



Maxwell Underground Project
Environmental Monitoring Data
Quarter 4 2021

1 INTRODUCTION

This report has been compiled to present environmental monitoring data for the Maxwell Underground Coal Mine Project (the project) in accordance with Schedule 2, Condition E17 (a) (vii) of SSD-9526.

This report covers the reporting period 1 October to 31 December 2021. Summaries of historic environmental monitoring data (prior to this report) can be found in the Annual Environmental Management Reports located on the Malabar Resources website.

2 MONITORING RESULTS

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

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

Continuous TEOM PM_{2.5} monitoring results are provided in **Figure 1**

Mine storage surface water quality monitoring results are provided in **Table 2**.

Downstream surface water quality monitoring results are provided in **Table 3**

Surface water quality field measurements from Saddlers Creek are compared to trigger levels in **Table 4**

Surface water quality laboratory results from Saddlers Creek are compared to trigger levels in **Table 5**

Groundwater quality results for Maxwell Infrastructure bores are provided in **Table 6**

Groundwater quality results for Maxwell Underground bores are provided in **Table 7**

Groundwater level results are provided in **Table 8**

Noise monitoring results are provided from **Table 9**

Locations of monitoring sites are shown in **Appendix 1 to 3**.

Table 1: Deposited dust monitoring results for Quarter 4.

Gauge	Insoluble Solids Result (g/m ² /month)			Annual Mean Limit (g/m ² /month)	Rolling Annual Average to end of September 2021 (g/m ² /month)
	October	November	December		
2175	1.9	2.0	2.9	4.0	1.7
2230	2.5	2.1	1.8	4.0	2.7
2235	1.9	2.4	4.1	4.0	1.9
2247	2.4	1.2	1.5	4.0	1.4

Notes

Sampling notes from January 2022 state that sample location 2235 contained bird droppings (no such comment for December 2021 however it is implied that the December result was also contaminated given the elevated value).

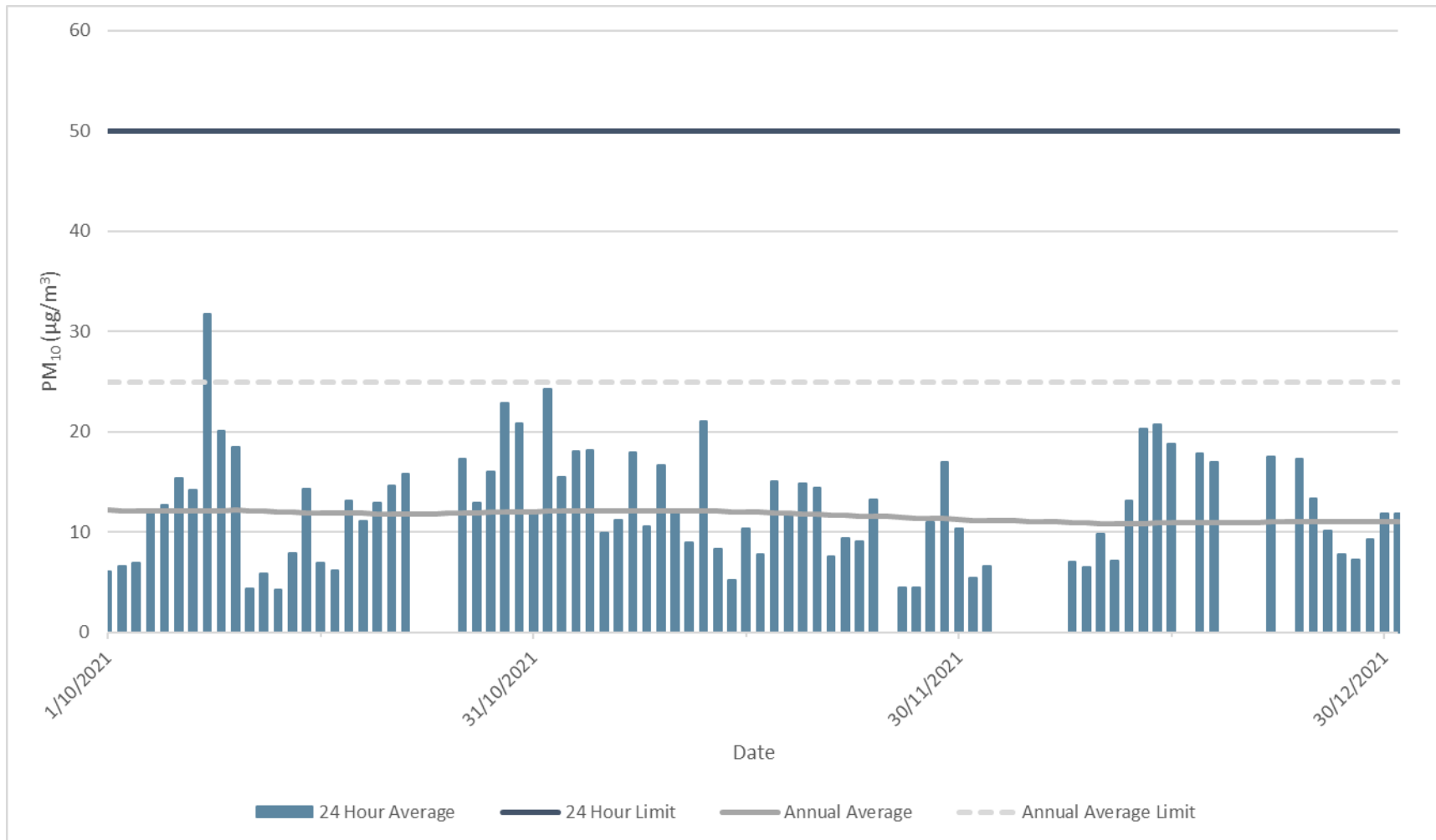


Figure 1: TEOM-1 PM₁₀ monitoring results for Quarter 4.

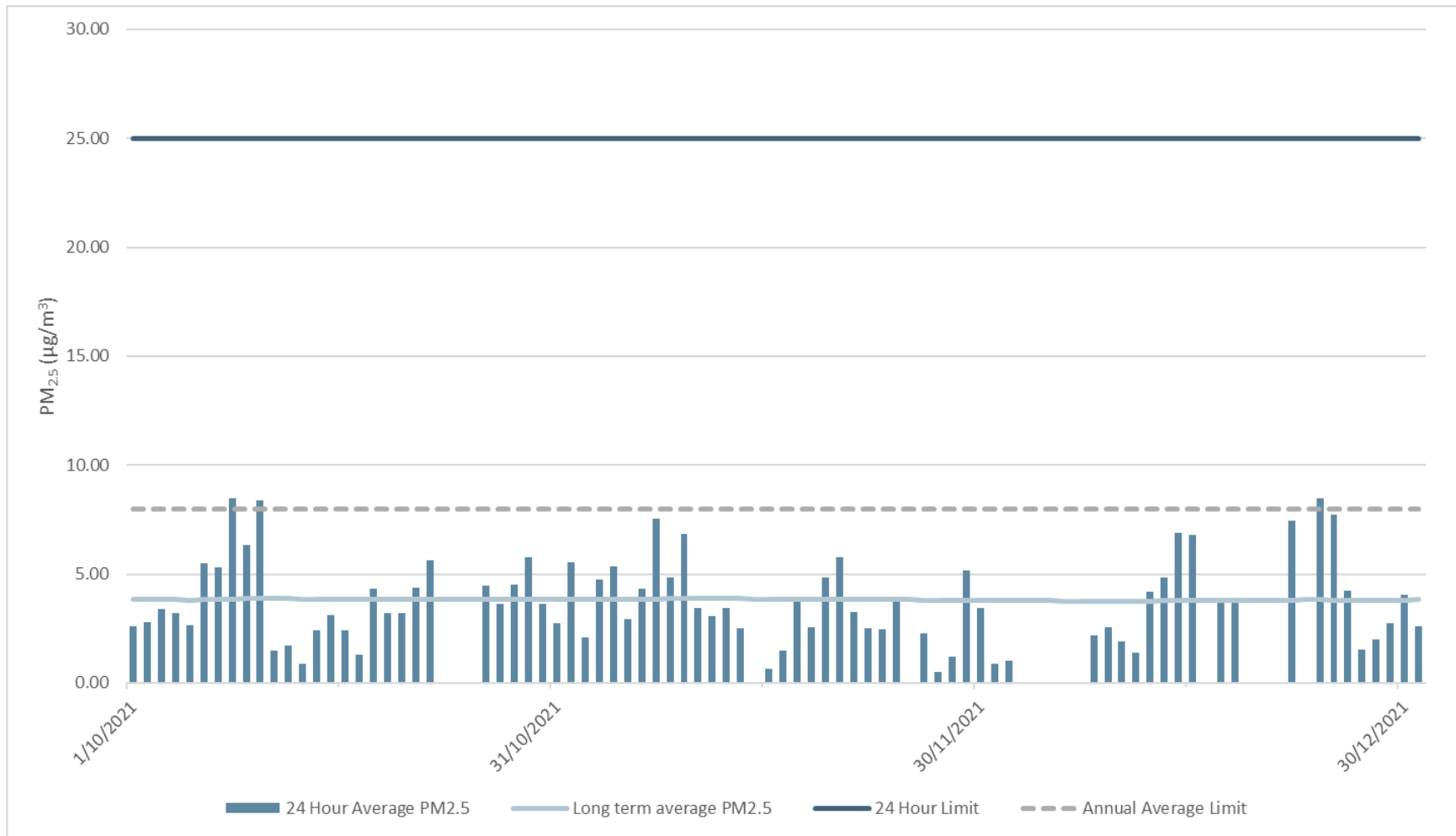


Figure 2: TEOM-1 PM_{2.5} monitoring results for Quarter 4.

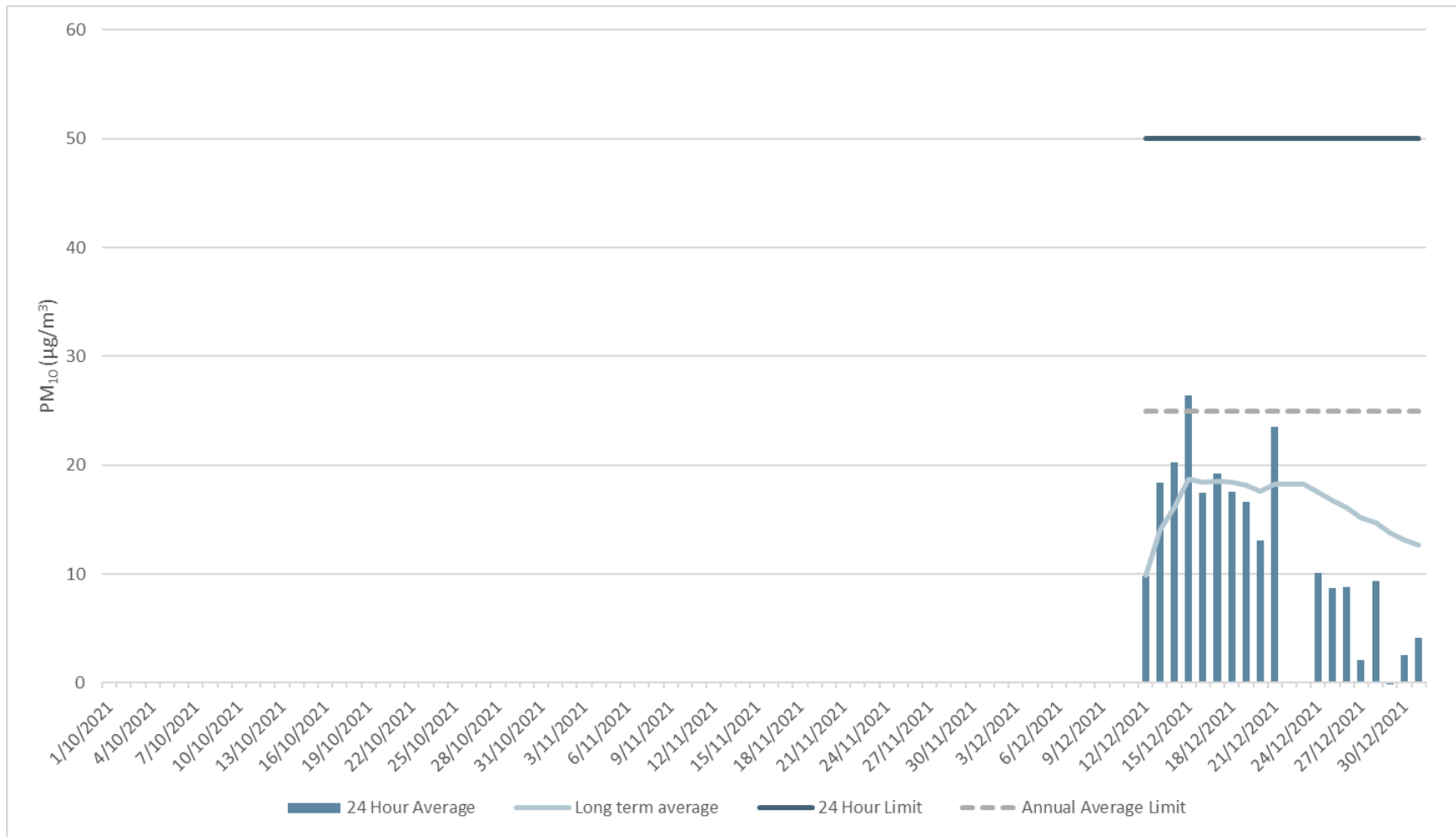


Figure 3: TEOM-2 PM₁₀ monitoring results for Quarter 4.

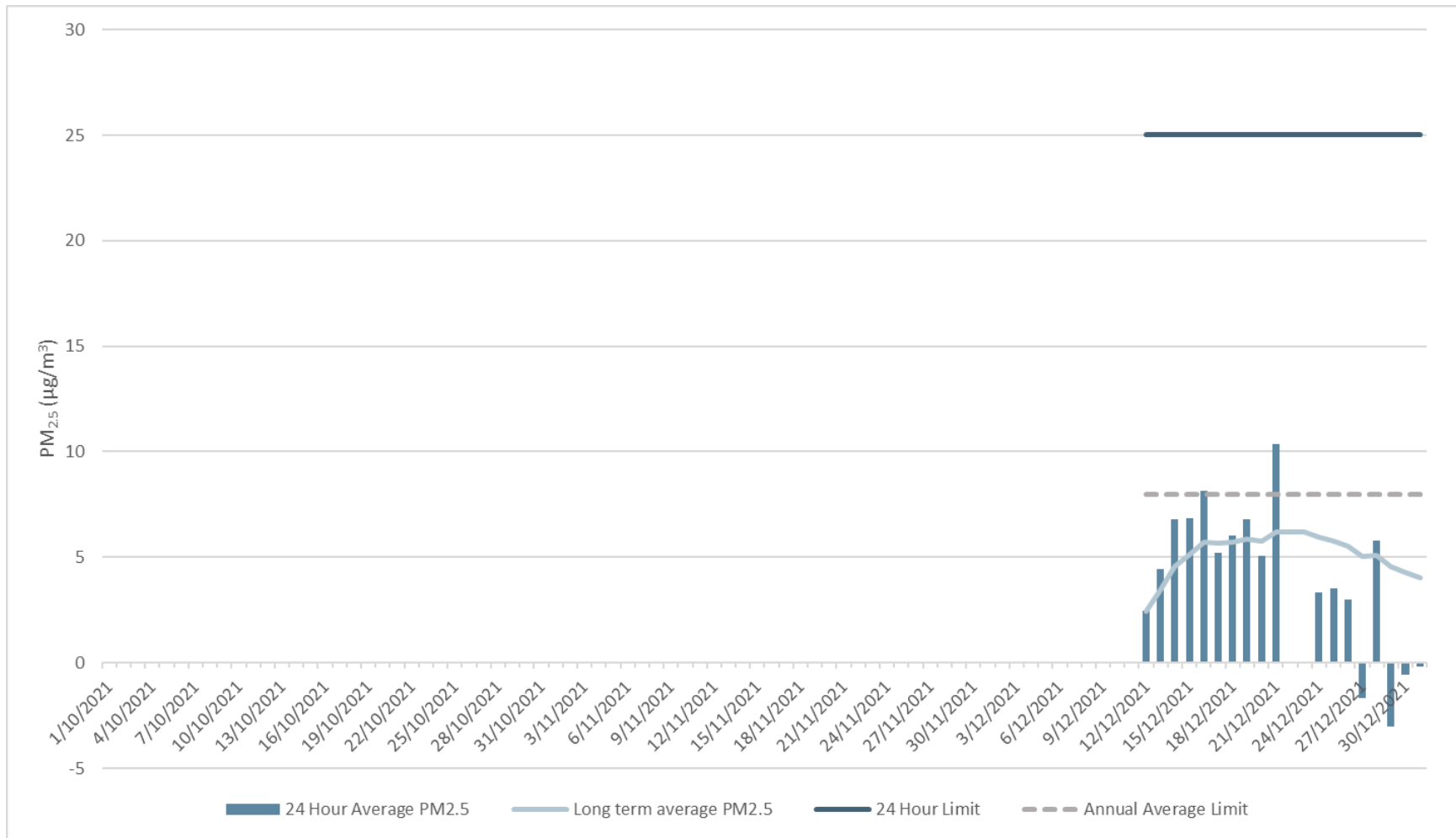


Figure 4: TEOM-2 PM_{2.5} monitoring results for Quarter 4.

Notes:

- Monitoring of PM₁₀ and PM_{2.5} commenced at TEOM-2 on 12 December 2021.
- All 24-hour averages during Quarter 4 were below the 24-Hour Limits for both PM₁₀ and PM_{2.5} at both TEOM-1 and TEOM-2. The results of the investigations into any exceedances (if required) are provided in the Annual Review.
- The rolling annual averages remained very low during the reporting period, which reflects lower recorded concentrations following the significant rainfall for the year to date with the resultant higher vegetation cover locally and across regional NSW. Levels are much lower than those experienced in 2019 and early 2020, which were predominantly due to regional dust storms and bush fires.
- Gaps in data are due to maintenance and scheduled calibration by monitoring contractor, plus occasionally power cuts and equipment failure. Such events result in <75% valid data to calculate a 24-hour average. Specific events during the reporting period were:
 - TEOM-1: 23–25/10 power tripped; 25/11 scheduled quarterly calibration; 3–7/12; 16/12, 19–21/12, 23/12/21: power tripped, diagnosed as overloaded power board which was replaced on 23/12;
 - TEOM-2: 22–23/12: ambient sensor failed and was replaced, resulting in <75% data capture threshold to generate a valid 24-hour average.
- To minimize future potential data loss due to power cuts/tripping, alerts are generated when more than 4 hours of data loss occurs.

Table 2. All mine water storage monitoring locations: laboratory water quality monitoring results for Quarter 4 (year to date average shown). See notes for further details.

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)
Access Rd Dam (2081)	Dec	82	278.0	563.0	5020.0	322.0	7.8	44.0	426.0	2270	12.0	4180
	Average	102	435	790	7118	543	8.1	70	690	3418	7.0	6955
DC2 Dam (2109)	Dec	54	28	144	1000	34	7.0	5.0	126	251	11	716
	Average	47	44	242	1613	56	7.0	5.8	226	397	17	1106
Rail Loop Dam (2114)	Dec	108	80.0	114	1320	63	7.7	6.0	114	436	8.0	936
	Average	112	96	151	1570	77	7.8	6.8	154	502	6.8	1051
Industrial Dam (1969)	Dec	88	150	294	2780	158	8.5	20	230	1100	5.0	2120
	Average	98	210	383	3598	231	8.5	31	327	1422	9.0	3060
OPC Dam	Dec	120	65	51	940	48	7.7	4.0	66	303	15	700
	Average	119	66	60	910	46	8.7	4.8	64	263	9.8	626
V Notch	Dec	226	246	714	5530	205	7.5	9.0	728	1910	5.0	4170
	Average	306	391	1161	8521	356	7.7	12	1318	2958	6.8	6995
ES Void	Dec	190	528	770	7420	539	8.1	72	592	3610	5.0	5770
	Average	248	548	789	7475	565	7.9	74	624	3715	6.0	6797

Notes:

The year-to-date value consists of the quarterly sample for the current quarter plus the three previous quarters, as per the Water Management Plan. The exception is for the V Notch dam, where samples are taken monthly as is required by the EPL.

Table 2 excludes mine water storages yet to be constructed (MEA dam, Mine Water Dam, Treated Water Dam, MEA Sedimentation Dam).

Table 3. All downstream surface water monitoring locations: laboratory surface water quality monitoring results for Quarter 4 compared to year-to-date averages (Q1–Q4 2021). See notes for further details.

Site	Month	Antimony	Arsenic	Bicarbonate (CaCO ₃)	Calcium	Chloride	EC	Magnesium	Molybdenum	Potassium	Selenium	Sodium	Sulphate (SO ₄)	TSS	TDS	Turbidity
Saddlers U/S	Oct	0.0010	0.0020	388	147	373	2250	116	0.0010	18	0.010	175	418	14	1580	5.7
	Average	0.0010	0.0022	260	153	230	1898	107	0.0010	19	0.010	129	535	18	1517	24
W3	Oct	Too low to sample														
	Average	0.0010	0.0014	649	107	1650	6356	277	0.0010	7.0	0.010	910	488	37	4024	12
SW1/ Saddlers	Oct	0.0010	0.0010	927	268	5280	15000	432	0.0010	6.0	0.010	2590	622	5.0	9910	3.4
	Average	0.0010	0.0013	718	214	3554	11532	334	0.0013	7.5	0.010	1963	562	28	7670	42
Saddlers D/S (W4-Bowfield)	Oct	0.0010	0.0010	311	34	849	3080	80	0.0010	9.0	0.010	476	109	58	1800	35
	Average	0.0010	0.0012	441	49	975	3801	105	0.0010	9.3	0.010	623	158	20	2253	30
MEA D/S	Oct	0.0010	0.0010	51	11	18	146	5.0	0.0010	9.0	0.010	11	1.0	8.0	149	26
	Average	0.0012	0.0010	55	9.2	11	144	4.4	0.0010	8.4	0.010	8.8	2.8	34	145	53
Saltwater D/S	Oct	Dry														
	Average	0.0010	0.0010	46	9.0	6.0	114	3.0	0.0010	16	0.010	4.0	1.0	33	175	50
SW3	Oct	Dry														
	Average	0.0010	0.0010	48	11	7.0	122	3.3	0.0010	11	0.010	4.3	10	25	172	85
Transport and Services Corridor sediment dams	See notes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

The average for the Saltwater Creek monitoring site consists of one sample only (6 January 2021), the average for the SW3 monitoring site consists of three samples (6 January, 16 March, 26 March 2021) as those locations were dry for all other sampling dates during the past 12 months.

The year-to-date value consists of the quarterly scheduled sampling and post-rainfall sampling during the past three previous quarters.

In addition to quarterly sampling, the MUG Project Water Management Plan requires sampling and analysis following 25mm of rain over a 24-hour period (defined as midnight to midnight and as recorded at the Drayton South meteorological recording station (AWS-2)). The results from any such rainfall events have been included in the year-to-date averages.

The quarterly field measurements of pH, EC, redox potential and temperature are recorded to enable subsequent evaluation in case of need and are not included in the quarterly reporting.

The location of the Transport and Services Corridor sediment dams (eg SW2) are to be confirmed as they are yet to be constructed hence monitoring has not yet commenced.

All results are in mg/L except Conductivity ($\mu\text{S}/\text{cm}$), pH (in pH units) and turbidity (nephelometric turbidity units).

The following will be reported in the AEMR:

- Comparison of water quality results from Saddlers Creek against Water Quality Trigger Values
- Results from the automatic weather stations (AWS-1 and AWS-2)
- Results of the stream health monitoring.

Table 4. Surface water field measurements at sites along Saddlers Creek during Q4 and comparison against trigger levels. If an exceedance of the trigger level occurs for three consecutive readings, this is highlighted in red.

Site		Field result			
		pH	EC	Turbidity	
		Units	µS/cm	NTU	
		Trigger	6.5–8.5	7600	64
		Sample date			
W3	26/10/21	Too low to sample			
Saddlers D/S (W4 – Bowfield)	26/10/21	7.9	3630	35	
MEA D/S	26/10/21	8.4	279	26	
Saddlers U/S	26/10/21	7.7	2817	5.7	
Saltwater D/S	26/10/21	Dry			
SW1/ Saddlers	26/10/21	7.8	17840	3.4	
SW2	Location to be established – see notes				
SW3	26/10/21	Dry			

Notes

- Any exceedances of trigger values will only be investigated if they occur after construction commences.
- Turbidity results presented are laboratory results; from Q1 2022, a field meter will be used to determine turbidity; this will enable direct comparison against the field trigger values for turbidity.
- Trigger for turbidity calculated by WRM Water based on the 80th percentile of the entire laboratory NTU dataset to end of 2021.

Table 5. Surface water laboratory results at sites along Saddlers Creek (scheduled and post-rainfall sampling) during Q4 and comparison against trigger levels. If an exceedance of the trigger level occurs for three consecutive readings, this is highlighted in **red.**

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO ₃	Ca	Cl	Mg	Mb	K	Se	Na	SO ₄	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9 ^(c)	13 ^(c)	24 ^(b) ^(c)	(a)	(a)	(a)	(a)	34 ^(c)	(a)	11 ^(c)	(a)	(a)	50	4900
W3	27/10/21	Scheduled	Too low to sample													
	12/11/21	Rainfall	0.0010	0.0010	0.0010	66	10	103	17	0.0010	7.0	0.010	62	41	17	406
	22/11/21	Rainfall	0.0010	0.0010	0.0010	187	22	284	44	0.0010	6.0	0.010	160	93	30	925
	10/12/21	Rainfall	Too low to sample													
Saddlers D/S (W4 – Bowfield)	27/10/21	Scheduled	0.0010	0.0010	0.0010	311	34	849	80	0.0010	9.0	0.010	476	109	58.0	1800
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	0.0010	0.0010	0.0010	80	17	111	17	0.0010	7.0	0.010	71	55	14.0	425
MEA D/S	27/10/21	Scheduled	0.0010	0.0010	0.0010	51	11	18	5.0	0.0010	9.0	0.010	11	1.0	8.0	149
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	No access, too wet													
Saddlers U/S	27/10/21	Scheduled	0.0010	0.0020	0.0020	388	147	373	116	0.0010	18.0	0.010	175	418	14.0	1580
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9 ^(c)	13 ^(c)	24 ^(b) ^(c)	(a)	(a)	(a)	(a)	34 ^(c)	(a)	11 ^(c)	(a)	(a)	50	4900
	10/12/21	Rainfall	No access, too wet													
Saltwater D/S	27/10/21	Scheduled	Dry													
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	No access, too wet													
SW1/ Saddlers	27/10/21	Scheduled	0.0010	0.0010	0.0010	927	268	5280	432	0.0010	6.0	0.010	2590	622	5.0	9910
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	0.0010	0.0010	0.0010	80	14	105	11	0.0010	7.0	0.010	63	17	14.0	372
SW2	27/10/21	-	Location to be established – see notes													
SW3	27/10/21	Scheduled	Dry													
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	0.0010	0.0010	0.0010	83	21	8.0	6.0	0.0010	11.0	0.010	6.0	10	7.0	216

Notes.

(a) No trigger; for interpretation purposes only. (b) Result is a combination of As (V) and As (III) (c) Trigger set as a preliminary guideline value.

In accordance with the Surface Water Management Plan, results from Saddlers Creek (median over three consecutive samples) will be compared to the relevant trigger levels. Trigger values are values that trigger further investigation or management action.

Table 6: Maxwell Infrastructure Groundwater quality biennial monitoring results for Quarter 4 (year to date average shown). See notes for further details. NS = Not sampled.

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Lead	Magnesium	Manganese	Nickel	pH value	pH trigger value
DS1	1.9	0.002	253	0.11	477	990	0.002	0.004	7570	-	0.003	323	1.1	0.022	6.51	-
Average	1.9	0.001	296	0.08	504	861	0.001	0.002	7548	-	0.001	330	1.39	0.021	6.53	-
R4241	0.16	0.002	518	0.24	195	969	0.001	0.003	5330	6253	0.005	274	0.344	0.022	7.14	Min: 6.0, Max: 8.5
Average	0.16	0.002	605	0.19	208	897	0.002	0.006	5180	-	0.009	297	0.305	0.016	7.10	-
F1162	0.24	0.002	522	0.17	101	738	0.003	0.003	3720	-	0.025	146	0.58	0.005	6.96	-
Average	0.24	0.002	522	0.17	101	738	0.003	0.003	3720	-	0.025	146	0.58	0.005	6.96	-
F1164	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	-
Average	NS	0.003	677	0.10	138	707	0.002	0.003	4320	-	0.033	185	0.64	0.006	6.90	-
GW01D	0.31	0.001	450	0.31	351	1280	0.003	0.008	5410	5680	0.001	149	0.263	0.063	6.86	Min: 6.0, Max: 8.5
Average	0.31	0.001	538	0.32	406	1198	0.001	0.003	5484	-	0.001	168	0.266	0.025	6.91	-
GW01S	7.5	0.003	488	0.15	235	2660	0.009	0.015	8600	9260	0.007	213	0.211	0.051	6.93	Min: 6.0, Max: 8.5
Average	7.5	0.01	367	0.15	218	2367	0.053	0.057	8013	-	0.030	211	0.296	0.171	6.96	-
GW02D	33.3	0.020	1620	0.29	27	1250	0.033	0.095	11500	10500	0.049	13	1.96	0.127	7.42	Min: 6.0, Max: 8.5
Average	33.3	0.015	1770	0.26	60	980	0.017	0.043	10640	-	0.025	15	1.25	0.052	7.42	*
GW02S	0.28	0.001	697	0.13	316	967	0.001	0.002	7030	9480	0.001	305	1.48	0.017	6.7	Min: 6.0, Max: 8.5
Average	0.28	0.002	871	0.12	368	905	0.003	0.004	7564	-	0.003	393	1.07	0.015	6.77	-

Table 6 continued

Site	Selenium	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DS1	0.01	925	3390	5	6290	0.04
<i>Average</i>	<i>0.01</i>	<i>987</i>	<i>3178</i>	<i>28</i>	<i>6393</i>	<i>0.03</i>
R4241	0.01	503	1090	24	3860	0.02
<i>Average</i>	<i>0.01</i>	<i>542</i>	<i>1027</i>	<i>61</i>	<i>3662</i>	<i>0.06</i>
F1162	0.01	506	360	110	2260	0.02
<i>Average</i>	<i>0.01</i>	<i>506</i>	<i>360</i>	<i>110</i>	<i>2260</i>	<i>0.02</i>
F1164	NS	NS	NS	NS	NS	NS
<i>Average</i>	<i>0.01</i>	<i>612</i>	<i>685</i>	<i>90</i>	<i>2900</i>	<i>0.03</i>
GW01D	0.01	510	610	82	3820	0.09
<i>Average</i>	<i>0.01</i>	<i>570</i>	<i>598</i>	<i>38</i>	<i>3738</i>	<i>0.04</i>
GW01S	0.43	1260	484	2420	5390	0.22
<i>Average</i>	<i>0.34</i>	<i>1237</i>	<i>508</i>	<i>6207</i>	<i>5407</i>	<i>0.38</i>
GW02D	0.03	2840	2840	3360	7250	0.21
<i>Average</i>	<i>0.01</i>	<i>2702</i>	<i>2752</i>	<i>1960</i>	<i>7808</i>	<i>0.13</i>
GW02S	0.01	887	2340	37	5340	0.02
<i>Average</i>	<i>0.01</i>	<i>999</i>	<i>2584</i>	<i>143</i>	<i>6136</i>	<i>0.04</i>

Table 7: Maxwell Underground Groundwater quality biennial monitoring results for Quarter 4 (year to date average shown). See notes for further details (under the new Maxwell Underground Project, sampling changed from quarterly to biennial and hence no sampling occurred for these bores in Q4 2021 as sampling occurred in Q3 2021 with the next scheduled sampling due Q1 2022). NS = Not sampled.

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	Lead	Magnesium	Manganese	Nickel	pH value
DD1005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.35	0.001	993	0.20	140	1753	0.006	0.027	7110	0.008	216	0.03	0.016	7.42
DD1014	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.14	0.001	847	0.35	75	2947	0.002	0.044	10187	0.006	43	0.17	0.004	7.38
DD1015	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.23	0.001	1110	0.19	113	1287	0.001	0.004	6000	0.007	181	0.22	0.004	7.10
DD1016	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.15	0.001	1180	0.26	161	1503	0.001	0.002	6197	0.002	305	0.16	0.001	6.95
DD1025	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.09	0.001	1237	0.17	242	3870	0.001	1.119	13167	0.002	451	0.25	0.014	6.99
DD1032	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.023	0.001	1200	0.26	11	1440	0.001	0.002	6603	0.001	4	0.01	0.001	7.93
DD1043	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.040	0.001	2347	0.37	43	1333	0.001	0.001	7913	0.001	26	0.03	0.001	7.04
DD1052	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.41	0.005	665	0.26	6	1805	0.002	0.556	6685	0.003	4	0.05	0.015	8.75
DD1057	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO ₃	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	Lead	Magnesium	Manganese	Nickel	pH value
Average	0.21	0.003	3523	0.36	11	1407	0.001	0.035	9967	0.001	6	0.04	0.002	7.59
MB03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	Dry	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MB1A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	4.2	0.003	647	0.09	104	623	0.011	0.034	2957	0.005	83	0.38	0.021	7.59
MB1R	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.070	0.001	1320	0.18	60	1293	0.001	0.002	6157	0.001	59	0.02	0.001	7.23
MB1W	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.063	0.001	1373	0.19	57	1183	0.001	0.002	5790	0.001	54	0.01	0.001	7.53
MB2A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.013	0.001	978	0.26	151	2830	0.001	0.001	10033	0.001	357	0.50	0.006	7.39
MB2R	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.077	0.001	995	0.23	36	1213	0.001	0.001	5407	0.001	47	0.02	0.001	8.06
MB3A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.023	0.001	826	0.30	48	2190	0.001	0.001	8637	0.001	230	0.01	0.001	7.59
MB3R	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.013	0.001	720	0.20	171	1373	0.001	0.001	6117	0.001	322	0.29	0.002	7.29
MB4A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.020	0.001	637	0.14	17	553	0.001	0.001	2733	0.001	33	0.02	0.001	8.14

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	Lead	Magnesium	Manganese	Nickel	pH value
MB4C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	0.75	0.001	292	0.05	57	111	0.001	0.001	860	0.001	42	0.27	0.002	7.24
MW1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	Dry	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	9.3	0.004	714	0.25	49	1490	0.035	0.011	5850	0.008	116	0.74	0.016	7.76
MW3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Average	Dry	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 7 continued

Site	Selenium	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DD1005	NS	NS	NS	NS	NS	NS
Average	0.01	1200	214	42	4113	0.03
DD1014	NS	NS	NS	NS	NS	NS
Average	0.01	2260	206	23	5937	0.02
DD1015	NS	NS	NS	NS	NS	NS
Average	0.01	977	165	41	3413	0.02
DD1016	NS	NS	NS	NS	NS	NS
Average	0.01	852	93	22	3710	0.01
DD1025	NS	NS	NS	NS	NS	NS
Average	0.01	2297	428	6	8290	0.09
DD1025	NS	NS	NS	NS	NS	NS
Average	0.01	1540	1	8	3900	0.01
DD1032	NS	NS	NS	NS	NS	NS
Average	0.01	1857	133	7	4997	0.01
DD1043	NS	NS	NS	NS	NS	NS
Average	0.01	1445	67	63	3965	0.09

Table 7 continued

Site	Potassium	Selenium	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DD1052	NS	NS	NS	NS	NS	NS	NS
Average	17	0.01	2707	1	26	6527	0.01
DD1057	NS	NS	NS	NS	NS	NS	NS
Average	NS	NS	NS	NS	NS	NS	NS
MB03	NS	NS	NS	NS	NS	NS	NS
Average	3	0.01	452	79	326	1747	0.07
MB1A	NS	NS	NS	NS	NS	NS	NS
Average	15	0.01	1373	83	32	3663	0.01
MB1R	NS	NS	NS	NS	NS	NS	NS
Average	14	0.01	1287	76	10	3480	0.01
MB1W	NS	NS	NS	NS	NS	NS	NS
Average	8	0.01	1733	700	37	6353	0.01
MB2A	NS	NS	NS	NS	NS	NS	NS
Average	9	0.01	1237	2	9	3033	0.02
MB2R	NS	NS	NS	NS	NS	NS	NS
Average	2	0.01	1587	550	10	5080	0.01

Table 7 continued

Site	Potassium	Selenium	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
MB3R	NS	NS	NS	NS	NS	NS	NS
Average	8	0.01	778	505	11	3977	0.01
MB4A	NS	NS	NS	NS	NS	NS	NS
Average	6	0.01	583	22	6	1593	0.01
MB4C	NS	NS	NS	NS	NS	NS	NS
Average	2	0.01	69	23	84	500	0.01
MW1	NS	NS	NS	NS	NS	NS	NS
Average	NS	NS	NS	NS	NS	NS	NS
MW2	NS	NS	NS	NS	NS	NS	NS
Average	8	0.03	1096	122	1550	3333	0.03
MW3	NS	NS	NS	NS	NS	NS	NS
Average	NS	NS	NS	NS	NS	NS	NS

Notes:

The Maxwell UG (MUG) Project Water Management Plan (WMP) was implemented for Q3 2021 and supercedes the requirements of the Maxwell Infrastructure WMP. The MUG Project WMP requires:

- the monthly recording of reduced standing water levels in all bores (standpipes either manually or using loggers and VWPs)
- quarterly recording (field measurement) of all standpipes for pH, EC, redox potential and temperature; and
- biennial sampling and analysis of all standpipes for TDS, TSS, major cations (Ca, Mg, Na), major anions (chloride, sulfate, carbonate, bicarbonate), total alkalinity, and total and dissolved metals (Al, As, B, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Se, Ag & Zn).

Of these, the following are new or amended variables required by the new MUG WMP:

- monthly rather than quarterly recording of reduced standing water levels where there are no loggers (however the long-term plan is to install loggers in all bores); for those with loggers and for the VWPs the data is downloaded quarterly;
- quarterly recording (field measurement) of redox potential and temperature (previously not required);
- biennial sampling and analysis for carbonate and total alkalinity (previously not required); these will be added to the table for Q4 2021 given the first sampling under the new plan occurred in Dec 2021;
- removal of the requirement to record barium (Ba), beryllium (Be), cadmium (Cd), cobalt (Co), potassium (K), vanadium (V), nitrite as N, nitrate as N, mercury (Hg), ammonia as N, total Kjeldahl nitrogen as N, total phosphorus (P) and reactive phosphorus as P.
- removal of bores DD1030, DD1034-A and B, DD1041 A and B.

Sampling for the MI bores under the previous Maxwell Infrastructure WMP occurred in June 2021 and was reported in the Q2 2021 report. Thereafter sampling transitioned to the new MUG Project WMP. The first biennial sampling of these bores under the new plan occurred on 14/12/21 and hence the quarterly reporting for Q4 2021 includes these new or amended results for the first time. Sampling of the MUG bores occurred in July 2021 and hence is next scheduled for January 2022 (Q1 2022) and hence there are no results in the Q4 2021 report for the MUG bores.

The year-to-date averages includes samples taken on a quarterly basis until the implementation of the new MUG Project WMP, which requires biennial sampling. The exception is for DS1 for which monthly samples are taken as per the EPL for EC, pH and TDS, and hence the average presented is the average of all samples taken during each of the past 12 months for those variables.

All results are in mg/L except Conductivity ($\mu\text{S}/\text{cm}$) and pH (in pH units).

Trigger levels

The electrical conductivity trigger level was exceeded at site GW02D in Q4 2021 and is the first exceedance. Monitoring notes indicate that the logger was suspended in mud, implying that the bore contained only mud and no water, hence the high EC value. It is planned that the logger will be raised out of the mud. The TARP for hard rock aquifers requires further investigation following the exceedance of three consecutive groundwater level, pH or EC trigger levels.

Table 8. All groundwater bores: Reduced standing groundwater levels (mAHD) during Quarter 4 compared to the year-to-date average

Site (with seam names for VWPs)	Oct	Nov	Dec	Year to date average	Type of bore	Type of measurement as of Sept 2021
DS1	223.61	223.73	223.80	223.52	Standpipe	Manual
R4241	174.89	175.99	176.81	175.77	Standpipe	Manual
F1162	133.59	135.80	136.59	134.44	Standpipe	Manual
F1164	131.88	134.32	129.19	131.82	Standpipe	Manual
GW01D	202.9	202.8	202.52	200.61	Standpipe	Logger
GW01S	198.8	198.7	198.08	198.29	Standpipe	Logger
GW02D	136.5	136.4	136.50	136.54	Standpipe	Logger
GW02S	193.1	192.8	192.44	190.96	Standpipe	Logger
GW04	143.7	NS	143.9	143.87	Standpipe	Manual
BLK6R12 – VW1 (WB)	159.7	159.8	159.8	159.9	VWP	Logger
BLK6R12 – VW2 (RB)	147.8	147.8	147.8	147.9	VWP	Logger
BLK6R12 – VW3 (WN)	122.0	122.0	122.0	122.2	VWP	Logger
BLK6R12 – VW4 (BK)	121.4	121.4	121.4	121.4	VWP	Logger
DD1005	136.1	144.2	144.1	142.6	Standpipe	Manual
DD1014	133.8	133.8	133.8	134.0	Standpipe	Manual
DD1015	NS	NS	NS	124.7	Standpipe	Manual
DD1016	141.3	141.4	141.4	141.4	Standpipe	Manual
DD1025	155.3	155.3	155.3	155.3	Standpipe	Manual
DD1027	NS	133.9	133.9	134.0	Standpipe	Manual
DD1032	128.3	128.4	128.4	128.4	Standpipe	Manual
DD1043	127.9	NS	128.7	128.0	Standpipe	Manual

DD1052	114.4	113.9	118.2	115.0	Standpipe	Manual
DD1057	124.5	124.5	124.5	124.5	Standpipe	Manual
MB03 ⁽¹⁾	114.8	114.8	114.8	114.8	Standpipe	Logger
MB1-Alluvial	73.9	73.5	NS	73.4	Standpipe	Logger
MB1-Redbank	74.9	75.1	75.6	75.2	Standpipe	Manual
MB1-Whybrow	74.2	75.5	75.1	74.6	Standpipe	Manual
MB2-Alluvial	113.7	114.0	114.1	113.8	Standpipe	Logger
MB2-Regolith	115.4	115.5	NS	115.4	Standpipe	Logger
MB3-Alluvial	129.9	129.7	NS	129.5	Standpipe	Logger
MB3-Regolith	128.8	129.4	129.4	129.0	Standpipe	Logger ⁽²⁾
MB4-Alluvial	72.6	71.8	NS	71.6	Standpipe	Logger
MB4-Coal	70.7	NS	NS	70.8	Standpipe	Manual
MW1	128.5	127.8	127.9	128.1	Standpipe	Logger
MW2	112.4	NS	NS	112.4	Standpipe	Logger
MW3	74.0	NS	NS	74.0	Standpipe	Manual
RBD1 – VW1 (WB)	147.6	147.7	147.7	147.6	VWP	Logger
RBD1 – VW2 (RB)	143.0	143.1	143.1	143.2	VWP	Logger
RBD1 – VW3 (WN)	127.8	127.9	128.4	128.0	VWP	Logger
RBD1 – VW4 (BK)	87.9	87.9	88.0	87.9	VWP	Logger
RD1189 – VWP1 (WH)	184.3*	184.8	NS	184.9	VWP	Logger
RD1189 – VWP2 (AZZBF)	59.1*	58.9	NS	58.6	VWP	Logger
RD1189 – VWP3 (WW12)	142.2*	142.0	NS	142.1	VWP	Logger
RD1189 – VWP4 (Mt Arthur seam)	141.0*	141.1	NS	141.1	VWP	Logger
RD1189 – VWP5 (PF2)	137.0*	136.3	NS	136.5	VWP	Logger

RD1189 – VWP6 (BY)	136.6*	135.9	NS	136.1	VWP	Logger
RD1189 – VWP7 (WY)	133.8*	134.4	NS	135.0	VWP	Logger
RD1192- VWP1 (WB)	148.1	148.1	148.4	148.3	VWP	Logger
RD1192- VWP2 (RB)	132.9	132.9	132.8	133.4	VWP	Logger
RD1192-VWP3 (BK)	148.9	149.1	149.4	148.5	VWP	Logger
MB1VWP (VWP1) (INT)	74.9	75.2	76.0	75.1	VWP	Logger
MB1VWP (VWP2) (INT)	86.6	86.7	87.0	87.0	VWP	Logger
MB1VWP (VWP3) (INT)	95.1	95.3	95.4	95.3	VWP	Logger
MB1VWP (VWP4) (WB)	96.4	96.6	96.8	96.6	VWP	Logger
MB1VWP (VWP5) (WN)	99.1	99.9	100.2	99.6	VWP	Logger
WND16 (VWP1) (WB)	111.8	112.7	112.8	112.8	VWP	Logger
WND16 (VWP2) (WN)	107.1	107.3	107.2	107.6	VWP	Logger
WND16 (VWP4) (BK)	109.2	109.2	109.1	109.4	VWP	Logger
WND26 (VWP1) (WB)	134.3*	134.3	134.4	134.3	VWP	Logger
WND26 (VWP2) (RB)	130.2*	130.2	130.3	130.3	VWP	Logger
WND26 (VWP3)	137.0*	137.3	137.6	137.4	VWP	Logger

(WA)						
------	--	--	--	--	--	--

1. In addition to a water level logger, a barologger was installed at MB3-Regolith on 23 August 2021 (a barologger enables the correction of water level for barometric pressure for all bores for this project). Prior to August, it was installed at DD1032.
2. In August 2021, loggers in DD1043, DD1057, DD1014, DD1025 and DD1032 were removed and placed into other bores that the Environmental Statement committed to containing loggers.
3. GWLs for the Maxwell Infrastructure loggers are the values on the same day as the manual measurements taken in the bores without loggers. See notes under Table 7 for an explanation of any NS.
4. GWLs for the Maxwell Underground loggers are the values taken on the 15th of each month (as the manual measurements are taken over a number of days due to the number of loggers). If there are multiple values on the same day, the average of the daily values is presented.
5. Data from MB1VWP (VWP5)(WN) and WND16 (VW3) (BK) was not available during the reporting period; no data is available from WND26 from 11/07/21 to 27/10/21; this is due to data download errors by the monitoring contractor. The latest available groundwater data at site RD1189 over the reporting period is on 23/11/2021.
6. New Solinst Levellogger 5's were installed in MB03, MB1 – Alluvial, MB4 - Alluvial, MB3 – Alluvial, MB2 – Regolith, GW01D, GW01S, GW02D and GW02S in August 2021. In addition, older loggers from DD1057, DD1014, DD1015, DD1025 and DD1032 were relocated to MB2 – Alluvial, MW2, MW1, MB3 – Regolith. Malabar became aware of an issue with the firmware installed on these new loggers in January 2022; the issue caused the loggers to stop recording in mid-November. Following identification of the issue and in consultation with Solinst, the firmware was upgraded and the loggers were redeployed in February 2022. Manual measurements recommenced monthly at all bores in January 2022 and will continue until confidence in the loggers can be obtained. Data in this table is therefore manual measurements unless not taken; if manual measurements were not taken an average of the monthly logger recordings are included, where available. Hence for those bores, there is a gap in data between mid-November 2021 and when the monthly manual measurements recommenced in January 2022.
7. Manual measurements were not taken in August and September 2021, as the Groundwater Management Plan at that time required only quarterly measurements (July and October). If data is shown for those months they are logger recordings, where loggers were installed. Annual averages are calculated from manual measurements only, to avoid calculating an average from two different measurement techniques.

* GWLs for the Maxwell Underground VWPs are the values taken on the 15th of each month. If there are multiple values on the same day, the average of the daily values is presented. If no data is recorded on the 15th of the month, then the first recorded value of the month is presented (see*).

Acronyms: DD = diamond drill hole. mAHD = meters above Australian Height Datum (the elevation of the water level is calculated by subtracting the Depth to Water from the reference elevation). n/a = not available. NS = not sampled. RH = rotary drill hole. VWP = Vibrating wire piezometer and logger. Seam acronyms: BK = Blakefield seam; BY = Bayswater seam; MA = Mt Arthur seam; PF = Piercefield seam; INT = Interburden; WB = Wambo seam; RB = Redbank Creek seam; WA = tbc; WH = Woodlands Hill seam; WN = Whynot seam; WY = Wynn seam. WW = Warkworth seam; ZZ = indicates that the seam is intruded or heat affected.

Noise monitoring results for Quarter 4

Noise monitoring under the Noise and Blasting Management Plan (NBMP) for the Maxwell Underground Coal Mine Project commenced in September 2021 at monitoring sites NM1 to NM4 as required by the plan.

To date, the Maxwell Underground Project has been inaudible at all locations and all dates, which is as expected as construction has not yet commenced.

Table 9. Noise monitoring results for 19 October 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	64	41	43	41	43	52	66	No	Project inaudible
17	NM2	44	56	40	44	40	36	52	42	No	Project inaudible
18	NM3	40	57	35	57	35	54	52	79	No	Project inaudible
-	NM4	40	57	35	60	35	37	52	45	No	Project inaudible
Additional Information											
Date of Final Report	29 November 2021										
Weather Conditions	Wind speed 2.5–5.4 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, plane, cows, frogs, a nearby mine & insects. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 10. Noise monitoring results for 20 October 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	57	41	49	41	53	52	72	No	Project inaudible
17	NM2	44	36	40	41	40	44	52	49	No	Project inaudible
18	NM3	40	51	35	55	35	55	52	70	No	Project inaudible
-	NM4	40	54	35	54	35	43	52	85	No	Project inaudible
Additional Information											
Date of Final Report	29 November 2021										
Weather Conditions	Wind speed 1.4–4.4 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, trains, frogs & a nearby mine. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 11. Noise monitoring results for 21 October 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	59	41	47	41	46	52	53	No	Project inaudible
17	NM2	44	47	40	41	40	36	52	41	No	Project inaudible
18	NM3	40	51	35	59	35	48	52	55	No	Project inaudible
-	NM4	40	52	35	52	35	58	52	73	No	Project inaudible
Additional Information											
Date of Final Report	29 November 2021										
Weather Conditions	Wind speed 2.2–4.7 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, frogs & a nearby mine. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 12. Noise monitoring results for 23 November 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	62	41	60	41	60	52	60	No	Project inaudible
17	NM2	44	44	40	56	40	55	52	55	No	Project inaudible
18	NM3	40	52	35	54	35	57	52	86	No	Project inaudible
-	NM4	40	67	35	68	35	51	52	72	No	Project inaudible
Additional Information											
Date of Final Report	9 December 2021										
Weather Conditions	Wind speed 2.9–4.9 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, frogs & insects. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 13. Noise monitoring results for 24 November 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	67	41	62	41	59	52	63	No	Project inaudible
17	NM2	44	54	40	49	40	38	52	56	No	Project inaudible
18	NM3	40	69	35	70	35	71	52	82	No	Project inaudible
-	NM4	40	51	35	49	35	62	52	75	No	Project inaudible
Additional Information											
Date of Final Report	9 December 2021										
Weather Conditions	Wind speed 0.9–3.5 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, insects, birds & frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 14. Noise monitoring results for 25 November 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	68	41	59	41	48	52	71	No	Project inaudible
17	NM2	44	51	40	52	40	41	52	62	No	Project inaudible
18	NM3	40	73	35	73	35	44	52	59	No	Project inaudible
-	NM4	40	54	35	56	35	63	52	82	No	Project inaudible
Additional Information											
Date of Final Report	9 December 2021										
Weather Conditions	Wind speed 1.0–2.6 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, insects, birds & frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 15. Noise monitoring results for 13 December 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	61	41	52	41	55	52	79	No	Project inaudible
17	NM2	44	47	40	51	40	50	52	60	No	Project inaudible
18	NM3	40	53	35	63	35	65	52	93	No	Project inaudible
-	NM4	40	72	35	55	35	52	52	72	No	Project inaudible
Additional Information											
Date of Final Report	10 January 2022										
Weather Conditions	Wind speed 1.8–7.3 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, a lawnmower, frogs, traffic. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 16. Noise monitoring results for 14 December 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	65	41	64	41	50	52	74	No	Project inaudible
17	NM2	44	40	40	43	40	48	52	54	No	Project inaudible
18	NM3	40	69	35	70	35	64	52	90	No	Project inaudible
-	NM4	40	54	35	53	35	50	52	71	No	Project inaudible
Additional Information											
Date of Final Report	10 January 2022										
Weather Conditions	Wind speed 1.8–7.3 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, a train, insects, & frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 17. Noise monitoring results for 15 December 2021

EPA identification no.	Sampling point	Day (L _A eq (15 minute))		Evening (L _A eq (15 minute))		Night (L _A eq (15 minute))		Night (L _{A1} (1 minute))		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	68	41	66	41	69	52	96	No	Project inaudible
17	NM2	44	42	40	43	40	49	52	72	No	Project inaudible
18	NM3	40	69	35	64	35	60	52	79	No	Project inaudible
-	NM4	40	64	35	68	35	62	52	81	No	Project inaudible
Additional Information											
Date of Final Report	10 January 2022										
Weather Conditions	Wind speed 1.1–4.1 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects & frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

APPENDIX 1 – AIR QUALITY MONITORING LOCATIONS

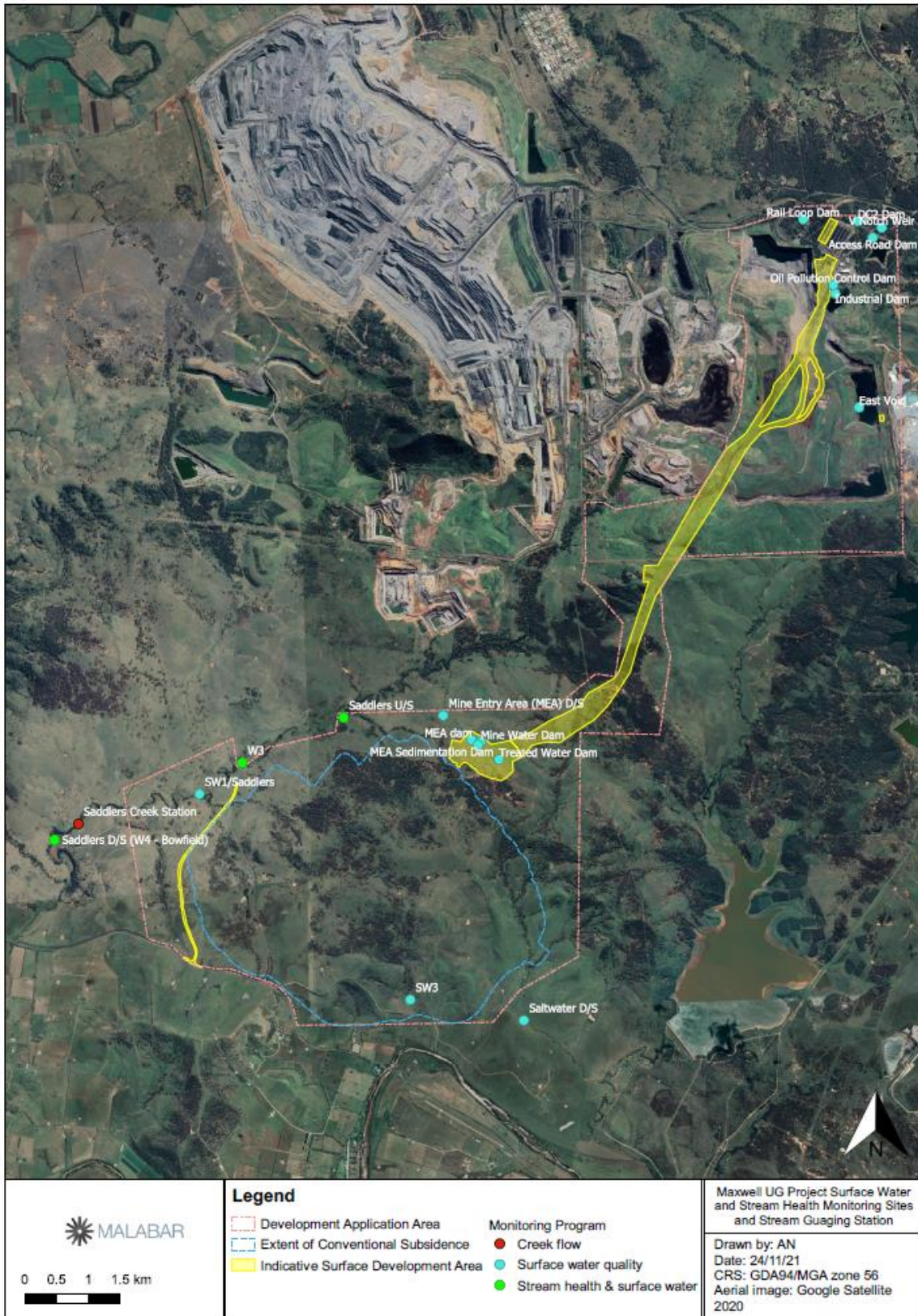


APPENDIX 2 – NOISE AND BLAST MONITORING LOCATIONS



Figure 1. Noise and Blast Monitoring Locations

APPENDIX 3 – SURFACE WATER MONITORING LOCATIONS



APPENDIX 4 – GROUNDWATER MONITORING LOCATIONS

