





Northparkes Mines
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1 October to 31 December 2017 - Quarter 4 Environmental Monitoring Results Summary

Name of Mine	Northparkes Mines
Name of Leaseholder and Mine Operator	CMOC Mining Pty Ltd
Mining Leases	ML 1247, ML 1367, ML 1641 and 1743
Environment Protection Licence	EPL 4784
Development Consent	PA11-0060, (Mod 1-3)

Reviewed by	Chase Dingle
Title	Superintendent – Community, Environment & Farming
Date	
Signature	 22/01/2018
Approved by	Stacey Kelly
Title	Manager – People, Safety and Environment
Date	22 JAN 2018
Signature	

1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 October 2017 to 31 December 2017. This monitoring is undertaken in accordance with the Environmental Monitoring Program (available at www.northparkes.com.au). Details of air quality, noise and water monitoring locations are available in the Environmental Monitoring Program.

2. AIR QUALITY

The air quality monitoring program utilises PM₁₀ (beta attenuated monitors), TSP's (high volume air samplers (HVAS)) and depositional dust gauges. Monitoring locations are strategically positioned around the mine lease and neighbouring properties. TSP and PM₁₀ monitoring has been 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 Approval), is >30 µg/m³ for the annual average and >50 µg/m³ for a 24-hour monitoring period.

Monitoring results for all three locations, were under the air quality criteria required by the approval. The missing data for each of the locations was attributed to power surges, most likely the result of nearby lightning strikes, damaging equipment and/or equipment failure due to aging equipment.

The annual average PM₁₀ levels recorded at all PM₁₀ monitoring locations are below the predicted levels within the EA (20 µg/m³).

Hubberstone PM₁₀ Results for Q4 2017

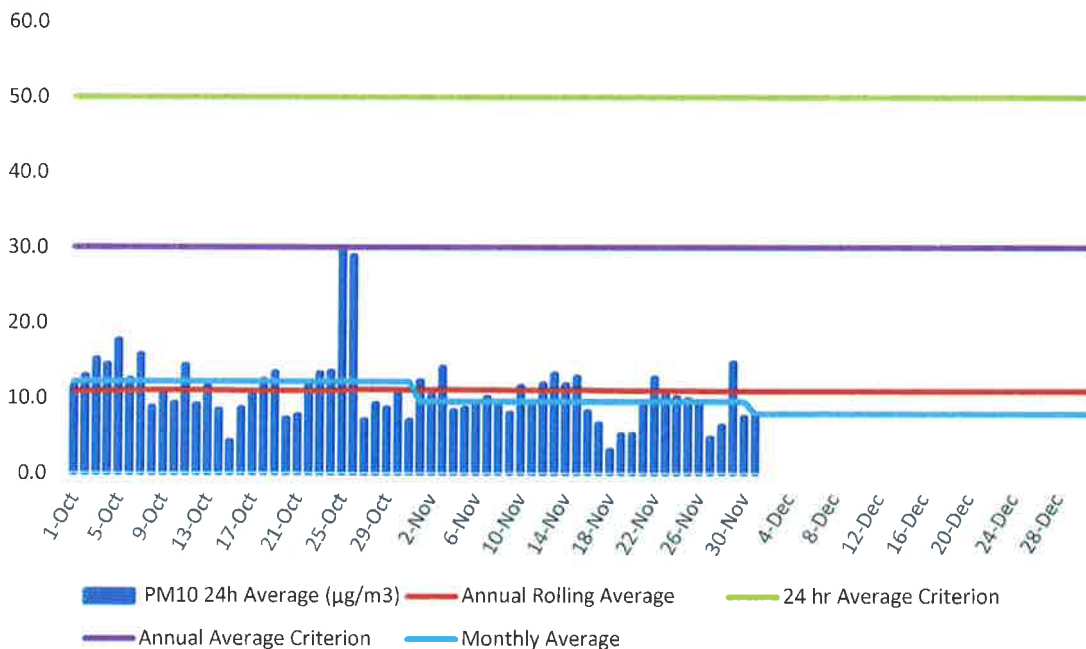


Figure 1: Hubberstone

Milpose PM10 Results for Q4 2017

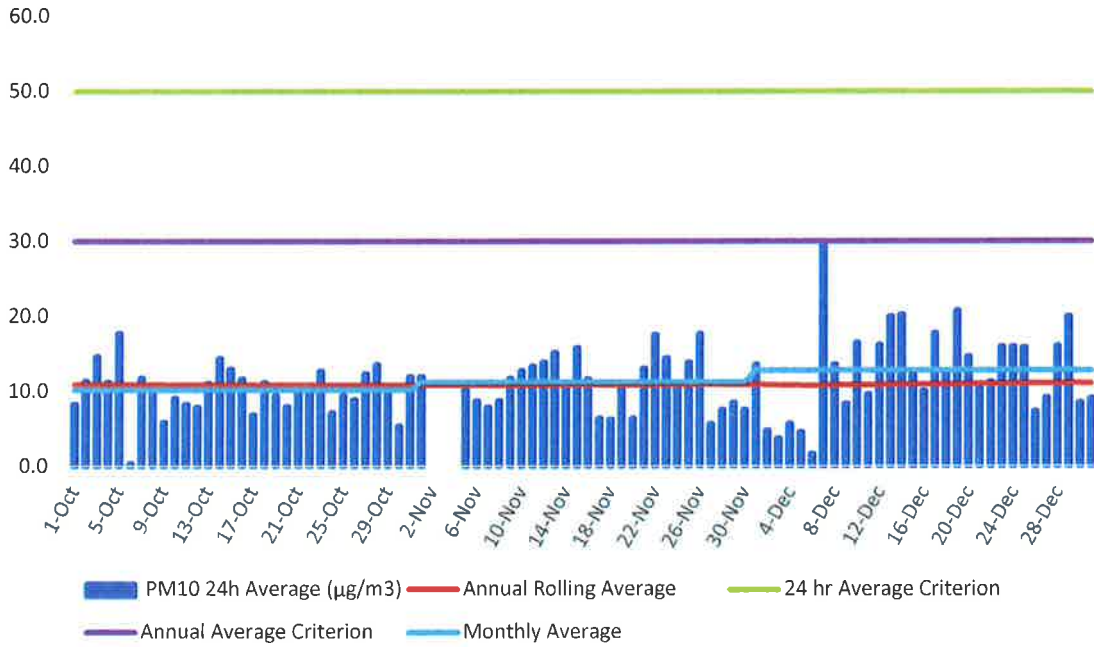


Figure 2: Milpose

Hillview PM10 Results for Q4 2017

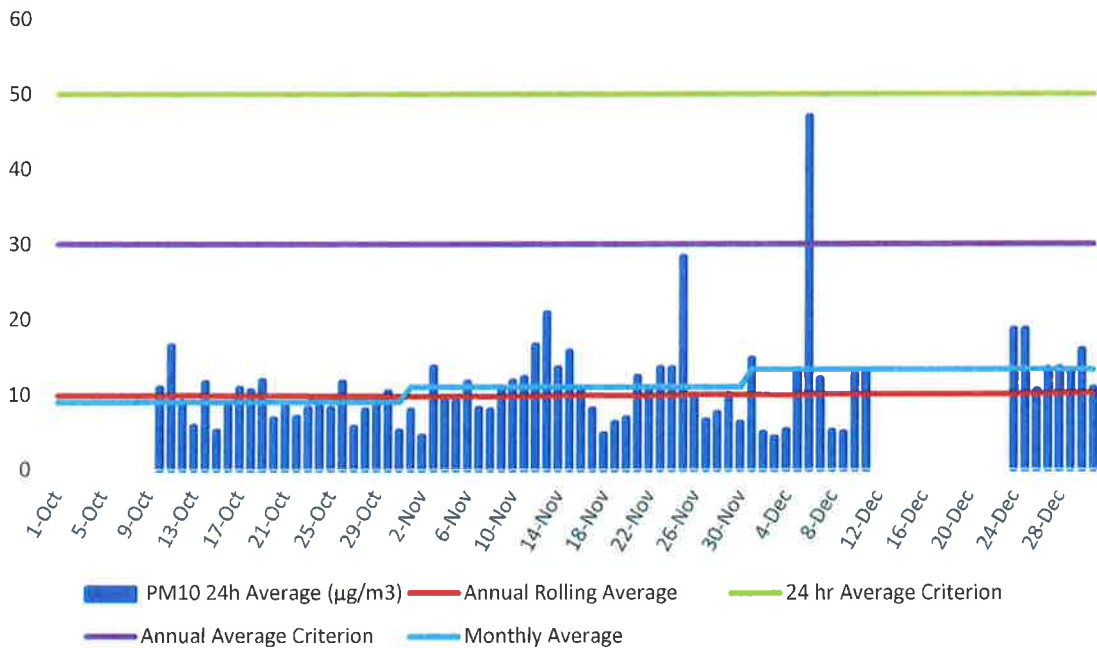


Figure 3: Hillview

2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required criteria set by the Approval (90 µg/m³) for the Q4 2017 monitoring period. Results are presented in Figure 4, Figure 5 and Figure 6 respectively. The annual average TSP dust levels recorded at all TSP monitoring locations are below the predicted levels within the EA (50 µg/m³).

The missing data for each of the locations was attributed to power surges, most likely the result of nearby lightning strikes, damaging equipment and/or equipment failure due to aging equipment.

Hubberstone TSP Results for Q4 2017

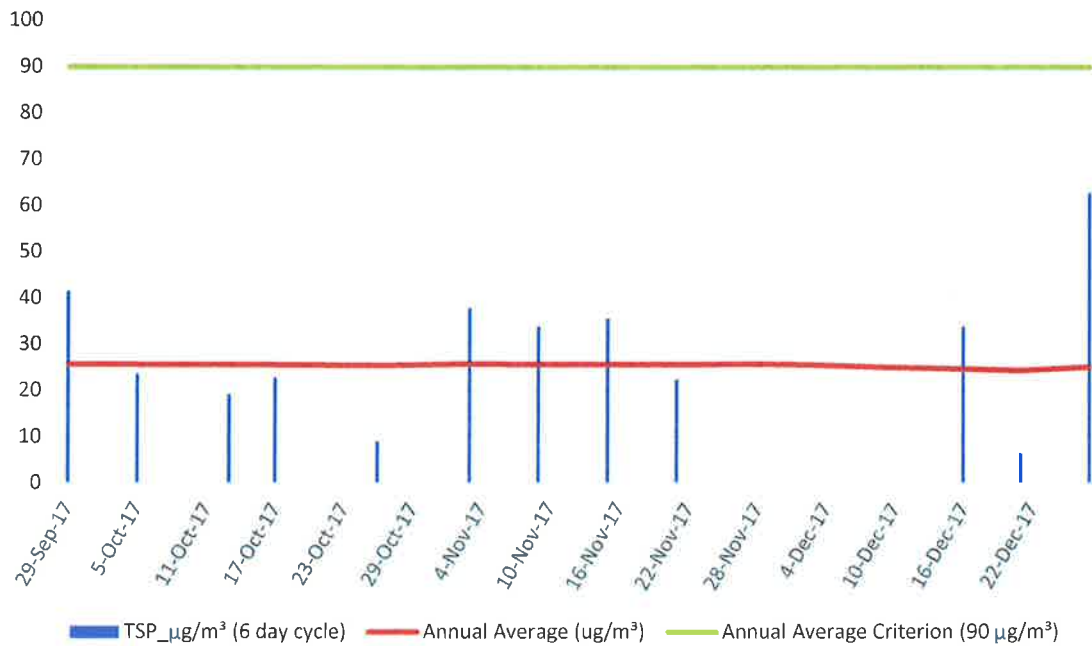


Figure 4: Hubberstone

Milpose TSP Results for Q4 2017

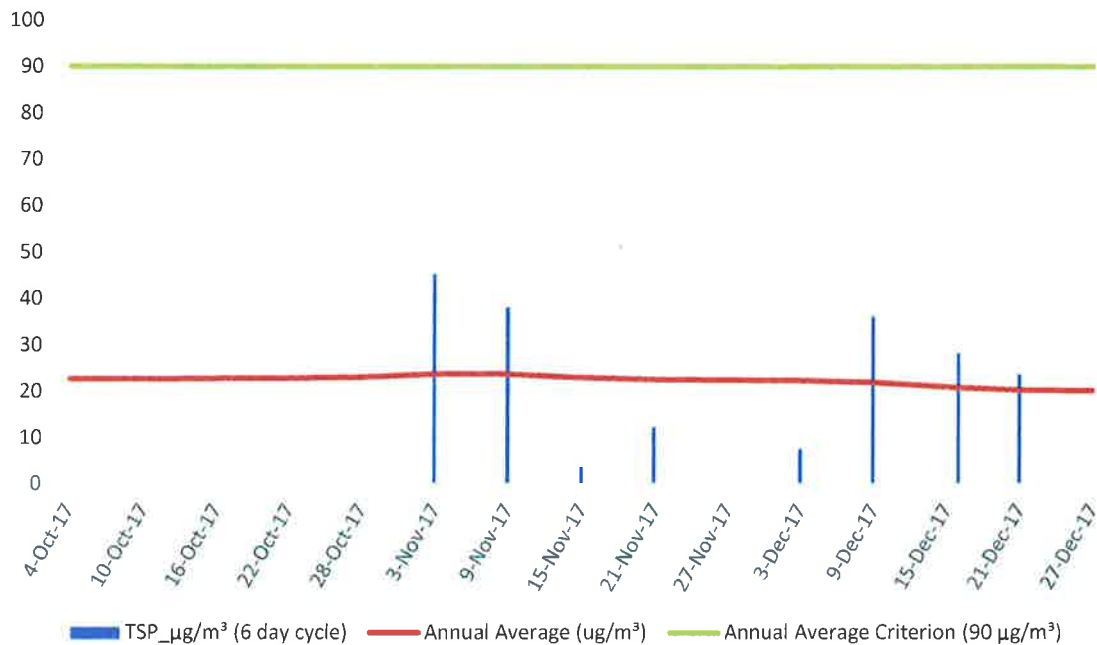


Figure 5: Milpose

Hillview TSP Results for Q4 2017

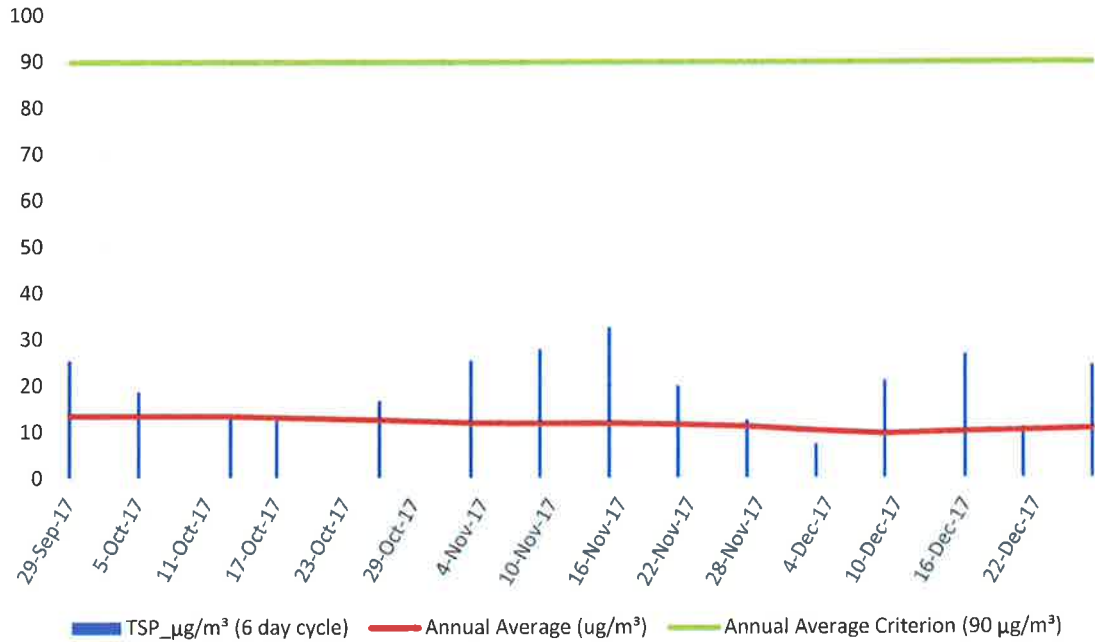


Figure 6: Hillview

2.3 Depositional Dust

Depositional dust gauges record the total of deposited dust for a month long period and are a useful measure of broad scale changes to the local air quality.

Eleven depositional dust gauges are located across the mining lease and neighbouring residential properties to monitor atmospheric dust. A summary of the monthly monitoring results at each monitoring location are presented in Figure 7, Figure 8 and Figure 9 respectively,

The indicative rolling average for all locations are below the long-term impact assessment criteria, complying with the conditions of the Approval.

Depositional Dust Results for October 2017

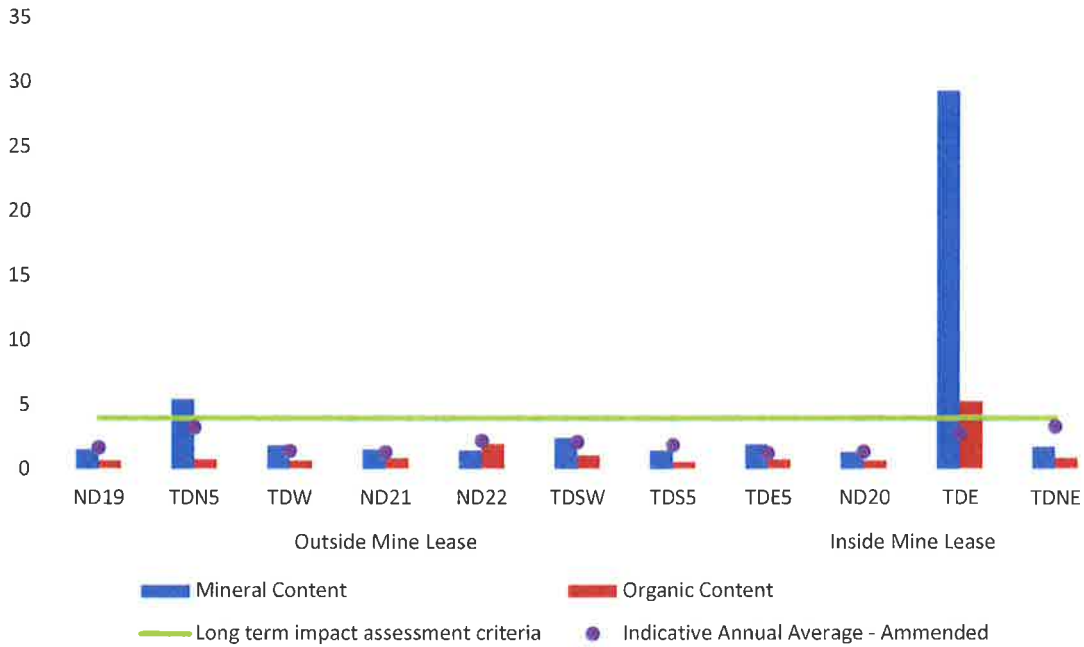


Figure 7: October depositional dust results for all locations

Depositional Dust Results for November 2017

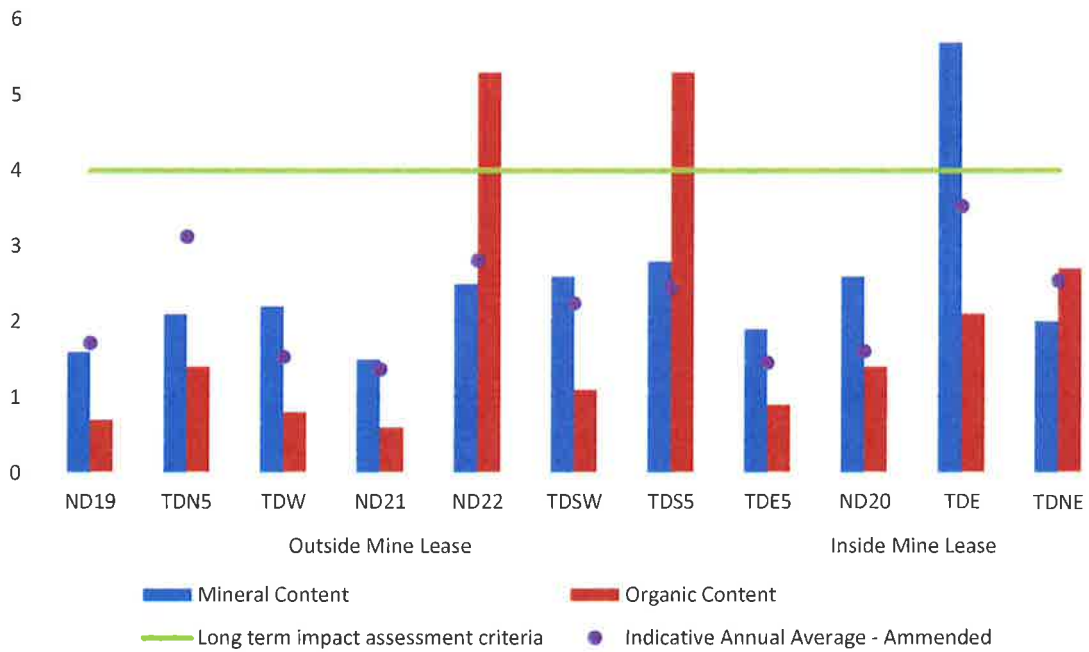


Figure 8: November depositional dust results for all locations

Depositional Dust Results for December 2017

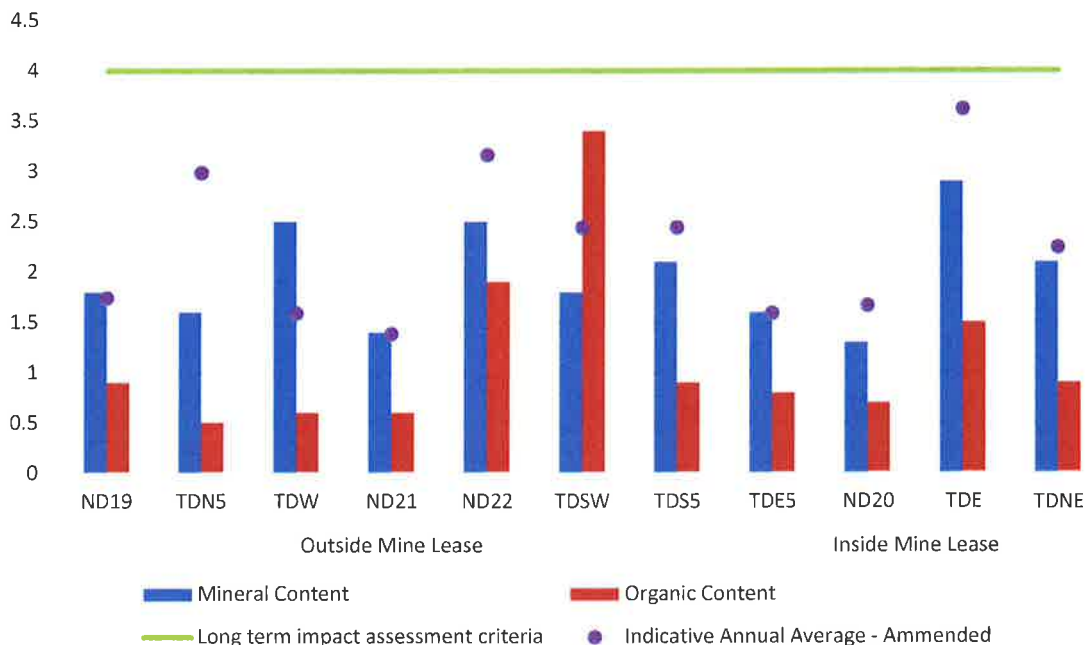


Figure 9: December depositional dust results for all locations

3. WATER

3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with Approval. 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.

CMOC's groundwater monitoring program aims to identify any changes to the natural groundwater system as a result of mining operations and ensure compliance with the Approval. 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 successfully carried out for the reporting period with no significant changes to the pH, EC or copper concentrations for all locations. Due to below average rainfall prior to monitoring, many locations were deemed dry and unable to be sampled. A summary of the monitoring results at each sampled location are presented in Tables 1-8 below.

Table 1: Process Water System

	RP1	RP2	RP3	RP5	RP7	RP8	RP09	RP10	RP13	RP15	RP21	RP26	RP27	RP29	RP30	RP32	RP33	PWD	SD2	CALLOOLA PIT
pH	8.39	8.3	8.15	10.51	8.01	8.15	8.68	8.19	7.97	8.17	7.82	9.6	8.07	8.12		9.93		8.23	9.18	8.39
EC (uS/cm)	388	1870	3691	617	1470	2094	2932	982	1095	6160	2699	585	3253	607		241	977	2323	9351	1432
Cu (mg/L)	0.030	0.019	0.067	0.027	0.003	0.063	0.007	0.129	0.028	0.034	0.024	0.024	0.015	0.002	0.002	0.010	0.008	0.000	0.000	0.000

Table 2: Sediment Ponds

	SP10
pH	9.05
EC (uS/cm)	293
Cu (mg/L)	0.100
TDS (mg/L)	26

Table 3: Watercourses

	WC12
pH	8.5
EC (uS/cm)	144.5
Cu (mg/L)	0.008
TDS (mg/L)	21

Table 4: Farm Dams

	FD4	FD5	FD6	FD7	FD11	FD16	FD18	FD21	FD25	FD26	FD27
pH	8.38	10.2	8.66	9.54	8.16	8.57	8.11	8.77	9.01	8.43	9.03
EC (uS/cm)	404	142	170	135.4	361	155.6	1867	334	267.6	553.4	429.1
Cu (mg/L)	0.03	0.01	0.004	0.007	0.00	0.008	0.01	0	0.000	0.045	0.004
TDS (mg/L)	50		6	<5	34	0.00	0.00	6	18	0	0

Table 5: TSF Bores

	MB1	MB2	MB3	MB5	MB6b
pH	7.21	6.14	6.24	6.67	6.95
EC (us/cm)	5312	10103	22374	24617	12879
Cu (mg/l)	0.001	0.002	0.019	0.003	0.002

Table 6: Opencut Bores

	W14	W19	W20	W21	W22	W23	W24	W25
pH	7.32	7.62	7	11.38	7.16	7.7	7.7	8
EC (us/cm)	10477	5729	14788	13694	18382	16181	1842	1288
Cu (mg/l)	0.002	0.008	0.006	0.004	0.004	0.006	0.005	0.006

Table 7: Underground Bores

	P101	P102	P103	P104	P139	P145	P149	MB17	MB18	MB19	MB20
pH	7.67	7.33	9.15	9.97	6.6	7.54	6.89	8.13	8.4	7.48	7.66
EC (us/cm)	11132	28122	25361	17192	28262	10240	28426	905	402.4	14710	11656
Cu (mg/l)	0.005	0.003	0.001	0.004	0.003	0.002	0.011	0.007	0.142	0.004	0.026

Table 8: Regional Bores

	Far Hillier	Wright	Moss
pH	8.14	7.55	7.29
EC (us/cm)	588.8	763.4	2291.7
Cu (mg/l)	0.002	0.022	0.006

4. NOISE AND VIBRATION

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 definition of the roles and responsibilities for noise management.

4.1 Overview

CMOC undertakes a noise monitoring program at four locations on privately owned properties outside the mining leases. The program consists of both operator-attended and unattended surveys at the four nearest occupied residences 'Hubberstone', 'Milpose', 'Lone Pine' and 'Hillview'.

Operator-attended noise measurements and recordings are undertaken at four locations on privately owned properties 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.

4.2 Quarterly Monitoring Analysis

Attended noise monitoring was undertaken from the 6th to the 8th of December 2017. Weather conditions overall were not favourable for noise monitoring; however, results indicate that noise emissions from the mine site comply with the development consent and project approval criteria. A summary of the monitoring results at each monitoring location are presented in Tables 9-11 below.

Table 9: Attended noise monitoring results (daytime)

Location	Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB	Compliance?	Notes
Hillview	06/12/17 17:15	41	37	32	29	Yes (adj.)	Bird noise necessitating adjustment. Wind noise. Wind gusting to 4.0 m/s. Mine inaudible
	06/12/17 17:30	44	40	38	38	NA	
	06/12/17 17:45	47	41	38	38	NA	
Hubberstone	06/12/17 14:22	43	38	35	30	Yes	Bird noise. Wind noise. Mine inaudible
	06/12/17 14:37	41	38	35	31	Yes	
	06/12/17 14:49	40	34	32	27	Yes	
Milpose	06/12/17 16:04	42	36	35	212	Yes	Bird noise. Wind noise. Wind gusting to 3.5 m/s. Mine inaudible
	06/12/17 16:23	47	40	37	32	NA	
	06/12/17 16:38	40	37	35	33	Yes	
Lonepine	06/12/17 13:26	46	40	33	32	Yes	Bird noise necessitating adjustment. Wind noise. Wind gusting to 3.5m/s. Mine inaudible
	06/12/17 13:38	42	40	31	30	Yes	
	06/12/17 13:47	42	40	37	30	NA	

Table 10: Attended noise monitoring results (evening)

Location	Date and Time	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A90} dB	Compliance?	Notes
Hillview	06/12/17 19:20	45	36	34	27	Yes	Bird noise. Mine inaudible.
	06/12/17 19:37	42	36	33	27	Yes	
	06/12/17 19:52	44	37	34	27	Yes	
Hubberstone	06/12/17 18:21	44	38	30	30	Yes (adj.)	Bird noise necessitating adjustment. Mine inaudible
	06/12/17 18:36	40	35	33	30	Yes	
	06/12/17 18:50	40	36	34	31	Yes	
Milpose	07/12/17 19:32	52	50	29	44	Yes (adj.)	Insect noise necessitating adjustment. Sheep noise. Wind noise. Mine barely audible
	07/12/17 19:49	53	52	29	45	Yes (adj.)	
	07/12/17 20:05	53	53	29	49	Yes (adj.)	
Lonepine	07/12/17 21:24	55	55	32	46	Yes (adj.)	Insect noise necessitating adjustment. Wind noise. Mine inaudible
	07/12/17 21:39	55	53	31	45	Yes (adj.)	
	07/12/17 21:50	51	48	34	45	Yes (adj.)	

Table 11: Attended noise monitoring results (night)

Location	Date and Time	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A90} dB	Compliance?	Notes
Hillview	-	-	-	-	-	NA	Wind gusts producing noise in excess of 60dB
	-	-	-	-	-	NA	
	-	-	-	-	-	NA	
Hubberstone	-	-	-	-	-	NA	Wind gusts producing noise in excess of 60dB
	-	-	-	-	-	NA	
	-	-	-	-	-	NA	
Milpose	-	-	-	-	-	NA	Wind gusts producing noise in excess of 60dB
	-	-	-	-	-	NA	
	-	-	-	-	-	NA	
Lonepine	07/12/17 22:15	56	50	48	43	NA	Insect noise. Frog noise. Loud wind noise
	07/12/17 22:32	52	50	48	45	NA	
	07/12/17 22:48	53	48	41	44	NA	

