



1 April – 30 June 2023

Environmental Monitoring Results Summary

Name of Mine	Northparkes Mines
Name of Leaseholder and Mine Operator	CMOC Mining Pty Ltd
Mining Leases	ML1247, ML1367, ML1641 AND ML1743
Environment Protection Licence	EPL 4784
Development Consent	DC11_0060 (as modified)

Reviewed by	Chris Higgins
Title	Superintendent – Environment & Farms
Date	
Signature	
Approved by	Stacey Kelly
Title	Manager – People, Safety & Environment
Date	
Signature	

1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 April to 30 April 2023. This monitoring is undertaken in accordance with the Environmental Monitoring Program (available at www.northparkes.com.au). Details of air quality, noise, water and vibration monitoring locations are available in the Environmental Monitoring Program. Refer to appendix A for all monitoring location maps.

2. AIR QUALITY

During the quarter the air quality monitoring program utilised PM₁₀ (beta attenuated monitors). Monitoring locations are strategically positioned around the mine lease and neighbouring properties. PM₁₀ monitoring is undertaken at three nearby farm residences Hubberstone, Milpose and Hillview. A summary of the monitoring results are provided below.

2.1 PM10

PM₁₀ monitoring results for the Hubberstone, Milpose and Hillview monitoring locations, for the reporting period, are displayed in Figure 1, Figure 2 and Figure 3 respectively. The criteria for exceedances (as nominated in the Development Consent DC11_0060, known as the Consent), are >25 µg/m³ for the annual average and >50 µg/m³ for a 24-hour monitoring period. The annual average has decreased by 5 µg/m³ during the most recent modification update to the development consent.

24 hour average:

During the reporting period one exceedance at Hubberstone on 21 April was recorded, receiving 99 µg/m³. An internal investigation was conducted to identify the source of elevated particulates, finding the result to be non-mine related and most likely to be caused by localised agricultural activities.

Missing data:

Hillview: 13 – 16 May – Tape breakage
27 – 29 May – Power failure

Milpose: 1 Apr – Instrument flow fault
9 – 16 May – Power interruption and intermittent instrument stabilisation
22 May - Power interruption and intermittent instrument stabilisation

Hubberstone: 11 – 13 May – Instrument fault – Tape Break
6 June – Power interruption and intermittent instrument stabilisation
14 June – Scheduled 6 month maintenance and subsequent instrument stabilisation – instrument calibration performed.

Annual Averages:

Annual averages, recorded year to date, at all monitoring locations are below the Consent criteria of 25 µg/m³:

- 11.0 µg/m³ at Hubberstone
- 12.6 µg/m³ at Milpose, and
- 11.9 µg/m³ at Hillview.

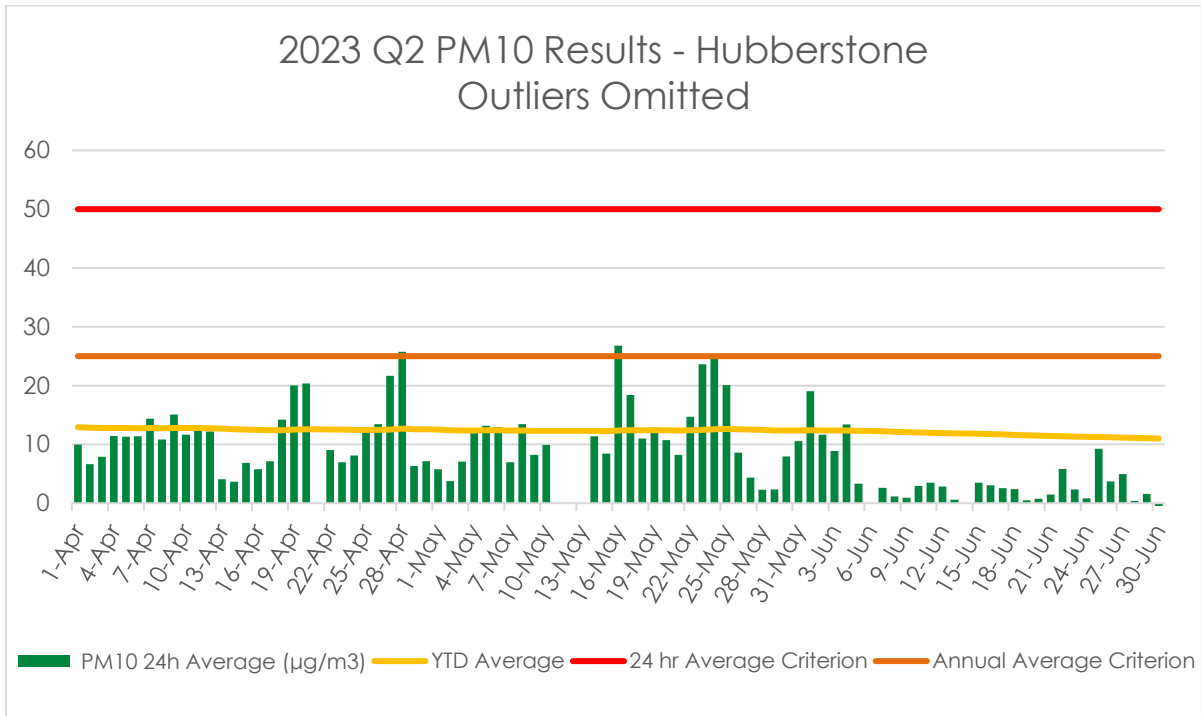


Figure 1: Hubberstone

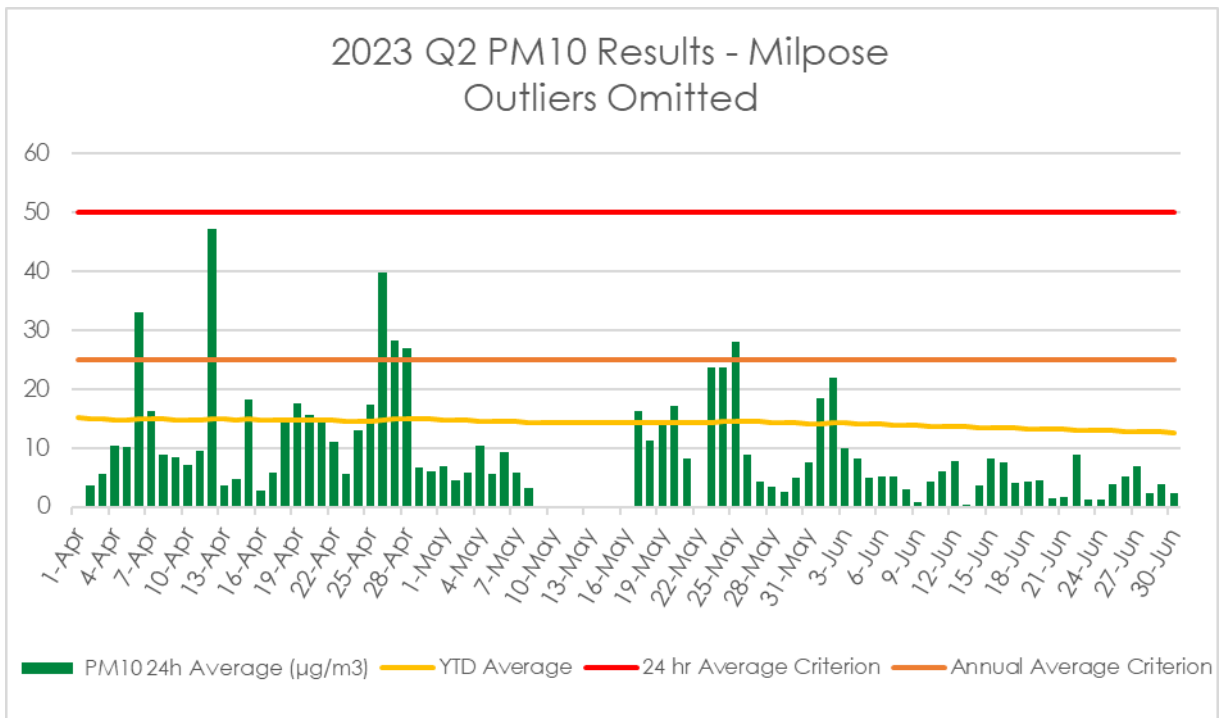


Figure 2: Milpose

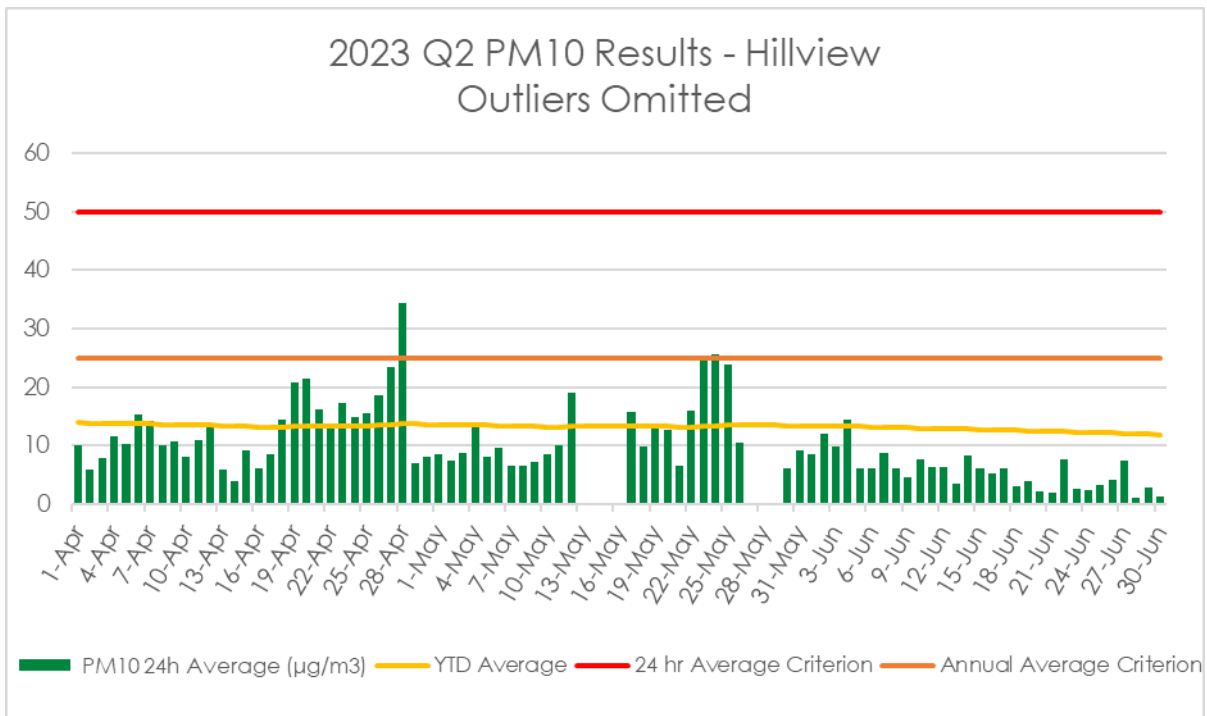


Figure 3: Hillview

2.2 PM2.5

The development consent states that compliance with the assessment criteria for PM_{2.5} may be calculated as a ratio of PM₁₀. This ratio is calculated as 0.35. PM_{2.5} monitoring results for three properties are displayed in Figures 4, 5 and 6 respectively.

The criteria for exceedances are >8 µg/m³ for the annual average and >25 µg/m³ for a 24-hour monitoring period.

24 hour average:

During the reporting period one exceedance at Hubberstone on 21 April was recorded, receiving 34.6 µg/m³. An internal investigation was conducted to identify the source of elevated particulates, finding the result to be non-mine related and most likely to be caused by localised agricultural activities.

A fault with the PM10 collection at Milpose from 9 to 15 May was due to power outage to the monitoring unit.

Annual Averages:

Annual averages recorded at all monitoring locations are below the Consent criteria of 8 µg/m³:

- 3.8 µg/m³ at Hubberstone
- 4.3 µg/m³ at Milpose, and
- 4.2 µg/m³ at Hillview.

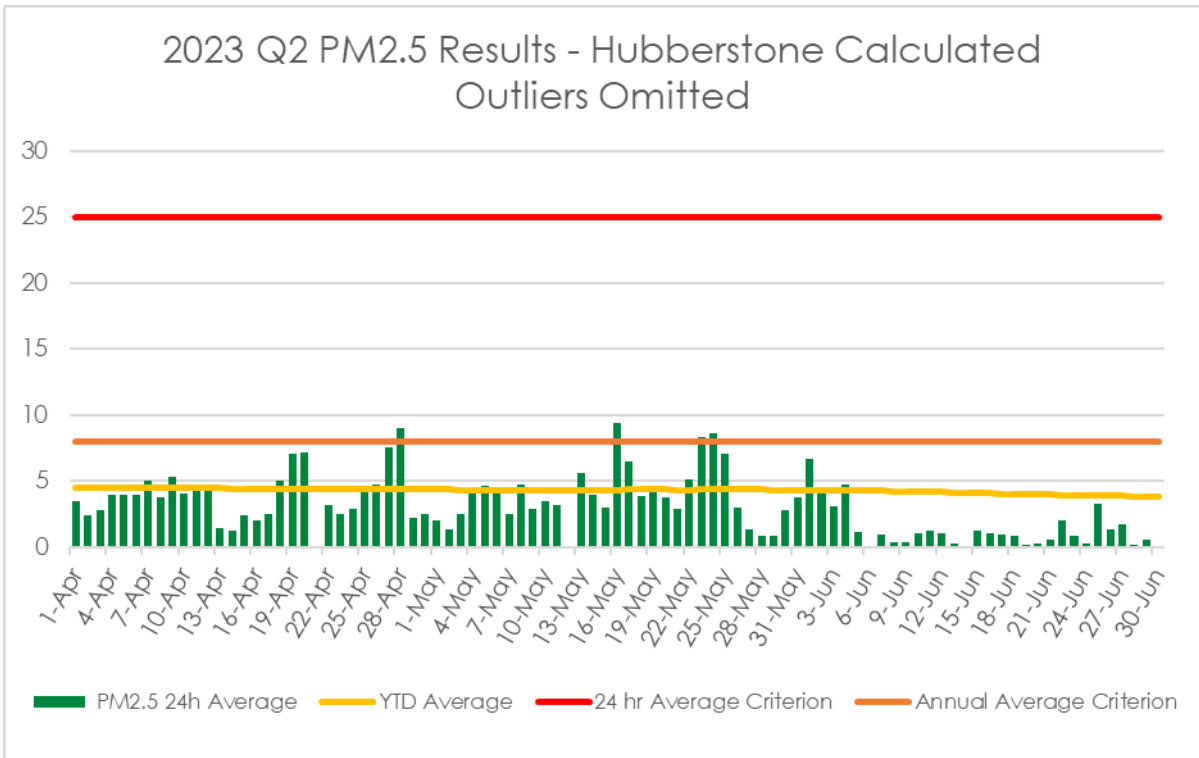


Figure 4: Hubberstone (Calculated)

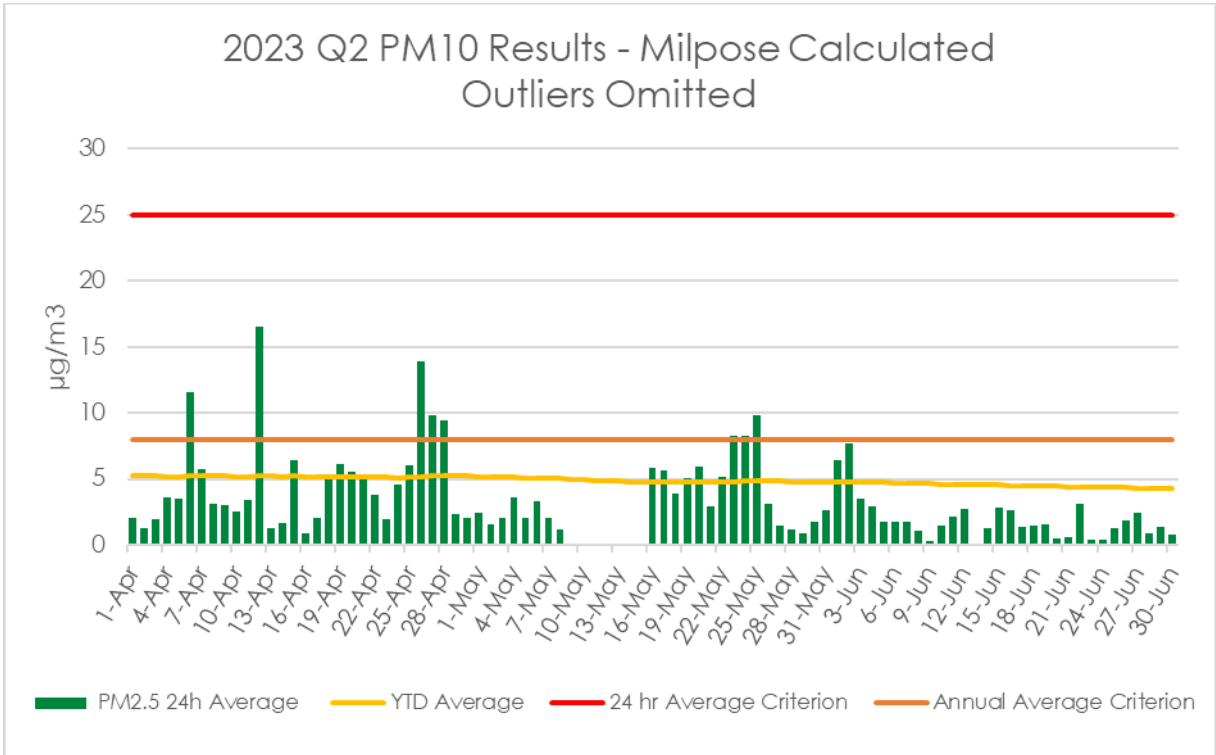


Figure 5: Milpose (Calculated)

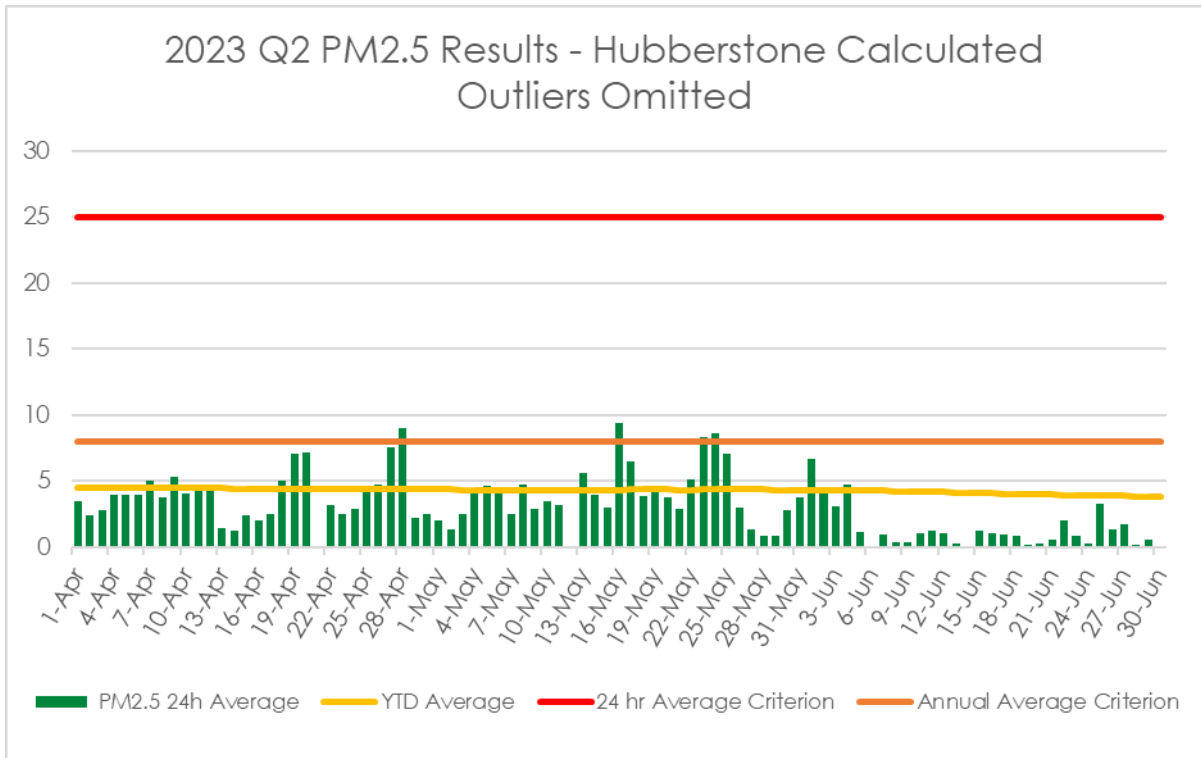


Figure 6: Hillview (Calculated)

3. WATER

3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with the Consent. All water samples are analysed at an independent National Association of Testing Authorities (NATA) accredited laboratory.

Surface water quality monitoring is undertaken at Northparkes specifically within the three defined water management systems of;

- Clean water management system, which includes farm dams and watercourses;
- Dirty water management system, which includes settlement ponds; and
- Contaminated water management system, which includes all aspects of ore processing, and retention ponds.

The groundwater monitoring program at Northparkes aims to identify any changes to the natural groundwater system as a result of mining operations and ensure compliance with the Consent. It focuses on potential impacts to environmental assets and groundwater users in the area surrounding Northparkes.

Monitoring results are assessed and interpreted utilising historical trend analysis and internal water quality criteria and trigger levels to identify potential changes.

3.2 Quarterly Monitoring Analysis

Water quality monitoring was carried out generally in accordance with the Consent, with no significant changes to the pH or EC for all locations. Copper concentrations increased at several locations, although results are still consistent with long term data. These locations will be closely monitored during the future reporting periods. A summary of the monitoring results at each location sampled are presented in Tables 1-7 below.

Table 1: Process Water System

Location	RP01	RP02	RP03	RP04	RP05	RP06	RP07	RP08	RP09	RP12	RP13	RP15	RP16	RP19	RP20
EC (uS/cm)	327	558	4309	1071	486	1911	749	1606	5430	288	875	4289	3667	2940	7547
Cu (mg/L)	0.027	0.006	0.041	0.112	0.008	0.004	0.009	0.008	0.016	0.012	0.04	0.026	0.006	0.005	0.043
pH	8.56	7.96	8.16	8.33	8.24	7.67	7.65	7.84	7.65	8.46	8.39	7.65	7.79	7.49	6.84

Table 1 continued: Process Water System

Location	RP21	RP22	RP23	RP24	RP25	RP26	RP27	RP28	RP32	Caloola North	Caloola South	GT02	SD1	SD2
EC (uS/cm)	1816	no sample	no sample	no sample	296	422	3048	3927	644	2226	2907	no sample	no sample	drying
Cu (mg/L)	0.008	-	-	-	0.023	0.014	0.031	0.009	0.015	0.009	0.004	-	-	-
pH	7.64	no sample	no sample	no sample	8.59	8.55	7.65	7.58	7.73	6.49	10.05	no sample	no sample	drying

Table 2: Sediment Ponds

Location	SP03	SP10	SP15	SP33
EC (uS/cm)	2846	220	Dry	197
Cu (mg/L)	0.007	0.007	Dry	0.02
pH	8.09	8.51	Dry	7.9

Table 3: Farm Dams

Location	FD04	FD05	FD06	FD07	FD11	FD12	FD16	FD18	FD25	FD26
EC (uS/cm)	1049	146	88	122	373	Dry	274	2191	159	563
Cu (mg/L)	0.01	0.01	0.003	0.011	0.014	-	0.011	0.002	0.009	0.007
pH	7.41	7.55	7.56	7.38	7.81	Dry	8.45	7.36	7.69	8.01

Table 4: Water Courses

Location	WC01	WC02	WC03	WC04	WC05	WC06	WC07	WC11	WC12	WC13	WC14	WC15	WC16
EC (uS/cm)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	125	Dry	Dry	Dry	Dry
Cu (mg/L)									0.008				
pH	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	7.93	Dry	Dry	Dry	Dry

Table 5: TSF Bores

Location	MB01	MB02	MB03	MB05	MB06B	W26	W27	W28	W29	W30	W31	W32
EC (uS/cm)	5315	8735	21869	20782	19017	10820	18927	12192	17202	2074	542	2854
Cu (mg/L)	0.006	0.003	0.039	0.004	0.006	0.009	0.006	0.01	0.059	0.002	0.011	0.012
pH	6.98	7.08	5.46	6.32	6.41	7.14	11.36	10.58	12.57	7.44	9.22	11.85
SWL	248.3	239.1	245.0	246.6				261.2	257.6	246.5	268.8	262.8

Table 6: Opencut Bores

Location	MB10	MB11 (dry)	MB12	MB13	MB14	W14	W19	W20	W21	W22	W23	W24	W25
EC (uS/cm)	10870	Dry	No sample	19122	2783	4155	13136	12726	25201	9839	13771	2064	2395
Cu (mg/L)	0.012			0.016	0.022	0.014	0.012	0.033	0.008	0.007	0.009	0.019	0.024
pH	7.33	Dry	No sample	6.95	7.47	6.89	6.54	6.87	6.68	7.33	6.71	7.33	6.67
SWL	252.0			247.1	262.1	270.4	255.0	268.8	271.0	268.5	264.3	284.1	283.8

Table 7: Underground Bores

Location	MB17	MB18	MB19	MB20	P101	P102	P103	P104	P139	P145	P149
EC (uS/cm)	669	17765	12855	10267	8693	24625	no sample	no sample	24163	152	23116
Cu (mg/L)	0.008	0.013	0.001	0.036	0.002	0.01			0.002	0.004	0.01
pH	7.63	6.86	7.1	7.03	6.86	6.71	no sample	no sample	6.66	7.14	6.68
SWL	268.7	249.8	246.4	246.4	255.4	254.3	252.4	255.0	253.1	252.0	227.6

Table 8: Regional Bores

Location	Far Hilliers	Long Paddock	Moss #1	Wright
EC (uS/cm)	491	741	1883	825
Cu (mg/L)	0.004	0.012	0.007	0.002
pH	6.63	7.58	7.16	8.11
SWL	263.7	240.2	288.0	288.7

4. VIBRATION

4.1 Overview

The assessment criteria for blast impacts at Northparkes are based on the ANZECC Guideline, aimed to minimise annoyance to human comfort levels. Table 8 below shows the blast impact criteria as set out in the Schedule 3 Conditions 6-13 of the Consent.

Table 8: Vibration and overpressure criteria of DC11_0060.

<i>Location</i>	<i>Airblast overpressure (dB(Lin Peak))</i>	<i>Ground vibration (mm/s)</i>	<i>Allowable exceedance</i>
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 <i>(or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)</i>	0%

The blast monitoring program uses blast units which measure ground vibration and air overpressure at the residences of the four closest privately owned properties, Adavale, Hillview, Hubberstone and Milpose. The program is designed to measure the effectiveness of control measures and ensure compliance with consent and licence conditions, relevant standards and corporate requirements. A summary of the monitoring results are provided below.

4.2 Quarterly Monitoring Analysis

During the reporting period, three surface blasts were undertaken. Highlighted cells are those where an exceedance was identified.

Monitor Location	Overpressure (dB) – 115 (dB)		
	5 Apr 23	16 May 23	24 May 23
Adavale	Did not record	104.3	85.6
Hillview	96.2	99.8	90.9
Hubberstone	93.8	103.2	89.3
Milpose	89.3	90.9	88.3

Table 9: Overpressure

Monitor Location	Vibration (mm/s) – 5 mm/s		
	5 Apr 23	16 May 23	24 May 23
Adavale	Did not record	0.02	0.46
Hillview	0.04	0.04	0.02
Hubberstone	0.02	0.02	0.02
Milpose	0.02	0.02	0.01

Table 10: Vibration

5. NOISE

Operational noise is managed by CMOC in accordance with the approved Noise Management Plan (NMP). The NMP covers all operational activities with the potential to generate noise at Northparkes. It details specific noise management and mitigation measures, outlines monitoring and reporting requirements and provides clear definitions of the roles and responsibilities for noise management.

Property	Day	Evening	Night	
	<i>L_{Aeq(15min)}</i>	<i>L_{Aeq(15min)}</i>	<i>L_{Aeq(15min)}</i>	<i>L_{A1(1min)}</i>
All privately-owned land	35	35	35	45

5.1 Overview

CMOC undertakes a noise monitoring program that consists of both operator-attended and unattended surveys at the five nearest occupied residences Hubberstone, Milpose, Lone Pine, Hillview and Adavale.

Operator-attended noise measurements and recordings are undertaken outside the mining leases in order to quantify the intrusive noise emissions from construction and of general mine activity as well as the overall level of ambient noise. This noise monitoring was undertaken by an independent and suitably qualified noise professional.

5.2 Quarterly Monitoring Analysis

Attended noise monitoring was undertaken between Tuesday 23 to Wednesday 24 May 2023.

The assessment was completed to quantify site noise emissions against relevant noise criteria pertaining to Northparkes operations in accordance with Conditions 1 to 5 of Schedule 3 of the NSW Development Consent Conditions (DC11_110060), Northparkes Noise Management Plan (NMP, 2019) and Traffic Management Plan (TMP, 2019).

Road noise monitoring identified that vehicle movements associated with shift change generated levels below the relevant road noise criteria specified in the TMP and NMP.

Attended monitoring has identified that operational emissions generated by Northparkes comply with relevant noise criteria at all monitoring locations for all assessment periods. Furthermore, project related noise emissions are generally barely audible at monitoring locations. Extraneous non-mining sources such as traffic, insects, wind in trees, birds, aircraft, residential and agricultural noise were audible during the monitoring period. A summary of the monitoring results at each monitoring location are presented in Tables 9-14 below.

Table 9: Attended noise monitoring results for Hubberstone

Table 3 Operator-Attended Noise Survey Results – Location NM1, Hubberstone					
Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L _{Amax}	L _{Aeq}	L _{A90}		
Day					
16:34 24/05/23	68	43	23	WD: SW WS: <0.5m/s Stab Class: E	Birds 20-68 Traffic 25-46
16:49 24/05/23	57	34	23		Insects 20-25 Livestock 25-38
17:04 24/05/23	51	33	15		Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Evening					
20:08 23/05/23	41	22	20	WD: S WS: <0.1m/s Stab Class: F	Wildlife 25-34 Birds 25-38 MAC Operator Noise 41-53 NPM – Processing 20-25 (barely to just audible throughout)
20:23 23/05/23	34	22	20		
20:38 23/05/23	53	22	20		
Site L _{Aeq} (15min) Contribution					<30
Night					
01:15 24/05/23	41	27	25	WD: S WS: 0.1m/s Stab Class: G	Dogs Barking 25-35 Livestock 25-42 NPM – Processing 23-29 (just audible throughout)
01:30 24/05/23	41	27	25		
01:45 24/05/23	42	26	24		
Site L _{Aeq} (15min) Contribution					<30
Site L _{A1} (1min) Contribution					<45

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 10: Attended noise monitoring results for Lone Pine

Table 4 Operator-Attended Noise Survey Results – Location NM2, Lone Pine					
Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	Duration 15min	L _{Amax}	L _{Aeq}		
Day					
15:35 24/05/23	72	41	21		Birds 20-72
15:50 24/05/23	77	51	24	WD: SW WS: 0.5m/s Stab Class: D	Insects 20-28 Traffic 25-77 Residential Noise 30-44
16:05 24/05/23	70	50	21		Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Evening					
21:09 23/05/23	41	17	13		Rural Hum <20
21:24 23/05/23	41	18	14	WD: S WS: <0.1m/s Stab Class: E	Birds 20-42 Dogs Barking 20-28
21:39 23/05/23	42	18	13		Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Night					
22:00 23/05/23	35	18	15		Rural Hum <20
22:15 23/05/23	41	20	14	WD: S WS: <0.1m/s Stab Class: G	Wildlife 20-34 Dogs Barking 20-41
22:30 23/05/23	40	18	13		Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Site L _{A1} (1min) Contribution					<45

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 11: Attended noise monitoring results for Milpose

Table 5 Operator-Attended Noise Survey Results – Location NM3, Milpose					
Date/Time (hrs)	Noise Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
	Duration 15min	L _{Amax}	L _{Aeq}		
Day					
13:46 24/05/23	62	35	18		Insects 20-34
14:01 24/05/23	48	27	18	WD: SW WS: 1.0m/s Stab Class: A	Birds 20-62 Wind Gusts 30-55
14:16 24/05/23	62	35	18		Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Evening					
20:19 24/05/23	39	23	21		Dogs Barking 25-38
20:34 24/05/23	41	21	19	WD: S WS: <0.5m/s Stab Class: G	MAC Operator 43 NPM - Site Hum 16-24 (barely to just audible throughout)
20:49 24/05/23	43	23	19		
Site L _{Aeq} (15min) Contribution					<30
Night					
00:01 24/05/23	47	23	18		Dogs Barking 20-36 Wildlife 20-35
00:16 24/05/23	39	21	16	WD: S WS: 0.1m/s Stab Class: G	Birds 20-39 MAC Operator 47 NPM - Site Hum 16-23 (barely to just audible throughout)
00:31 24/05/23	41	18	13		
Site L _{Aeq} (15min) Contribution					<30
Site L _{A1} (1min) Contribution					<45
<p>Note: NPM denotes Northparkes Mines.</p> <p>Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.</p>					

Table 12: Attended noise monitoring results for Hillview

Table 6 Operator-Attended Noise Survey Results – Location NM4, Hillview					
Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L _{Amax}	L _{Aeq}	L _{A90}		
12:31 24/05/23	67	43	27		Residential Noise 25-67
12:46 24/05/23	54	35	24	WD: W WS: 0.5m/s	Traffic 25=-56 Birds 25-48
13:01 24/05/23	51	36	27	Stab Class: A	Agricultural Noise 25-36 Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Evening					
18:00 24/05/23	69	49	24		Traffic 20-69
18:15 24/05/23	72	49	21	WD: SW WS: <0.5m/s	Birds 20-42 Dogs Barking 20-29
18:30 24/05/23	75	49	22	Stab Class: E	Residential Noise 25-75 Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Night					
02:17 24/05/23	58	35	20		Dogs Barking 25-34
02:32 24/05/23	35	23	20	WD: SE WS: <0.5m/s	Traffic 20-58 NPM - Site Hum 18-25
02:47 24/05/23	42	24	22	Stab Class: G	(just audible throughout)
Site L _{Aeq} (15min) Contribution					<30
Site L _{A1} (1min) Contribution					<45

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 13: Attended noise monitoring results for Adavale

Table 7 Operator-Attended Noise Survey Results – Location NM5, Adavale					
Date/Time (hrs) Duration 15min	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
Day					
14:42 24/05/23	48	28	23		Birds 20-62
14:57 24/05/23	51	29	22	WD: SW WS: 0.5m/s	Insects 20-25 Distant Traffic 20-26
15:12 24/05/23	62	37	24	Stab Class: A	Aircraft 25-34 Site Inaudible
Site L _{Aeq} (15min) Contribution					<30
Evening					
19:20 24/05/23	45	22	20		Birds 20-45
19:35 24/05/23	47	22	18	WD: S WS: <0.5m/s	MAC Operator 47 NPM - Site Hum 15-23
19:50 24/05/23	42	21	18	Stab Class: G	(barely to just audible throughout)
Site L _{Aeq} (15min) Contribution					<30
Night					
22:57 23/05/23	48	26	20		Aircraft 20-41
23:12 23/05/23	38	22	20	WD: S WS: 0.1m/s	Birds 20-33 MAC Operator 49
23:27 23/05/23	49	23	20	Stab Class: G	NPM - Site Hum 17-24 (barely to just audible throughout)
Site L _{Aeq} (15min) Contribution					<30
Site L _{A1} (1min) Contribution					<45

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 14: Attended road noise survey results

Table 8 Operator-Attended Road Noise Survey Results – Location NM4, Hillview				
Date/Time (hrs)	Measured Noise Level	Meteorology	Criteria	Description and SPL dBA
Duration 1 hour	dB LAeq(1hr)		dB LAeq(1hr)	
12:31	41	WD: W	55	Residential Noise 25-67
24/05/23 (Day)		WS: 0.5m/s Stab Class: A		Traffic 25-56 Birds 25-48 Agricultural Noise 25-36 NPM Concentrate Truck (offsite) 30-54 (1 Pass) (Approx. 16 vehicles Enter/Exit NPM Site)
18:00	48	WD: SW	55	Traffic 20-69
23/05/23 (Evening)		WS: <0.5m/s Stab Class: E		Birds 20-42 Dogs Barking 20-29 Residential Noise 25-75 NPM Concentrate Truck (offsite) 30-55 (2 Passes) (Approx. 84 vehicles Enter/Exit NPM Site)

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.