	91.4	0.04
6/03/2023	12:12	95.3	0.09	99.7	0.08	96.2	0.04
6/03/2023	12:16	86.4	0.09	85.6	0.09	99.6	0.05
7/03/2023	16:12	97.5	0.11	91.7	0.12	97.8	0.03
10/03/2023	16:06	86.7	0.11	82.5	0.34	83.6	0.14
13/03/2023	12:09	101.1	0.06	109.9	0.15	103.8	0.07
15/03/2023	12:11	93.6	0.08	85.6	0.07	84.4	0.03
17/03/2023	12:05	84.5	0.05	93.5	0.14	102.0	0.10
17/03/2023	16:06	85.5	0.08	93.9	0.07	97.8	0.09
22/03/2023	12:55	92.8	0.15	97.4	0.25	99.0	0.07
22/03/2023	15:57	89.1	0.07	96.5	0.08	100.8	0.03
23/03/2023	12:16	95.3	0.08	93.2	0.06	88.8	0.02
27/03/2023	12:02	85.2	0.09	83.0	0.07	86.8	0.08
28/03/2023	12:10	86.8	0.13	92.2	0.15	100.6	0.10
31/03/2023	16:11	90.1	0.09	101.3	0.12	97.2	0.06
4/04/2023	12:08	98.6	0.27	102.6	0.18	99.8	0.13
5/04/2023	16:06	95.0	0.14	95.7	0.20	99.6	0.21
11/04/2023	12:02	95.5	0.24	98.8	0.30	97.2	0.13

Date	Time	BM1 Ulan School		BM5 Ridge Road		BM8 Moolarben Road	
		Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)
11/04/2023	12:06	87.6	0.12	100.2	0.07	84.8	0.03
13/04/2023	12:09	93.2	0.08	95.8	0.13	96.6	0.09
13/04/2023	16:08	89.2	0.11	93.9	0.22	93.1	0.13
14/04/2023	12:06	97.9	0.13	92.7	0.13	85.9	0.10
17/04/2023	12:05	111.3	0.22	108.3	0.75	100.5	0.33
17/04/2023	16:19	92.3	0.08	99.3	0.02	102.6	0.01
19/04/2023	13:02	92.4	0.11	92.2	0.10	93.6	0.07
22/04/2023	16:07	96.7	0.13	97.9	0.22	94.2	0.19
24/04/2023	12:15	90.1	0.07	105.6	0.01	105.9	0.01
24/04/2023	12:22	92.4	0.09	93.0	0.13	99.6	0.07
26/04/2023	16:15	90.6	0.03	90.3	0.03	100.4	0.01
27/04/2023	16:07	98.0	0.23	105.7	0.35	105.4	0.24
29/04/2023	12:07	85.0	0.06	91.2	0.12	96.4	0.07
2/05/2023	12:14	94.0	0.11	95.8	0.10	92.7	0.05
5/05/2023	16:02	89.6	0.06	89.0	0.16	96.7	0.18
6/05/2023	16:05	86.9	0.11	91.2	0.19	96.9	0.25
8/05/2023	12:03	99.9	0.09	95.3	0.10	97.7	0.06
8/05/2023	12:39	94.2	0.07	90.7	0.05	99.1	0.04
9/05/2023	16:40	92.3	0.12	85.6	0.10	84.1	0.15
12/05/2023	12:09	93.2	0.11	89.5	0.15	92.6	0.09
15/05/2023	12:07	88.3	0.05	87.6	0.02	79.4	0.02
16/05/2023	12:05	100.5	0.19	96.9	0.18	106.7	0.28
23/05/2023	12:27	94.0	0.24	96.2	0.18	91.2	0.15
23/05/2023	13:10	96.2	0.08	84.1	0.09	81.8	0.06
27/05/2023	12:03	101.9	0.16	109.2	0.25	112.7	0.23
29/05/2023	16:06	89.1	0.08	97.3	0.09	97.1	0.05
1/06/2023	12:05	94.4	0.16	95.3	0.37	99.5	0.24
2/06/2023	12:09	88.1	0.09	81.1	0.02	88.3	0.01
3/06/2023	16:11	93.4	0.18	90.8	0.11	91.0	0.12
5/06/2023	12:11	90.5	0.05	99.3	0.06	97.3	0.03
6/06/2023	16:08	98.9	0.12	99.5	0.16	98.6	0.09
8/06/2023	12:04	84.8	0.10	83.0	0.08	92.3	0.04
8/06/2023	12:12	86.4	0.04	85.6	0.03	91.8	0.01
10/06/2023	16:09	93.1	0.24	101.0	0.21	99.9	0.22
13/06/2023	12:12	98.0	0.16	97.0	0.12	95.0	0.05
15/06/2023	12:14	94.3	0.06	91.9	0.15	92.9	0.07
16/06/2023	16:02	87.1	0.08	89.1	0.05	80.9	0.02
17/06/2023	12:07	95.9	0.09	102.7	0.08	98.6	0.05
19/06/2023	12:06	95.2	0.21	94.1	0.33	100.0	0.25
22/06/2023	12:11	91.9	0.13	103.2	0.13	101.4	0.12
24/06/2023	15:40	94.9	0.18	86.9	0.15	84.8	0.11
27/06/2023	13:28	102.1	0.20	86.3	0.23	89.1	0.11
30/06/2023	16:26	96.1	0.27	96.8	0.20	97.8	0.11
1/07/2023	15:59	96.3	0.18	97.1	0.41	95.6	0.32
4/07/2023	12:00	88.4	0.07	90.9	0.10	95.9	0.13
7/07/2023	12:32	90.1	0.10	88.9	0.12	98.2	0.05
10/07/2023	12:22	95.1	0.12	92.6	0.19	86.9	0.11
11/07/2023	16:19	89.6	0.23	87.4	0.30	87.7	0.11
18/07/2023	12:52	92.5	0.08	103.6	0.16	96.3	0.15

Date	Time	BM1 Ulan School		BM5 Ridge Road		BM8 Moolarben Road	
		Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)
19/07/2023	16:17	97.4	0.22	106.2	0.29	101.5	0.47
21/07/2023	12:18	95.9	0.16	87.0	0.16	93.5	0.04
22/07/2023	15:59	92.2	0.12	90.3	0.18	79.7	0.20
25/07/2023	12:44	94.4	0.06	96.3	0.09	98.4	0.07
25/07/2023	16:16	97.8	0.20	94.6	0.18	91.2	0.19
27/07/2023	16:10	92.0	0.17	92.2	0.30	97.7	0.31
31/07/2023	12:15	99.8	0.22	106.7	0.19	113.0	0.32
1/08/2023	16:04	87.1	0.13	93.5	0.10	93.3	0.06
2/08/2023	16:13	96.9	0.05	97.5	0.04	98.0	0.02
9/08/2023	12:14	89.6	0.16	99.3	0.13	105.0	0.15
12/08/2023	16:14	92.6	0.16	91.2	0.14	95.8	0.13
12/08/2023	16:18	94.7	0.17	89.2	0.17	86.8	0.06
14/08/2023	12:14	83.8	0.09	91.8	0.09	86.8	0.05
15/08/2023	16:02	93.2	0.25	89.2	0.39	87.3	0.29
17/08/2023	15:57	89.0	0.21	91.8	0.22	93.3	0.42
21/08/2023	12:07	92.9	0.06	86.0	0.06	87.9	0.03
21/08/2023	16:21	88.9	0.16	91.1	0.11	89.4	0.13
22/08/2023	13:07	90.6	0.06	97.4	0.04	97.1	0.03
22/08/2023	16:10	95.2	0.19	85.8	0.20	100.4	0.19
24/08/2023	11:59	102.7	0.15	113.6	0.6	104.5	0.35
28/08/2023	12:22	91.2	0.05	91.9	0.04	92.0	0.04
29/08/2023	12:11	89.7	0.11	85.6	0.08	84.7	0.03
30/08/2023	15:33	95.7	0.23	101.0	0.44	101.7	0.19
31/08/2023	16:03	86.0	0.09	99.4	0.04	99.1	0.02
2/09/2023	12:05	96.5	0.36	105.0	0.35	104.6	0.28
4/09/2023	12:01	87.6	0.11	99.6	0.01	102.8	0.01
6/09/2023	12:08	93.4	0.11	86.0	0.10	95.5	0.10
9/09/2023	16:04	90.7	0.31	90.7	0.38	100.6	0.24
12/09/2023	12:18	93.0	0.21	93.2	0.23	102.1	0.22
12/09/2023	12:24	90.1	0.17	94.6	0.18	96.5	0.13
14/09/2023	12:08	101.0	0.16	106.3	0.17	112.7	0.23
16/09/2023	16:06	82.3	0.19	92.7	0.14	90.8	0.15
21/09/2023	12:10	83.8	0.06	96.2	0.10	96.0	0.10
23/09/2023	12:05	95.6	0.18	99.7	0.14	97.0	0.06
25/09/2023	11:55	86.5	0.04	83.6	0.02	94.9	0.04
28/09/2023	14:25	91.0	0.07	87.0	0.01	85.9	0
29/09/2023	16:13	94.3	0.17	91.1	0.24	93.3	0.18
30/09/2023	12:14	88.5	0.17	97.3	0.09	87.4	0.10
3/10/2023	12:08	98.0	0.06	101.8	0.05	100.1	0.05
3/10/2023	12:19	98.8	0.11	104.3	0.09	105.3	0.15
9/10/2023	12:36	89.1	0.14	87.4	0.09	79.5	0.06
9/10/2023	16:15	91.5	0.14	103.3	0.12	87.3	0.07
12/10/2023	12:22	102.8	0.06	104.3	0.04	114.3	0.09
13/10/2023	16:04	90.9	0.06	93.8	0.04	84.3	0.02
14/10/2023	12:08	103.1	0.21	99.7	0.44	98.9	0.37
16/10/2023	15:59	111.7	0.16	115.6	0.22	112.6	0.25
18/10/2023	16:13	99.9	0.22	106.5	0.17	95.7	0.13
21/10/2023	12:04	103.2	0.07	89.4	0.10	87.3	0.12
23/10/2023	16:07	85.2	0.07	82.3	0.08	89.1	0.06

Date	Time	BM1 Ulan School		BM5 Ridge Road		BM8 Moolarben Road	
		Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)	Blast Overpressure (dBL)	Ground Vibration (mm/s)
24/10/2023	12:17	100.7	0.18	90.7	0.23	92.5	0.12
27/10/2023	13:06	103.8	0.16	105.3	0.23	105.0	0.20
28/10/2023	12:00	85.3	0.08	104.4	0.01	104.7	0.01
1/11/2023	16:23	100.7	0.24	108.3	0.29	114.6	0.29
2/11/2023	16:02	87.7	0.15	94.5	0.15	95.9	0.12
4/11/2023	16:01	90.6	0.08	90.7	0.06	108.4	0.02
4/11/2023	16:02	87.6	0.11	93.0	0.07	108.4	0.04
6/11/2023	12:14	94.8	0.12	104.0	0.10	104.2	0.08
7/11/2023	15:58	98.9	0.14	104.4	0.12	108.1	0.13
10/11/2023	12:03	85.7	0.13	84.3	0.09	78.8	0.11
11/11/2023	16:24	89.8	0.19	85.0	0.17	94.4	0.17
13/11/2023	16:10	91.0	0.08	89.3	0.05	90.3	0.02
14/11/2023	16:19	103.7	0.19	97.9	0.24	94.8	0.18
15/11/2023	12:13	93.5	0.18	104.0	0.13	108.1	0.10
17/11/2023	16:00	87.1	0.07	93.4	0.08	90.0	0.05
18/11/2023	12:01	92.1	0.11	104.7	0.16	102.0	0.2
20/11/2023	16:20	97.3	0.07	100.4	0.05	108.0	0.03
23/11/2023	16:06	97.0	0.07	97.1	0.12	97.3	0.08
25/11/2023	16:05	98.2	0.16	98.5	0.36	92.8	0.23
27/11/2023	12:04	86.2	0.05	96.3	0.05	80.6	0.02
30/11/2023	12:02	102.3	0.17	108.7	0.15	106.3	0.12
2/12/2023	12:08	95.1	0.09	92.9	0.06	93.4	0.06
2/12/2023	15:53	88.2	0.19	92.8	0.17	95.2	0.16
6/12/2023	12:31	95.1	0.06	103.6	0.07	97.6	0.03
6/12/2023	16:09	87.6	0.08	87.4	0.16	96.0	0.12
7/12/2023	12:04	90.2	0.08	93.1	0.07	89.2	0.05
11/12/2023	16:16	91.4	0.15	95.8	0.16	106.2	0.25
14/12/2023	12:15	99.0	0.13	95.4	0.10	96.4	0.06
14/12/2023	16:13	110.0	0.17	108.7	0.14	109.2	0.24
15/12/2023	16:08	91.2	0.16	96.4	0.15	103.1	0.23
16/12/2023	12:05	100.3	0.07	101.1	0.14	101.3	0.08
18/12/2023	11:54	87.1	0.20	94.1	0.21	98.3	0.21
20/12/2023	12:21	94.7	0.22	105.8	0.24	104.5	0.19
20/12/2023	12:33	84.5	0.09	89.8	0.09	87.3	0.06
23/12/2023	12:08	89.3	0.18	103.1	0.17	95.9	0.17
23/12/2023	12:19	88.7	0.11	87.8	0.06	84.7	0.02

APPENDIX 3D. AIR QUALITY DATA

Table A : Summary of the MCO Air Quality-Monitoring Program

Monitoring Parameter	Monitoring Location	Frequency	Justification
Dust Deposition	DG01 – Bobadeen	Every 30 days ± 2 days	Background monitoring north of the Moolarben Coal Complex.
	DG04 – Ulan Village	Every 30 days ± 2 days	Representative of nearest non-mine owned residences to the north-west of the Moolarben Coal Complex.
	DG05 – Glenmoor	Every 30 days ± 2 days	Representative of nearest non-mine owned residences to the south-west and west of the Moolarben Coal Complex.
	DG09 – Wilga	Every 30 days ± 2 days	Representative of non-mine owned residences to the south-west and west of the Moolarben Coal Complex.
HVAS – PM10	PM 01 (Ulan Village)	Every 6 days	Indicative of potential impacts to nearest non-mine owned residences to the north-west of the Moolarben Coal Complex.
	PM 02 (Ridge Road)	Every 6 days	Background monitoring south-west and west of the Moolarben Coal Complex.
Real Time PM_{10}	TEOM 01 (Ulan School)	Real Time PM_{10}	Real time monitoring at Ulan Public School.
	TEOM 04 (Ulan Road)	Real Time PM_{10}	Real time monitoring representative of nearest non-mine owned residences to the west of the Moolarben Coal Complex.
	TEOM 07 (Ulan Road)	Real Time PM_{10}	Real time monitoring representative of non-mine owned residences to the south-west of and west of the Moolarben Coal Complex.
	TEOM 06 (Ulan-Wollar Rd)	Real Time PM_{10}	Real time monitoring not representative of private residences, used to measure “upwind” air quality.
Real Time $PM_{2.5}$	TEOM 07 (Ulan Road)	Real Time $PM_{2.5}$	Real time monitoring representative of non-mine owned residences to the south-west of and west of the Moolarben Coal Complex.

Table B : Summary of the MCO Air Quality-Monitoring Program – Dust Deposition

Dust Gauge	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul- 23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
DG1	0.5	0.5	0.5	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.6	0.5
DG4	0.9	0.8	0.8	0.8	0.9	0.6	0.6	0.6	1.0	1.0	0.9	0.8
DG5	0.7	0.7	0.8	0.8	0.8	0.7	0.5	0.5	1.0	1.0	0.7	0.7
DG9	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.6	0.6	0.5	0.4

Figure 3-b 2019 to 2023 Dust Depositional Results

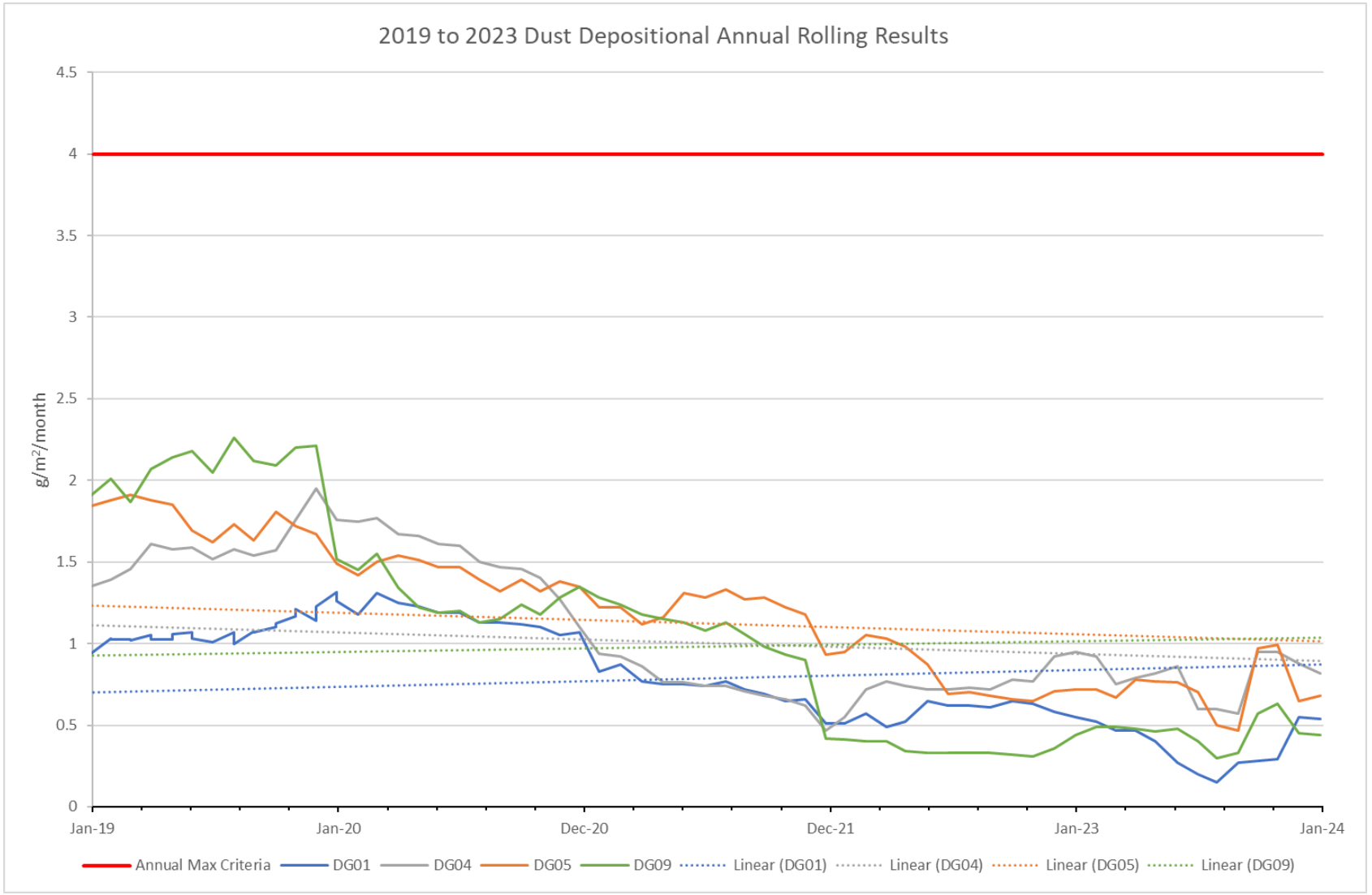


Table 3: TEOM Monitoring Data (Cumulative)

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
/2023	17.6	16.6	10.8	5.3	11.5		
2/01/2023	18.7	21.0	14.6	5.7	12.4		
3/01/2023	19.7	21.4	17.1	8.0	18.2		Equipment breakdown
4/01/2023	16.1	20.2	16.8	9.0	16.8		Equipment breakdown
5/01/2023	13.9	11.7	6.1	3.6	11.1		
6/01/2023	13.8	8.4	3.2	1.7	11.0		Equipment breakdown
7/01/2023	11.3	11.9	7.4	4.4	6.3		
8/01/2023	14.8	15.7	11.3	4.6	11.2		
9/01/2023	21.0	21.0	16.7	6.5	18.0		
10/01/2023	22	21.6	16.3	6.2	14.3		
11/01/2023	22.4	22.7	16.6	7.4	14.0		
12/01/2023	21.5	23.0	15.9	7.4	17.8		Power loss
13/01/2023	23.2	26.7	18.5	9.5	17.5		Power loss
14/01/2023	15.4	18.8	14.8	7.2	10.9		
15/01/2023	20.7	16.9	12.1	6.0	16.2		
16/01/2023	19.9	21.3	13.6	7.2	14.5		
17/01/2023	21.2	14.5	9.4	3.6	9.7		
18/01/2023	16.1	16.2	12.1	5.5	24.3		
19/01/2023	8.8	8.6	6.0	4.3	7.3		Power loss
20/01/2023	12.6	12.1	4.9	2.7	7.7		
21/01/2023	17.2	20.1	10.7	3.9	11.4		
22/01/2023	8.8	8.9	5.4	3.7	7.2		
23/01/2023	14.5	12.7	9.8	6.3	12.5		
24/01/2023	15.0	13.4	13.1	10.1	19.7		
25/01/2023	16.1	15.4	11.0	5.8	24.1		
26/01/2023	23.5	21.5	17.3	9.6	24.7		
27/01/2023	22.1	21.5	15.3	9.7	17.1		
28/01/2023	15.8	15.5	14.2	8.4	15.9		
29/01/2023	21.3	17.4	14.4	9.4	23.4		
30/01/2023	12.6	10.9	9.0	7.3	10.9		
31/01/2023	10.3	9.6	9.0	6.5	7.4		
1/02/2023	13.5	11.5	11.2	6.3	11.7		Power loss
2/02/2023	17.5	14.6	11.4	5.6	14.7		
3/02/2023	15.3	13.8	11.0	4.3	19.3		
4/02/2023	10.3	9.9	7.7	3.9	21.2		
5/02/2023	13.1	12.3	8.0	3.1	18.5		Power loss
6/02/2023	22.6	22.2	15.3	8.1	24		Power loss
7/02/2023	25.3	24.0	17.2	9.3	17.4		
8/02/2023	20.0	19.6	12.7	7.0	13.8		
9/02/2023	8.5	7.8	6.7	4.8	8.4		
10/02/2023	12.1	9.1	8.0	4.8	12.8		
11/02/2023	14.8	12.0	11.2	7.1	23.1		
12/02/2023	18.1	16.0	12.2	5.5	36.9		Power loss
13/02/2023	25.3	25.6	16.2	9.5	18.7		
14/02/2023	19.2	15.6	8.0	5.6	12.6		
15/02/2023	17.1	18.5	8.6	3.8	11.5		
16/02/2023	17.9	16.7	11.6	5.9	18.2		
17/02/2023	25.7	22.3	17.0	7.8	26.5		

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
18/02/2023	23.4	27.1	16.4	8.3	25.7		
19/02/2023	22.1	25.0	14.3	7.9	16.9		
20/02/2023	23.5	20.7	18.6	11.5	19.9		
21/02/2023	23.5	20.8	-	-	29.3		Power loss
22/02/2023	16.1	8.0	-	-	6.5		Power loss
23/02/2023	15.2	15.9	8.9	3.7	9.0		Power loss
24/02/2023	17.4	17.7	12.1	5.8	12.3		
25/02/2023	16.4	14.0	10.8	4.7	18.1		
26/02/2023	20.6	16.8	12.6	4.6	20.7		
27/02/2023	21.8	15.3	13.0	6.1	28.4		
28/02/2023	22.7	21.6	16.8	8.3	19.3		
1/03/2023	18.7	15.5	12.3	5.2	21.7		
2/03/2023	19.0	19.8	13.1	6.1	13.3		
3/03/2023	18.5	18.2	12.6	5.1	12.6		
4/03/2023	18.1	16.3	11.0	4.9	11.9		
5/03/2023	19.8	18.4	13.6	6.2	13.0		
6/03/2023	20.5	14.7	12.5	4.0	32.8		
7/03/2023	26.5	22.7	22.6	11.5	-		Power loss
8/03/2023	21.9	19.6	18.5	6.7	44.7		
9/03/2023	18.5	17.8	14.7	5.9	34.7		
10/03/2023	24.1	30.3	25.9	13.9	28.8		Power loss
11/03/2023	20.5	16.7	13.4	5.5	18.9		
12/03/2023	14.7	12.3	10.2	6.5	13.0		
13/03/2023	18.2	16.6	10.3	5.6	13.0		
14/03/2023	15.2	16.0	10.9	7.0	12.2		
15/03/2023	13.7	13.7	10.6	5.8	12.9		
16/03/2023	16.6	18.1	14.8	6.4	28.7		
17/03/2023	17.4	20.3	17.5	4.6	36.7		
18/03/2023	24.2	19.7	14.7	5.3	30.0		
19/03/2023	21.6	17.7	12.4	4.1	35.3		
20/03/2023	32.0	29.2	18.5	7.8	42.9		
21/03/2023	15.5	15.8	7.8	3.8	10.8		
22/03/2023	17.7	15.2	10.0	4.3	15.4		
23/03/2023	14.7	11.4	9.0	4.5	11.2		
24/03/2023	13.2	12.4	6.7	3.8	11.9		
25/03/2023	10.8	11.2	7.3	5.3	8.8		
26/03/2023	12.4	12.9	8.0	4.7	9.4		Power loss
27/03/2023	14.2	11.1	8.3	5.0	10.2		
28/03/2023	18.6	13.9	10.6	6.1	16.0		
29/03/2023	13.4	7.7	7.4	4.8	10.5		Power loss
30/03/2023	10.4	6.2	5.3	3.2	12.1		
31/03/2023	10.7	7.3	5.7	3.1	13.2		
1/04/2023	10.5	9.7	7.6	5.0	13.5		
2/04/2023	11.3	11.0	5.3	3.0	8.0		
3/04/2023	13.0	13.2	6.8	3.7	9.8		Power loss
4/04/2023	12.2	12.6	5.2	2.5	7.4		
5/04/2023	19.0	13.5	6.9	3.0	14.6		
6/04/2023	14.8	13.9	9.5	3.1	11.6		
7/04/2023	12.1	12.8	7.6	4.0	11.5		

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
8/04/2023	11.5	10.4	7.6	4.0	11.4		
9/04/2023	9.5	8.1	6.1	2.7	14.6		
10/04/2023	8.7	7.4	6.5	3.8	17.8		
11/04/2023	10.7	8.3	9.3	3.9	11.7		
12/04/2023	12	9.3	6.3	3.2	12.8		
13/04/2023	9.2	7.6	4.4	3.3	8.7		
14/04/2023	11.1	9.0	5.7	2.6	10.2		
15/04/2023	13.2	10.4	6.7	3.5	10.1		
16/04/2023	12.6	9.5	6.2	2.4	29.7		
17/04/2023	25.6	16.8	8.5	2.9	20.2		
18/04/2023	49.8	39.3	27.2	18.4	40.8		
19/04/2023	27.9	18.2	15.3	6.4	26.8		Power loss
20/04/2023	18.1	14.2	7.5	4.3	24.2		Power loss
21/04/2023	19.5	10.8	7.9	2.6	16.1		
22/04/2023	15.9	9.1	6.3	3.3	19.0		
23/04/2023	12.5	10.8	6.9	3.5	12.2		
24/04/2023	13.2	13.2	9.3	4.4	8.9		Power loss
25/04/2023	20.4	20.0	15.5	5.8	14.9		
26/04/2023	16.6	13.6	12.4	5.4	14.8		Equipment breakdown
27/04/2023	20	-	15.6	8.0	28.9		Equipment breakdown
28/04/2023	27.6	23.1	17.9	9.8	40.3		
29/04/2023	8.3	7.7	6.0	4.0	10.7		Power loss
30/04/2023	6.4	4.6	3.4	2.5	5.7		
1/05/2023	8.8	6.1	5.2	3.8	7.6		Power loss
2/05/2023	8.7	-	6.3	3.8	9.2		Power loss
3/05/2023	10.4	-	7.4	3.2	14.5		Power loss
4/05/2023	11.3	-	9.7	4.3	15.1		Power loss
5/05/2023	11.8	-	8.0	3.8	19.4		Power loss
6/05/2023	12.2	13.0	10.7	5.3	22.4		Power loss
7/05/2023	8.0	7.0	5.4	3.4	17.3		Power loss
8/05/2023	7.6	6.6	4.1	2.4	12.3		
9/05/2023	8.4	6.9	5.6	2.9	14.7		
10/05/2023	14	15.8	9.3	4.5	14.2		
11/05/2023	21.5	18.6	15.0	8.8	21.9		
12/05/2023	19.4	18.4	12.7	7.3	28.6		
13/05/2023	21.6	18.0	13.8	7.8	35.1		
14/05/2023	16.1	13.3	8.7	5.7	19.7		
15/05/2023	17.6	13.0	7.8	4.6	13.2		
16/05/2023	10.6	8.7	7.2	4.2	16.7		
17/05/2023	14.7	11.6	6.4	3.3	13.8		
18/05/2023	12.7	10.0	5.7	3.2	17.0		
19/05/2023	11.5	11.6	8.3	4.3	17.5		
20/05/2023	10.8	9.3	8.8	4.0	15.9		
21/05/2023	9.1	8.5	7.5	3.6	18.8		
22/05/2023	10.9	9.1	9.6	3.9	14.4		
23/05/2023	14.1	17.9	13.1	4.9	21.0		
24/05/2023	15.5	22.7	16.4	6.5	25.4		
25/05/2023	18.3	15.1	16.0	6.6	28.8		
26/05/2023	13.6	11.7	10.4	6.5	27.5		

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
27/05/2023	7.4	6.2	3.2	1.5	12.0		
28/05/2023	8.5	5.9	6.2	2.8	13.2		
29/05/2023	9.9	7.5	7.4	2.7	14.7		
30/05/2023	12.9	8.8	6.8	2.1	14.8		
31/05/2023	11.9	8.5	11.0	4.1	14.4		
1/06/2023	15.1	13.3	9.6	2.2	13.8		
2/06/2023	17.7	18.9	9.8	4.1	21.8		
3/06/2023	18.9	16.9	11.5	5.5	27.6		
4/06/2023	19.5	16.8	9.3	5.1	19.6		
5/06/2023	13.2	16.7	7.0	2.5	10.2		
6/06/2023	12.3	17.0	7.3	3.1	10.3		
7/06/2023	20.1	15.6	8.2	3.8	15.7		
8/06/2023	12.5	8.5	4.9	2.7	18.7		
9/06/2023	10.8	6.4	3.4	2.1	8.8		
10/06/2023	9.3	7.6	4.8	2.9	11.0		
11/06/2023	12.2	9.8	6.7	4.1	15.8		
12/06/2023	13.8	10.6	8.3	5.1	17.2		
13/06/2023	10	5.8	3.7	2.7	10.2		
14/06/2023	-	-	4.1	2.4	-		Scheduled maintenance
15/06/2023	-	-	4.9	2.7	-		Scheduled maintenance
16/06/2023	12.0	6.1	6.6	3.5	13.5		
17/06/2023	9.1	6.7	6.7	3.8	13.2		
18/06/2023	9.4	5.7	4.1	1.8	15.3		
19/06/2023	8.5	4.8	5.9	1.6	7.9		
20/06/2023	7.2	5.3	3.0	1.5	9.5		
21/06/2023	23.3	12.6	5.5	1.6	17.2		
22/06/2023	22.2	16.1	9.2	4.3	17.9		
23/06/2023	7.8	5.2	2.8	1.9	6.7		
24/06/2023	7.6	4.0	3.6	3.2	7.5		
25/06/2023	8.7	5.1	2.8	1.8	11.9		
26/06/2023	10.4	6.8	5.7	2.1	13.3		
27/06/2023	12.9	8.1	6.9	2.7	13.6		
28/06/2023	7.1	5.4	-	-	7.1		Equipment breakdown
29/06/2023	8.6	4.5	2.8	2.0	6.4		
30/06/2023	7.1	3.9	2.0	1.5	6.8		
1/07/2023	4.6	3.6	-	-	10.2		Equipment breakdown
2/07/2023	11.9	8.8	3.8	2.4	12.5		
3/07/2023	18.3	14.8	9.8	4.5	14.3		
4/07/2023	6.6	6.9	3.8	2.8	6.2		
5/07/2023	4.7	3.6	1.8	1.6	4.4		
6/07/2023	8.2	3.7	1.4	1.2	4.9		
7/07/2023	8.7	4.8	2.9	2.5	5.5		
8/07/2023	10.6	5.7	3.8	2.2	8.3		
9/07/2023	13.8	12.0	9.0	4.4	14.2		
10/07/2023	10.8	6.0	4.3	2.9	10.2		
11/07/2023	13.7	8.4	3.7	2.6	12.3		
12/07/2023	15.1	12.1	6.9	4.0	21.6		
13/07/2023	16.4	10.7	8.0	5.0	20.4		
14/07/2023	16.2	12.0	10.0	5.0	19.4		

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
15/07/2023	12.7	9.1	10.8	4.5	17.5		
16/07/2023	12.5	8.9	4.7	3.6	23.6		
17/07/2023	16.9	15.1	10.8	5.8	12.9		
18/07/2023	16.2	10.7	10.1	5.2	19.4		Equipment breakdown
19/07/2023	11.6	8.2	7.2	3.4	11.5		
20/07/2023	16.6	8.3	7.2	2.8	20.7		
21/07/2023	10.3	6.7	5.0	3.4	17.4		
22/07/2023	9.4	6.5	4.9	2.6	11.5		
23/07/2023	18.1	11.6	7.0	3.6	19.2		
24/07/2023	15.6	9.4	4.3	2.2	17.6		
25/07/2023	15	13.9	10.2	5.3	19.8		
26/07/2023	14.5	11.3	11.6	5.4	24.9		
27/07/2023	13.3	12.2	10.4	5.7	21.6		
28/07/2023	15.6	12.8	8.6	4.1	22		
29/07/2023	14.9	11.6	10.4	6.1	22.9		
30/07/2023	10.2	8.4	4.9	2.4	18.3		
31/07/2023	10.8	6.0	5.7	3.0	11		
1/08/2023	10	9.9	7.6	2.7	18.7		
2/08/2023	21.9	19.9	13.7	5.2	24.3		
3/08/2023	16.4	17.8	12.4	6.5	30.9		
4/08/2023	17.2	14.3	11.1	6.2	27.2		
5/08/2023	14.9	13.2	10.8	5.9	27.1		
6/08/2023	12.6	12.9	7.4	4.4	20.1		
7/08/2023	14.3	13.8	8.5	3.7	9.8		
8/08/2023	16.1	13.5	7.3	3.5	12.9		
9/08/2023	14.9	15.1	10.3	5.5	24.8		
10/08/2023	15.3	10.4	10.9	4.2	36.1		Power loss
11/08/2023	13.8	15.1	12.5	4.5	24.4		
12/08/2023	15.4	12.7	8.6	2.8	26.6		
13/08/2023	14.3	11.8	7.6	3.1	26.6		
14/08/2023	12.7	8.6	6.0	4.4	11.6		
15/08/2023	13.9	8.4	-	-	11.0		Equipment breakdown
16/08/2023	14.8	9.4	6.4	3.8	12.8		
17/08/2023	14	7.4	6.2	3.7	23.5		
18/08/2023	7.4	5.4	4.0	2.7	6.5		
19/08/2023	7.3	6.5	4.2	1.8	9.7		
20/08/2023	8.6	5.1	4.4	3.5	15.2		
21/08/2023	11.9	7.7	4.5	1.9	17.4		
22/08/2023	16.9	9.5	6.6	2.6	30.2		
23/08/2023	10.9	6.2	5.2	2.0	11.6		
24/08/2023	20.4	16.3	11.6	5.4	19.2		
25/08/2023	21.0	16.2	10.6	4.5	26.5		
26/08/2023	26.0	21.9	16.0	7.3	35.8		
27/08/2023	19.6	16.5	10.9	5.5	16.3		
28/08/2023	23.2	17.7	12.4	5.4	16.2		
29/08/2023	21.2	15.4	13.1	7.5	21.8		
30/08/2023	16.7	10.4	8.8	4.7	34.4		
31/08/2023	9.1	6.4	4.1	2.3	12.3		
1/09/2023	11	8.2	6.4	2.7	12.3		

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
2/09/2023	15.3	16.4	11.2	2.6	15.8		
3/09/2023	24.1	17.3	11.4	4.9	26.1		
4/09/2023	24.4	20.8	14.6	4.7	23.2		
5/09/2023	16.8	12.2	11.7	2.7	25.2		
6/09/2023	12.9	13.8	12.0	3.6	29.7		
7/09/2023	29.8	-	17.9	8.6	41.7		Equipment breakdown
8/09/2023	8.0	-	6.2	4.3	-		Equipment breakdown
9/09/2023	8.5	7.5	5.5	2.1	11.6		
10/09/2023	10.8	8.1	5.3	2.9	12.4		
11/09/2023	16.5	16.2	10.1	4.8	18.7		
12/09/2023	17.6	13.6	10.3	4.8	30.4		
13/09/2023	13.2	11.6	6.2	3.0	25.9		
14/09/2023	22.9	25.9	18.2	8.7	24.9		
15/09/2023	21.2	22.1	17.8	8.0	36.1		
16/09/2023	17.3	16.0	11.7	3.9	36.1		
17/09/2023	18.5	16.9	13.3	5.8	41.4		
18/09/2023	26.3	22.8	21.2	8.6	46.0		Power loss
19/09/2023	23.8	19.4	21.0	9.1	58.5		
20/09/2023	28.9	23.3	23.9	8.4	58.9		
21/09/2023	19.1	13.7	10.9	4.1	26.6		
22/09/2023	17.8	17.2	10.1	3.0	12.7		
23/09/2023	18.5	16.8	10.0	3.9	11.8		
24/09/2023	18.8	14.9	11.6	4.5	11.2		
25/09/2023	18.0	16.9	19.4	5.5	23.3		
26/09/2023	19.6	15.2	12.1	3.4	29.2		
27/09/2023	17.7	12.8	10.5	5.2	30.5		
28/09/2023	24.5	18.7	11.9	7.3	31.2		
29/09/2023	16.5	16.0	13.6	7.0	31.4		
30/09/2023	24.7	24.2	20.0	9.1	46.3		
1/10/2023	27.5	20.7	19.8	7.5	47.9		
2/10/2023	33.7	28.8	22.3	8.8	29.8		
3/10/2023	26.8	17.3	16.0	6.3	27.3		
4/10/2023	17.9	14.8	13.4	5.9	20.8		
5/10/2023	7.8	6.2	3.8	1.5	11.9		
6/10/2023	11.5	8.7	5.6	2.6	12.7		
7/10/2023	15.8	13.3	7.4	3.1	8.9		
8/10/2023	15.1	12.2	6.5	1.6	9.2		
9/10/2023	16.1	13.6	9.3	3.1	16.7		
10/10/2023	17.2	16.0	15.2	5.8	30.0		
11/10/2023	20.6	18.3	14.9	7.4	20.9		
12/10/2023	22.7	17.4	14.3	4.9	77.9		
13/10/2023	9.7	8.4	5.2	2.0	20.2		
14/10/2023	10.4	9.3	7.9	2.8	24.0		
15/10/2023	16.4	11.8	11.8	3.8	23.9		
16/10/2023	22.9	13.4	12.0	2.6	129.6		Extraordinary event
17/10/2023	20.8	-	5.8	2.8	14.3		Power loss
18/10/2023	18.2	12.1	11.0	3.7	10.0		
19/10/2023	16.9	15.7	12.9	2.8	13.9		Power loss
20/10/2023	27.9	21.0	21.6	6.9	29.5		

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
21/10/2023	41.2	28.9	21.9	9.0	60.1		
22/10/2023	24.5	16.7	18.1	7.2	35.3		
23/10/2023	19.0	14.3	10.5	4.0	27.2		
24/10/2023	20.3	16.3	12.9	3.4	35.2		
25/10/2023	29.8	19.7	17.4	3.6	73		
26/10/2023	15.3	12.0	8.8	3.1	13.7		
27/10/2023	9.7	8.4	5.5	2.7	7.9		
28/10/2023	11.7	10.7	7.4	2.9	8.4		
29/10/2023	14.9	10.9	7.1	3.2	16.1		
30/10/2023	26.7	16.5	17.4	8.2	51.2		
31/10/2023	25.8	17.3	10.4	1.8	51.7		
1/11/2023	35.3	28.3	18.5	5.9	27.0		
2/11/2023	26.7	26.3	20.9	8.8	18.3		
3/11/2023	29.1	26.3	19.9	10.9	17.4		
4/11/2023	16.4	19.2	13.3	7.4	11.9		Power loss
5/11/2023	13.0	11.1	6.0	3.2	7.9		Power loss
6/11/2023	16.6	17.3	9.4	3.0	11.3		
7/11/2023	19.7	17.9	13.3	4.7	12.4		
8/11/2023	19.6	16.4	10.5	4.5	12.9		
9/11/2023	-	9.3	6.9	4.3	22.7		Equipment breakdown
10/11/2023	-	9.7	7.2	3.7	10.3		Equipment breakdown
11/11/2023	17.3	13.5	12.7	7.3	17.3		
12/11/2023	16.6	13.2	12.9	5.8	29.2		
13/11/2023	27.8	25.6	20.5	8.3	34.0		
14/11/2023	24.5	-	19.9	6.7	25.1		Scheduled maintenance
15/11/2023	25.8	21.4	23	6.5	50.4		
16/11/2023	23.5	20.7	20.2	7.0	30.9		
17/11/2023	17.3	19.1	13.7	5.6	14.4		
18/11/2023	20.5	24.8	15.4	5.0	13.5		
19/11/2023	19.6	18.4	13.1	4.7	14.8		
20/11/2023	13.0	12.3	9.7	5.8	10.8		
21/11/2023	15.8	14.1	11.9	5.1	12.0		
22/11/2023	21.6	22.9	16.1	7.5	13.8		
23/11/2023	14.5	17.1	11.9	5.1	10.6		
24/11/2023	7.6	9.1	5.3	3.0	6.2		
25/11/2023	4.3	4.5	3.5	2.1	3.3		
26/11/2023	10.3	7.7	6.0	3.2	15.3		
27/11/2023	14.4	11.2	8.5	5.0	16.5		
28/11/2023	18.9	16.3	12.8	9.1	13.9		
29/11/2023	12.0	10.0	8.1	5.3	9.6	9.8	Power loss
30/11/2023	8.2	6.0	5.2	3.0	17.9	11.4	
1/12/2023	11.4	7.7	6.3	3.4	12.7	14	Power loss
2/12/2023	12.1	6.9	7.5	4.0	9.3	10	
3/12/2023	19.6	9.2	7.5	3.6	19.1	18.3	
4/12/2023	21.9	17.6	11.8	5.5	14.2	13.9	
5/12/2023	23.1	21.6	18.5	8.2	30.6	19.7	
6/12/2023	23.2	18.1	17.4	5.5	-	61.7	Power loss
7/12/2023	34.4	37.0	19.1	6.7	26.1	27.3	
8/12/2023	27.9	28.3	23.7	11.1	30.5	21	Power loss

Date	Ulan School TEOM01 EPL 17	Lagoons Road TEOM04	Ulan Road TEOM07 EPL27		Ulan-Wollar Road TEOM06^ EPL15	Ulan-Wollar Road TEOM08^	Comment
	PM10 Daily Result (24hr Average Limit = 50µg/m³)			PM2.5 Daily Result (24hr Average Limit = 25µg/m³)	PM10 Daily Result (µg/m³)		
9/12/2023	26.7	30.2	22.9	13.7	42.6	42.4	
10/12/2023	25.0	29.5	22.8	13.1	19.4	17.3	
11/12/2023	30.8	40.1	31.6	15.1	25.8	22.4	
12/12/2023	26.4	31.0	22.1	8.4	19.6	20.0	
13/12/2023	27.3	27.4	23.0	10.9	42.8	28.7	
14/12/2023	17.9	16.2	17.6	8.2	70.5	28.6	
15/12/2023	17.5	17.4	16.3	7.6	48.9	39.5	
16/12/2023	18.1	19.3	18.0	5.1	71.3	31.8	
17/12/2023	28.9	44.5	21.4	9.2	43.5	35.5	
18/12/2023	35.9	44.6	30.6	18.1	34.4	39.1	
19/12/2023	45.8	40.8	45.8	28.0	66.1	56.3	Extraordinary event
20/12/2023	19.9	18.8	18.3	15.5	18.0	16.7	
21/12/2023	10.8	17.6	6.2	3.3	6.4	6.0	
22/12/2023	23.1	22.8	15.1	7.0	16.5	16.4	
23/12/2023	19.6	24.8	14.1	6.5	15.3	14.0	
24/12/2023	-	-	5.6	3.8	9.4	9.7	Equipment breakdown
25/12/2023	-	21.2	13.1	7.4	12.8	13.7	Equipment breakdown
26/12/2023	-	13.0	12.1	7.1	9.3	10.3	Equipment breakdown
27/12/2023	-	8.1	7.3	2.6	20.6	28.5	Equipment breakdown
28/12/2023	7.8	14.0	6.5	2.6	23.8	39.4	
29/12/2023	10.6	9.7	9.0	3.5	46.2	46.9	
30/12/2023	8.1	7.8	7.2	3.8	22.7	14.4	
31/12/2023	20.2	15.2	9.7	6.3	11.1	10.6	

Notes:
All readings are cumulative (Moolarben Mine Contribution plus background). PM10 24 hour average criteria is cumulative. PM2.5 24 hour average criteria is Incremental Impact (Concentration due to Moolarben Mine Complex on its own).
^ TEOM06 and TEOM08 are used to measure "upwind" air quality when wind is in the direction of private residences. They are not representative of private residences.

Figure 3-c 2019 to 2023 TEOM Rolling Average

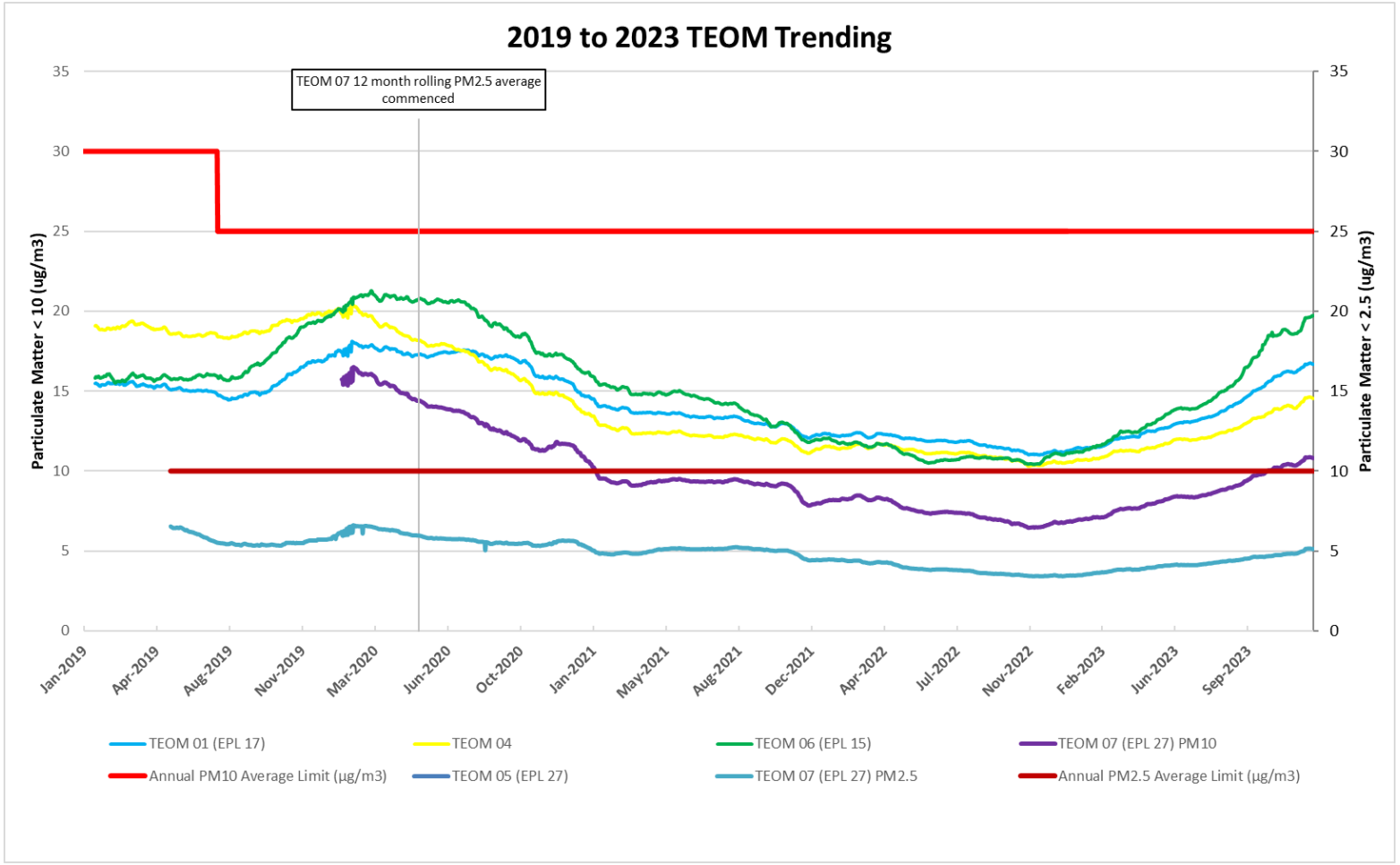
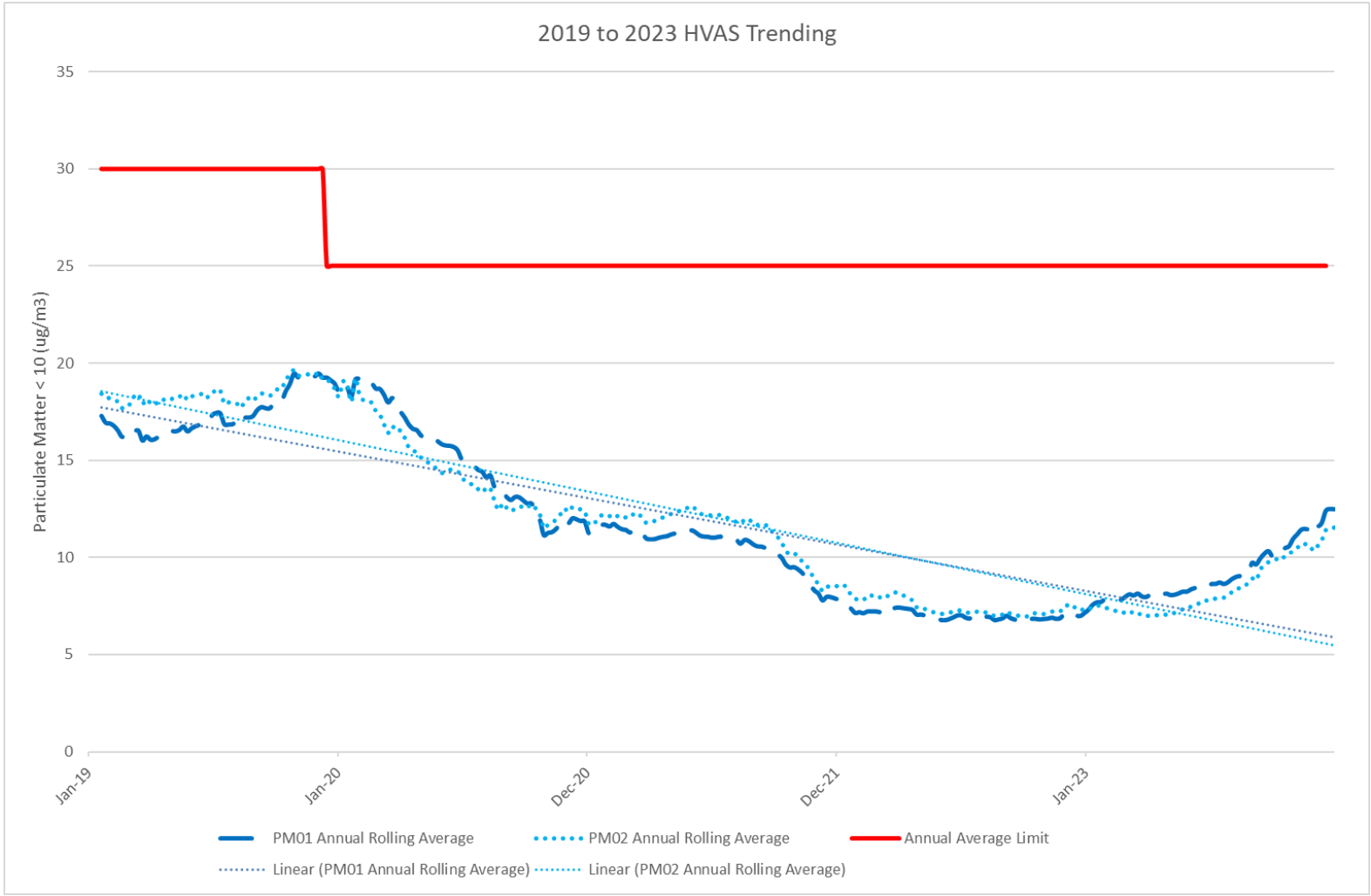


Table 4: HVAS monitoring results

Sampling Date	PM01	PM02
	Particulate Matter <10 µm (µg/m³)	Particulate Matter <10 µm (µg/m³)
5/01/2023	7.29	7.31
11/01/2023	7.54	7.49
17/01/2023	7.67	7.52
23/01/2023	7.69	7.54
29/01/2023	7.81	7.43
4/02/2023	7.78	7.38
10/02/2023	7.75	7.3
16/02/2023	7.77	7.23
22/02/2023	7.82	7.14
28/02/2023	7.98	7.22
6/03/2023	8.09	7.27
12/03/2023	8.03	7.12
18/03/2023	8.13	7.17
24/03/2023	7.98	7.01
30/03/2023	7.95	6.99
5/04/2023	8.05	7.03
11/04/2023	7.99	7.01
17/04/2023	8.11	7.06
23/04/2023	8.10	7.04
29/04/2023	8.13	7.08
5/05/2023	8.05	7.06
11/05/2023	8.07	7.17
17/05/2023	8.14	7.23
23/05/2023	8.23	7.35
29/05/2023	8.23	7.35
4/06/2023	8.35	7.50
10/06/2023	8.42	7.60
16/06/2023	8.47	7.65
22/06/2023	8.61	7.80
28/06/2023	8.55	7.80
4/07/2023	8.62	7.89
10/07/2023	8.62	7.89
16/07/2023	8.70	7.93
22/07/2023	8.62	7.94
28/07/2023	8.71	8.05
3/08/2023	8.88	8.24
9/08/2023	8.99	8.40
15/08/2023	9.03	8.43
21/08/2023	9.04	8.51
2/09/2023	9.71	8.94
8/09/2023	9.63	8.84
14/09/2023	9.94	9.38
20/09/2023	10.18	9.65
26/09/2023	10.31	9.77

Sampling Date	PM01	PM02
	Particulate Matter <10 µm (µg/m³)	Particulate Matter <10 µm (µg/m³)
2/10/2023	10.05	9.82
8/10/2023	10.18	9.93
14/10/2023	10.15	9.86
20/10/2023	10.46	10.08
26/10/2023	10.56	10.17
1/11/2023	10.94	10.38
7/11/2023	11.17	10.50
13/11/2023	11.41	10.73
19/11/2023	11.45	10.70
25/11/2023	11.39	10.65
1/12/2023	11.19	10.36
7/12/2023	11.54	10.60
13/12/2023	11.76	10.90
19/12/2023	12.39	11.42
25/12/2023	12.48	11.54
31/12/2023	12.47	11.55

Figure 3-d 2019 to 2023 HVAS Trending



APPENDIX 3E. BIODIVERSITY MONITORING DATA

2023 Stage 1 and Stage 1 Mod 9 Autumn Flora Monitoring Results

BOA	Plot Number	Native Overstorey Species	Native Mid Storey Species	Native ground cover (Grasses)	Native Ground Cover (Shrubs)	Native Ground Cover (Other)	Exotic Ground Cover	Litter	Bare soil	Crypto
BOA 1	**1a**	7	6	12	8	12	6	58	0	4
BOA 1	**1b**	29	2	22	6	2	0	70	0	0
BOA 1	**4a**	5	0	20	0	10	28	36	6	0
BOA 1	**4b**	5	6	28	0	2	24	38	8	0
BOA 1	**2c**	25	4	15	0	18	0	68	0	0
BOA 1	**2d**	30	5	44	0	8	0	48	0	0
BOA 1	**5a**	12	16	14	16	10	0	58	0	2
BOA 1	**5b**	29	15	8	6	10	0	76	0	0
BOA 1	**5c**	15	7	10	42	4	0	34	10	0
BOA 1	**6a**	15	3	14	44	2	0	32	8	0
BOA 1	**6b**	22	7	2	24	2	0	70	2	0
BOA 1	**7b**	0	10	28	36	0	0	26	10	0
BOA 1	**9a**	5	0	46	2	4	2	46	0	0
BOA 1	**9b**	8	0	50	4	2	0	26	6	0
BOA 1	**14a**	15	0	16	0	8	0	76	0	0
BOA 1	**14b**	8	6	26	16	30	2	22	4	0
BOA 1	**24a**	0	0	50	6	0	30	8	6	0
BOA 1	**24b**	1	4	52	0	2	0	8	38	0
BOA 1	**21a**	0	10	46	8	6	6	30	4	0
BOA 1	**21b**	0	0	26	0	40	6	24	4	0
BOA 2	**25a**	0	0	20	2	8	14	50	6	0
BOA 2	**11a**	15	5	30	0	4	0	52	14	0
BOA 2	**11b**	17	14	44	0	0	0	46	4	0
BOA 2	**11c**	6	4	18	18	0	0	52	4	8
BOA 2	**11d**	7	4	2	16	0	0	60	0	22
BOA 2	**10b**	6	16	4	8	0	0	68	4	0

BOA	Plot Number	Native Overstorey Species	Native Mid Storey Species	Native ground cover (Grasses)	Native Ground Cover (Shrubs)	Native Ground Cover (Other)	Exotic Ground Cover	Litter	Bare soil	Crypto
BOA 2	**13a**	6	4	0	12	0	0	14	2	71
BOA 2	**13e**	9	5	6	13	4	0	46	19	13
BOA 2	**13g**	22	8	8	6	4	0	82	0	0
BOA 2	**13h**	12	2	8	4	24	0	58	2	4
BOA 3	**1e**	9	3	36	20	12	0	28	0	4
BOA 3	**1f**	6	0	40	22	8	0	28	2	0
BOA 3	**1h**	24	19	60	28	6	0	6	0	0
BOA 3	**4e**	19	4	62	4	2	2	28	2	0
BOA 3	**4f**	0	3	44	14	0	0	10	0	32
BOA 3	**5e**	10	3	26	28	14	0	28	2	2
BOA 3	**5h**	8	2	12	12	38	0	30	8	0
BOA 3	**6d**	6	10	6	6	38	0	48	0	0
BOA 3	**6c**	5	1	16	20	2	0	38	4	0
BOA 3	**8a**	11	8	2	22	2	0	54	6	14
BOA 3	**8c**	52	2	0	12	4	0	84	0	0
BOA 3	**8d**	17	13	10	24	0	0	54	12	0
BOA 3	**15a**	3	12	44	52	2	0	0	2	0
BOA 3	**15b**	2	7	6	14	62	0	10	8	0
BOA 3	**16a**	0	2	2	18	2	2	24	6	46
BOA 3	**16b**	1	1	26	36	14	6	12	2	4
BOA 3	**17a**	8	0	2	42	8	0	32	8	8
BOA 3	**17b**	2	1	8	46	20	0	14	2	10
BOA 3	**17c**	2	4	6	18	32	0	16	10	18
BOA 3	**17d**	1	2	12	32	12	4	8	2	30
BOA 3	**19a**	5	8	20	12	12	2	22	14	10
BOA 3	**19b**	6	1	48	6	8	0	32	4	0
BOA 3	**19c**	8	8	6	2	46	0	36	2	0
Bobadeen	**Mod9_Fl2**	0	0	30	0	0	58	12	0	0
Bobadeen	**Mod9_Fl3**	18	1	58	0	0	0	40	2	0
Bobadeen	**Mod9_Fl4**	0	0	18	0	4	58	18	0	0

BOA	Plot Number	Native Overstorey Species	Native Mid Storey Species	Native ground cover (Grasses)	Native Ground Cover (Shrubs)	Native Ground Cover (Other)	Exotic Ground Cover	Litter	Bare soil	Crypto
Bobadeen	Mod9_FI5	0	0	26	2	2	70	0	0	0
Bobadeen	Mod9_FI6	0	3	20	0	68	12	0	0	0
Bobadeen	Mod9_FI7	2	1	16	0	8	76	0	0	0
Bobadeen	Mod9_FI8	0	0	76	0	0	24	0	0	0
Bobadeen	Mod9_FI9	0	2	44	8	8	34	6	0	0
Clarkes	Mod9_FI15	0	0	56	0	24	4	6	10	0
Clarkes	Mod9_FI16	6	0	40	2	12	27	17	2	0
Property 5	Mod9_FI26	0	0	44	0	6	16	34	0	0
Property 5	Mod9_FI27	0	0	16	0	6	32	46	0	0
Property 24 & 25	Mod9_FI30	0	0	26	2	34	18	4	16	0
Property 24 & 25	Mod9_FI31	0	0	56	2	8	34	0	0	0
Moolarmoo	Mod9_FI34	0	0	84	0	6	10	0	0	0
Moolarmoo	Mod9_FI35	0	0	100	0	0	0	0	0	0

2023 Stage 2 Autumn Flora Monitoring Results

BOA	Plot Number	Native Overstorey Species	Native Mid Storey Species	Native ground cover (Grasses)	Native Ground Cover (Shrubs)	Native Ground Cover (Other)	Exotic Ground Cover	Litter	Bare soil	Crypto
Dun Dun East	Stage2_FI20	11.2	0.5	16.0	0.0	12.0	14	24	16	0
Dun Dun East	Stage2_FI26	33	0	10.0	0.0	0.0	0	86	4	0
Dun Dun East	Stage2_FI29	12.8	0	4.0	2.0	0.0	1	38	46	0
Dun Dun East	Stage2_FI36	3.6	3.8	12.5	0.0	4.2	17	30	4	0
Dun Dun East	Stage2_FI37	0	0.2	28.0	0.0	10.0	21	12	8	0
Dun Dun East	Stage2_FI71	0	1	4.0	0.0	14.0	27	12	16	0
Dun Dun East	Stage2_FI107	11.9	0	14.0	0.0	2.0	1	12	70	0
Dun Dun East	Stage2_FI108	29	0	4.0	0.0	2.0	0	66	6	0
Dun Dun East	Stage2_FI109	0	2	14.0	0.0	8.0	19	10	10	0
Dun Dun East	Stage2_FI110	0	0	4.0	0.0	26.0	30	2	8	0
Dun Dun East	Stage2_FI111	0	1	4.0	0.0	20.0	38	0	0	0
Dun Dun East	Stage2_FI112	0	0	4.0	0.0	22.0	33	0	8	0
Dun Dun East	Stage2_FI113	5	0	18.8	0.0	6.3	7	34	24	0

BOA	Plot Number	Native Overstorey Species	Native Mid Storey Species	Native ground cover (Grasses)	Native Ground Cover (Shrubs)	Native Ground Cover (Other)	Exotic Ground Cover	Litter	Bare soil	Crypto
Dun Dun East	Stage2_FI114	0	0	10.0	0.0	18.0	22	20	8	0
Dun Dun East	Stage2_FI115	0	0	18.0	0.0	16.0	27	10	0	0
Dun Dun East	Stage2_FI116	0	0	8.0	2.0	24.0	19	18	2	8
Dun Dun West	Stage2_FI10	5.9	0	0.0	0.0	2.0	0	44	26	0
Dun Dun West	Stage2_FI14	13.5	0	4.0	0.0	0.0	0	60	26	0
Dun Dun West	Stage2_FI16	0	0	48.0	6.0	0.0	17	2	2	0
Dun Dun West	Stage2_FI17	0	0	30.0	0.0	0.0	22	12	2	0
Dun Dun West	Stage2_FI117	4.2	0	0.0	0.0	0.0	0	10	70	0
Dun Dun West	Stage2_FI118	9	0	0.0	0.0	0.0	0	30	34	0
Dun Dun West	Stage2_FI119	0	0	44.0	0.0	0.0	2	8	38	0
Dun Dun West	Stage2_FI120	0	0	52.0	0.0	24.0	5	0	12	0
Dun Dun West	Stage2_FI121	0	0	36.0	0.0	18.0	21	2	2	0
Dun Dun West	Stage2_FI122	1.7	0.4	16.0	0.0	0.0	15	26	18	0
Dun Dun West	Stage2_FI123	0.2	0	14.0	0.0	6.0	18	6	36	0
Dun Dun West	Stage2_FI124	8.2	0.5	2.0	0.0	0.0	0	16	76	0
Libertus	Stage2_FI129	0	0	65.3	0.0	6.1	7	12	2	0
Libertus	Stage2_FI130	0	0	52.0	0.0	16.0	10	8	4	0
Old Bobadeen	Stage2_FI52	0	0	80	0	2	9	0	0	0
Old Bobadeen	Stage2_FI153	0	0	14	0	38	8	32	0	0
Old Bobadeen	Stage2_FI154	0	0	46	0	32	11	0	0	0
Old Bobadeen	Stage2_FI156	0	0	80	0	2	9	0	0	0
Onsite Offset	Stage2_FI64	0	0	80.0	0.0	10.0	5	0	0	0
Onsite Offset	Stage2_FI69	0	4	74.0	4.0	8.0	2.0	10	0	0
Onsite Offset	Stage2_FI136	0	0.1	60.0	0.0	24.0	3	4	6	0
Onsite Offset	Stage2_FI137	0	0	44.0	0.0	30.0	13	0	0	0
Onsite Offset	Stage2_FI141	0	0	36.0	0.0	28.0	9	8	0	0
Ulan 18	Stage2_FI43	0	0	48.0	0.0	16.0	16	4	0	0
Ulan 18	Stage2_FI45	0	0	26.0	0.0	10.0	32	0	0	0
Ulan 18	Stage2_FI155	0	0	44.0	0.0	2.0	17	20	0	0

Appendix 3F. SURFACE WATER MONITORING DATA

Table 5: 2023 Surface water quality data

Sample Point	Sample Date	pH (Field) (Unit)	pH (Lab) (Unit)	EC (Field) (µS/cm)	EC (Lab) (µS/cm)	TSS (mg/L)	TDS (mg/L)	Temperature (°C)	Turbidity (Lab) (NTU)	Al - T (mg/L)	Cu - T (mg/L)	Pb - T (mg/L)	Zn - T (mg/L)	Ni - T (mg/L)	Fe - T (mg/L)	Mn - T (mg/L)	As - T (mg/L)	Se - T (mg/L)	Cd - T (mg/L)	Cr - T (mg/L)	Li (mg/L)	Ba - T (mg/L)	Sr (mg/L)	DO (mg/L)	N - T (mg/L)	P - T (mg/L)
SW01	11/01/2023	7.95	8	1061	1040	<5	616	22.2	2.2	0.02	<0.001	<0.001	<0.005	0.004	0.26	0.03	<0.001	<0.01	<0.0001	<0.001	0.071	0.044	0.275	8.64	0.3	<0.01
SW01	23/01/2023*	7.69	7.8	859	877	19	567	19.7	31.1				0.008		1.21											
SW01	7/02/2023	7.97	8.1	623	653	<5	412	23.8	3.6																	
SW01	14/03/2023	7.76	7.9	454	564	<5	323	20.9	7.4	0.17	<0.001	<0.001	<0.005	0.004	0.6	0.057	<0.001		<0.0001							
SW01	4/04/2023	8.02	8	612	601	<5	382	19	7.6																	
SW01	9/05/2023	8.51	8.3	647	600	<5	367	14.5	4.5																	
SW01	14/06/2023	8.13	8	607	609	6	314	8.7	6.9	0.13	<0.001	<0.001	<0.005	0.004	0.35	0.038	<0.001	<0.01	<0.0001	<0.001	0.091	0.027	0.134	11.76	0.3	0.02
SW01	11/07/2023	8.38	6.72	649	665	<5	362	10.5	3.1																	
SW01	8/08/2023	8.31	8.4	545	583	<5	346	15	2.9																	
SW01	12/09/2023	8.18	8.3	646.9	637	<5	364	19	3.2																	
SW01	10/10/2023	8.4	8.4	812.4	755	<5	378	24.2	4.6																	
SW01	15/11/2023	8.2	8.3	919.8	797	<5	471	27.1	2																	
SW01	5/12/2023	8.26	8.5	904.6	772	<5	446	33	1.7																	
SW01	21/12/2023*	8.26	8.3	970.1	806	<5	438	24.6	1.5				<0.005		0.19											
SW02	11/01/2023	8.01	8	1075	1050	<5	635	22.2	2.8	0.04	<0.001	<0.001	<0.005	0.005	0.35	0.055	<0.001	<0.01	<0.0001	<0.001	0.078	0.04	0.264	8.8	0.3	<0.01
SW02	23/01/2023*	7.74	7.8	837	857	22	559	19.7	43.1				0.01		2.59											
SW02	7/02/2023	8.06	8	6.19	656	5	432	22.5	3.4																	
SW02	14/03/2023	7.86	7.8	539	571	<5	344	20.5	7.4																	
SW02	4/04/2023	8.15	8	602	611	<5	357	18.3	7.1																	
SW02	9/05/2023	8.59	8.3	601	612	<5	348	13.4	4																	
SW02	14/06/2023	8.27	8.1	566	588	6	299	8.7	7.5	0.25	0.001	<0.001	0.887	0.151	49	11.9	<0.001	<0.01	0.0001	<0.001	0.093	0.027	0.323	11.38	0.2	0.02
SW02	11/07/2023	8.58	6.84	631	651	<5	374	10.2	3.6																	

Sample Point	Sample Date	pH (Field) (Unit)	pH (Lab) (Unit)	EC (Field) (µS/cm)	EC (Lab) (µS/cm)	TSS (mg/L)	TDS (mg/L)	Temperature (°C)	Turbidity (Lab) (NTU)	Al - T (mg/L)	Cu - T (mg/L)	Pb - T (mg/L)	Zn - T (mg/L)	Ni - T (mg/L)	Fe - T (mg/L)	Mn - T (mg/L)	As - T (mg/L)	Se - T (mg/L)	Cd - T (mg/L)	Cr - T (mg/L)	Li (mg/L)	Ba - T (mg/L)	Sr (mg/L)	DO (mg/L)	N - T (mg/L)	P - T (mg/L)
SW02	8/08/2023	8.43	8.4	527	579	<5	348	13.4	2.7																	
SW02	12/09/2023	8.31	8.3	619.9	596	<5	346	17.2	3.6																	
SW02	10/10/2023	8.45	8.4	771.1	756	<5	388	22.2	4.3																	
SW02	15/11/2023	8.25	8.3	918.4	796	<5	489	26	2																	
SW02	5/12/2023	8.32	8.5	904.8	777	<5	444	32.7	2.3																	
SW02	21/12/2023*	8.19	8.2	980.1	821	<5	464	24.4	2.1				0.006		0.22											
SW04	11/01/2023	8.16	8.2	2280	2170	<5	1510	25	0.4	<0.01	<0.001	<0.001	<0.005	0.126	0.09	0.034	<0.001	<0.01	<0.0001	<0.001	0.162	0.048	0.566	8.14	1.7	<0.01
SW05	11/01/2023	8.11	8	1676	1610	18	998	25	8.3	0.1	<0.001	<0.001	<0.005	0.008	0.4	0.161	<0.001	<0.01	<0.0001	<0.001	0.087	0.047	0.41	8.6	0.8	0.04
SW05	23/01/2023*	7.9	7.7	951	966	30	588	22.2	28.4				<0.005		1.63											
SW05	7/02/2023	7.88	7.7	614	657	28	436	25	13.3																	
SW05	14/03/2023	7.54	7.4	282	322	18	201	19.8	20.9																	
SW05	4/04/2023	7.78	7.4	355	375	22	250	21.7	24																	
SW05	9/05/2023	7.96	7.6	439	442	12	316	13.9	19.5																	
SW05	14/06/2023	7.86	7.5	469	486	10	263	10.5	13.6	0.58	<0.001	<0.001	<0.005	0.001	0.78	0.08	<0.001	<0.01	<0.0001	<0.001	0.004	0.019	0.111	10.23	1.1	0.03
SW05	11/07/2023	7.8	7.49	683	727	<5	409	10.4	14.5																	
SW05	8/08/2023	7.79	7.6	626	682	10	420	13	10.5																	
SW05	12/09/2023	7.7	7.6	755.3	734	9	424	17.4	11.3																	
SW05	10/10/2023	7.6	7.4	771.3	739	12	386	21.1	18.5																	
SW05	15/11/2023	7.43	7.3	685	602	6	368	26.5	21.9																	
SW05	5/12/2023	7.25	7.3	628.6	533	11	330	24.6	9																	
SW05	21/12/2023*	7.4	7.3	619.1	513	12	308	23.9	9.1				<0.005		1.27											
SW07	11/01/2023	7.79	7.8	911	893	<5	585	25.8	1.8	0.03	<0.001	<0.001	<0.005	<0.001	0.19	0.1	<0.001	<0.01	<0.0001	<0.001	0.001	0.019	0.327	6.6	1.4	0.17
SW07	23/01/2023*	7.68	7.7	3170	3170	6	2020	20.7	0.7				<0.005		0.22											
SW07	7/02/2023	7.89	7.8	1044	1120	<5	684	23.4	0.7																	
SW07	14/03/2023	7.86	7.9	1060	1090	<5	634	18	1.1																	

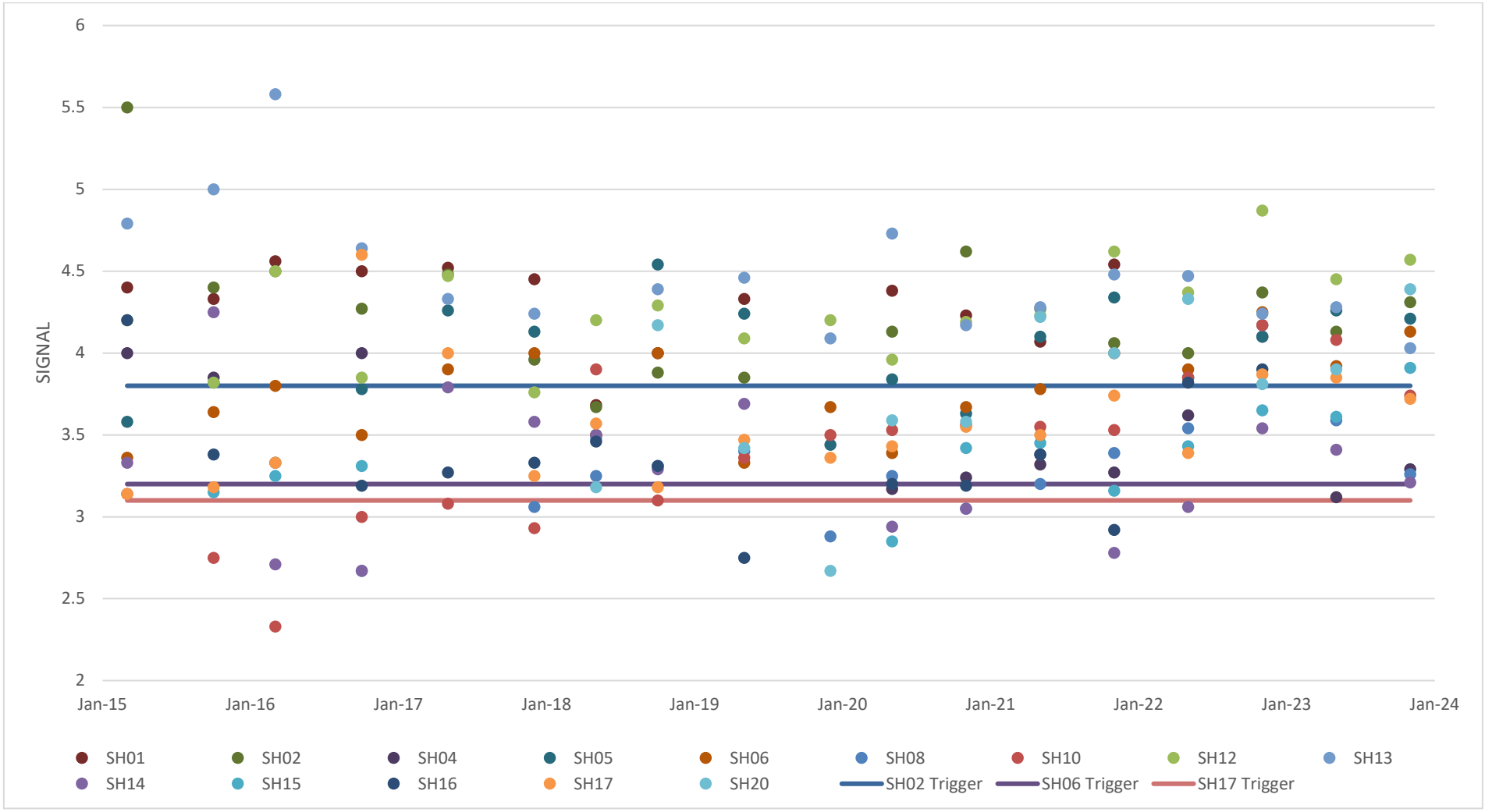
Sample Point	Sample Date	pH (Field) (Unit)	pH (Lab) (Unit)	EC (Field) (µS/cm)	EC (Lab) (µS/cm)	TSS (mg/L)	TDS (mg/L)	Temperature (°C)	Turbidity (Lab) (NTU)	Al - T (mg/L)	Cu - T (mg/L)	Pb - T (mg/L)	Zn - T (mg/L)	Ni - T (mg/L)	Fe - T (mg/L)	Mn - T (mg/L)	As - T (mg/L)	Se - T (mg/L)	Cd - T (mg/L)	Cr - T (mg/L)	Li (mg/L)	Ba - T (mg/L)	Sr (mg/L)	DO (mg/L)	N - T (mg/L)	P - T (mg/L)
SW07	4/04/2023	7.97	7.8	1573	1720	<5	968	18.2	0.6																	
SW07	9/05/2023	8.2	8	1684	1670	<5	992	11.1	0.5																	
SW07	14/06/2023	8.18	8	1834	1810	<5	952	9	1	<0.01	<0.001	<0.001	<0.005	<0.001	<0.05	0.028	<0.001	<0.01	<0.0001	<0.001	0.002	0.044	0.6	10.81	0.6	0.04
SW07	11/07/2023	8.15	7.92	1629	1690	<5	963	8.9	0.7																	
SW07	8/08/2023	8.21	8.1	1517	1430	189	924	13.9	48.9																	
SW07	12/09/2023	7.98	8.1	1733	1720	<5	957	17.3	0.5																	
SW07	10/10/2023	8.06	8	2100	2010	<5	1150	18.3	1.8																	
SW07	15/11/2023	7.84	7.9	2661	2410	<5	1600	24.1	1																	
SW07	5/12/2023	7.8	7.9	3214	3030	<5	2220	23.2	2.5																	
SW07	21/12/2023*	6.93	6.8	5000	4720	9	3900	22.2	1.3				0.04		0.43											
SW08	11/01/2023	7.7	7.7	976	977	<5	526	24.9	1.6	<0.01	<0.001	<0.001	<0.005	0.002	0.35	0.039	<0.001	<0.01	<0.0001	<0.001	<0.001	0.021	0.277	7.7	0.7	0.02
SW08	23/01/2023*	7.61	7.6	637	672	<5	404	18.1	8.3				<0.005		0.98											
SW08	7/02/2023	7.57	7.5	1035	1110	<5	615	21.9	1.9																	
SW08	14/03/2023	7.05	7	1390	1420	6	780	18.1	7.7																	
SW08	4/04/2023	7.65	7.6	1332	1360	<5	722	17.2	3.7																0.6	0.03
SW08	9/05/2023	7.77	7.5	1436	1380	<5	764	7.9	5.8																	
SW08	14/06/2023	7.84	7.6	1556	1500	<5	752	8.7	4.6	0.04	<0.001	<0.001	0.006	0.002	0.51	0.145	<0.001	<0.01	<0.0001	<0.001	0.001	0.043	0.383	10.71	0.5	0.03
SW08	11/07/2023	7.69	7.88	1247	1280	<5	726	6.2	2.9																	
SW08	8/08/2023	7.47	7.4	1592	1690	<5	930	8.7	3.6																	
SW08	12/09/2023	7.45	7.4	1812	1780	<5	982	11.9	4																	
SW08	10/10/2023	7.28	7.2	2309	2200	<5	1130	15.7	10.5																0.8	0.04
SW08	15/11/2023	7.07	7.1	2020	1820	<5	1160	21.8	10.7																	
SW08	5/12/2023	7.06	7.1	2564	2270	10	1430	21.4	14																	
SW08	21/12/2023*	6.75	6.8	2575	2170	10	1320	20.3	8.8				0.005		3.09											
SW09	11/01/2023	7.44	7.5	641	619	<59	317	29.9	37.2	0.14	<0.001	<0.001	<0.005	0.005	4.68	1.88	0.001	<0.01	<0.0001	<0.001	<0.001	0.065	0.174	5.57	2.2	0.13

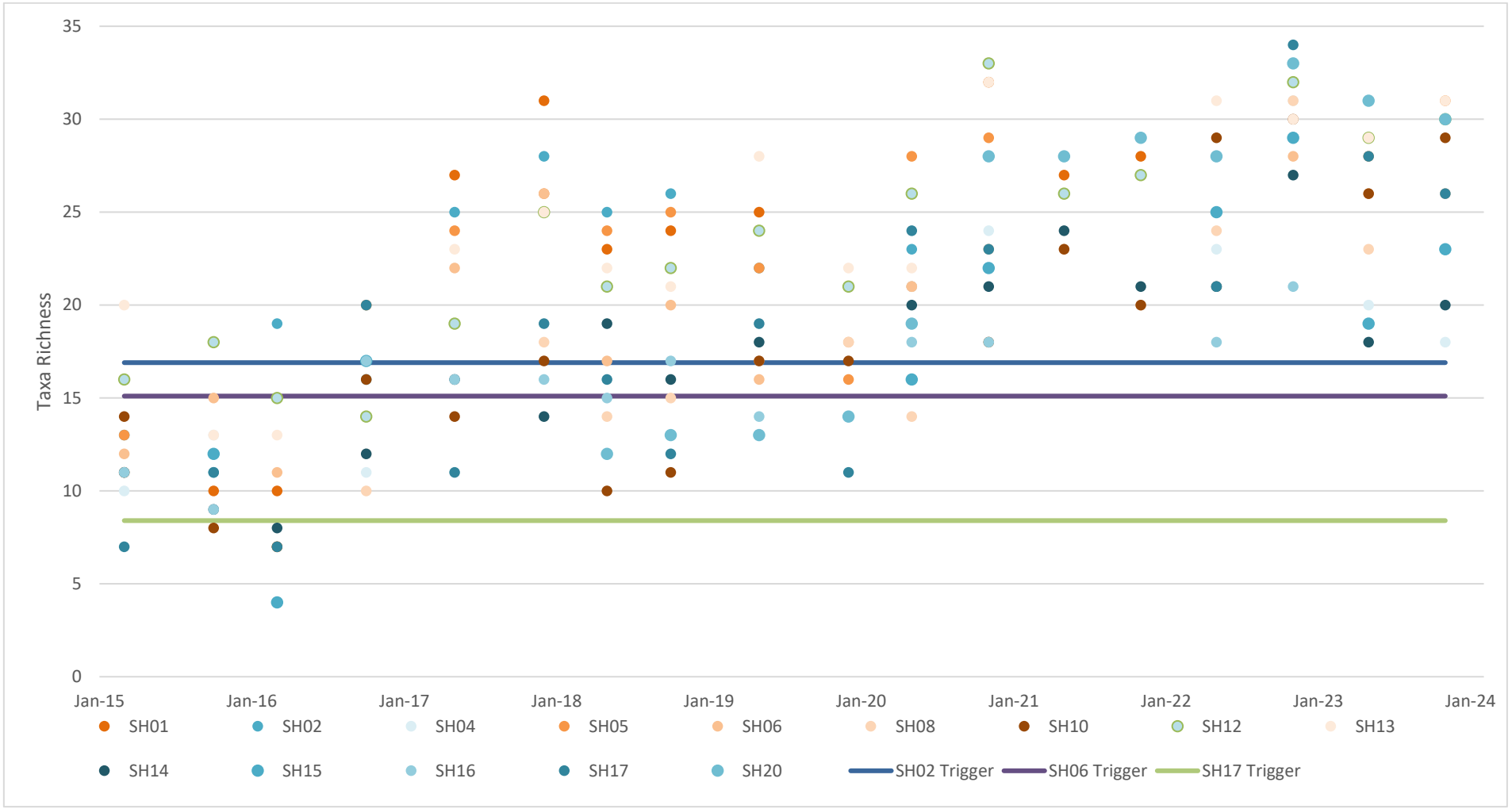
Sample Point	Sample Date	pH (Field) (Unit)	pH (Lab) (Unit)	EC (Field) (µS/cm)	EC (Lab) (µS/cm)	TSS (mg/L)	TDS (mg/L)	Temperature (°C)	Turbidity (Lab) (NTU)	Al - T (mg/L)	Cu - T (mg/L)	Pb - T (mg/L)	Zn - T (mg/L)	Ni - T (mg/L)	Fe - T (mg/L)	Mn - T (mg/L)	As - T (mg/L)	Se - T (mg/L)	Cd - T (mg/L)	Cr - T (mg/L)	Li (mg/L)	Ba - T (mg/L)	Sr (mg/L)	DO (mg/L)	N - T (mg/L)	P - T (mg/L)
SW09	23/01/2023*	7.7	7.6	471	488	8	297	19.7	10.8				<0.005		2.53											
SW09	7/02/2023	7.63	7.6	612	652	6	410	24.9	8.8																	
SW09	14/03/2023	7.55	7.6	885	883	<5	472	19.4	10.3																	
SW09	4/04/2023	7.53	7.4	917	1100	10	587	19.3	17.5																	
SW09	9/05/2023	7.51	7.4	909	1030	10	555	9.7	10.4																	
SW09	14/06/2023	7.92	7.6	921	857	7	455	11.5	8.3	0.06	<0.001	<0.001	<0.005	0.002	1.48	0.377	<0.001	<0.01	<0.0001	<0.001	<0.001	0.045	0.19	9.99	0.6	0.04
SW09	11/07/2023	7.67	7.88	1157	1200	<5	618	6.3	11.9																	
SW09	8/08/2023	7.26	7.5	1146	805	5	424	10.4	6.8																	
SW09	12/09/2023	7.36	7.3	1214	1270	9	643	12.7	20.3																	
SW09	10/10/2023	7.08	7.1	1435	1430	8	742	15.1	39.2																	
SW09	15/11/2023	6.81	6.9	1948	1710	13	994	19.2	60.5																	
SW09	5/12/2023	6.85	6.8	2042	1860	22	1140	20.2	82.8																	
SW09	21/12/2023*	6.87	6.9	2194	1830	33	1000	19.4	19.5				<0.005		9.86											
SW12	11/01/2023	7.97	8	1567	1500	18	1020	27.5	13	0.12	<0.001	<0.001	<0.005	0.006	0.47	0.154	<0.001	<0.01	<0.0001	<0.001	0.084	0.041	0.355	8.44	1.2	0.02
SW12	23/01/2023*	7.74	7.6	807	833	44	536	21.9	58.4				<0.005		3.67											
SW12	7/02/2023	7.65	7.6	538	574	31	372	25.2	22.1																	
SW12	14/03/2023	7.45	7.4	261.9	299	31	201	20	34.2																	
SW12	4/04/2023	7.57	7.3	319	343	24	236	20.9	34.3																	
SW12	9/05/2023	7.83	7.4	362	401	10	266	12.3	24.8																	
SW12	14/06/2023	7.82	7.4	420	441	8	270	9.8	16.9	0.45	<0.001	<0.001	<0.005	<0.001	0.62	0.053	<0.001	<0.01	<0.0001	<0.001	0.003	0.017	0.093	10.44	0.9	0.03
SW12	11/07/2023	7.7	7.61	605	652	<5	418	10.5	27																	
SW12	8/08/2023	7.76	7.5	540	594	18	364	13.4	21.7																	
SW12	12/09/2023	7.61	7.6	688	671	18	388	17.2	27.2																	
SW12	10/10/2023	7.62	7.6	707.5	658	10	338	21.7	20.7																	
SW12	15/11/2023	7.43	7.4	660.1	578	1<5	358	27	16.8																	

Sample Point	Sample Date	pH (Field) (Unit)	pH (Lab) (Unit)	EC (Field) (µS/cm)	EC (Lab) (µS/cm)	TSS (mg/L)	TDS (mg/L)	Temperature (°C)	Turbidity (Lab) (NTU)	Al - T (mg/L)	Cu - T (mg/L)	Pb - T (mg/L)	Zn - T (mg/L)	Ni - T (mg/L)	Fe - T (mg/L)	Mn - T (mg/L)	As - T (mg/L)	Se - T (mg/L)	Cd - T (mg/L)	Cr - T (mg/L)	Li (mg/L)	Ba - T (mg/L)	Sr (mg/L)	DO (mg/L)	N - T (mg/L)	P - T (mg/L)
SW12	5/12/2023	7.55	7.4	607.9	466	9	312	26.1	18.6																	
SW12	21/12/2023*	7.33	7.4	637	509	41	298	24.2	63.2				0.006		1.68											
SW15	11/01/2023	6.6	6.4	111.6	125	24	95	22.6	54.6	0.02	<0.001	<0.001	<0.005	0.002	8.37	0.481	0.001	<0.01	<0.0001	<0.001	<0.001	0.034	0.046	2.82	0.6	0.04
SW15	23/01/2023*	6.53	6.5	100.1	127	20	113	19.4	39.6				<0.005		10.8											
SW16	11/01/2023	8.2	7.8	2253	2160	<5	1490	24.5	0.8	<0.01	<0.001	<0.001	<0.005	0.117	0.15	0.05	<0.001	<0.01	<0.0001	<0.001	0.157	0.048	0.552	8.39	1.9	<0.01
SW16	23/01/2023*	7.57	7.6	1058	1080	12	754	21.5	19.2				<0.005		3.99											
SW18	11/01/2023	8.3	8.4	2254	2150	<5	1480	25.3	2.4	<0.01	<0.001	<0.001	<0.005	0.082	0.35	0.036	<0.001	<0.01	<0.0001	<0.001	0.169	0.047	0.532	10.75	4.1	<0.01
SW18	23/01/2023*	8	8	1884	1910	10	1410	23.9	35.4				<0.005		4.5											
SW22	11/01/2023	8.23	8.2	1052	1040	<5	622	22.5	2.2	0.02	<0.001	<0.001	<0.005	0.005	0.22	0.029	<0.001	<0.01	<0.0001	<0.001	0.075	0.038	0.251	8.75	14.2	<0.01
SW22	23/01/2023*	8.03	8	847	873	16	570	19	32.9				0.008		2.37											
SW22	7/02/2023	8.22	8.2	605	650	<5	446	22.2	3.3																	
SW22	14/03/2023	7.98	8	513	539	<5	318	19.4	7.3																	
SW22	4/04/2023	8.27	8.2	583	604	<5	307	17.7	6																	
SW22	9/05/2023	8.57	8.3	634	603	<5	356	13.1	4.7																	
SW22	14/06/2023	8.34	8.1	590	613	6	324	8.7	6.5	0.14	<0.001	<0.001	<0.005	0.003	0.35	0.033	<0.001	<0.01	<0.0001	<0.001	0.098	0.027	0.138	11.75	0.1	0.02
SW22	11/07/2023	8.44	7.24	636	667	<5	414	9.8	2.8																	
SW22	8/08/2023	8.43	8.4	513	589	<5	346	15.2	2.4																	
SW22	12/09/2023	8.29	8.4	636.6	636	<5	356	17	3																	
SW22	10/10/2023	8.49	8.4	797.7	756	<5	420	20.9	2.9																	
SW22	15/11/2023	8.35	8.4	914.3	784	<5	472	26.4	1.4																	
SW22	5/12/2023	8.38	8.5	897.2	769	<5	434	31.4	1																	
SW22	21/12/2023*	8.39	8.5	949	799	<5	419	21.8	1.1				<0.005		0.11											

Notes:
Sampling events where location were too low to sample have not been included.
* Denotes Rainfall Event sampling.

Figure 3-e Stream Health Trending data




Taxa Richness
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SH01
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SH12
SH13
SH14
SH15
SH16
SH17
SH20
SH02 Trigger
SH06 Trigger
SH17 Trigger

Table 6: Effluent Discharge Quality

Sample Location	Sample Date	Biological Oxygen Demand (mg/L)	Total Nitrogen (mg/L)	Oil & Grease (mg/L)	Total Phosphorus (mg/L)	pH	Total Suspended Solids (mg/L)
OC Effluent Tank	22/2/2023	23	76.9	10	10.9	7.9	22
OC Effluent Tank	16/5/2023	15	78.7	<5	10.8	7.6	27
OC Effluent Tank	17/8/2023	59	109.0	13	14.3	7.7	36
OC Effluent Tank	7/11/2023	19	81.8	<5	10.9	7.6	54
Admin Effluent	22/2/2023	<2	26.6	<5	24.0	7.2	47
Admin Effluent	16/5/2023	<2	38.5	<5	23.6	7.1	32
Admin Effluent	17/8/2023	<2	34.1	<5	21.4	7.1	34
Admin Effluent	7/11/2023	<2	22.9	<5	23.7	7.2	66
CHPP Effluent	22/2/2023	8	5.6	<5	0.2	7.2	31
CHPP Effluent	16/5/2023	7	4.8	6	0.3	7.4	38
CHPP Effluent	17/8/2023	3	5.7	<5	0.3	7.4	38
CHPP Effluent	7/11/2023	10	4.8	<5	0.2	7.1	68
UG Effluent Tank	22/2/2023	74	18.0	11	5.4	7.0	235
UG Effluent Tank	16/5/2023	58	30.6	8	9.2	7.2	86
UG Effluent Tank	17/8/2023	12	76.8	<5	12.6	7.2	46
UG Effluent Tank	7/11/2023	22	9.2	9	1.0	6.9	66

Figure 3-f 2023 Stream Flow and rainfall

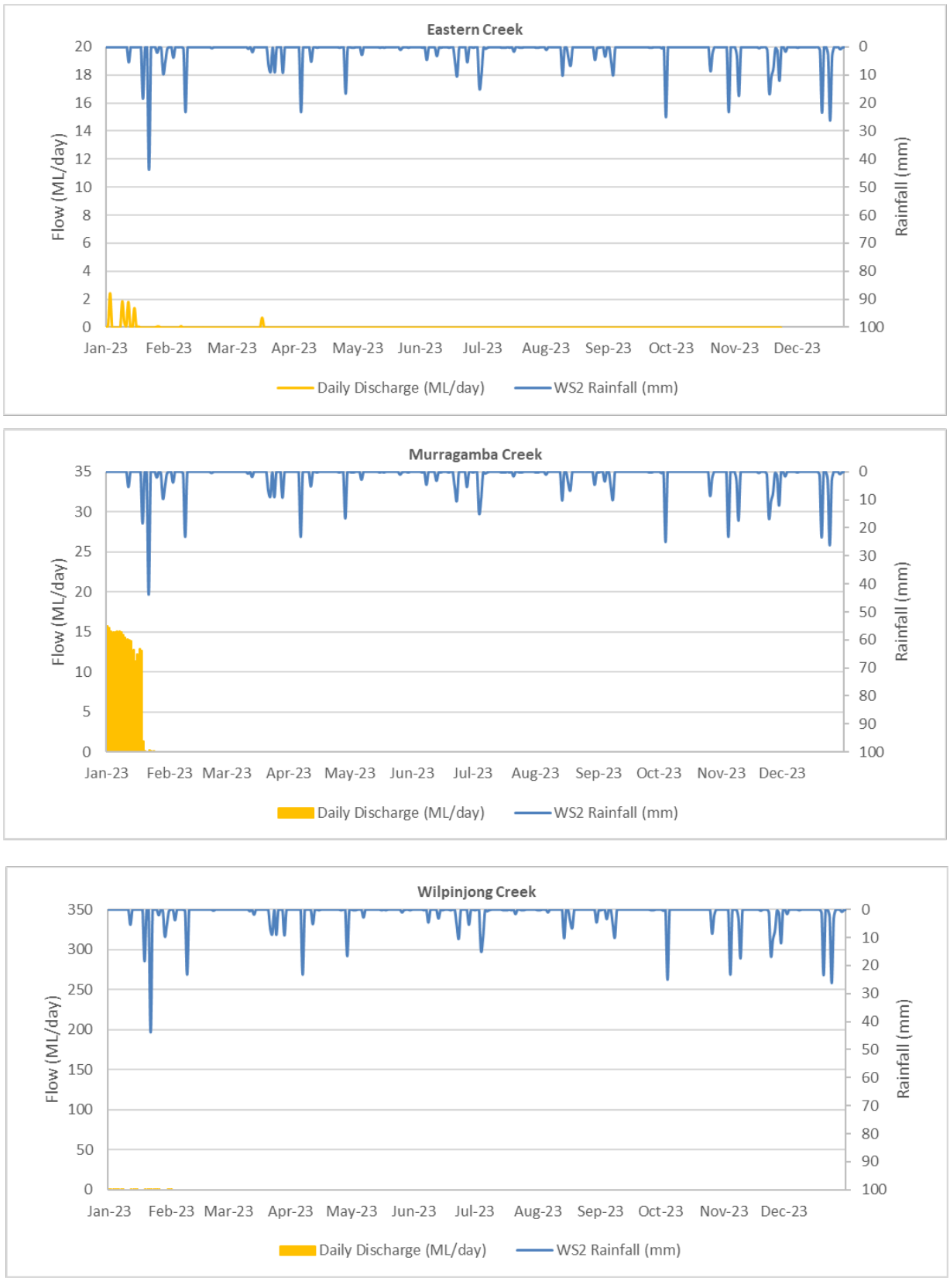


Table 7: LDP01 Discharge Quality

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
1/01/2023	16.3	196	7.0	0.00										
2/01/2023	14.5	200	7.2	0.02										
3/01/2023	16.4	203	7.1	0.00	<5	<1	<0.005	0.13	0.0022	0.003	<0.0005	<0.0001	<0.0002	<0.0001
4/01/2023	15.2	205	7.1	0.13										
5/01/2023	16.4	203	7.2	0.00										
6/01/2023	16.3	205	7.3	0.00										
7/01/2023	14.4	207	7.3	0.33										
8/01/2023	15.5	210	7.1	0.07										
9/01/2023	15.0	211	7.1	0.23	<5	1								
10/01/2023	13.1	213	7.1	0.23										
11/01/2023	13.4	212	7.1	0.12										
12/01/2023	14.1	221	7.1	0.16										
13/01/2023	17.5	217	7.2	0.00										
14/01/2023	15.6	228	7.2	0.17										
15/01/2023	17.5	218	7.0	0.00										
16/01/2023	17.4	221	7.2	0.12	<5	<1								
17/01/2023	17.1	212	7.1	0.02										
18/01/2023	14.9	213	7.2	0.15										
19/01/2023	13.9	212	7.0	0.01										
20/01/2023	12.7	217	7.1	0.32										
21/01/2023	13.7	229	7.2	0.09										
22/01/2023	14.7	216	7.1	0.03										
23/01/2023	14.7	219	7.0	0.00										
24/01/2023	14.2	217	7.1	0.08	<5	<1								
25/01/2023	14.7	218	7.0	0.00										
26/01/2023	14.3	213	7.0	0.10										
27/01/2023	14.8	210	7.1	0.00										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
28/01/2023	14.7	217	7.1	0.00										
29/01/2023	14.8	217	7.0	0.00										
30/01/2023	14.4	212	6.9	0.05	<5	<1								
31/01/2023	12.3	244	7.1	0.27										
1/02/2023	12.6	213	7.0	0.24										
2/02/2023	6.8	241	7.2	0.62										
3/02/2023	14.5	212	7.1	0.18										
4/02/2023	14.3	210	7.2	0.01										
5/02/2023	14.7	210	7.1	0.00										
6/02/2023	14.4	213	7.1	0.25	<5	<1	<0.005	0.0354	0.0085	<0.001	<0.0005	<0.0001	<0.0002	<0.0001
7/02/2023	14.8	218	7.1	0.15										
8/02/2023	14.8	218	7.3	0.01										
9/02/2023	14.2	221	7.2	0.18										
10/02/2023	12.9	224	7.1	0.00										
11/02/2023	14.8	223	7.1	0.00										
12/02/2023	14.7	222	7.1	0.04										
13/02/2023	14.7	221	7.1	0.00	<5	<1								
14/02/2023	14.3	214	7.2	0.00										
15/02/2023	7.2	221	7.1	0.00										
16/02/2023	12.9	221	7.0	0.05										
17/02/2023	14.6	215	6.9	0.01										
18/02/2023	12.5	215	7.1	0.13										
19/02/2023	14.3	218	7.1	0.05										
20/02/2023	14.2	216	7.0	0.04	<5	<1								
21/02/2023	14.8	216	7.1	0.04										
22/02/2023	14.6	214	7.1	0.00										
23/02/2023	14.8	217	7.2	0.00										
24/02/2023	14.8	219	7.1	0.08										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
25/02/2023	14.7	221	7.1	0.00										
26/02/2023	14.7	220	7.0	0.00										
27/02/2023	12.9	219	7.0	0.07	<5	<1								
28/02/2023	14.3	225	7.1	0.01										
1/03/2023	13.6	229	7.0	0.18										
2/03/2023	13.2	221	7.1	0.62										
3/03/2023	14.7	218	7.1	0.26										
4/03/2023	13.7	214	7.1	0.45										
5/03/2023	13.6	226	7.1	0.77										
6/03/2023	14.6	219	7.0	0.46	<5	<1	<0.005	0.0224	0.0042	0.002	<0.0005	<0.0001	<0.0002	<0.0001
7/03/2023	14.6	221	7.0	0.50										
8/03/2023	14.9	221	7.0	0.03										
9/03/2023	12.7	213	7.1	0.53										
10/03/2023	14.7	203	7.2	0.13										
11/03/2023	14.7	199	7.1	0.33										
12/03/2023	14.6	200	7.1	0.01										
13/03/2023	14.9	210	7.2	0.29	<5	<1								
14/03/2023	14.5	196	7.2	0.09										
15/03/2023	13.7	194	7.0	0.04										
16/03/2023	13.9	193	7.1	0.04										
17/03/2023	13.9	196	7.1	0.00										
18/03/2023	14.3	196	7.1	0.01										
19/03/2023	14.2	200	7.1	0.15										
20/03/2023	14.2	198	7.0	0.08	<5	<1								
21/03/2023	14.1	199	7.1	0.11										
22/03/2023	14.2	199	7.1	0.04										
23/03/2023	14.2	196	7.1	0.04										
24/03/2023	14.4	218	7.1	0.00										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
25/03/2023	14.6	235	7.2	0.00										
26/03/2023	13.9	228	7.1	0.00										
27/03/2023	14.6	224	7.1	0.00	<5	<1								
28/03/2023	14.8	230	7.1	0.00										
29/03/2023	9.7	205	7.3	0.34										
30/03/2023	0.0	214	7.2	0.01										
31/03/2023	0.0	203	7.1	0.00										
1/04/2023	0.0	202	7.1	0.01										
2/04/2023	4.3	202	7.2	0.03										
3/04/2023	9.5	201	7.2	0.00	<5	<1	<0.005	0.052	0.0016	0.002	<0.0005	<0.0001	<0.0002	<0.0001
4/04/2023	9.9	193	7.3	0.00										
5/04/2023	9.5	183	7.2	0.00										
6/04/2023	9.3	187	7.2	0.01										
7/04/2023	10.2	191	7.2	0.01										
8/04/2023	10.3	192	7.2	0.00										
9/04/2023	10.0	198	7.1	0.00										
10/04/2023	10.0	195	7.1	0.00										
11/04/2023	10.5	187	7.2	0.00	<5	<1								
12/04/2023	9.9	186	7.2	0.00										
13/04/2023	2.3	183	7.2	0.03										
14/04/2023	4.0	184	7.2	0.00										
15/04/2023	9.9	190	7.2	0.01										
16/04/2023	10.0	194	7.2	0.00										
17/04/2023	7.0	186	7.2	0.01										
18/04/2023	10.4	186	7.2	0.00	<5	*								
19/04/2023	7.6	185	7.2	0.00										
20/04/2023	9.1	185	7.2	0.00										
21/04/2023	9.9	187	7.2	0.00										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
22/04/2023	9.8	190	7.2	0.00										
23/04/2023	10.3	194	7.2	0.01										
24/04/2023	10.4	193	7.1	0.00	<5	<1								
25/04/2023	9.7	193	7.1	0.00										
26/04/2023	6.0	188	7.1	0.00										
27/04/2023	9.8	187	7.1	0.00										
28/04/2023	10.1	189	7.2	0.00										
29/04/2023	10.1	187	7.1	0.00										
30/04/2023	10.1	187	7.1	0.00										
1/05/2023	9.4	197	7.2	0.00	<5	<1	<0.005	0.0728	0.0012	0.006	<0.0005	<0.0001	<0.0002	<0.0001
2/05/2023	9.8	196	7.2	0.03										
3/05/2023	9.7	193	7.2	0.12										
4/05/2023	8.8	191	7.3	0.04										
5/05/2023	8.6	190	7.2	0.00										
6/05/2023	6.0	185	7.1	0.00										
7/05/2023	5.9	187	7.1	0.02										
8/05/2023	5.4	181	7.1	0.00	<5	<1								
9/05/2023	9.0	175	7.1	0.01										
10/05/2023	9.4	177	7.1	0.00										
11/05/2023	8.5	180	7.1	0.00										
12/05/2023	9.5	178	7.2	0.01										
13/05/2023	9.5	179	7.2	0.00										
14/05/2023	9.6	177	7.2	0.01										
15/05/2023	9.4	182	7.2	0.03	<5	<1								
16/05/2023	10.0	183	7.3	0.00										
17/05/2023	8.9	184	7.3	0.00										
18/05/2023	9.1	188	7.3	0.00										
19/05/2023	9.8	212	7.4	0.24										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
20/05/2023	10.2	201	7.2	0.14										
21/05/2023	10.1	198	7.2	0.03										
22/05/2023	4.0	193	7.2	0.01										
23/05/2023	0.0	192	7.1	0.00										
24/05/2023	5.0	195	7.1	0.00	<5	<1								
25/05/2023	8.4	198	7.1	0.00										
26/05/2023	8.4	198	7.1	0.00										
27/05/2023	9.8	193	7.2	0.00										
28/05/2023	10.1	192	7.1	0.00										
29/05/2023	10.0	195	7.1	0.00	<5	<1								
30/05/2023	9.9	198	7.1	0.00										
31/05/2023	2.7	209	7.1	0.00										
8/06/2023	0.0	215	7.1	0.33										
9/06/2023	0.0	211	7.1	0.00										
10/06/2023	0.0	218	7.1	0.00										
11/06/2023	0.0	219	7.1	0.00										
12/06/2023	0.0	207	7.1	0.02										
13/06/2023	6.4	206	7.0	0.00	<5	<1	<0.005	0.0525	0.0008	0.004	<0.0005	<0.0001	<0.0002	<0.0001
14/06/2023	9.0	204	7.1	0.04										
15/06/2023	9.7	209	7.1	0.00										
16/06/2023	8.7	196	7.2	0.03										
17/06/2023	8.6	185	7.1	0.00										
18/06/2023	8.6	194	7.2	0.00										
19/06/2023	8.4	188	7.2	0.00	<5	<1								
20/06/2023	11.1	193	7.1	0.01										
21/06/2023	7.7	186	7.1	0.00										
22/06/2023	11.9	188	7.1	0.00										
23/06/2023	10.6	197	7.1	0.00										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
24/06/2023	10.2	202	7.1	0.00										
25/06/2023	8.6	202	7.1	0.00										
26/06/2023	10.2	206	7.2	0.00	<5	<1								
27/06/2023	10.0	208	7.2	0.00										
28/06/2023	9.3	222	7.2	0.00										
29/06/2023	9.1	212	7.2	0.00										
30/06/2023	9.4	196	7.3	0.00										
1/07/2023	9.5	183	7.2	0.00										
2/07/2023	9.4	161	7.2	0.00										
3/07/2023	8.6	140	7.3	0.00	<5	<1	<0.005	0.0762	0.0009	0.006	<0.0005	<0.0001	<0.0002	<0.0001
4/07/2023	6.2	141	7.3	0.00										
5/07/2023	4.9	145	7.3	0.00										
6/07/2023	4.9	147	7.3	0.00										
7/07/2023	4.9	147	7.2	0.00										
8/07/2023	4.9	152	7.3	0.00										
9/07/2023	4.9	170	7.2	0.00										
10/07/2023	4.9	174	7.2	0.00	<5	<1								
11/07/2023	3.3	172	7.2	0.00										
12/07/2023	4.4	180	7.2	0.00										
13/07/2023	3.7	184	7.2	0.00										
14/07/2023	6.2	181	7.1	0.00										
15/07/2023	7.6	179	7.1	0.02										
16/07/2023	7.8	178	7.1	0.00										
17/07/2023	6.9	178	7.2	0.09	<5	1								
18/07/2023	7.1	177	7.2	0.01										
19/07/2023	7.9	174	7.2	0.00										
20/07/2023	6.0	178	7.1	0.00										
21/07/2023	9.2	176	7.1	0.00										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
22/07/2023	7.8	177	7.1	0.00										
23/07/2023	6.7	177	7.1	0.01										
24/07/2023	8.4	177	7.1	0.00	<5	<1								
25/07/2023	9.2	179	7.1	0.00										
26/07/2023	8.7	159	7.0	0.16										
27/07/2023	9.1	196	7.0	0.00										
28/07/2023	8.6	200	7.0	0.03										
29/07/2023	9.4	203	7.0	0.00										
30/07/2023	9.4	205	7.1	0.00										
31/07/2023	11.6	203	7.0	0.00	<5	<1								
1/08/2023	13.7	138	7.1	0.00										
2/08/2023	14.3	143	7.0	0.00										
3/08/2023	13.6	149	7.1	0.52										
4/08/2023	13.9	152	7.1	0.01										
5/08/2023	14.2	158	7.1	0.00										
6/08/2023	14.1	163	7.0	0.08										
7/08/2023	11.9	165	7.1	0.00	<5	<1	<0.005	<0.0005	0.0012	<0.001	<0.0005	<0.0001	<0.0002	<0.0001
8/08/2023	11.0	170	7.1	0.00										
9/08/2023	12.1	172	6.9	0.00										
10/08/2023	13.6	171	6.9	0.06										
11/08/2023	12.5	170	6.9	0.00										
12/08/2023	14.1	169	7.0	0.00										
13/08/2023	14.1	172	7.1	0.11										
14/08/2023	14.1	172	7.1	0.00	<5	<1								
15/08/2023	13.4	170	7.0	0.00										
16/08/2023	14.2	168	7.0	0.00										
17/08/2023	4.7	164	6.9	0.00										
18/08/2023	3.7	158	7.0	0.00										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
19/08/2023	9.1	152	7.0	0.11										
20/08/2023	9.7	153	7.0	0.09										
21/08/2023	9.0	149	7.1	0.08	<5	<1								
22/08/2023	8.8	153	7.0	0.00										
23/08/2023	3.2	151	7.0	0.00										
24/08/2023	3.8	155	7.2	0.15										
25/08/2023	6.7	155	7.1	0.11										
26/08/2023	3.9	153	7.2	0.08										
27/08/2023	0.0	168	7.2	0.05										
28/08/2023	0.0	167	7.2	0.02										
29/08/2023	4.6	175	7.3	0.01	<5	<1								
30/08/2023	3.3	164	7.3	0.09										
31/08/2023	5.4	167	7.2	0.06										
1/09/2023	7.0	157	7.2	0.04										
2/09/2023	7.4	146	7.2	0.01										
3/09/2023	4.6	166	7.1	0.01										
4/09/2023	1.7	186	7.2	0.01	<5	<1	<0.005	<0.0005	0.0015	0.002	<0.0005	<0.0001	<0.0002	<0.0001
5/09/2023	1.8	140	7.1	0.02										
6/09/2023	3.9	128	7.0	1.03										
7/09/2023	4.6	126	7.0	0.33										
8/09/2023	4.7	129	7.1	0.17										
9/09/2023	4.3	128	7.1	0.05										
10/09/2023	4.3	122	7.1	0.14										
11/09/2023	8.0	115	7.1	0.11	<5	<1								
12/09/2023	8.1	111	7.1	0.18										
13/09/2023	11.0	109	7.1	0.32										
14/09/2023	12.3	107	7.1	0.08										
15/09/2023	10.2	124	7.2	0.17										

Date	Flow (ML)	Electrical Conductivity -Field (µS/cm)	pH (Field) (Unit)	Turbidity (NTU)	Oil & Grease	Total Suspended Solids (mg/L)	Aluminium – Dissolved (mg/L)	Manganese – Dissolved (mg/L)	Nickel – Dissolved (mg/L)	Zinc – Dissolved (mg/L)	Copper – Dissolved (mg/L)	Cadmium – Dissolved (mg/L)	Arsenic – Dissolved (mg/L)	Lead – Dissolved (mg/L)
16/09/2023	8.9	124	7.2	0.01										
17/09/2023	6.9	130	7.3	0.03										
18/09/2023	6.2	138	7.2	0.01	<5	<1								
19/09/2023	7.0	141	7.2	0.01										
20/09/2023	7.9	138	7.1	0.03										
21/09/2023	6.2	184	7.2	0.00										
22/09/2023	4.5	164	7.3	0.00										
23/09/2023	4.8	161	7.3	0.02										
24/09/2023	5.0	162	7.3	0.02										
25/09/2023	4.8	166	7.0	0.00	<5	<1								
26/09/2023	4.5	171	7.2	0.02										
27/09/2023	3.9	179	7.1	0.00										
28/09/2023	3.7	179	7.1	0.13										
29/09/2023	2.3	185	7.2	0.00										

Notes
Days of no discharge have not been included.
**Oil and Grease Sample Missed and reported to DPHI and EPA.*

Table 8: LDP53 Dam 209 Emergency Discharge Quality

Date	Flow (ML)	pH (Field) (Unit)	Total Suspended Solids (mg/L)	Turbidity (NTU)
1/01/2023	27.6	8.0	0	0.9
2/01/2023	27.4	7.1	0	1.0
3/01/2023	27.2	7.9	0	0.8
4/01/2023	27.3	7.7	0	0.9
5/01/2023	27.1	7.9	7	1.8
6/01/2023	27.1	7.8	0	1.0
7/01/2023	26.9	8.2	0	1.4
8/01/2023	26.9	8.1	0	1.1
9/01/2023	27.0	8.1	0	1.0
10/01/2023	27.3	8.1	0	1.3
11/01/2023	27.3	8.0	0	1.6
12/01/2023	27.6	8.0	0	1.4
13/01/2023	27.2	7.6	7	1.6
14/01/2023	24.9	8.1	0	1.5
15/01/2023	26.7	8.2	9	1.5
16/01/2023	26.8	8.0	13	1.4
17/01/2023	26.9	8.1	0	1.9
18/01/2023	26.9	8.0	0	2.3
19/01/2023	5.4	8.1	0	1.7

Table 9: LDP54 Dam 401 Emergency Discharge Quality

Date	Flow (ML)	pH (Field) (Unit)	Total Suspended Solids (mg/L)	Turbidity (NTU)
1/01/2023	18.5	8.0	0	1.3
2/01/2023	18.4	7.8	0	1.0
3/01/2023	18.4	7.9	0	1.0
4/01/2023	18.5	7.8	0	1.1
5/01/2023	18.4	7.8	0	1.0
6/01/2023	18.5	7.7	0	1.3
7/01/2023	18.4	7.9	0	1.2
8/01/2023	18.6	7.8	0	1.0
9/01/2023	18.5	7.8	0	1.0
10/01/2023	18.4	7.8	0	1.2
11/01/2023	18.3	7.5	0	1.5
12/01/2023	18.3	7.5	0	1.6
13/01/2023	18.4	7.3	6	0.8
14/01/2023	17.3	7.5	0	0.9
15/01/2023	15.3	7.6	14	0.9
16/01/2023	17.9	7.4	8	1.3
17/01/2023	17.5	7.5	0	1.2
18/01/2023	17.5	7.5	0	1.8
19/01/2023	0.5	7.4	0	1.6

APPENDIX 3G. GROUNDWATER MONITORING DATA

Sample Point	Date	Electrical Conductivity -Field (µS/cm)	Electrical Conductivity - Lab (µS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	pH (Field) (Unit)	pH Lab (Unit)	Calcium - Dissolved (mg/L)	Magnesium - Dissolved (mg/L)	Sodium - Dissolved (mg/L)	Potassium - Dissolved (mg/L)	Alkalinity Carbonate (mg/L)	Alkalinity Bicarbonate (mg/L)	Chloride (mg/L)	Sulphate - Turbidimetric (mg/L)	Aluminium - Dissolved (mg/L)	Arsenic - Dissolved (mg/L)	Boron - Dissolved (mg/L)	Cobalt - Dissolved (mg/L)	Cadmium - Dissolved (mg/L)	Chromium - Dissolved (mg/L)	Copper - Dissolved (mg/L)	Iron - Dissolved (mg/L)	Lead - Dissolved (mg/L)	Manganese - Dissolved (mg/L)	Mercury - Dissolved (mg/L)	Nickel - Dissolved (mg/L)	Selenium - Dissolved (mg/L)	Silver - Dissolved (mg/L)	Zinc - Dissolved (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Phosphorus - Total (mg/L)	Reactive Phosphorus - Total (mg/L)	Fluoride (mg/L)
PZ003	5/04/2023	2011	1960	1020	12	6.35	6.6	73	87	212	16	<1	442	366	150	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	3.44	<0.001	0.134	<0.0001	<0.001	<0.01	<0.001	<0.005	0.2	0.11	0.06	<0.01	0.7
PZ003	4/10/2023	1925	1970	1090	29	6.68	6.6	79	90	214	16	<1	424	368	174	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	4	<0.001		<0.0001	<0.001	<0.01	<0.001	<0.005	0.32	0.05	0.14	<0.01	0.6
PZ040B	5/04/2023	736	757	398	170	5.35	4.8	3	19	110	3	<1	8	235	21	0.14	<0.001	<0.05	0.008	<0.0001	<0.001	<0.001	<0.05	<0.001	0.046	<0.0001	0.005	<0.01	<0.001	0.034	0.01	0.99	0.04	<0.01	0.2
PZ040B	18/10/2023	1325	1170	724	128	4.47	4.5	5	36	158	4	<1	7	392	30	0.28	<0.001	<0.05	0.015	<0.0001	<0.001	<0.001	<0.05	<0.001	0.103	<0.0001	0.01	<0.01	<0.001	0.07	<0.01	0.5	0.03	<0.01	0.2
PZ044	4/04/2023	2580	2760	2240	24	6.63	6.6	432	82	106	41	<1	428	241	866	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.048	<0.0001	0.002	<0.01	<0.001	0.016	<0.01	0.14	0.03	<0.01	0.3
PZ044	18/10/2023	2864	2820	2400	39	6.61	6.6	398	83	97	41	<1	412	290	848	<0.01	0.006	<0.05	0.004	<0.0001	<0.001	<0.001	6.5	<0.001	0.743	<0.0001	0.003	<0.01	<0.001	<0.005	0.06	<0.01	0.1	<0.01	0.3
PZ055	20/04/2023	2337	2230	1570	32	5.79	5.7	24	81	271	18	<1	68	469	422	<0.01	<0.001	<0.05	0.285	<0.0001	<0.001	<0.001	32.8	<0.001	7.26	<0.0001	0.081	<0.01	<0.001	0.07	1.13	0.02	0.01	<0.01	0.1
PZ055	20/10/2023	2330	2410	1570	28	5.12	5.1	24	96	299	19	<1	16	530	467	0.01	<0.001	<0.05	0.32	0.0001	<0.001	<0.001	0.12	<0.001	8.13	<0.0001	0.091	<0.01	<0.001	0.067	1.94	<0.01	<0.01	<0.01	<0.1
PZ058A	5/04/2023																																		
PZ058A	4/10/2023	10600	10800	8640	619	3.95	3.9	110	437	1630	13	<1	<1	2740	3080	189	0.025	<0.05	1.1	0.0003	0.031	<0.001	20.9	<0.001		0.0003	1.33	0.13	<0.001	1.85	0.02	<0.01	0.88	0.1	0.5
PZ101C	5/04/2023	593	629	328	53	6.9	6.9	34	18	64	10	<1	244	60	3	<0.01	0.002	<0.05	0.002	<0.0001	<0.001	<0.001	0.86	<0.001	0.617	<0.0001	<0.001	<0.01	<0.001	<0.005	0.21	0.03	0.12	<0.01	0.5
PZ101C	12/10/2023	659.1	636	356	235	6.78	6.9	32	17	63	10	<1	232	61	3	<0.01	0.002	<0.05	0.002	<0.0001	<0.001	<0.001	0.83	<0.001	0.554	<0.0001	0.001	<0.01	<0.001	0.009	0.23	0.11	0.14	<0.01	0.6
PZ101B	5/04/2023	724	780	433	68	7.47	7.4	54	21	80	18	<1	371	52	2	<0.01	0.005	<0.05	<0.001	<0.0001	<0.001	<0.001	1.49	<0.001	0.183	<0.0001	0.002	<0.01	<0.001	<0.005	0.56	0.02	0.29	<0.01	1.2
PZ101B	12/10/2023	844	792	429	36	7.29	7.4	51	18	76	16	<1	143	52	<1	<0.01	0.006	<0.05	<0.001	<0.0001	<0.001	<0.001	2.01	<0.001	0.184	<0.0001	0.001	<0.01	<0.001	<0.005	0.76	0.03	0.25	<0.01	0.8
PZ103C	4/04/2023	287	291	226	1570	5.82	5.6	5	9	32	7	<1	42	53	14	<0.01	0.007	<0.05	0.012	<0.0001	<0.001	<0.001	8.35	<0.001	0.412	<0.0001	0.073	<0.01	<0.001	0.036	0.03	0.01	0.89	<0.01	<0.1
PZ103C	12/10/2023	330.1	310	174	1720	5.67	5.6	5	8	32	7	<1	38	58	12	<0.01	0.004	<0.05	0.016	<0.0001	<0.001	<0.001	6.91	<0.001	0.502	<0.0001	0.098	<0.01	<0.001	0.047	0.05	0.02	0.29	<0.01	<0.1
PZ104	5/04/2023																																		
PZ105C	5/04/2023	207.1	219	110	57	7.37	5.9	6	4	28	3	<1	26	52	3	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.012	<0.0001	0.018	<0.01	<0.001	0.027	<0.01	0.17	0.05	<0.01	<0.1
PZ105C	12/10/2023	230.1	223	156	26	6.28	6	5	4	26	3	<1	30	48	3	<0.01	<0.001	<0.05	0.013	<0.0001	<0.001	<0.001	<0.05	<0.001	0.621	<0.0001	0.048	<0.01	<0.001	0.032	0.03	0.07	<0.01	<0.01	<0.1
PZ106A	3/04/2023	768	782	398	33	7.49	8	32	3	107	18	<1	82	197	12	0.16	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.003	<0.0001	<0.001	<0.01	<0.001	<0.005	<0.01	0.96	0.04	0.02	0.1
PZ106A	31/10/2023	808.2	819	440	14	7.72	8.1	31	3	102	17	<1	86	186	11	0.18	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.002	<0.0001	<0.001	<0.01	<0.001	<0.005	0.02	0.93	0.03	0.02	0.2
PZ109	5/04/2023	680	694	347	7	6.7	6.9	35	33	60	3	<1	238	85	16	<0.01	<0.001	<0.05	<0.001	<0.0001	0.001	<0.001	<0.05	<0.001	0.001	<0.0001	0.002	<0.01	<0.001	0.011	0.04	0.26	<0.01	0.01	0.2
PZ109	12/10/2023	788.6	755	376	16	6.66	6.8	33	29	59	3	<1	225	114	18	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.011	<0.0001	0.002	<0.01	<0.001	0.018	0.03	0.28	0.07	0.01	0.2
PZ111	20/04/2023	1163	1090	692	859	6.94	7.1	96	39	46	22	<1	227	230	29	<0.01	<0.001	<0.05	0.002	<0.0001	<0.001	<0.001	<0.05	<0.001	0.116	<0.0001	0.004	<0.01	<0.001	<0.005	0.43	0.1	0.24	<0.01	0.4
PZ111	20/10/2023	1112	1120	684	149	6.86	7	96	42	49	24	<1	242	229	23	0.03	<0.001	<0.05	0.001	<0.0001	<0.001	<0.001	0.1	<0.001	0.058	<0.0001	0.003	<0.01	<0.001	0.006	0.45	0.07	0.16	<0.01	0.4
PZ112B	20/04/2023	2306	2180	1400	<5	5.55	5.4	2	24	403	10	<1	10	499	349	0.11	<0.001	<0.05	0.021	0.0002	<0.001	<0.001	<0.05	<0.001	0.051	<0.0001	0.055	<0.01	<0.001	0.084	<0.01	3.65	0.02	0.01	0.1
PZ112B	19/10/2023	2063	2010	1100	16	5.22	5.2	4	22	363	8	<1	5	440	318	0.46	<0.001	<0.05	0.02	0.0002	<0.001	<0.001	0.52	<0.001	0.072	<0.0001	0.048	<0.01	<0.001	0.119	0.03	1.96	<0.01	<0.01	0.1
PZ137	3/04/2023	1710	1800	972	42	5.74	5.7	60	60	187	34	<1	32	474	46	<0.01	<0.001	<0.05	0.002	<0.0001	<0.001	<0.001	8.93	<0.001	0.695	<0.0001	0.006	<0.01	<0.001	0.024	0.17	0.25	<0.01	<0.01	<0.1
PZ137	31/10/2023	1339	1390	866	14	5.24	5.3	42	38	138	30	<1	6	397	47	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.32	<0.0001	0.006	<0.01	<0.001	0.026	0.02	0.09	0.03	<0.01	<0.1
PZ170	6/04/2023	2242	2230	1480	15	6.29	6.3	55	111	218	9	<1	236	596	20	0.96	<0.001	<0.05	0.04	0.0009	<0.001	0.018	0.34	<0.001	0.214	<0.0001	0.093	<0.01	<0.001	0.154	0.01	<0.01	0.02	0.01	0.2
PZ170	18/10/2023	1881	1730	1100	8	6.27	6.2	44	83	142	10	<1	218	491	13	<0.01	0.001	<0.05	0.01	<0.0001	<0.001	<0.001	<0.05	<0.001	0.049	<0.0001	0.072	<0.01	<0.001	0.107	0.06	0.01	0.06	<0.01	0.2
PZ184	20/04/2023																																		
PZ184	19/10/2023																																		
PZ188	6/04/2023	185.4	208	110	7	5.1	5.2	<1	4	33	<1	<1	10	52	2	0.28	<0.001	<0.05	0.009	0.0002	<0.001	0.006	0.12	<0.001	0.034	0.0002	0.017	<0.01	<0.001	0.038	<0.01	0.02	0.07	<0.01	<0.1
PZ188	18/10/2023	260.4	230	154	34	5.03	5.2	<1	4	30	<1	<1	9	59	<1	<0.01	<0.001	<0.05	0.005	<0.0001	<0.001	<0.001	<0.05	<0.001	0.022	0.0002	0.016	<0.01	<0.001	0.013	0.05	0.02	0.03	<0.01	<0.1

Sample Point	Date	Electrical Conductivity -Field (µS/cm)	Electrical Conductivity - Lab (µS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	pH (Field) (Unit)	pH Lab (Unit)	Calcium - Dissolved (mg/L)	Magnesium - Dissolved (mg/L)	Sodium - Dissolved (mg/L)	Potassium - Dissolved (mg/L)	Alkalinity Carbonate (mg/L)	Alkalinity Bicarbonate (mg/L)	Chloride (mg/L)	Sulphate - Turbidimetric (mg/L)	Aluminium - Dissolved (mg/L)	Arsenic - Dissolved (mg/L)	Boron - Dissolved (mg/L)	Cobalt - Dissolved (mg/L)	Cadmium - Dissolved (mg/L)	Chromium - Dissolved (mg/L)	Copper - Dissolved (mg/L)	Iron - Dissolved (mg/L)	Lead - Dissolved (mg/L)	Manganese - Dissolved (mg/L)	Mercury - Dissolved (mg/L)	Nickel - Dissolved (mg/L)	Selenium - Dissolved (mg/L)	Silver - Dissolved (mg/L)	Zinc - Dissolved (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Phosphorus - Total (mg/L)	Reactive Phosphorus - Total (mg/L)	Fluoride (mg/L)
PZ189	6/04/2023	453	448	338	52	6.02	5.6	14	13	46	6	<1	27	119	7	0.15	<0.001	<0.05	0.002	0.0002	<0.001	0.002	18.3	<0.001	0.498	<0.0001	0.003	<0.01	<0.001	0.14	0.03	0.05	0.12	<0.01	0.1
PZ189	18/10/2023	553.3	520	356	21	5.84	6	15	13	43	6	<1	32	140	8	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	15.8	<0.001	0.476	<0.0001	0.001	<0.01	<0.001	0.042	0.1	0.02	0.1	<0.01	0.2
PZ191	3/04/2023	1679	2170	997	3200	6.31	6.2	31	58	225	13	<1	173	106	500	0.06	<0.001	<0.05	0.023	0.002	<0.001	<0.001	8.93	<0.001	2.21	<0.0001	0.098	<0.01	<0.001	0.571	0.67	0.02	3.06	<0.01	0.6
PZ191	19/10/2023	1897	1780	1330	5150	6.68	7	44	56	256	17	<1	243	107	551	0.07	0.001	<0.05	0.014	<0.0001	<0.001	<0.001	10.9	<0.001	1.73	<0.0001	0.051	<0.01	<0.001	0.106	0.4	0.03	6.46	<0.01	0.6
PZ203	20/04/2023	429.6	380	238	32	5.28	5.2	4	7	55	1	<1	9	110	15	0.02	<0.001	<0.05	0.056	<0.0001	<0.001	<0.001	<0.05	<0.001	0.284	<0.0001	0.051	<0.01	<0.001	0.04	0.01	0.11	0.03	0.01	<0.1
PZ203	20/10/2023	360.8	369	202	42	5.85	5.8	3	5	57	<1	<1	6	106	13	<0.01	<0.001	<0.05	0.011	<0.0001	<0.001	<0.001	<0.05	<0.001	0.021	<0.0001	0.033	<0.01	<0.001	0.041	0.01	0.14	0.05	<0.01	<0.1
PZ211	5/04/2023																																		
PZ211	18/10/2023																																		
PZ213	5/04/2023	201.4	197	117	36	5.37	5.2	4	4	25	1	<1	13	46	4	0.04	<0.001	<0.05	0.011	<0.0001	<0.001	<0.001	2.98	<0.001	0.189	<0.0001	0.014	<0.01	<0.001	0.024	0.03	0.02	0.2	<0.01	<0.1
PZ213	18/10/2023	214.6	170	134	46	5.46	5.4	3	4	19	1	<1	13	40	5	<0.01	<0.001	<0.05	0.009	<0.0001	<0.001	<0.001	2.71	<0.001	0.156	<0.0001	0.011	<0.01	<0.001	0.013	0.03	<0.01	0.07	<0.01	<0.1
PZ214	5/04/2023	171.5	193	100	154	5.74	6	5	5	23	1	<1	37	32	2	0.04	<0.001	<0.05	0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.005	<0.0001	0.005	<0.01	<0.001	0.013	<0.01	1.65	0.44	0.24	<0.1
PZ214	18/10/2023	230.8	218	147	366	5.61	5.7	6	7	23	2	<1	36	40	2	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	<0.001	<0.0001	0.006	<0.01	<0.001	<0.005	0.03	1.6	0.04	<0.01	<0.1
PZ217	5/04/2023	3000	3100	1850	18	7.02	7.1	73	115	431	14	<1	395	703	356	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	<0.001	<0.0001	0.001	<0.01	<0.001	0.007	<0.01	2.77	0.18	0.01	0.8
PZ217	4/10/2023	3310	3330	2290	152	7.12	7.2	90	128	465	15	<1	408	818	433	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001		<0.0001	0.001	<0.01	<0.001	0.006	0.02	2.45	0.16	0.01	0.6
PZ221	5/04/2023	1344	1290	664	32	6.23	6.5	35	53	162	12	<1	317	223	62	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	1.31	<0.001	0.151	<0.0001	<0.001	<0.01	<0.001	0.007	0.05	0.07	0.14	<0.01	0.7
PZ221	4/10/2023	1371	1320	725	26	6.5	6.4	40	54	163	13	<1	299	247	75	0.02	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	3.04	<0.001		<0.0001	<0.001	<0.01	<0.001	0.022	0.15	0.03	0.11	<0.01	0.6
PZ236A	5/04/2023	289	319	174	146	8.62	8.5	32	5	22	2	35	50	42	13	<0.01	<0.001	<0.05	<0.001	<0.0001	0.019	<0.001	<0.05	<0.001	0.006	<0.0001	0.007	<0.01	<0.001	<0.005	0.07	0.2	0.04	<0.01	0.1
PZ236A	12/10/2023	1077	1110	345	632	11.58	11.6	90	<1	23	4	217	84	45	16	0.2	0.002	<0.05	<0.001	<0.0001	0.033	<0.001	<0.05	<0.001	<0.001	<0.0001	<0.001	<0.01	<0.001	<0.005	0.14	0.22	<0.01	<0.01	0.2
PZ235C	12/10/2023	775	768	462	219	6.68	6.9	79	19	42	10	<1	267	48	79	0.05	0.009	<0.05	0.054	<0.0001	<0.001	<0.001	3.5	<0.001	1.89	<0.0001	0.311	<0.01	<0.001	0.054	0.04	0.01	<0.01	0.01	0.1
PZ235A	5/04/2023	3350	3320	813	125	12.24	11.1	270	<1	46	26	25	<1	30	4	2.12	<0.001	<0.05	<0.001	<0.0001	0.027	0.005	<0.05	<0.001	<0.001	<0.0001	0.004	<0.01	<0.001	<0.005	0.28	<0.01	0.05	<0.01	0.3

Gaps in data indicate that no result is available, or bore is dry

BORE	PZ102C – 28m	PZ102C – 64m	PZ103D – 31m	PZ103D – 55m	PZ103D – 85m	PZ105A – 28m	PZ105A – 80m	PZ105A – 118m	PZ105A – 130m	PZ127 - 43m	PZ127 - 68m	PZ128 - 20m	PZ128 - 36m	PZ128 - 55m
Jan-23	382.49	347.08	397.07	370.62	347.59	376.91	360.49	338.78	331.82	448.9	424.26	388.66	373.97	367.5
Feb-23	382.47	346.74	396.9	370.6	347.55	376.91	360.22	338.59	331.59	448.84	424.2	388.61	373.94	367.43
Mar-23	382.41	346.47	396.76	370.55	347.54	376.92	360.04	338.4	331.14	448.78	424.03	388.63	373.93	367.42
Apr-23	382.33	346.08	396.66	370.49	347.49	376.94	359.86	338.13	330.65	448.72	423.91	388.61	373.92	367.35
May-23	382.28	345.82	396.58	370.45	347.13	376.98	359.49	337.96	330.31	448.78	424.14	388.64	373.94	367.25
Jun-23	382.2	345.47	396.52	370.39	347.3	376.96	359.28	337.67	329.89	448.72	424.08	388.71	373.95	367.29
Jul-23	382.14	345.09	396.61	370.31	346.93	377	358.95	337.43	329.46	449.24	423.97	388.68	373.94	367.43
Aug-23	382.01	344.66	396.7	370.23	346.81	377.05	358.7	337.16	329.06	449.01	423.91	388.72	373.96	367.55
Sep-23	381.92	345.44	396.64	370.13	346.48	377.1	358.06	336.79	328.23	449.07	423.85	388.66	373.95	367.59
Oct-23	381.85	345.77	396.69	370.06	346.27	377.08	358.01	336.78	328.19	448.95		388.61	373.93	367.62
Nov-23	381.77	345.69	396.67	369.99	346.2	377.08	357.59	336.45	327.54	448.72	423.79	388.35	373.9	367.59
Dec-23	381.71	345.6	396.61	369.85	346.1	377.06	357.2	336.22	327.09	448.72	423.79	388.5	373.85	367.49
Min	381.71	344.66	396.52	369.85	346.1	376.91	357.2	336.22	327.09	448.72	423.79	388.35	373.85	367.25
Max	382.49	347.08	397.07	370.62	347.59	377.1	360.49	338.78	331.82	449.24	424.26	388.72	373.97	367.62

BORE	PZ129 - 35m	PZ129 - 53m	PZ129 - 74m	PZ130 - 38.5m	PZ130 - 64m	PZ179 - 28m	PZ179 - 33m	PZ179 - 145m	PZ186a – 13.5m	PZ186 – 40m	PZ186 – 65m	PZ186 – 86m	PZ186 – 118m	PZ192-68m
Jan-23	389.95	383.66	364.9	496.97	470.62	418.41	417.89	320.53	405.91	386.32	369.37	365.42	325.33	400.68
Feb-23	389.93	383.39	364.85	496.54	470.58	418.46	417.88	320.55	405.93	386.33	370.88	365.41	325.15	400.41
Mar-23	389.91	383.44	364.81	496.3	470.62	418.43	417.85	320.26	405.96	386.35	371.9	365.4	324.9	402.32
Apr-23	389.89	383.34	364.77	496.06	470.7	418.41	417.85	320.15	405.96	386.43	372.91	365.53	324.54	402.4
May-23	389.9	383.53	364.74	495.82	470.69	418.44	417.83	319.92	405.97	386.47	372.79	365.57	324.29	402.16
Jun-23	389.9	383.73	364.71	495.75	470.75	418.43	417.83	319.8	405.97	386.49	372.86	365.61	324.12	401.93
Jul-23	389.91	383.68	364.67	495.61	470.72	418.41	417.75	319.74	405.93	386.62	372.93	365.74	323.85	401.74
Aug-23	389.92	383.62	364.62	495.65	470.86	418.41	417.75	319.63	405.93	386.63	372.85	365.75	323.47	401.63
Sep-23	389.93	383.41	364.6	495.39	470.7	418.44	417.72	319.46	405.89	386.63	373.39	365.67	323.06	401.18

BORE	PZ129 - 35m	PZ129 - 53m	PZ129 - 74m	PZ130 - 38.5m	PZ130 - 64m	PZ179 - 28m	PZ179 - 33m	PZ179 - 145m	PZ186a – 13.5m	PZ186 – 40m	PZ186 – 65m	PZ186 – 86m	PZ186 – 118m	PZ192-68m
Oct-23	389.95	383.34	364.58	495.32	470.69	418.41	417.67	319.5	405.87	386.6	373.34	365.63	322.88	400.92
Nov-23	389.97	383.34	364.55	495.39	470.74	418.41	417.63	319.28	405.83	386.67	373.17	365.64	322.7	400.67
Dec-23	389.97	383.28	364.52	495.2	470.72	418.35	417.58	319.23	405.8	386.67	372.96	365.58	322.49	400.38
Min	389.89	383.28	364.52	495.2	470.58	418.35	417.58	319.23	405.8	386.32	369.37	365.4	322.49	400.38
Max	389.97	383.73	364.9	496.97	470.86	418.46	417.89	320.55	405.97	386.67	373.39	365.75	325.33	402.4

BORE	PZ192-166m	PZ192-178m	PZ193 - 80m	PZ193 - 162m	PZ193 - 184m	PZ194 - 78m	PZ194 - 173m	PZ194 - 196m	PZ195 - 72m	PZ195 - 162m	PZ195 - 175m	PZ229 - 84m	PZ229 - 140m
Jan-23	322.72	314.48	415.6	336.18	310.56	415.07	326.68	292.84	410.4	336.81	279.5	427.77	388.74
Feb-23	322.52	314.63	415.48	336.05	310.32	414.79	326.14	292.76	410.21	336.87	279.17	427.88	388.72
Mar-23	320.15	313.8	415.47	335.98	310.06	414.59	325.76	292.73	410.02	327.74	281.63	427.89	388.71
Apr-23	319.44	313.57	414.48	334.81	309.76	413.01	324.95	292.8	401.81	308.83	267.1	473.17	456.47
May-23	318.7	313.15	413.89	333.12	309.44	412.71	324.23	292.78	401.8	309.06	267.05	472.93	456.47
Jun-23	318.23	312.9	413.5	332.98	309.2	412.59	324.58	292.73	401.79	309.99	267.18	472.72	456.47
Jul-23	317.79	312.6	413.32	332.83	308.92	412.46	324.2	292.61	401.76	311.31	268.35	472.66	456.45
Aug-23	317.44	312.27	413.17	332.8	308.65	412.38	323.84	292.59	401.73	310.69	268.68	472.49	456.45
Sep-23	316.66	312.27	411.05	321.07	308.27	408.47	326.63	293.74	400.24	309.77	267.83	428.84	388.73
Oct-23	315.83	311.67	410.17	320.86	307.72	407.64	324.87	292.58	400.23	309.7	267.97	428.95	388.69
Nov-23	315.08	311.3	409.76	320.71	306.96	407.14	324.97	292.17	400.19	309.92	268.09	429.04	388.7
Dec-23	314.92	311.22	409.52	320.69	306.72	406.87	324.31	291.98	400.09	310.57	268.22	429.1	388.66
Min	314.92	311.22	409.52	320.69	306.72	406.87	323.84	291.98	400.09	308.83	267.05	427.77	388.66
Max	322.72	314.63	415.6	336.18	310.56	415.07	326.68	293.74	410.4	336.87	281.63	473.17	456.47

BORE	PZ229 - 198m	PZ229 - 253m	PZ229 - 319m	PZ232 – 45m	PZ232 – 75m	PZ232 – 96m	PZ232 – 132m	PZ235B – 68m	PZ235B – 96m	PZ235B – 147m	PZ236B – 85m	PZ236B – 110m	PZ236B – 157m
Jan-23	385.52	378.63	376.62	442.55	415.81	408.38	363.75	376.14	354.26	316.55			
Feb-23	385.49	378.5	376.73	442.52	415.5	407.89	363.69	375.97	354.31	316.37			
Mar-23	385.49	378.41	376.52	442.52	415.26	407.53	363.57	375.97	354.24	316.03			
Apr-23	401.7	353.87	289.46	442.52	413.19	403.03	359.74	375.99	354.11	315.57	371.82	357.25	316.65
May-23	401.7	353.97	289.32	442.52	412.45	401.75	358.32	376.08	353.47	314.91	371.81	357.41	316.46
Jun-23	401.71	354.06	289.74	442.56	412.06	400.47	356.98	376.15	353.05	314.6	371.86	357.52	314.86
Jul-23	401.71	353.95	289.46	442.56	411.78	400.22	356.69	376.18	352.32	314.07	371.85	356.38	314.84
Aug-23	401.7	353.71	289.23	442.6	411.54	400.4	356.83	376.36	351.86	313.44	371.85	356.4	314.57
Sep-23	385.46	378.63	376.98	442.6	409.72	398.91	352.75	376.33	351.02	312.73	371.69	355.88	314.7
Oct-23	385.44	378.79	376.68	442.51	409.35	394.22	352.48	376.4	349.94	311.93	371.58	355.73	315.07
Nov-23	385.45	378.97	376.68	442.48	409.33	392.3	352.15	376.46	349.21	311.22	371.53	355.7	315.43
Dec-23	385.42	379.07	376.76	442.46	409.25	391.68	351.95	376.47	348.52	310.66	371.2	355.46	314.98
Min	385.42	353.71	289.23	442.46	409.25	391.68	351.95	375.97	348.52	310.66	371.2	355.46	314.57
Max	401.71	379.07	376.98	442.6	415.81	408.38	363.75	376.47	354.31	316.55	371.86	357.52	316.65

BORE	PZ003	PZ40B	PZ44	PZ55	PZ58A	PZ101C	PZ101B	PZ103C	PZ104	PZ105C	PZ106A	PZ109	PZ111
Jan-23	474.0	406.7	482.5	424.1	467.5	379.8	357	397.7		375.4		382.2	363
Feb-23	474.0	406.2	481.9	424.1	467.6	379.8	357	397.6		375.5		382.2	362.2
Mar-23	473.9	402.5	481.5	424.1	467.6	379.8	356.9	397.4		375.5	426.3	382.1	361.8
Apr-23	473.7	402.7	481	424.1	467.7	379.7	356.7	397.2		375.4	426.4	382.1	361.2
May-23	473.5	402.1	480.5	424.1	467.7	379.7	356.5	397.0		375.3	425.7	382.1	361.2
Jun-23	473.5	400.5	480.1	424.1	467.7	379.8	356.2	396.9		375.3	425.8	382.1	360.9
Jul-23	473.3	398.7	479.8	424.0	467.7	379.7	356	397.0		375.2	426.1	382.1	360.4
Aug-23	473.3	398.8	479.8	424.0	467.6	379.7	355.7	397.0		375.2	426.2	382	359.8
Sep-23	473.0	397.4	479.7	424.0	467.8	379.7	355.4	397.0		375.1	426.2	382	361.2

BORE	PZ003	PZ40B	PZ44	PZ55	PZ58A	PZ101C	PZ101B	PZ103C	PZ104	PZ105C	PZ106A	PZ109	PZ111
Oct-23	472.9	395.7	479.4	423.9	467.8	379.7	355.1	397.1		375	426.4	382.1	358.4
Nov-23	472.8		479.3	423.8	467.8	379.7	354.8	397.0		375	425.6	382.1	358.2
Dec-23	473.0		479.3	423.8	467.7	379.7	354.5	397.0		375	425.9	382.0	357.9
Min	472.8	395.7	479.3	423.8	467.5	379.7	354.5	396.9		375	425.6	382	357.9
Max	474	406.7	482.5	424.1	467.8	379.8	357	397.7		375.5	426.4	382.2	363

Note
**Gaps in data indicate that no result is available, data determined to be anomalous, bore is dry or not yet commissioned.*

BORE	PZ112B	PZ137	PZ170	PZ184	PZ188	PZ189	PZ191	PZ194B	PZ194C	PZ195B	PZ195C	PZ203
Jan-23	483.7				411.3	388.6	348.8	415.6	412.8	413.0	402.5	403.0
Feb-23	483.7		425.1		411.3	388.6	348.1	415.3	412.7	412.8	402.3	402.9
Mar-23	483.5	461.6	424.1		411.2	388.6	348.1	413.7	412.8	411.3	384.8	402.8
Apr-23	483.2	461.3	423.5		411.1	388.6	347.6	412.8	411.7	410.9	385.1	402.7
May-23	483	461.2	422.9		411	388.6	347.4	412.1	410.9	410.4	385.2	402.6
Jun-23	483	460.9	422.6		410.9	388.6	347.4	411.9	410.4	410.2	385.4	402.6
Jul-23	482.7	460.6	422.3		410.8	388.6	347.2	411.7	412.8	409.4	385.5	402.5
Aug-23	482.8	460.6	422.2		410.7	388.6	347.2	408.5	410.5	407.9	385.6	402.6
Sep-23	482.6	460.5	422.1		410.7	388.5	347.2	406.3	405.2	407.4	385.3	402.4
Oct-23	482.5	460.5	421.9		410.6	388.5	347.2	406.8	403.9	406.7	385.5	402.4
Nov-23	482.5	460.7	421.7		410.5	388.5	347.2	406.7	403	406.5	385.6	402.3
Dec-23	482.4	460.7	421.7		410.5	388.5	347.2	406.6	402.6	406.4	385.7	402.3
Min	482.4	460.5	421.7	0	410.5	388.5	347.2	406.3	402.6	406.4	384.8	402.3
Max	483.7	461.6	425.1	0	411.3	388.6	348.8	415.6	412.8	413	402.5	403

Note
**Gaps in data indicate that no result is available, data determined to be anomalous, bore is dry or not yet commissioned.*

BORE	PZ211	PZ213	PZ214	PZ217	PZ221	PZ236A	PZ237A	PZ237B	PZ237C	PZ234A	PZ234B	PZ234C
Jan-23		410.2	410.8	493.2	472.8							
Feb-23		410.1	410.7	492.9	472.9							
Mar-23		410.0	410.6	492.4	472.9	389.3						
Apr-23		410.0	410.6	492.00	472.7	391.9						
May-23		409.9	410.5	491.7	472.6	389.2						
Jun-23		409.7	410.4	491.5	472.6	388.1						
Jul-23		409.6	410.3	491.3	472.6	388.0						
Aug-23		409.5	410.5	491.2	472.6	387.9						
Sep-23		409.4	410.2	491	472.3	388.0						
Oct-23		409.4	410.2	490.8	472.2	388.3						
Nov-23		409.4	410.1	490.7	472.3	388						
Dec-23		409.3	410.00	490.6	472.4	396.3	383.2	382.2	361.8	383.2	382.2	361.8
Min		409.3	410.00	490.6	472.2	387.9	383.2	382.2	361.8	383.2	382.2	361.8
Max		410.2	410.8	493.2	472.9	396.3	383.2	382.2	361.8	383.2	382.2	361.8

Note
**Gaps in data indicate that no result is available, data determined to be anomalous, bore is dry or not yet commissioned.*

GROUNDWATER LEVEL GRAPHS

Figure 3-g: Ulan Granite Composite Hydrograph

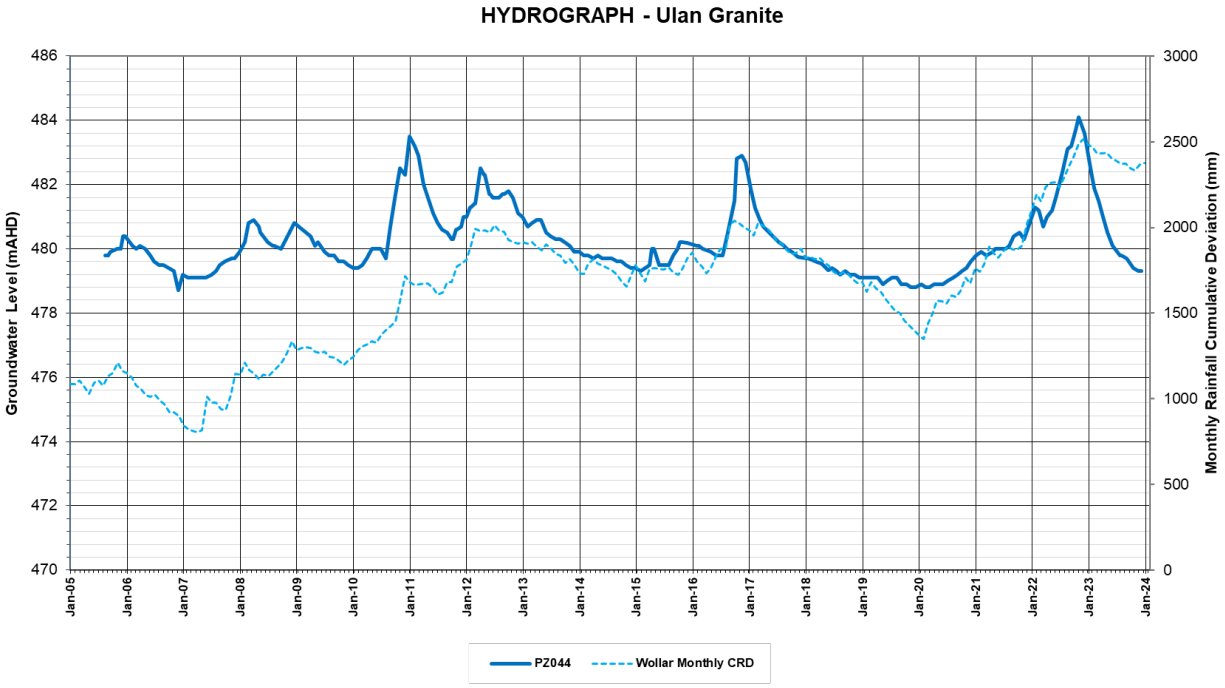


Figure 3-h: Marrangaroo and Ulan Seam Composite Hydrograph

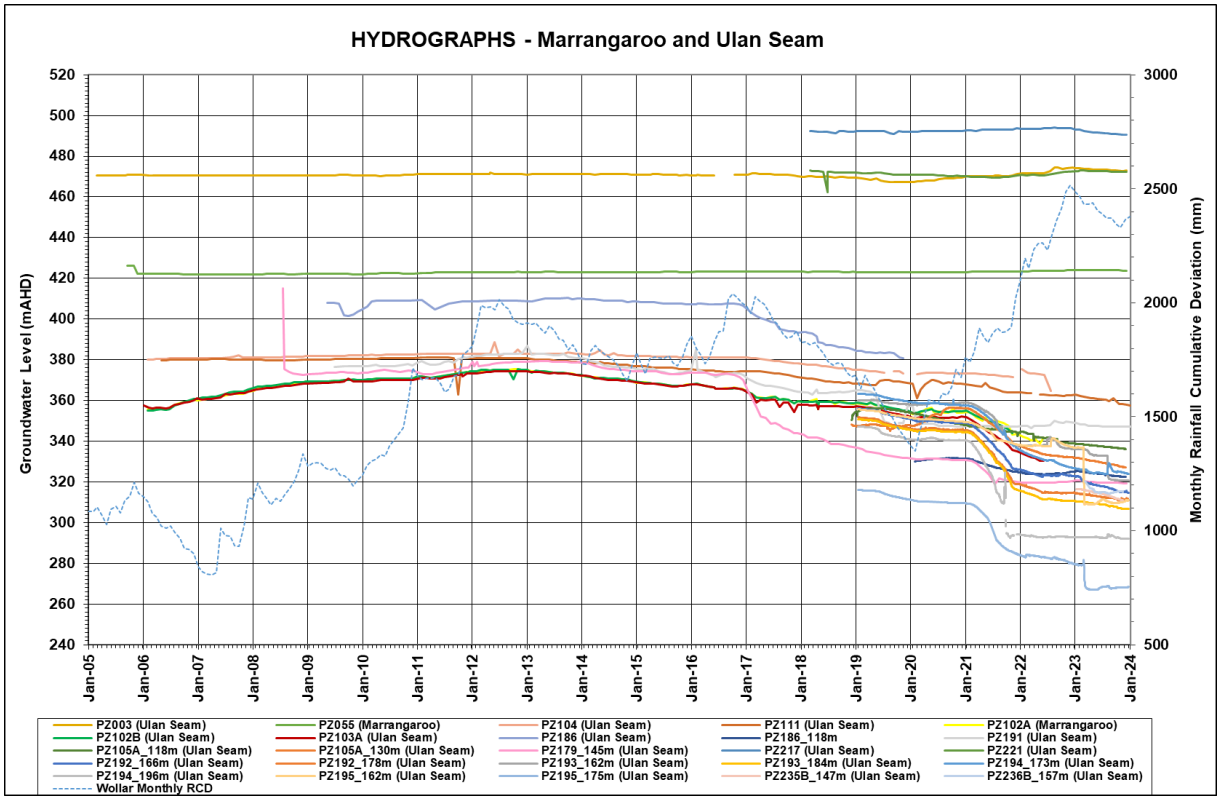


Figure 3-i: Permian Overburden Composite Hydrograph

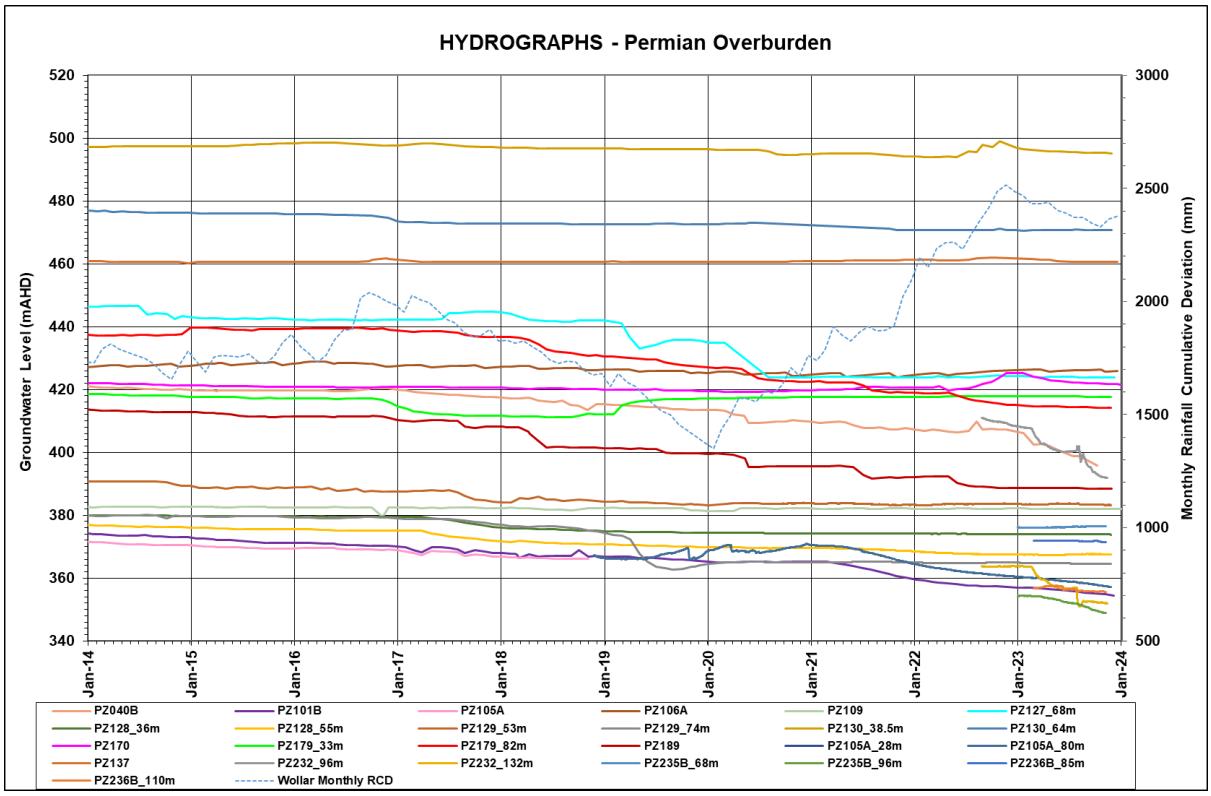


Figure 3-j: Triassic Composite Hydrograph

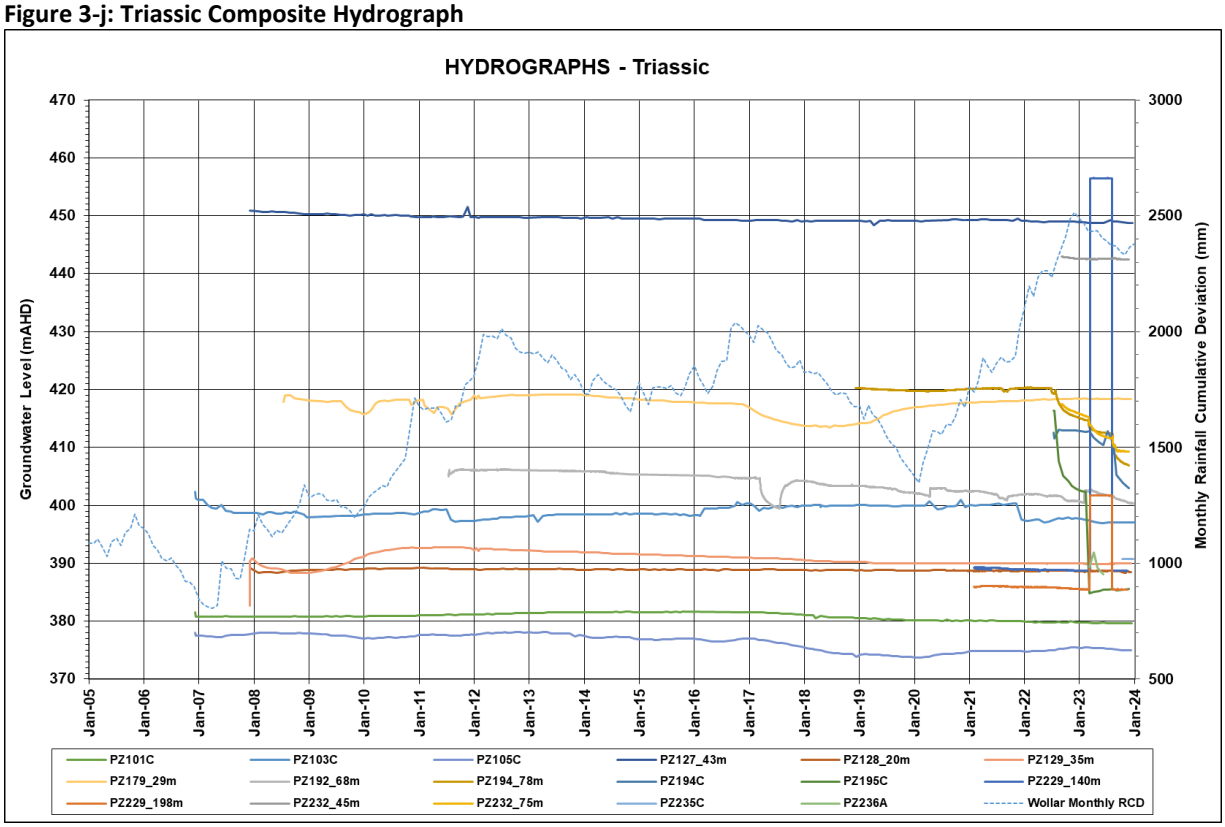
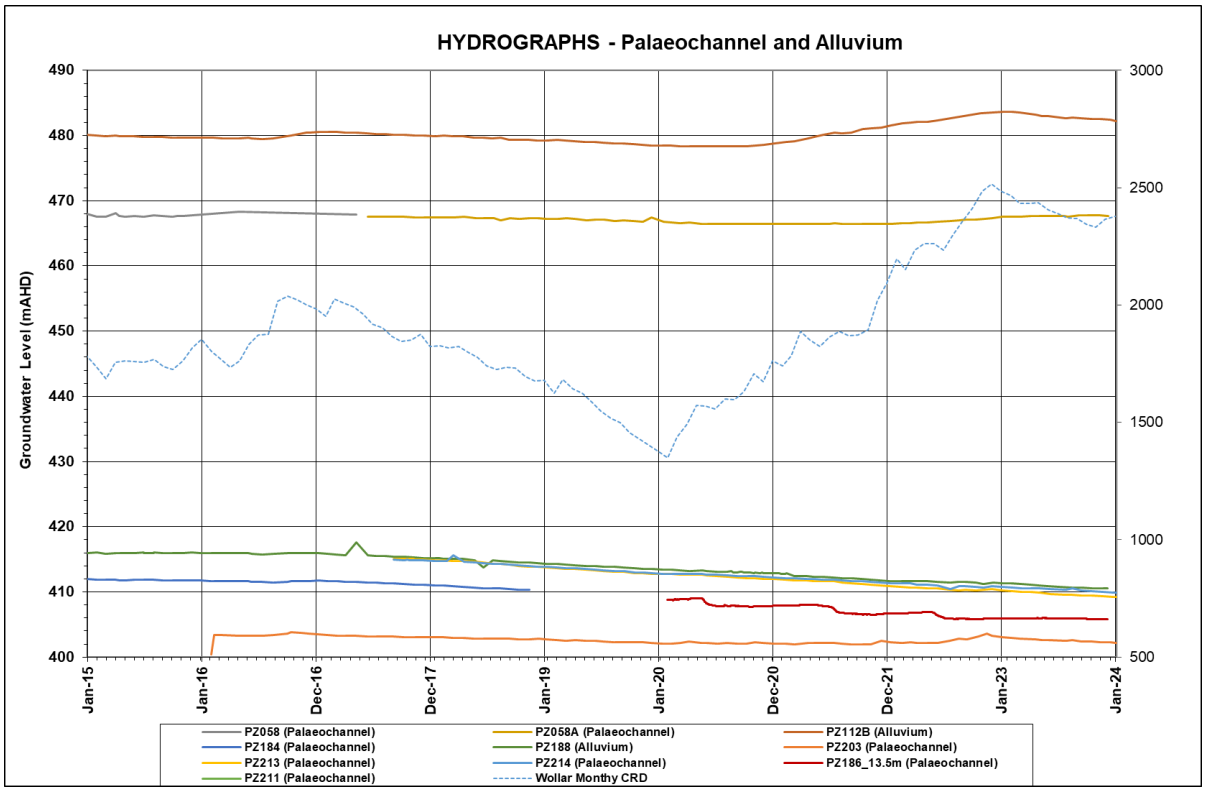


Figure 3-k Alluvium Composite Hydrograph



APPENDIX 4. COMMUNITY COMPLAINTS SUMMARY 2023

Date	Type	Location	Complaint Description
11/1/2023	Noise	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable noise levels. No actions required.
26/1/2023	Noise	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. Operational changes were made. Complainant not contacted upon their request.
29/1/2023	Other	Ulan	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable water release data. No actions required.
11/2/2023	Other	withheld	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable dust levels. No actions required. Complainant contacted to advise of investigation, results and actions.
11/2/2023	Blasting (V/O)	Wollar	Investigation revealed no unusual mining operations were occurring at the time. No actions required. Complainant advised of investigation, results and actions.
5/3/2023	Lighting	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. Operational changes were made. Complainant advised of investigation, results and actions.
7/3/2023	Lighting	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. Operational changes were made. Complainant advised of investigation, results and actions.
22/3/2023	Lighting	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. Operational changes were made. Complainant advised of investigation, results and actions.
26/3/2023	Noise	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable noise levels. No actions required.
3/4/2023	Air (Dust)	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. No actions required. Complainant advised of investigation, results and actions.
6/4/2023	Noise	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable noise levels. No actions required.
6/5/2023	Blasting (V/O)	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. No actions required. Complainant advised of investigation, results and actions.
14/6/2023	Other	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. No actions required.
19/7/2023	Blasting (V/O)	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable blast levels. No actions required.
27/9/2023	Other	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. No actions required.
29/9/2023	Blasting (V/O)	Cooks Gap	Investigation revealed no unusual mining operations were occurring at the time. Monitoring results indicated acceptable blast levels. No actions required.
7/3/2023	Lighting	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. Operational changes were made. Complainant advised of investigation, results and actions.
18/11/2023	Air (Dust)	Ulan Road	Investigation revealed no unusual mining operations were occurring at the time. No actions required

APPENDIX 5. COMMUNITY CONTRIBUTIONS

Beneficiary	Project/Event
The Business Concierge Ltd	2023 Survivor Life Skills Program
Mudgee Touch Association	Equipment Upgrades
Merriwa Can Assist	Community Family Day fundraiser
Sculptures in the Garden	2023 Sculptures in the Garden
Mudgee Mountain Bike Club	Skills Training
Macquarie Homestay	Organisational support
Educar Foundation	2023 Max Potential Program
Mudgee Rotary Club	2023 Christmas Carols
Gulgong Arts Council	UneARThed Art & Sculpture exhibition
Gulgong Arts Council	Gulgong Scarecrow Stroll
Gowrie Childcare centre	Outdoor Garden Upgrade
Gulgong Chamber of Commerce	Sponsorship of the Gulgong Gossip
Mudgee Rescue Squad	Phone Boosters
Cudgegong Cruisers	2023 Can Cruise
Gulgong Show Society	2023 Gulgong Show
Mudgee Show Society	2023 Mudgee Show
Kandos Museum	Security System
Cudgegong Valley Antique Machinery Club	Building restoration
Mudgee Aero Club	2023 Wings, Wheels & Wine
Mudgee Tri Club	2023 Mudgee Running Festival
Cooyal Park Reserve	Park fence maintenance
Business Mudgee	Cudgegong Defib Project
Mudgee Can Assist	Patient Support
Mid-Western Regional Council	2023 Mid-Western Regional Senior Festival
Gulgong Hospital	Equipment Upgrades
NorthWest Falcons Football Club	Falcons Development project
Gulgong Show Society	2023 Youth Ambassador Development program
Gulgong Holtermann Museum	Display Cases
Mudgee Lions Club	2023 Community Festival and Market
Gulgong Amateur Swimming Club	Shade sails and swimming equipment
Rylstone Show Society	2023 Rylstone Show
Rylstone Show Society	2023 Bull-a-rama
Lifeskills Plus	Supported Independent Living (LSL)
Mudgee Community Pre-School	Community Wellbeing
Gulgong & District Folk Club	2023 Gulgong Folk Festival
St Matthews Catholic School	School Vegetable Gardens
Mudgee District Kennel & Obedience Club	Obedience and scent workshops
Westpac Rescue Helicopter	Charity Golf Day
Mudgee Bowling Club	Bowls Tournament - Sponsorship
Gulgong and District Avicultural Society	Annual Bird Show
Dunedoo Sports Club	Tunes on the Turf
Henry Lawson Society Gulgong	Henry Lawson Festival
Watershed Landcare Group Inc	Green Day 2023
Cassilis Bowling Club	Cassilis Camping, Campfires and Country Music Festival
Business Mudgee	Magnificent Mudgee Business Awards