





1 April to 30 June 2020 - Quarter 2 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 and Farms
Date	17 Dec 20
Signature	
Approved by	Stacey Kelly
Title	Manager – People, Safety and Environment
Date	17 DECEMBER 2020
Signature	

1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 April to 30 June 2020. 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 have 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 Development Consent DC11_0060, known as the Consent), are >30 µg/m³ for the annual average and >50 µg/m³ for a 24-hour monitoring period. Refer to Appendix A for map of all PM10 monitoring locations.

During the reporting period there were no elevated 24hr criteria readings recorded across the three monitoring locations.

Annual averages recorded at all monitoring locations are below the Consent criteria of 30 µg/m³, recording 16.4 µg/m³ at Hubberstone, 16.7 µg/m³ at Milpose, and 13.7 µg/m³ at Hillview.

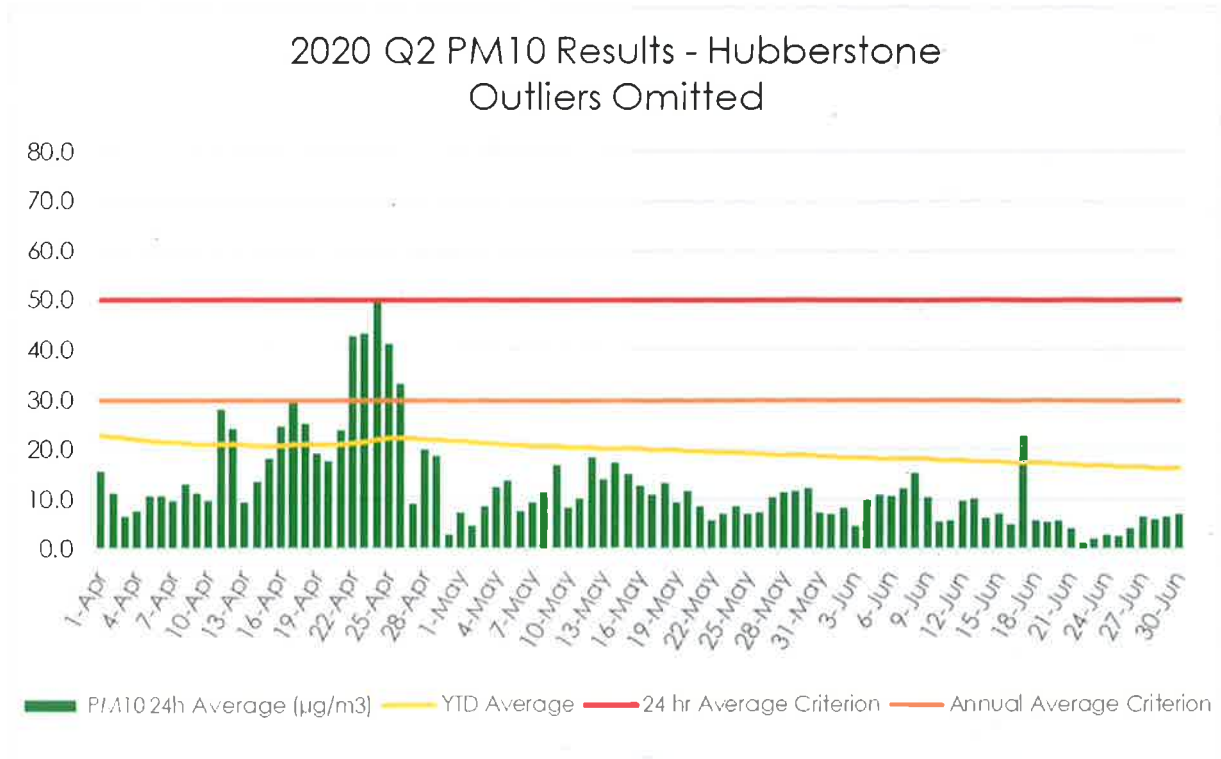


Figure 1: Hubberstone

2020 Q2 PM10 Results - Milpose Outliers Omitted

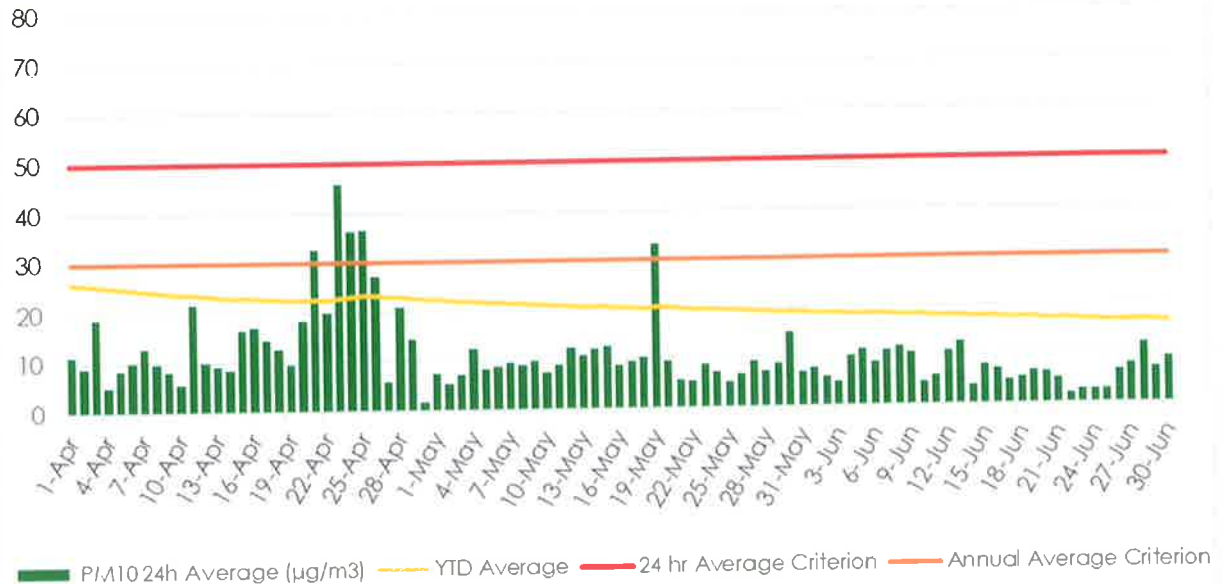


Figure 2: Milpose

2020 Q2 PM10 Results - Hillview Outliers Omitted

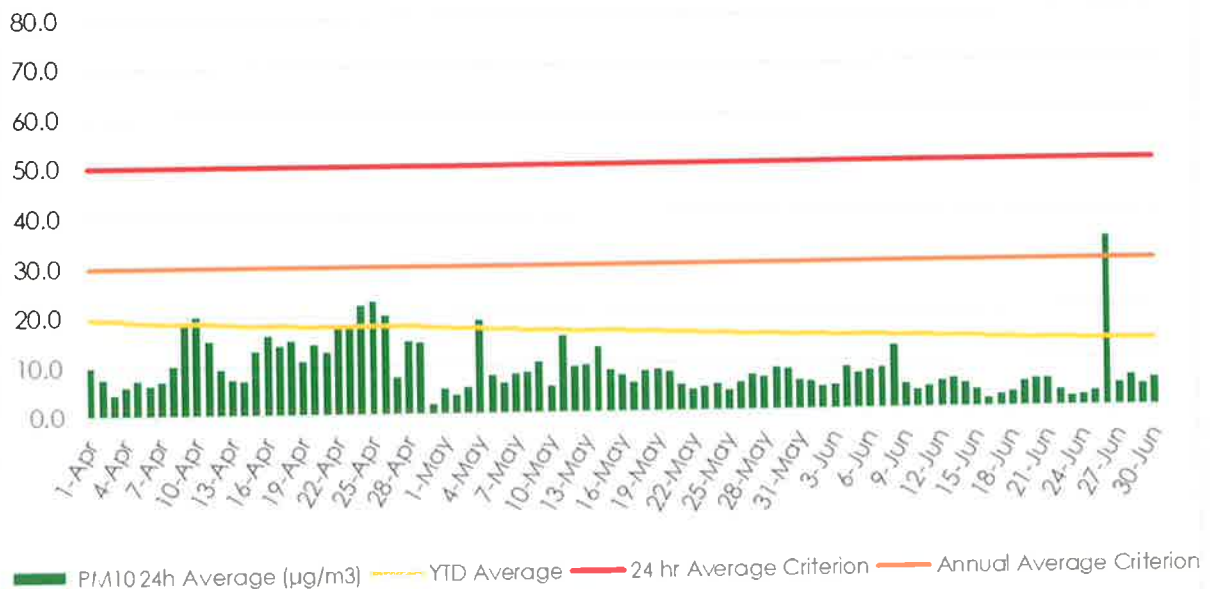


Figure 3: Hillview

2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required average annual criteria set by the Consent ($90 \mu\text{g}/\text{m}^3$) for the quarter for the reporting period. Refer to Appendix A for a map of all TSP monitoring locations.

During the reporting period there were zero elevated results recorded at the three monitoring locations. Any elevated reading ($>90 \mu\text{g}/\text{m}^3$) triggers an internal investigation process to determine the likely source and if mining operations were a contributing factor.

The missing data for Milpose on 3 May and Hubberstone on 14 June was related to power supply issues.

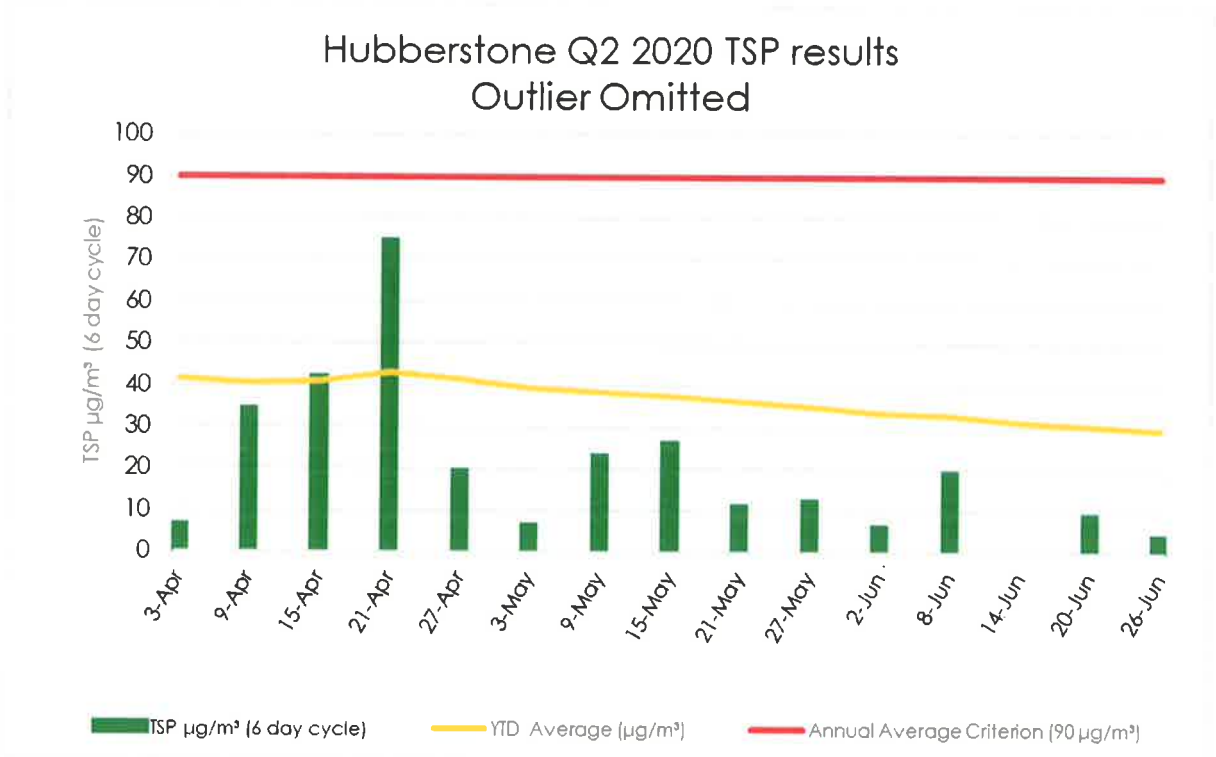


Figure 4: Hubberstone

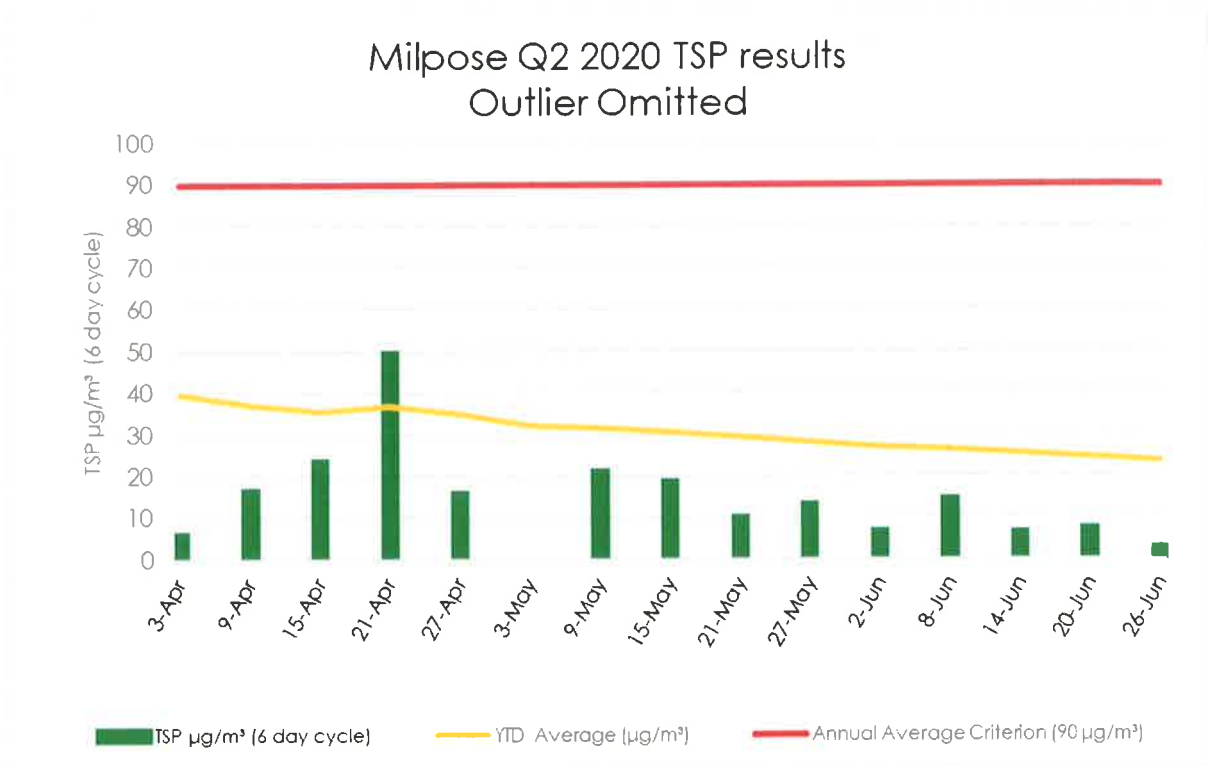


Figure 5: Milpose

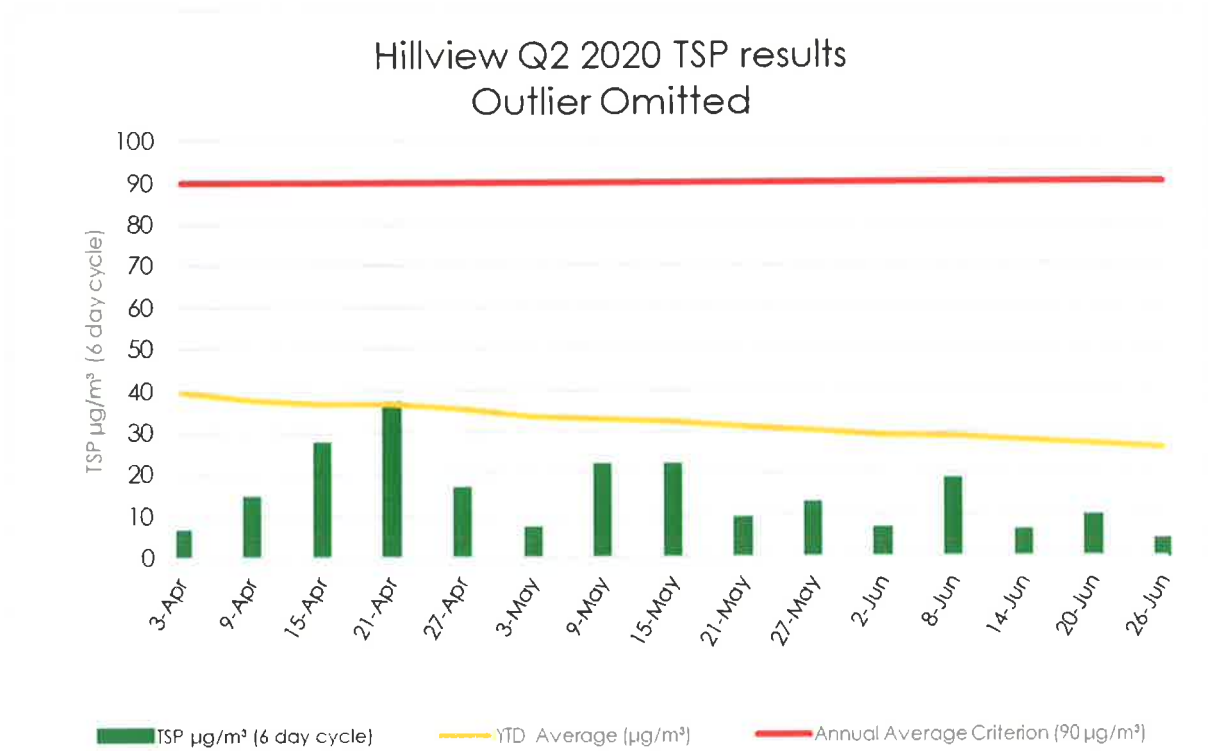


Figure 6: Hillview

2.3 Depositional Dust

Depositional dust gauges record the total of deposited dust for a month-long period and are a 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 the figures below. Please be advised that only monitoring locations ND19, ND20, ND21 & ND22 are regulated by the criteria stated in the Consent, as they are the only depositional dust gauges that are at a residence on privately-owned land. All other depositional dust gauges are used to inform operational activities. Refer to Appendix B for map of all depositional dust monitoring locations.

The indicative annual average for all locations are below the long-term impact assessment criteria (4 g/m²/month), complying with the conditions of the Consent.

During the quarter, two depositional dust gauges exceeded the criteria of the Consent. TDN5 (April 5.3 ug/m³, May 4.8 ug/m³) and TDNE (April 9.5 ug/m³, May 4.2 ug/m³, June 11.1 ug/m³). Although the two monitoring locations recorded results above 4 g/m², their corresponding residential location (ND19) was well below the licence condition criteria.

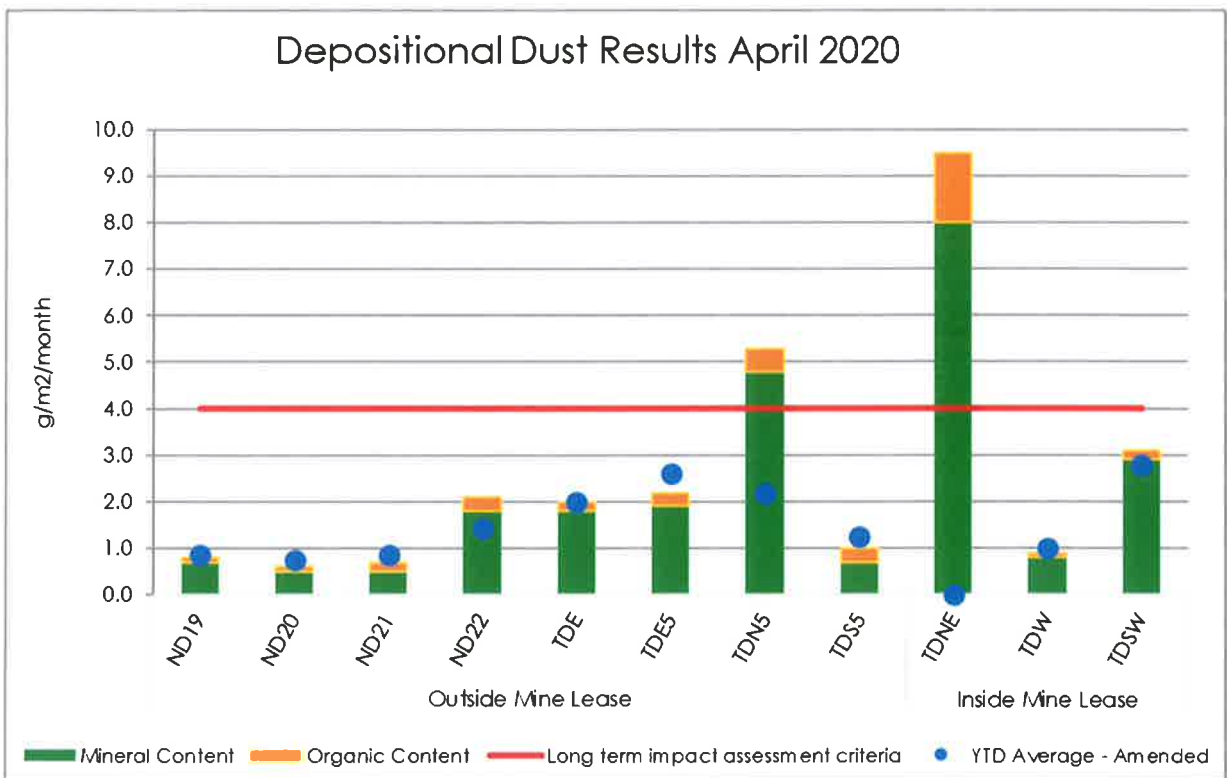


Figure 7: April depositional dust results for all locations

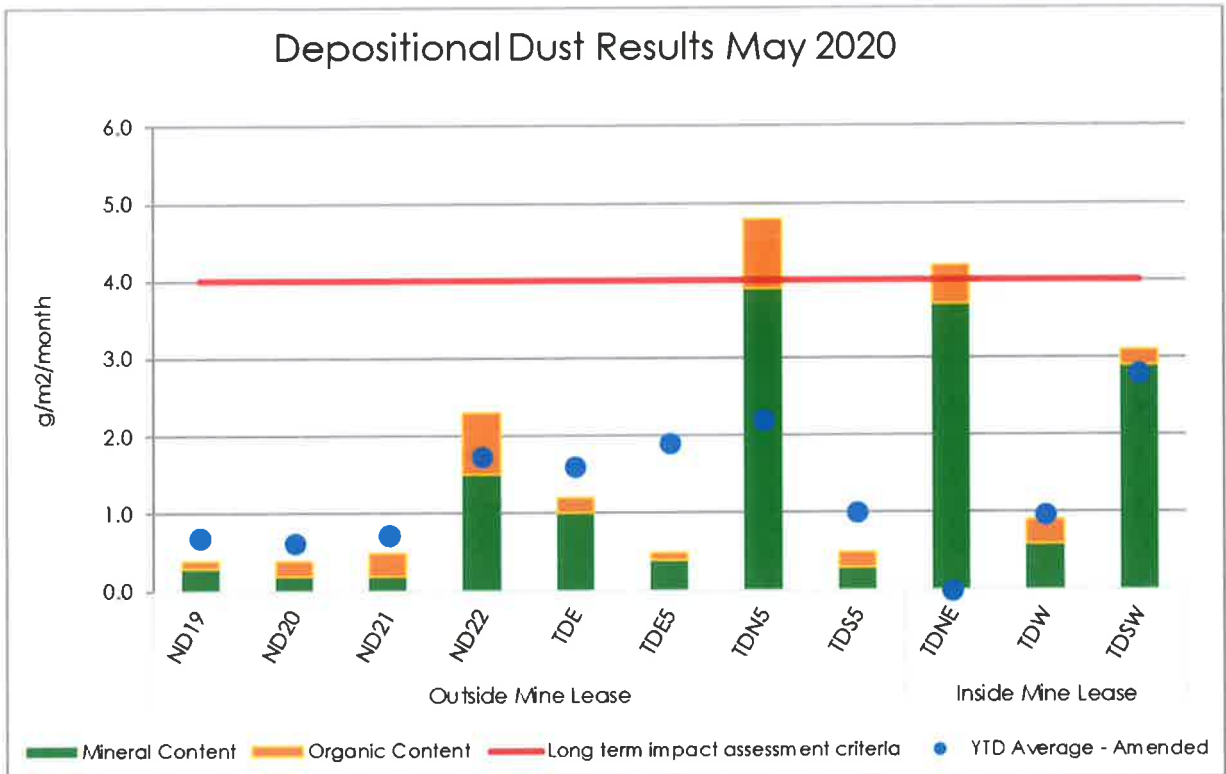


Figure 8: May depositional dust results for all locations

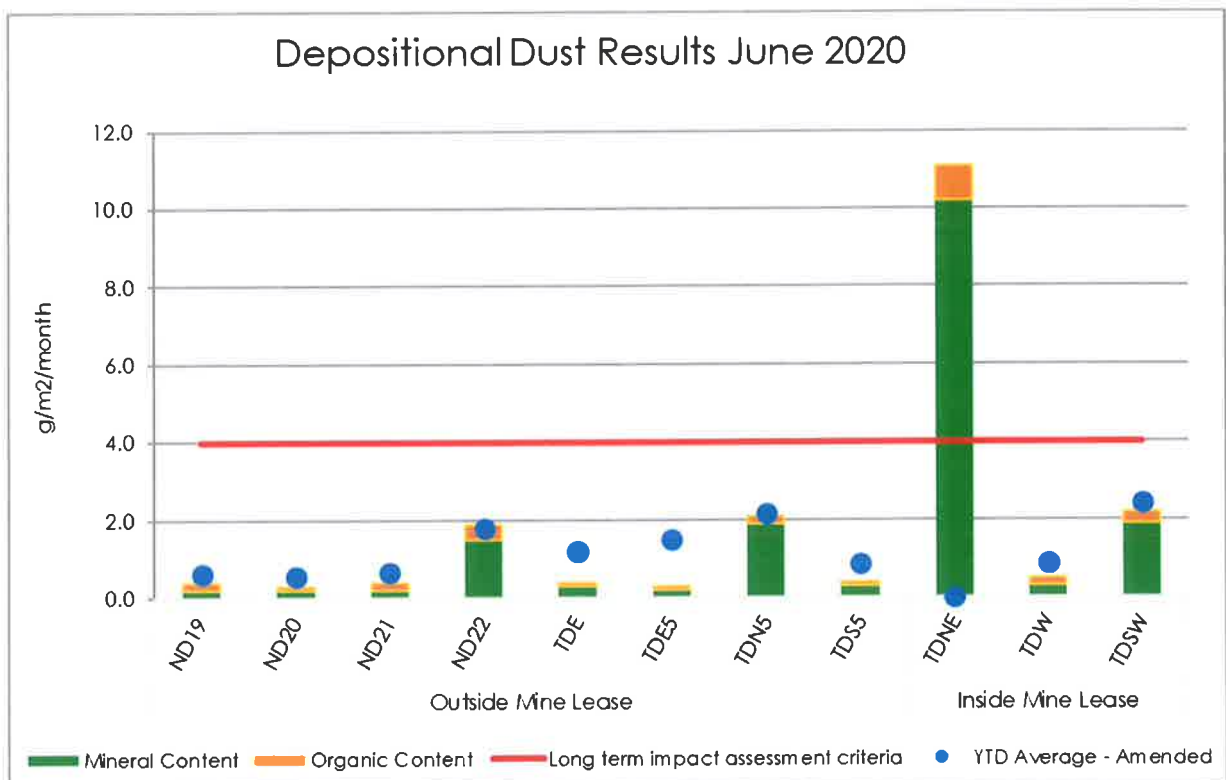


Figure 9: June depositional dust results for all locations

3. WATER

3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with 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. Refer to Appendix C & D for map of all surface and groundwater dust monitoring locations.

3.2 Quarterly Monitoring Analysis

Water quality monitoring was carried out generally in accordance with the Consent, with no significant changes to the pH, EC or copper concentrations for all locations. Many of the surface water monitoring locations had an increase in volume compared to the previous reporting period. A summary of the monitoring results at each location sampled are presented in Tables 1-6 below.

Table 1: Process Water System

Location	RP01	RP02	RP03	RP05	RP06	RP07	RP08	RP09	RP12	RP13	RP15	RP16	RP19	RP20	RP21	RP23
pH	8.41	7.96	8.82	8.15	8.5	8.34	7.99	8.23	8.83	8.11	8.46	9.23	8.49	8.59	7.73	8.64
EC (uS/cm)	2,129.9	1,276.6	1,842.1	434.57	400.34	840.04	1,410.0	3,842.4	183.3	667.09	1,300.8	204.25	2,430.6	5,545.4	1,040.1	361.26
Cu (mg/l)	0.094	0.043	0.048	0.024	0.047	0.042	0.038	0.027	0.023	0.069	0.019	0.021	0.016	0.045	0.026	0.019

Table 1 continued: Process Water System

Location	RP24	RP25	RP26	RP27	RP32	RP33	GT01	GT02	PWD
pH	8.77	8.27	8.15	8.69	8.54	9.19	8.64	9.67	8.19
EC (uS/cm)	208.45	301.78	182.63	3,040.4	916.9	168.36	988.64	2,161.1	2,950.3
Cu (mg/l)	0.047	0.026	0.052	0.023	0.125	0.023	0.01	0.057	0.057

Table 2: Farm Dams

Location	FD04	FD05	FD06	FD07	FD11	FD12	FD16	FD18	FD25	FD26	FD27
pH	8.86	7.79	7.36	8.29	8.04	9.04	8.8	8.24	7.89	8.36	8.37
EC (uS/cm)	112.65	47.71	59.66	58.87	157.22	82.73	95.96	2,108.1	42.75	119.03	111.91
Copper (mg/l)	0.026	0.013	0.009	0.011	0.036	0.016	0.018	0.028	0.008	0.044	0.022

Table 3: TSF Bores

Location	MB01	MB02	MB03	MB05	MB6B	W26	W27	W28	W29	W30	W31	W32
pH	7.52	7.47	6.74	7.11	6.96	6.92	11.15	6.84	13.06	7.37	7.46	11.85
EC (uS/cm)	5,777.4	9,444.3	21,311.0	24,128.0	16,048.0	13,528.0	5,543.6	15,879.0	20,918.0	2,182.9	800.8	2,097.4
Copper (mg/l)	0.006	0.013	0.02	0.007	0.006	0.01	0.025	0.018	0.029	0.012	0.03	0.015

Table 4: Opencut Bores

Location	MB10	MB13	MB14	MB16	W14	W19	W20	W21	W22	W23	W24	W25
pH	7.33	7.15	7.41	6.64	7.56	7.95	7.42	9.81	7.03	6.86	7.68	7.9
EC (uS/cm)	13,860.0	23,302.0	2,520.8	16,990.0	7,352.2	5,998.9	13,230.0	13,613.0	15,788.0	18,250.0	1,925.0	1,816.7
Copper (mg/L)	0.011	0.019	0.015	0.012	0.004	0.011	0.014	0.003	0.006	0.013	0.009	0.013

Table 5: Underground Bores

Location	MB17	MB18	MB19	MB20	P101	P102	P139	P145	P149
pH	7.96	10.62	7.87	8.13	6.99	6.9	6.32	6.46	6.69
EC (uS/cm)	850.85	3,371.8	15,074.0	12,742.0	10,271.0	27,821.0	27,714.0	34.42	25,870.0
Copper (mg/L)	0.011	0.022	0.008	0.038	0.003	0.003	0.003	0.03	0.017

Table 6: Regional Bores

Location	Far Hilliers	Long Paddock	Moss	Wright
pH	7.42	8.65	7.53	7.7
EC (uS/cm)	597.87	877.6	2,223.1	833.11
Copper (mg/L)	0.004	0.006	0.008	0.008

4. 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.

4.1 Overview

CMOC undertakes a noise monitoring program that consists of both operator-attended and unattended surveys at the four nearest occupied residences 'Hubberstone', 'Milpose', 'Lone Pine' and 'Hillview'. Refer to Appendix E for map of all attended noise monitoring locations.

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.

4.2 Quarterly Monitoring Analysis

Attended noise monitoring was undertaken between 3 and 4 June 2020.

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 concentrate trucks (where present) and light 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 statutory noise criteria at all monitoring locations for all assessment periods. Furthermore, project related noise emissions are generally barely audible at monitoring locations. Extraneous non-mine sources such as traffic, wind in trees, livestock, birds, aircraft, dogs barking and insects were audible during the monitoring period. A summary of the monitoring results at each monitoring location are presented in Tables 7-11 below.

Table 7: Attended noise monitoring results for Hubberstone

Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
Day					
04/06/2020 16:03	68	43	28		Birds 25-68 Traffic 25-44 Livestock 26-41
04/06/2020 16:18	67	44	30	WD: SW WS: 1.0m/s Stab Class: A	Agriculture 30-65 Residential Noise 22-26 Dogs 28-37
04/06/2020 16:33	67	48	30		NPM Haul Trucks <25 NPM Site Hum <25
Site L _{Aeq} (15min) Contribution					<25
Site L _{A1} (1min) Contribution					<40
Evening					
03/06/2020 18:50	36	28	26		Traffic 26-56 Residential Noise 25-28
03/06/2020 19:05	56	36	26	WD: SW WS: <0.5m/s Stab Class: G	Livestock 25-48 NPM Site Hum <24-32 NPM Site Alarms <25
03/06/2020 19:20	46	31	28		
Site L _{Aeq} (15min) Contribution					27
Site L _{A1} (1min) Contribution					<40
Night					
04/06/2020 0:07	37	28	25		Livestock 22-39
04/06/2020 0:22	39	27	25	WD: S WS: 0.5m/s Stab Class: G	NPM Site Hum <21-34 NPM Site Alarms <20-22
04/06/2020 0:37	38	27	25		
Site L _{Aeq} (15min) Contribution					25
Site L _{A1} (1min) Contribution					<40

Table 8: Attended noise monitoring results for Lone Pine

Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
Day					
04/06/2020 15:06	70	45	20		Birds 22-70 Wind 19-27
04/06/2020 15:21	55	32	20	WD: S WS: 1.0m/s Stab Class: A	Aircraft 24-48 Insects 22-28 Dogs 28 -38
04/06/2020 15:36	64	36	21		Livestock 20-31 NPM Inaudible
Site L _{Aeq} (15min) Contribution					<20
Site L _{A1} (1min) Contribution					<40
Evening					
03/06/2020 19:52	45	27	23	WD: SW	Dogs 24-45 Birds <20
03/06/2020 20:07	40	26	23	WS: <0.5m/s Stab Class: G	Livestock 24-31 Distant Traffic 23-28
03/06/2020 20:22	38	25	23		NPM Site Hum <20-27
Site L _{Aeq} (15min) Contribution					23
Site L _{A1} (1min) Contribution					<40
Night					
03/06/2020 23:08	38	29	27	WD: S	Wind 24-34 Dogs 25-31
03/06/2020 23:23	41	31	28	WS: 1.0m/s Stab Class: G	Livestock 25-34 Birds 26-37
03/06/2020 23:38	40	27	25		Operator/Car 41 NPM Site Hum <22-25
Site L _{Aeq} (15min) Contribution					26
Site L _{A1} (1min) Contribution					<40

Table 9: Attended noise monitoring results for Milpose

Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
Day					
04/06/2020					Dogs 20-60
14:07	60	35	21		Agriculture 23-49
04/06/2020				WD: S	Birds 20-54
14:22	43	23	20	WS: 1.0m/s	Aircraft 24-52
				Stab Class: A	Wind 19-24
04/06/2020					Livestock 23-31
14:37	53	26	20		NPM inaudible
Site L _{Aeq} (15min) Contribution					<20
Site L _{A1} (1min) Contribution					<40
Evening					
03/06/2020					Dogs 20-47
20:59	47	22	19		Livestock 20-36
03/06/2020				WD: S	Aircraft 24-38
21:14	35	21	19	WS: <0.1m/s	Birds 22-26
				Stab Class: G	NPM Site Hum <20
03/06/2020					
21:29	40	25	20		
Site L _{Aeq} (15min) Contribution					<20
Site L _{A1} (1min) Contribution					<40
Night					
03/06/2020					Livestock 18-32
22:04	38	22	21	WD: S	Birds 21-63
03/06/2020				WS: <0.1m/s	NPM Site Hum <18-24
22:19	35	24	22	Stab Class: G	
03/06/2020					
22:34	63	35	22		
Site L _{Aeq} (15min) Contribution					22
Site L _{A1} (1min) Contribution					<40

Table 10: Attended noise monitoring results for Hillview

Date/Time (hrs)	Noise Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
Day					
04/06/2020 12:50	62	44	24	WD: W WS: 0.5m/s Stab Class: A	Traffic 25-58 Birds 20-51
04/06/2020 13:05	72	46	24		Residential noise 35-72 Offsite NPM
04/06/2020 13:20	63	43	25		Concentrate Truck 33-62 NPM Inaudible
Site L _{Aeq} (15min) Contribution					<20
Site L _{A1} (1min) Contribution					<40
Evening					
04/06/2020 18:01	63	50	31	WD: S WS: <0.5m/s Stab Class: G	Traffic 22-68 Dogs 20-37
04/06/2020 18:16	59	44	22		Aircraft 25-39 Livestock 20-31
04/06/2020 18:31	68	49	33		Residential noise 40-58 NPM Inaudible
Site L _{Aeq} (15min) Contribution					<25
Site L _{A1} (1min) Contribution					<40
Night					
04/06/2020 01:06	45	33	30	WD: SE WS: 1.5m/s Stab Class: G	Wind 30-50
04/06/2020 01:21	50	36	34		Livestock 30-41 NPM Inaudible
04/06/2020 01:36	42	34	32		
Site L _{Aeq} (15min) Contribution					<25
Site L _{A1} (1min) Contribution					<40

Table 11: Attended road noise survey results

Time (hrs)/Duration	Measured Noise		Criteria dB LAeq(1hr)	Description and SPL dBA
	Descriptor (re 20 µPa) dB LAeq	Meteorology		
04/06/2020 12:50 (Day) (1hour duration)	44	WD: W WS: 0.5m/s Stab Class: A	55	Traffic 25-62 Birds 20-48 Agriculture 35-72 NPM Concentrate Truck 33-62 (1 movement)
04/06/2020 18:01 (Evening) (1hour duration)	49	WD: S WS: <0.5m/s Stab Class: G	55	Traffic 22-68 Dogs 20-37 Aircraft 25-37 Livestock 20-31 Agriculture 40-58 NPM Concentrate Truck 35-60 (1 movement) Vehicles Enter/Exit NPM Site Approx. 65