



Maxwell Infrastructure
Environmental Monitoring Data
Quarter 4 2019

1 INTRODUCTION

Maxwell Infrastructure (formerly Drayton Mine) is owned by Malabar Coal. This report has been compiled to present environmental monitoring data for Maxwell Infrastructure in accordance with Schedule 5, Condition 11 (b) and (c) of Project Approval 06_0202.

This report covers the reporting period 1 October to 31 December 2019. Summaries of historic environmental monitoring data (prior to 2019) can be found in the Annual Environmental Management Reports located on the Malabar Coal website.

2 MONITORING RESULTS

Deposited dust monitoring results are provided in **Table 1**.

Continuous TEOM PM₁₀ monitoring results are provided in **Figure 1**.

Surface water quality monitoring results are provided in **Table 2**.

Groundwater quality results are provided in **Table 3**.

Groundwater level results are provided in **Table 4**.

Noise monitoring results are provided in **Table 5**.

Locations of monitoring sites are shown in **Appendix 1**.

Table 1: Deposited dust monitoring results for Quarter 4.

Gauge	Insoluble Solids Result (g/m ² /month)			Annual Mean Limit (g/m ² /month)	2019 Annual Mean (g/m ² /month)
	October	November	December		
2175	2.4	5.4	4.3	2.8	2.8
2230	3.5	6.7	3.1	2.9	2.9
2235	3.0	4.8	2.0	3.2	3.2
2247	2.6	5.9	4.3	2.8	2.8

Note: Elevated deposited dust results were recorded at all Maxwell Infrastructure gauges in November 2019. Elevated results were also recorded at gauges 2175 and 2247 in December 2019. A number of bushfires occurred throughout NSW in November and December 2019 and smoke, ash and dust from these fires is likely to have contributed to elevated deposited dust levels in the region. The year-to-date mean of results recorded at all gauges remain below the annual mean limit.

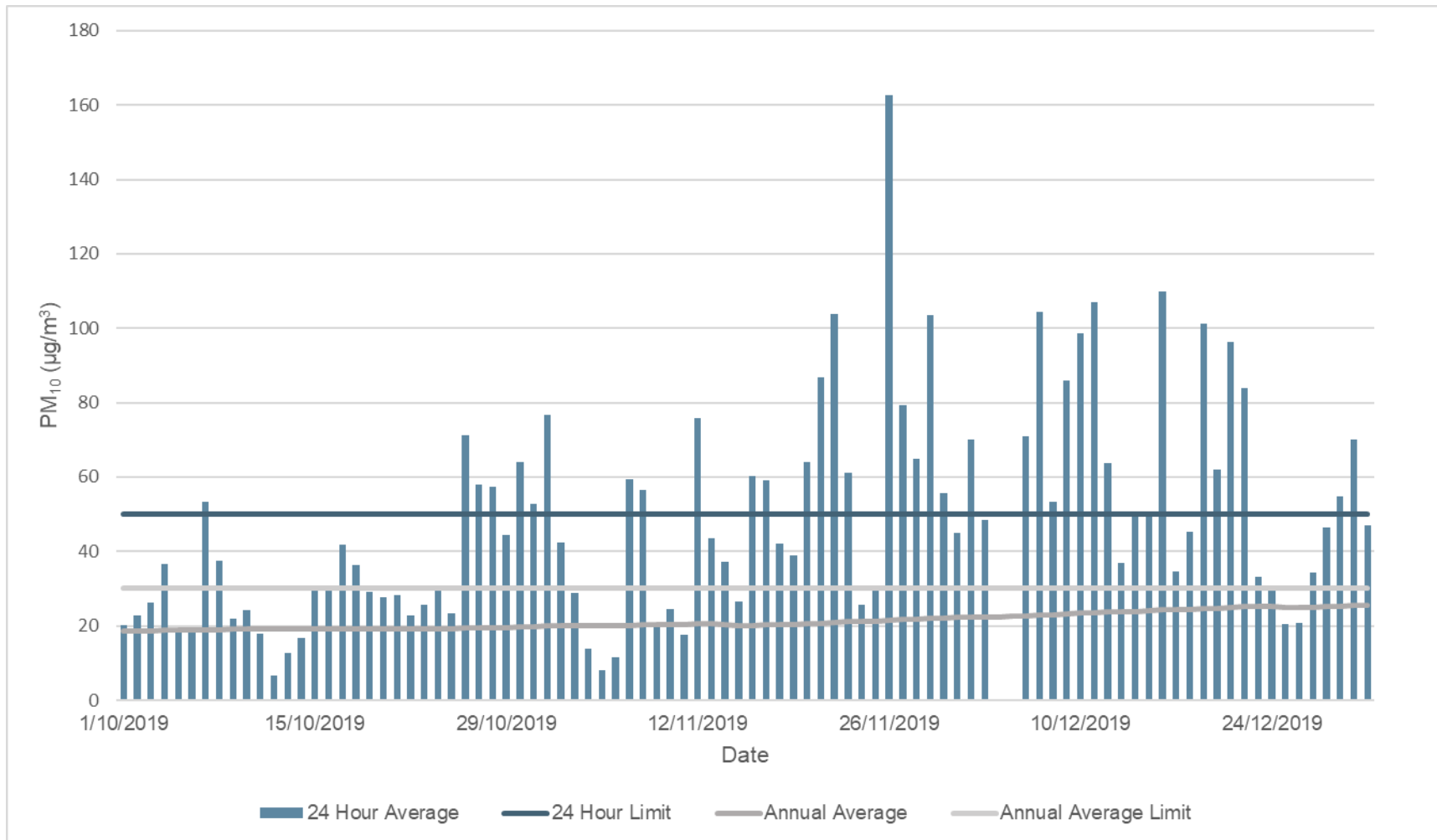


Figure 1: TEOM PM₁₀ monitoring results for Quarter 4.

Notes:

- On 13 November 2019 an invalid 24-hour average PM₁₀ result was recorded due to an instrument malfunction. Valid 1-hour average results were recorded for 92 percent of this day. These were utilised to calculate a valid 24-hour average PM₁₀ result.
- On 20 November 2019 an invalid 24-hour average PM₁₀ result was recorded due to an instrument malfunction. Valid 1-hour average results were recorded for 88 percent of this day. These were utilised to calculate a valid 24-hour average PM₁₀ result.
- On 7 October 2019 an elevated 24-hour average PM₁₀ result was recorded. The monitor was located downwind of Maxwell Infrastructure's operations for 3 percent of the day. Calculated based on five-minute TEOM data and wind direction, it is inferred that Maxwell Infrastructure made a contribution of 2.8 µg/m³. No operations were undertaken at Maxwell Infrastructure on 7 October 2019. Results recorded at by the UHAQMN indicated elevated PM₁₀ levels across the region.
- On 26 October 2019 an elevated 24-hour average PM₁₀ result was recorded. The monitor was located downwind of Maxwell Infrastructure's operations for 3 percent of the day. Calculated based on five-minute TEOM data and wind direction, it is inferred that Maxwell Infrastructure made a contribution of 2.0 µg/m³. No operations were undertaken at Maxwell Infrastructure on 26 October 2019. Results recorded at by the UHAQMN indicated elevated PM₁₀ levels across the region.
- On 27 October 2019 an elevated 24-hour average PM₁₀ result was recorded. The monitor was located downwind of Maxwell Infrastructure's operations for 25 percent of the day. Calculated based on five-minute TEOM data and wind direction, it is inferred that Maxwell Infrastructure made a contribution of 16.5 µg/m³. No operations were undertaken at Maxwell Infrastructure on 27 October 2019. Results recorded at by the UHAQMN indicated elevated PM₁₀ levels across the region.
- On 28 October 2019 an elevated 24-hour average PM₁₀ result was recorded. The monitor was located downwind of Maxwell Infrastructure's operations for 11 percent of the day. Calculated based on five-minute TEOM data and wind direction, it is inferred that Maxwell Infrastructure made a contribution of 4.3 µg/m³. In accordance with the Greenhouse Gas and Air Quality Management Plan operations at Maxwell Infrastructure on 28 October 2019 were modified to limit dust generation. Results recorded at by the UHAQMN indicated elevated PM₁₀ levels across the region.
- An elevated 24-hour average PM₁₀ result was recorded on the following dates:
 - 30 October 2019
 - 31 October 2019
 - 1 November 2019
 - 7 November 2019
 - 8 November 2019
 - 12 November 2019
 - 16 November 2019
 - 17 November 2019
 - 20 November 2019
 - 21 November 2019
 - 22 November 2019
 - 23 November 2019
 - 26 November 2019
 - 27 November 2019
 - 28 November 2019
 - 29 November 2019
 - 30 November 2019
 - 2 December 2019
 - 6 December 2019
 - 7 December 2019

- 8 December 2019
- 9 December 2019
- 10 December 2019
- 11 December 2019
- 12 December 2019
- 15 December 2019
- 16 December 2019
- 19 December 2019
- 20 December 2019
- 21 December 2019
- 22 December 2019
- 29 December 2019
- 30 December 2019

Each of these results were investigated and, on each date, it was found that regional air quality was likely to be impacted by bushfires occurring throughout NSW. Investigation details will be provided in Maxwell Infrastructure's 2019 Annual Environmental Management Report.

Table 2. Surface water quality monitoring results for Quarter 4

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TSS (mg/L)	TDS (mg/L)
Antiene Dam (2221)	Oct	-	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-	-
	Average	1	205	220	3550	158	3.0	35	194	1950	13	2800
Access Rd Dam* (2081)	Oct	54	604	1160	10700	774	7.7	97	941	4750	18	10000
	Nov	60	677	1200	9910	861	9.0	109	1060	5040	0	9670
	Dec	62	660	1230	11300	861	8.8	105	1030	5330	0	10300
	Average	91	609	1092	9998	750	8.2	98	928	4756	9	9219
DC2 Dam* (2109)	Oct	258	154	1400	8640	306	7.7	13	1270	2400	10	5340
	Nov	320	206	1950	10600	430	8.2	15	1800	3000	5	8340
	Dec	359	246	2820	14700	570	8.2	20	2420	4230	6	10900
	Average	247	161	1351	8085	301	7.9	14	1259	2129	12	5584
Rail Loop Dam* (2114)	Oct	100	107	300	2690	121	8.1	11	261	716	7	1470
	Nov	121	118	388	3110	160	7.9	16	363	990	0	2240
	Dec	207	163	502	4200	203	8.0	21	455	1440	6	3760
	Average	131	120	283	2593	120	8.1	13	269	768	8	1832
Far East Tip* (1895)	Oct	-	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-	-	-	-

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TSS (mg/L)	TDS (mg/L)
Savoy Dam* (1609)	Oct	62	788	3210	24300	2650	8.8	317	2610	13300	6	27300
	Nov	79	738	5310	28600	3690	9.0	462	3850	18600	0	35500
	Dec	164	701	7480	44000	5960	8.5	694	6300	22500	18	54300
	Average	105	708	2944	21040	2300	8.5	293	2424	11320	12	23070
SW 13	Oct	-	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-	-
	Average	219	518	697	7533	526	8.0	61	636	3603	15	6535
Industrial Dam* (1969)	Oct	100	405	857	7560	519	7.7	59	672	3500	6	6780
	Nov	113	433	872	7160	530	8.3	64	705	3250	20	6890
	Dec	122	434	898	8120	551	8.4	63	726	3690	0	6880
	Average	91	401	791	7272	499	8.1	59	675	3241	13	6226
OPC Dam*	Oct	296	676	1300	11500	842	8.1	98	1050	4970	14	10700
	Nov	253	507	1060	8400	635	8.7	80	831	3770	74	8150
	Dec	-	-	-	-	-	-	-	-	-	-	-
	Average	176	531	957	8963	655	8.3	82	831	3965	22	7949
V Notch*	Oct	525	557	3280	18800	783	7.5	22	3100	5770	11	15600
	Nov	511	591	4010	19800	962	8.0	29	3920	7500	0	18500
	Dec	429	651	5170	27900	1300	8.1	37	5250	8500	0	25300
	Average	401	535	2873	17442	766	8.0	27	3031	6209	6	14488

Notes:

Site 2221 (Antiene Dam) was too low to sample in the reporting period.

Site 1895 (Far East Tip) was not accessible in the reporting period.

Site SW13 was not accessible in the reporting period.

The OPC Dam site was too low to sample in December 2019.

Average is for 2019 (January – December 2019).

Maxwell Infrastructure is a closed water management system with all water maintained on-site for use in operational activities.

* Indicates mine water storage.

Table 3: Groundwater quality monitoring results for Quarter 4

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TDS (mg/L)	TSS (mg/L)
DS1	Oct	248	510	886	8100	6.4	21	1050	3490	290	6840	248
	Nov	285	496	909	7470	6.6	20	996	3450	161	5740	285
	Dec	300	524	890	8310	6.5	22	1070	3440	196	6470	300
	Average	266	515	842	7991	6.7	22	1049	3518	435	6214	266
DS2	-	-	-	-	-	-	-	-	-	-	-	-
	Average	959	515	4645	21700	7.2	41	3610	7185	19	19150	959
DS3	-	-	-	-	-	-	-	-	-	-	-	-
	Average	979	520	1345	14200	7.1	40	2145	6575	713	13300	979
R4241	-	-	-	-	-	-	-	-	-	-	-	-
	Average	631	228	1085	5800	7.1	15	611	1024	53	3925	631
F1162	-	-	-	-	-	-	-	-	-	-	-	-
F1167	-	-	-	-	-	-	-	-	-	-	-	-
F1024	-	-	-	-	-	-	-	-	-	-	-	-
F1164	-	-	-	-	-	-	-	-	-	-	-	-
F1163	-	-	-	-	-	-	-	-	-	-	-	-
F1168	-	-	-	-	-	-	-	-	-	-	-	-
W1102	-	-	-	-	-	-	-	-	-	-	-	-

Table 4. Reduced standing groundwater levels (mAHD) for Quarter 4

Site	October	November	December	2019 Average
DS1	223.41	223.36	223.27	223.45
DS2	238.27	238.47	238.37	238.66
DS3	234.87	234.95	235.62	235.54
R4241	175.21	175.19	174.82	174.95
F1162	121.26	121.25	121.25	121.28
F1167	159.88	158.89	158.9	159.49
F1024	178.68	178.68	178.67	178.68
F1164	119.28	119.28	119.29	119.28
F1163	-	-	-	-
F1168	-	-	-	-
W1102	-	-	-	-

Notes:

Water quality is analysed monthly at DS1 and twice annually at other monitoring sites (in March and September).

Sites W1102 and F1163 were not accessible in the reporting period.

Site F1168 was unable to be sampled in the reporting period as it was blocked.

Average is for 2019 (January – December 2019)

Table 5. Noise monitoring results for Quarter 4

Sampling point	Day (LA eq (15 minute))		Evening (LA eq (15 minute))		Night (LA eq (15 minute))		Night (LA1 (1 minute))		Exceedance (yes/no)	Observations
	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
R12	35	-	35	-	39	-	47	-	-	
R13	35	-	35	-	36	-	45	-	-	
R14	35	-	35	-	37	-	47	-	-	
R16*	35	-	35	-	38	-	47	-	-	
R17	35	-	35	-	38	-	47	-	-	
R18	35	-	35	-	40	-	47	-	-	
R19	35	-	35	-	41	-	47	-	-	
R20	35	-	35	-	41	-	45	-	-	
R21	35	-	36	-	41	-	45	-	-	
R22	35	-	36	-	42	-	45	-	-	
R23	35	-	37	-	40	-	47	-	-	
R25	35	-	37	-	41	-	47	-	-	
R26	36	-	36	-	35	-	47	-	-	
R27	36	-	36	-	36	-	47	-	-	
R28	36	-	37	-	37	-	47	-	-	
R29	36	-	37	-	38	-	47	-	-	
R31	36	-	37	-	39	-	47	-	-	
R32	36	-	37	-	42	-	47	-	-	
R33	37	-	38	-	36	-	45	-	-	
R34	38	-	38	-	38	-	45	-	-	
R35	38	-	38	-	38	-	45	-	-	

R37	38	-	39	-	38	-	45	-	-	
R42	39	-	40	-	39	-	45	-	-	
R61*	39	-	40	-	39	-	45	-	-	
R69	40	-	39	-	39	-	47	-	-	
R70	40	-	40	-	39	-	47	-	-	
R71	41	-	41	-	39	-	47	-	-	
R72*	35	-	35	-	35	-	47	-	-	
R75*	35	-	35	-	35	-	47	-	-	
R76*	35	-	35	-	35	-	47	-	-	
R86	35	-	35	-	35	-	45	-	-	
All Other Privately-Owned Land	35	-	35	-	35	-	45	-	-	
Additional Information										
Date of Final Report	-									
Date Sampled	-									
Weather Conditions	-									
Notes	<p>Noise monitoring is conducted 6-monthly in March and September</p> <p>* Measured: R16 (Doherty), R35 (Wilson), R61 (Skinner), R72 (Robertson), R75 (Shaman), and R76 (Holder). The noise levels at all other locations are determined by noise modelling or extrapolation.</p>									

APPENDIX 1 – MONITORING LOCATIONS



 <p>0 0.5 1 1.5 km</p> 	<p>Legend</p> <ul style="list-style-type: none"> ● TEOM Monitoring ● Deposited Dust Monitoring ● Surface Water Monitoring ● Groundwater Monitoring ● Attended Noise Monitoring — Project Approval Boundary 		<p style="text-align: center;">Monitoring Sites</p> <hr/> <p>Drawn by: RH Checked by: DM Date: [29/04/2019]</p>
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