



Rasp Mine  
Monthly Environmental Monitoring Report  
September 2022



## INTRODUCTION

Broken Hill Operations Pty Ltd (BHOP) [a wholly owned subsidiary of CBH Resources Limited (CBH)] owns and operates the Rasp Mine (the Mine), which is located centrally within the City of Broken Hill on Consolidated Mine Lease 7 (CML7).

Mining has been undertaken within CML7 since 1885. The existing operations at the Rasp Mine include underground mining operations, a processing plant producing zinc and lead concentrates and a rail siding for concentrate dispatch. These operations are undertaken in accordance with Project Approval 07\_0018 granted 31 January 2011, under Part3A of the Environmental Planning and Assessment Act 1979 (EP&A Act).

As the holder of an Environmental Protection Licence, 12559, BHOP is required, under Section 66(6) of the NSW *Protection of the Environment Operations Act 1997*, to publish pollution monitoring data. In addition BHOP is required to publish data in accordance with its Project Approval 07\_0018 Schedule 4 Condition 9. These documents can be found on the Rasp Mine web site.

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## 1 Air Quality

The following pollutants as listed in the Project Approval (DA 07\_0018 MOD6 March 2022) are required to be monitored in EPL 12559:

### Long Term Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Total solid particles (TSP)	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	25 µg/m <sup>3</sup>

### Short Term Criterion for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>

### Long Term Criteria for Deposited Dust

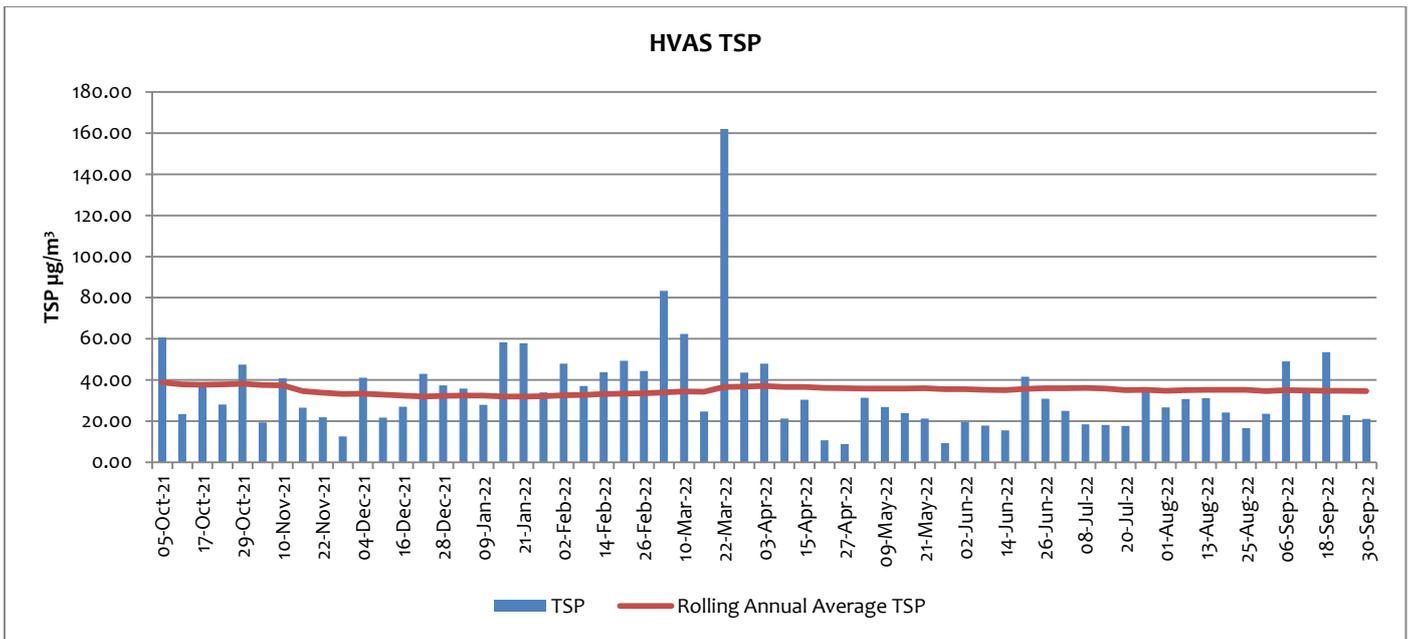
Pollutant	Averaging Period	Maximum Project Contribution	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

### 1.1 High Volume Air Samplers

There are four high volume air samplers used to measure ambient air quality at the Rasp Mine – HVAS (EPL10) and HVAS1 (EPL11) are located at the Silver Tank, central and to the south of the mine lease, and HVAS2 (EPL12) and HVAS3 (EPL57) are located adjacent to and north of Blackwood Pit. A map indicating these locations can be found on the Rasp Mine web site. HVAS and HVAS3 sample for total suspended particulates (TSP) and lead dust, and HVAS1 and HVAS2 sample for particulate matter less than 10 microns (PM<sub>10</sub>) and lead dust.

#### ***HVAS (EPL10) - Silver Tank (On Site) Results for September 2022***

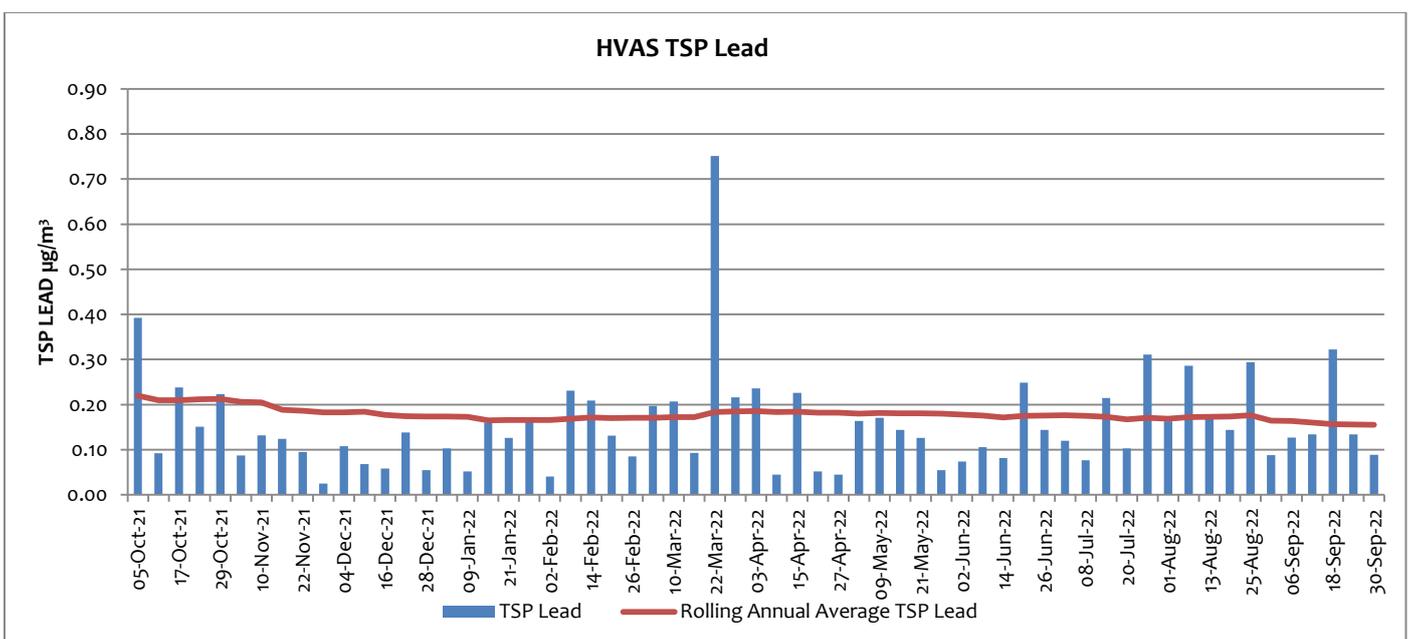
DATE	TSP (µg/m <sup>3</sup> )	Lead (µg/m <sup>3</sup> )
06-September-22	49.10	0.13
12-September-22	35.90	0.13
18-September-22	53.50	0.32
24-September-22	23.00	0.13
30-September-22	21.00	0.09



HVAS (EPL10) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.

TSP dust results at HVAS for the month of September were consistent with results slightly higher than previous months. The highest TSP level for September was 53.50 µg/m<sup>3</sup> on 18 September when winds were predominantly from the West, suggesting that the dust has originated on-site. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The annual rolling average for TSP at this location is 34.55 µg/m<sup>3</sup> at the end of September, lower than the average at the beginning of October 2021 which was 38.78 µg/m<sup>3</sup>.

The annual rolling average for TSP is determined using data with extreme dust events included.



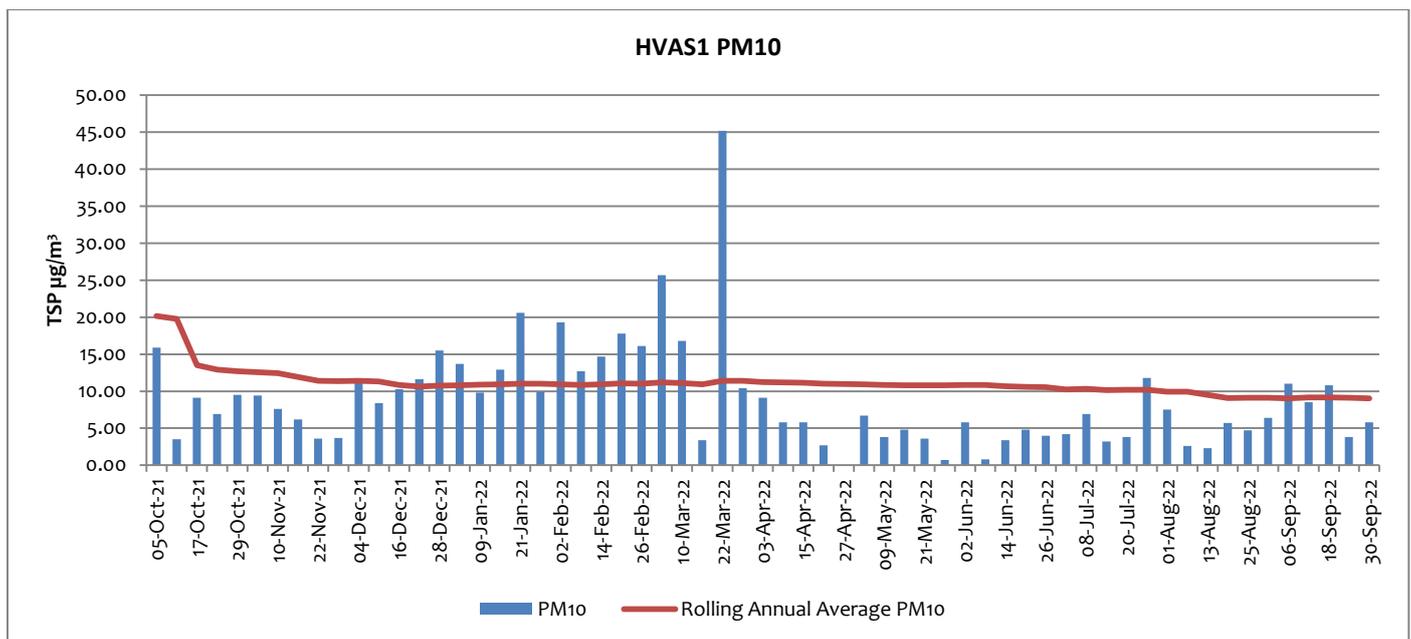


TSP Lead dust results at HVAS for the month of September were consistent with results seen in previous months. The highest TSP Lead level for September was 0.32  $\mu\text{g}/\text{m}^3$  on 18 September when winds were predominately from the West, suggesting that the dust has originated on-site. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The rolling annual average for TSP Lead in September 2022 was 0.16  $\mu\text{g}/\text{m}^3$  which is lower than the rolling annual average of 0.22  $\mu\text{g}/\text{m}^3$  for TSP Lead in October 2021.

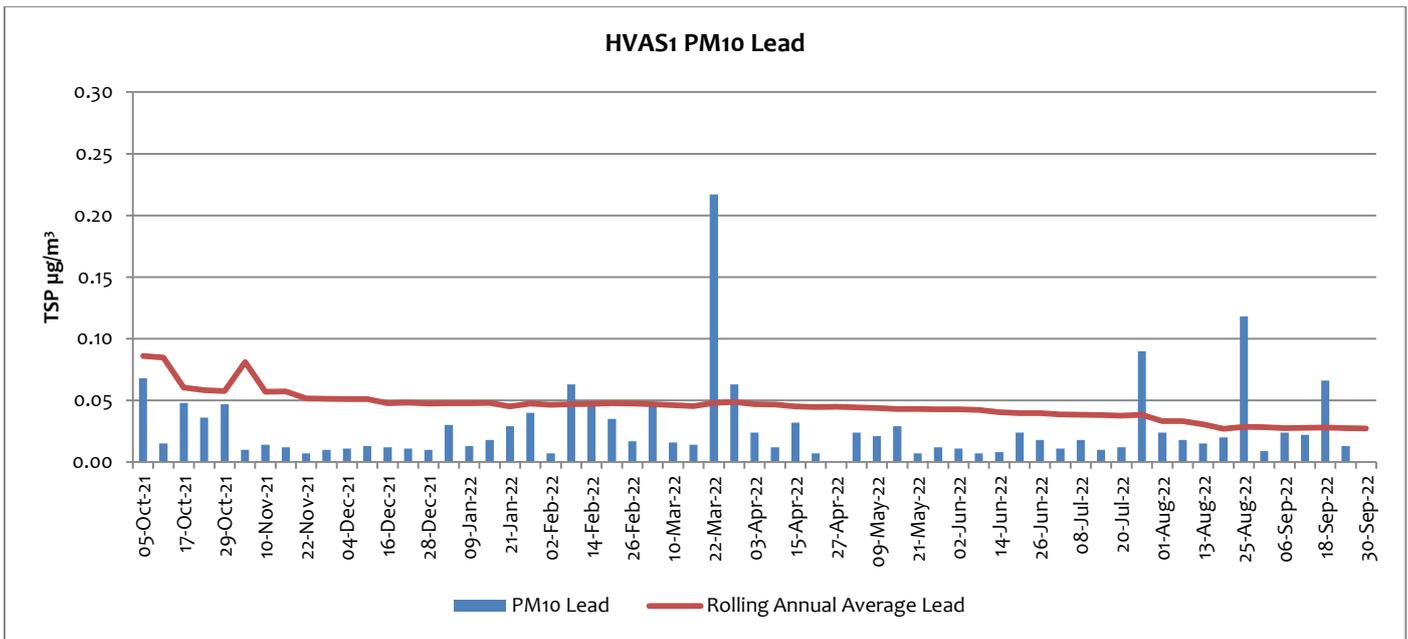
**HVAS1 (EPL11) - Silver Tank (On Site) Results for September 2022**

DATE	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> Lead ( $\mu\text{g}/\text{m}^3$ )
06-September-22	11.00	0.02
12-September-22	8.50	0.02
18-September-22	10.80	0.07
24-September-22	3.80	0.01
30-September-22	5.80	<0.007

HVAS1 (EPL11) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.



PM<sub>10</sub> dust results at HVAS1 for month of September were elevated compared with previous months. The highest PM<sub>10</sub> dust level for September was 11.00  $\mu\text{g}/\text{m}^3$  on 18 September when winds were predominantly from the West, suggesting that the dust has originated on-site. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The annual rolling average for PM<sub>10</sub> dust at this location is 9.0  $\mu\text{g}/\text{m}^3$  at the end of September 2022, lower than the annual rolling average at the beginning of October 2021 which was 20.2  $\mu\text{g}/\text{m}^3$ . External and extreme dust events are recorded in measurements.



PM<sub>10</sub> Lead dust results at HVAS1 were consistent in the month of September compared to previous months. The highest Lead PM<sub>10</sub> result for September was 0.07 µg/m<sup>3</sup> on 18 September when winds were predominantly from the West, suggesting that the dust has originated on-site. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The rolling annual average for PM<sub>10</sub> Lead in September was 0.03 µg/m<sup>3</sup>, down from 0.08 µg/m<sup>3</sup> in October 2021.

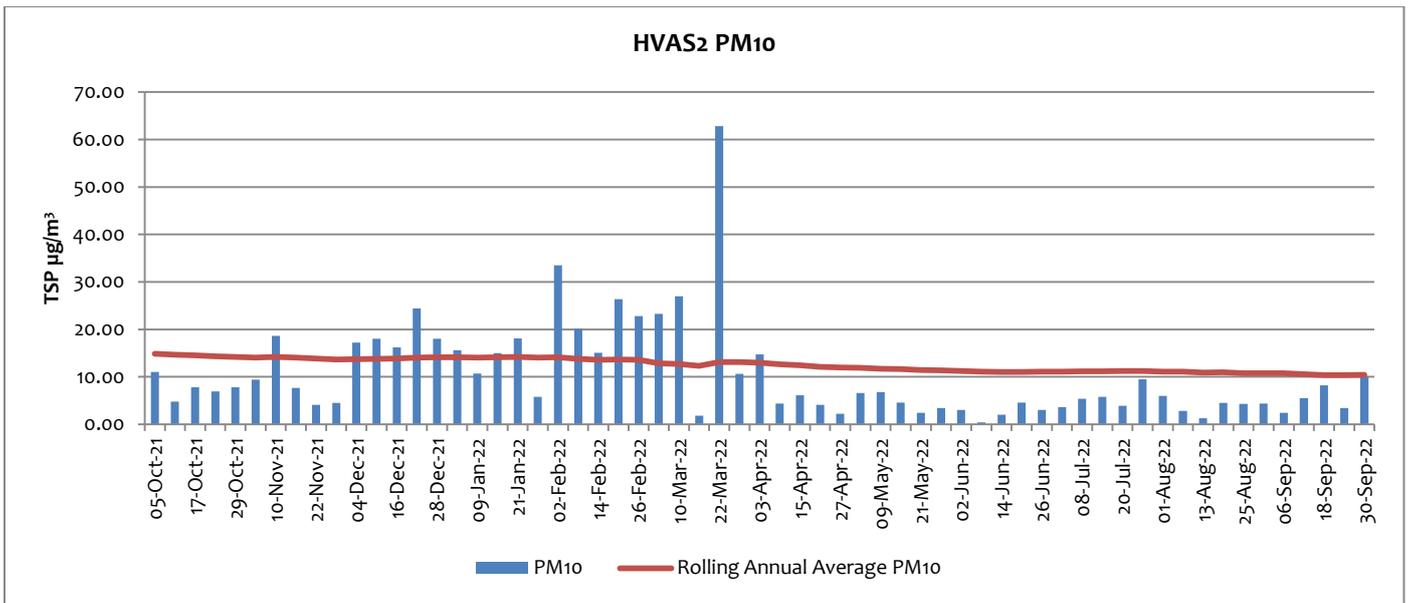
**HVAS 2 (EPL12) - Blackwood Pit (On Site) Results for September 2022**

DATE	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> Lead (µg/m <sup>3</sup> )
06-September-22	2.40	0.03
12-September-22	5.50	0.01
18-September-22	8.20	0.01
24-September-22	3.40	0.01
30-September-22	10.00	0.11

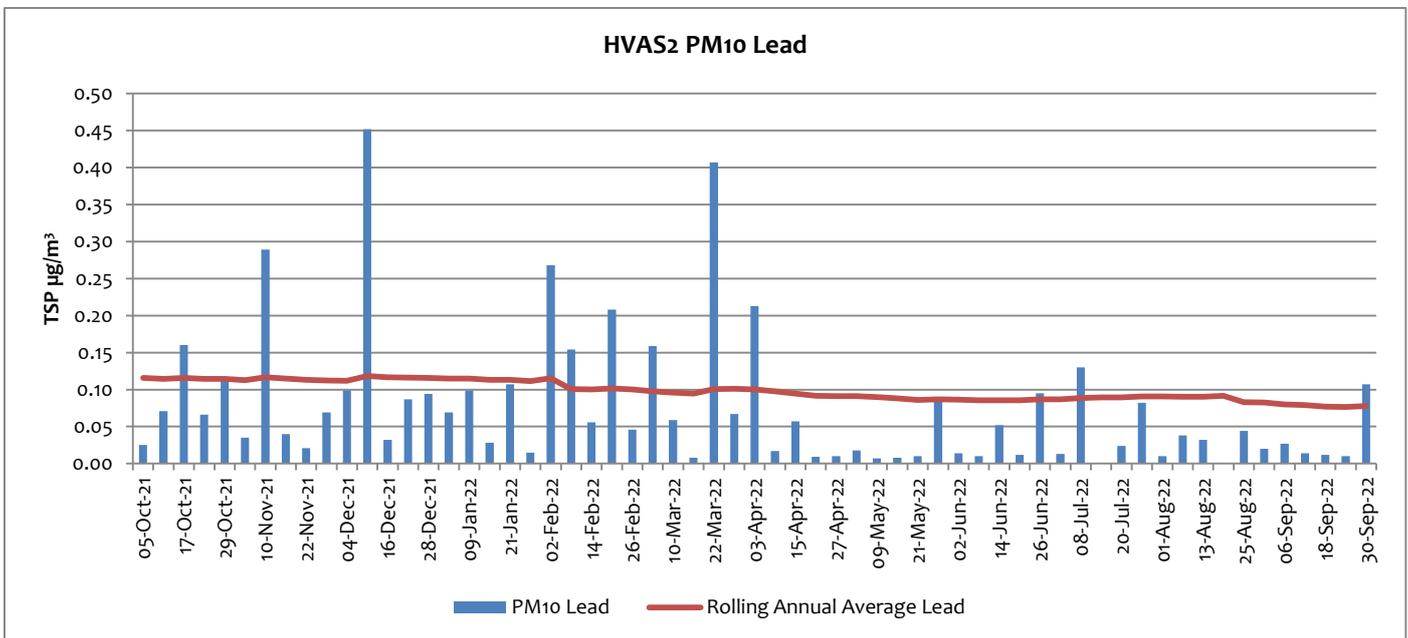
HVAS2 (EPL12) is located on the northern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.

PM<sub>10</sub> levels at HVAS2 remained consistent with previous months in September. The highest recorded PM<sub>10</sub> dust reading for September was 10.00 µg/m<sup>3</sup> on the 30 September when winds were from the South suggesting Blackwoods TSF2 was the source of the dust. The surface of Blackwoods TSF2 is treated with dust suppressant and the TSF spray system is under construction. The annual rolling average for PM<sub>10</sub> dust at this location is 10.40 µg/m<sup>3</sup> at the end of September 2022, down from 14.89 µg/m<sup>3</sup> in October 2021.

The annual rolling average for PM<sub>10</sub> dust is determined using data with extreme dust events included.



There were low PM<sub>10</sub> lead levels in September despite there being little change in wind activity in the area. The highest recorded PM<sub>10</sub> Lead dust reading for September was 0.11 µg/m<sup>3</sup> on the 30 September when winds were from the South suggesting Blackwoods TSF2 was the source of the dust. The surface of Blackwoods TSF2 is treated with dust suppressant and the TSF spray system is under construction. The rolling annual average for PM<sub>10</sub> Lead in September 2022 was 0.08 µg/m<sup>3</sup> down from 0.12 µg/m<sup>3</sup> in October 2021.





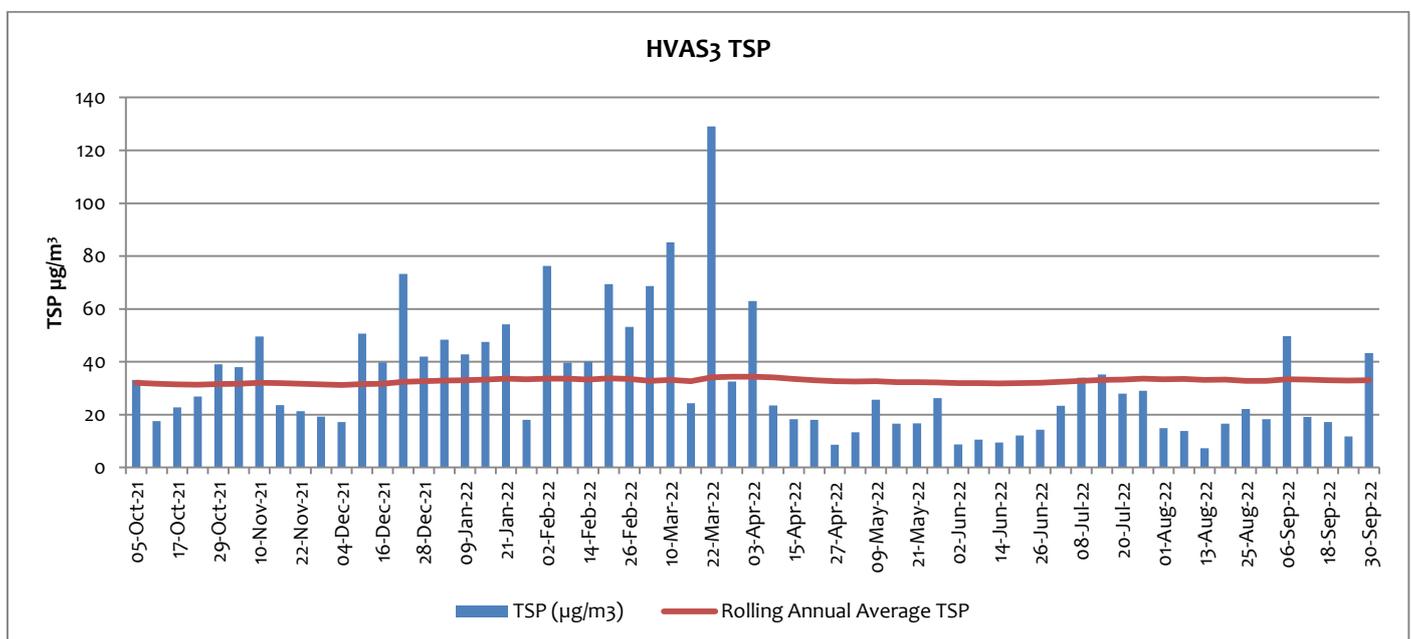
**HVAS 3 (EPL57) - Blackwood Pit (On Site) Results for September 2022**

DATE	TSP ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
06-September-22	49.70	0.18
12-September-22	19.10	0.07
18-September-22	17.20	0.04
24-September-22	11.70	0.08
30-September-22	43.30	0.69

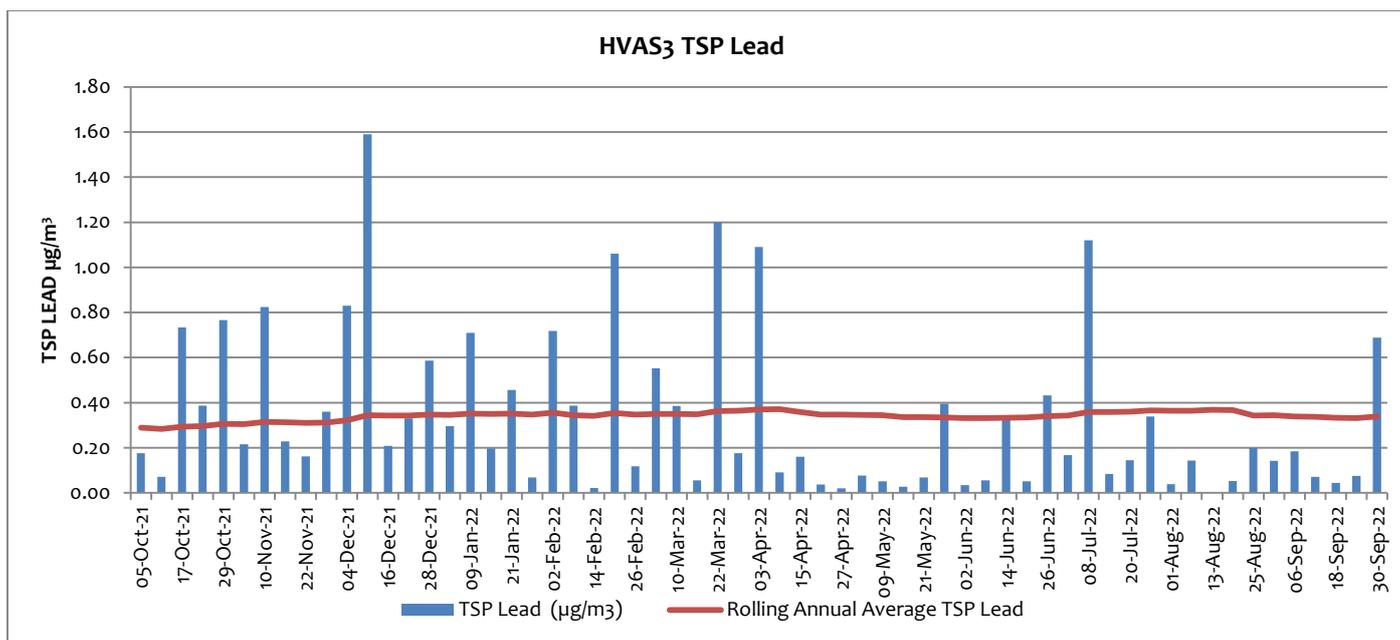
HVAS3 (EPL57) was included in EPL 12559 on 14 March 2019 to provide for monitoring of TSP Dust on the northern boundary of the site at Blackwoods Pit TSF2.

TSP levels at HVAS3 were highest on 6 September with a result of  $49.70 \mu\text{g}/\text{m}^3$ . Wind on this day was predominately from the NE suggesting that the dust possibly originated from Blackwoods TSF2. The surface of Blackwoods TSF2 is treated with dust suppressant and the TSF spray system is under construction. The annual rolling average for TSP dust at this location is  $32.98 \mu\text{g}/\text{m}^3$  at the end of September 2022, up slightly from  $32.02 \mu\text{g}/\text{m}^3$  in October 2021.

The annual rolling average for TSP is determined using data with extreme dust events included.



TSP Lead levels in September were consistent with previous months, with the highest result of  $0.69 \mu\text{g}/\text{m}^3$  recorded on 30 September when winds were predominantly from the South suggesting contribution from Blackwoods TSF2. The rolling annual average for TSP Lead in September was  $0.34 \mu\text{g}/\text{m}^3$ , up from  $0.29 \mu\text{g}/\text{m}^3$  in October 2021. A sprinkler system is currently being installed on the TSF.



## 1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

There are two Tapered Element Oscillating Microbalance (TEOM) sampling units used to measure ambient air quality at the Rasp Mine – TEOM1 (EPL13) is located off-site within the perimeter fence of Essential Water south of the mine lease, and TEOM2 (EPL14) is located on-site adjacent to Blackwood Pit to the north of the mine lease. A map indicating these locations can be found on the Rasp Mine web site. TEOM1 and TEOM2 are designed to operate continuously and sample for particulate matter less than 10 microns (PM<sub>10</sub>) in size.

TEOM2 was temporarily decommissioned in 19 June 2019 due to Embankment 2 TSF2 construction works. The decommissioning is in accordance with dust management strategies agreed with the EPA which includes the operation of a real-time PM<sub>10</sub> monitor north of the construction works. Both Project Approval and Environment Protection Licence criteria exclude dust storms and other extraordinary events.

Project Approval 07\_0018 criteria apply at TEOM1 and TEOM2, with two criteria listed for PM<sub>10</sub>, a 24 hour average criteria of 50 µg/m<sup>3</sup> and an annual average criteria of 25 µg/m<sup>3</sup>.

TEOM data is validated by third party consultants using Australian Standards and internal procedures, and is used to populate the table of TEOM monthly data provided below.



**TEOM1 (EPL13) (Off Site) and TEOM2 (EPL14) (On Site) Validated Results for August 2022**

Particulate Matter <10 Microns 24Hr Average				
Date	TEOM 1 ( $\mu\text{g}/\text{m}^3$ )	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?	TEOM 2 ( $\mu\text{g}/\text{m}^3$ )	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?
1-Aug-22	9.6	Y	7.38	Y
2-Aug-22	12.6	Y	7.36	Y
3-Aug-22	24.3	Y	14.3	Y
4-Aug-22	20.6	Y	NS	Y
5-Aug-22	NS	Y	6	Y
6-Aug-22	0.8	Y	5.6	Y
7-Aug-22	0.4	Y	3.6	Y
8-Aug-22	0.1	Y	4.7	Y
9-Aug-22	1.8	Y	4.6	Y
10-Aug-22	12.4	Y	4.9	Y
11-Aug-22	0.9	Y	5.9	Y
12-Aug-22	1.4	Y	5.6	Y
13-Aug-22	1.4	Y	6.0	Y
14-Aug-22	0.6	Y	5.3	Y
15-Aug-22	0.8	Y	5.2	Y
16-Aug-22	1.5	Y	10.2	Y
17-Aug-22	2.1	Y	8.4	Y
18-Aug-22	1.9	Y	7.5	Y
19-Aug-22	3.9	Y	7.3	Y
20-Aug-22	1.9	Y	8.6	Y
21-Aug-22	0.2	Y	5.6	Y
22-Aug-22	4.4	Y	8.2	Y
23-Aug-22	1.7	Y	10.9	Y
24-Aug-22	2.1	Y	6.7	Y
25-Aug-22	2.9	Y	6.9	Y
26-Aug-22	1.1	Y	6.0	Y
27-Aug-22	1.6	Y	5.7	Y
28-Aug-22	3.5	Y	8.7	Y
29-Aug-22	13.9	Y	9.8	Y
30-Aug-22	2.3	Y	8.9	Y
31-Aug-22	2.8	Y	6.8	Y

NS – no sample collected. SC – sample collected.

Installation of new TEOM units occurred from 3 to 5 August 2022, followed by calibration of the new units, which accounts for no data being available from TEOM1 for 5 August and TEOM2 for 4 August.

Validated data for the August round of monitoring is being reported in arrears as it was not received from the third-party monitoring consultants in time for inclusion in the August report.

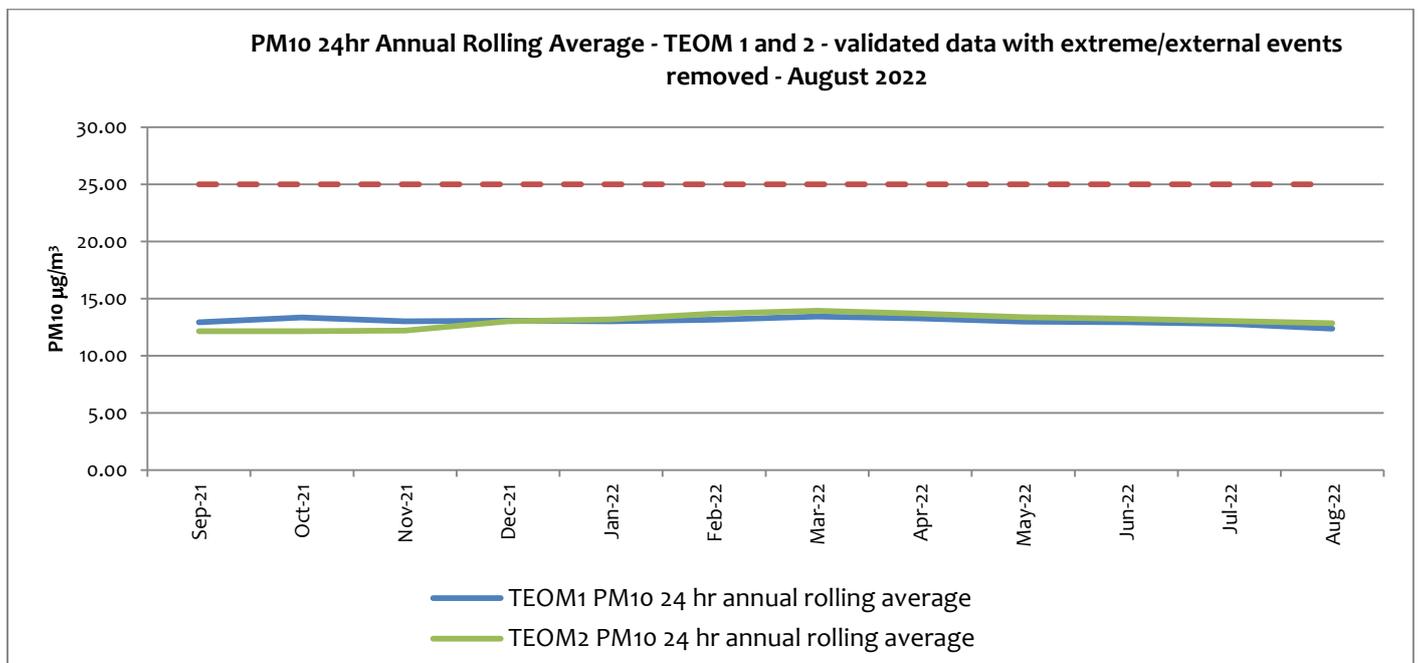
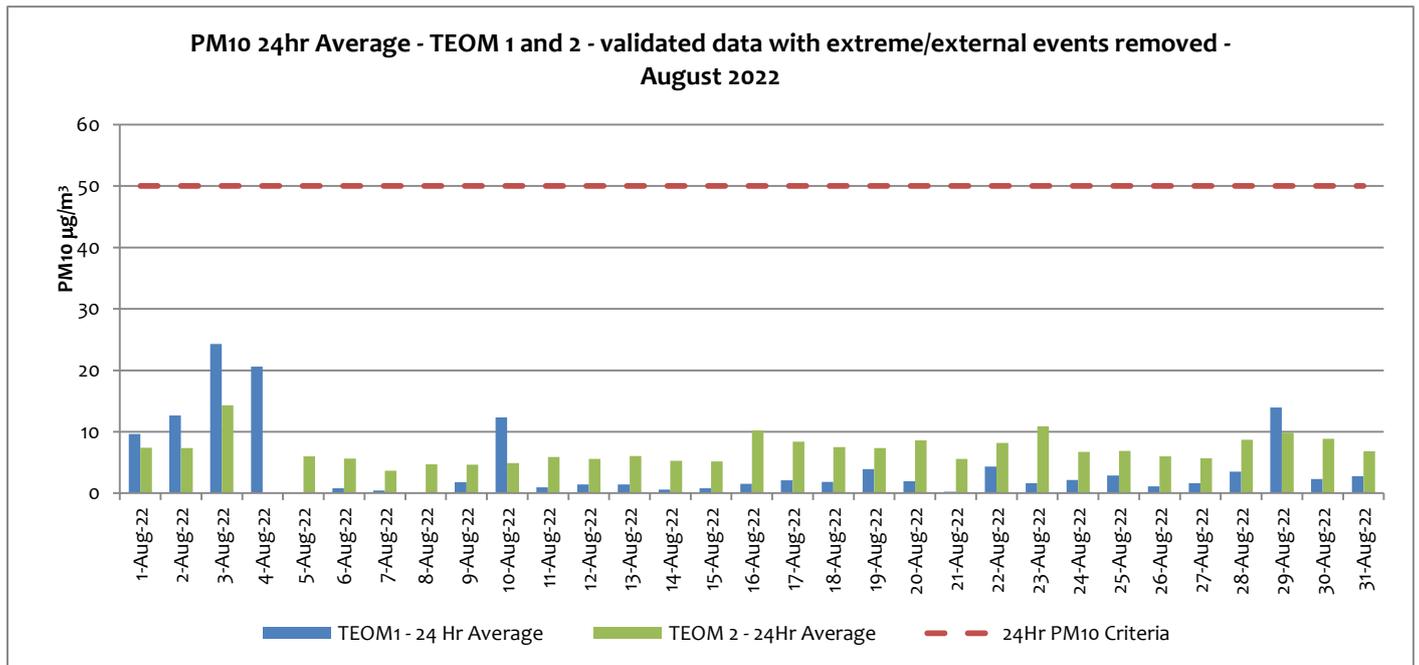
PM<sub>10</sub> dust levels at both TEOM units were low in the month of August, with neither site recording a daily average over the limit of 50  $\mu\text{g}/\text{m}^3$ .



The rolling annual average for PM10 at TEOM1 with external dust events removed for the period September 2021 to August 2022 is 12.37  $\mu\text{g}/\text{m}^3$ , down from 12.94  $\mu\text{g}/\text{m}^3$  at the beginning of the annual period.

The rolling annual average for PM10 at TEOM2 with external dust events removed for the period September 2021 to August 2022 is 12.84  $\mu\text{g}/\text{m}^3$ , up from 12.14  $\mu\text{g}/\text{m}^3$  at the beginning of the annual period.

The PM<sub>10</sub> 24-hour rolling annual average for both TEOM sites remain below the annual average criteria of 25  $\mu\text{g}/\text{m}^3$ .





**TEOM1 (EPL13) (Off Site) and TEOM2 (EPL14) (On Site) Validated Results for September 2022**

Particulate Matter <10 Microns 24Hr Average				
Date	TEOM 1 ( $\mu\text{g}/\text{m}^3$ )	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?	TEOM 2 ( $\mu\text{g}/\text{m}^3$ )	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?
1-Sep-22	4.6	Y	9.0	Y
2-Sep-22	1.1	Y	10.2	Y
3-Sep-22	1.4	Y	5.2	Y
4-Sep-22	0.7	Y	6.7	Y
5-Sep-22	3.0	Y	7.3	Y
6-Sep-22	8.0	Y	7.2	Y
7-Sep-22	11.6	Y	7.7	Y
8-Sep-22	0.7	Y	5.6	Y
9-Sep-22	1.0	Y	5.1	Y
10-Sep-22	3.8	Y	5.7	Y
11-Sep-22	3.2	Y	4.9	Y
12-Sep-22	3.6	Y	5.2	Y
13-Sep-22	3.3	Y	3.8	Y
14-Sep-22	11.8	Y	5.6	Y
15-Sep-22	3.8	Y	5.4	Y
16-Sep-22	5.9	Y	6.5	Y
17-Sep-22	1.5	Y	4.8	Y
18-Sep-22	4.9	Y	5.7	Y
19-Sep-22	3.1	Y	5.0	Y
20-Sep-22	3.8	Y	6.4	Y
21-Sep-22	0.7	Y	5.3	Y
22-Sep-22	0.4	Y	5.3	Y
23-Sep-22	1.6	Y	5.1	Y
24-Sep-22	0.6	Y	5.1	Y
25-Sep-22	3.0	Y	5.1	Y
26-Sep-22	2.5	Y	5.6	Y
27-Sep-22	2.5	Y	5.1	Y
28-Sep-22	2.2	Y	4.9	Y
29-Sep-22	0.9	Y	5.8	Y
30-Sep-22	2.0	Y	4.7	Y

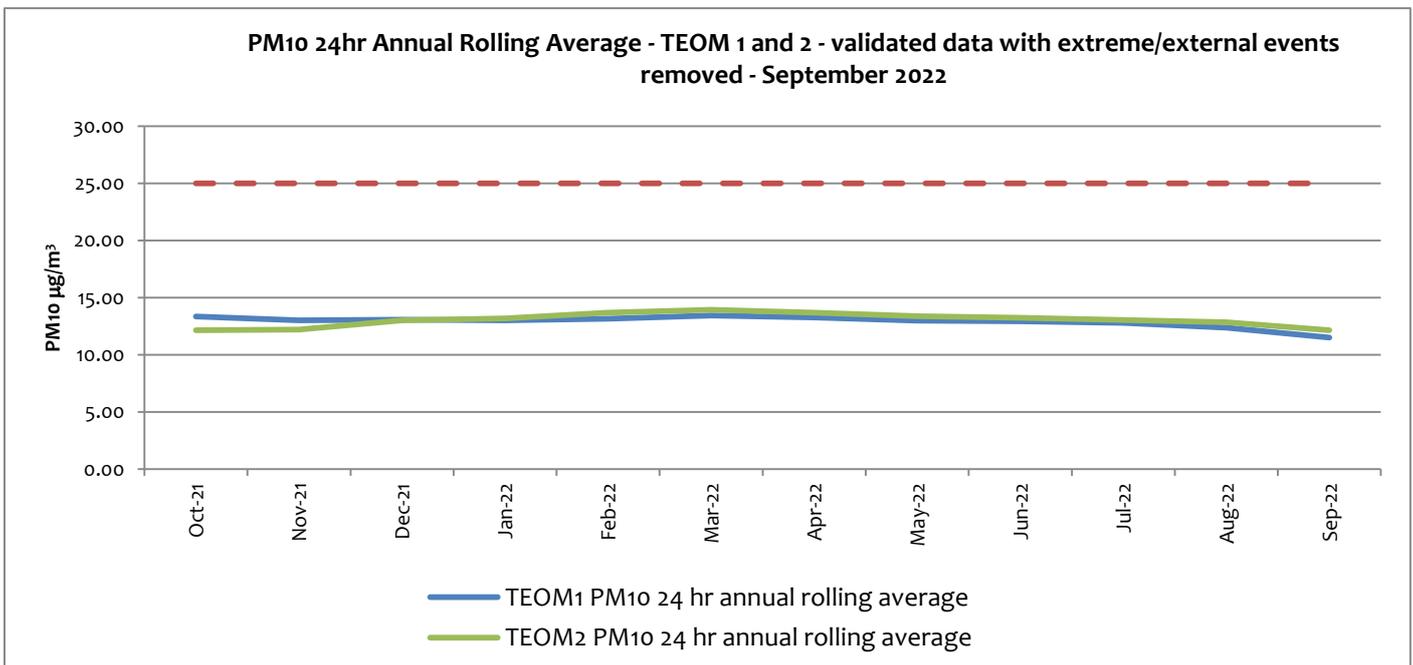
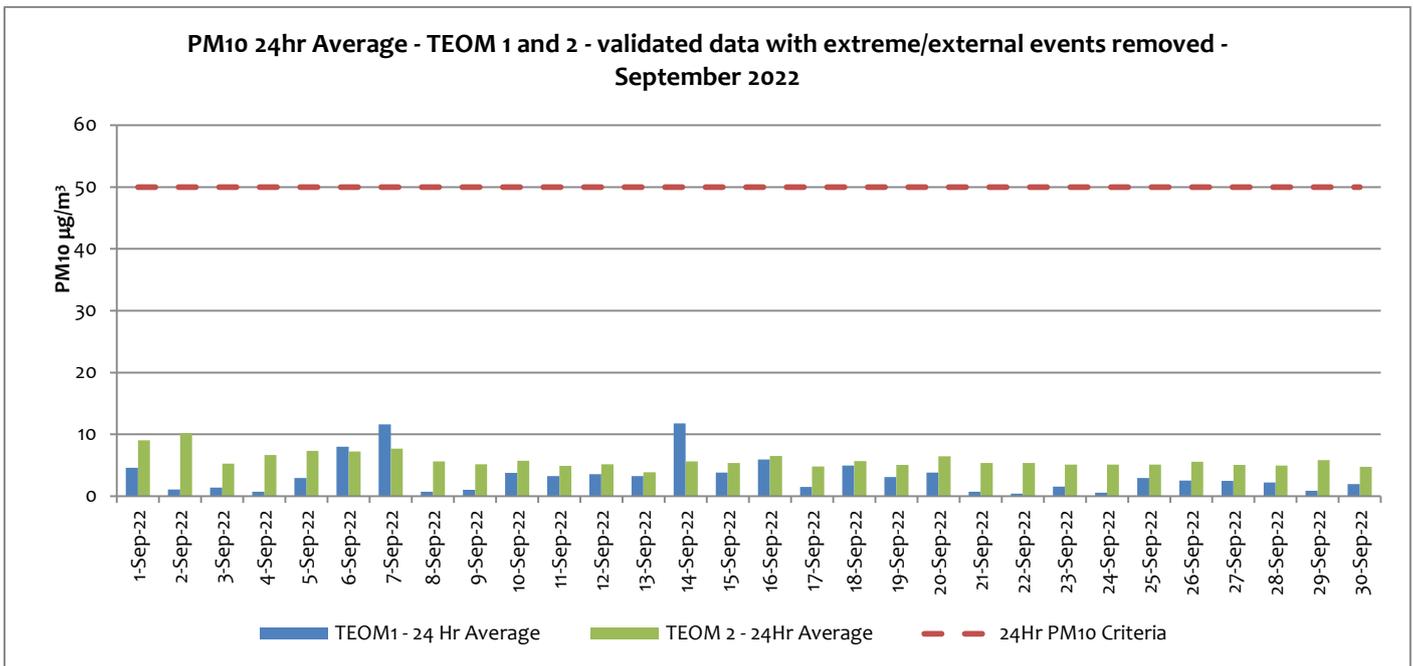
PM<sub>10</sub> dust levels at both TEOM units were low in the month of September, with neither site recording a daily average over the limit of 50  $\mu\text{g}/\text{m}^3$ .

The rolling annual average for PM<sub>10</sub> at TEOM1 with external dust events removed for the period October 2021 to September 2022 is 11.50  $\mu\text{g}/\text{m}^3$  down from 13.36  $\mu\text{g}/\text{m}^3$  at the beginning of the reporting period.

The rolling annual average for PM<sub>10</sub> at TEOM2 with external dust events removed for the period October 2021 to September 2022 is 12.15  $\mu\text{g}/\text{m}^3$  consistent with 12.16  $\mu\text{g}/\text{m}^3$  at the beginning of the reporting period.



The PM<sub>10</sub> 24-hour rolling annual average for both TEOM sites remain below the annual average criteria of 25 µg/m<sup>3</sup>.





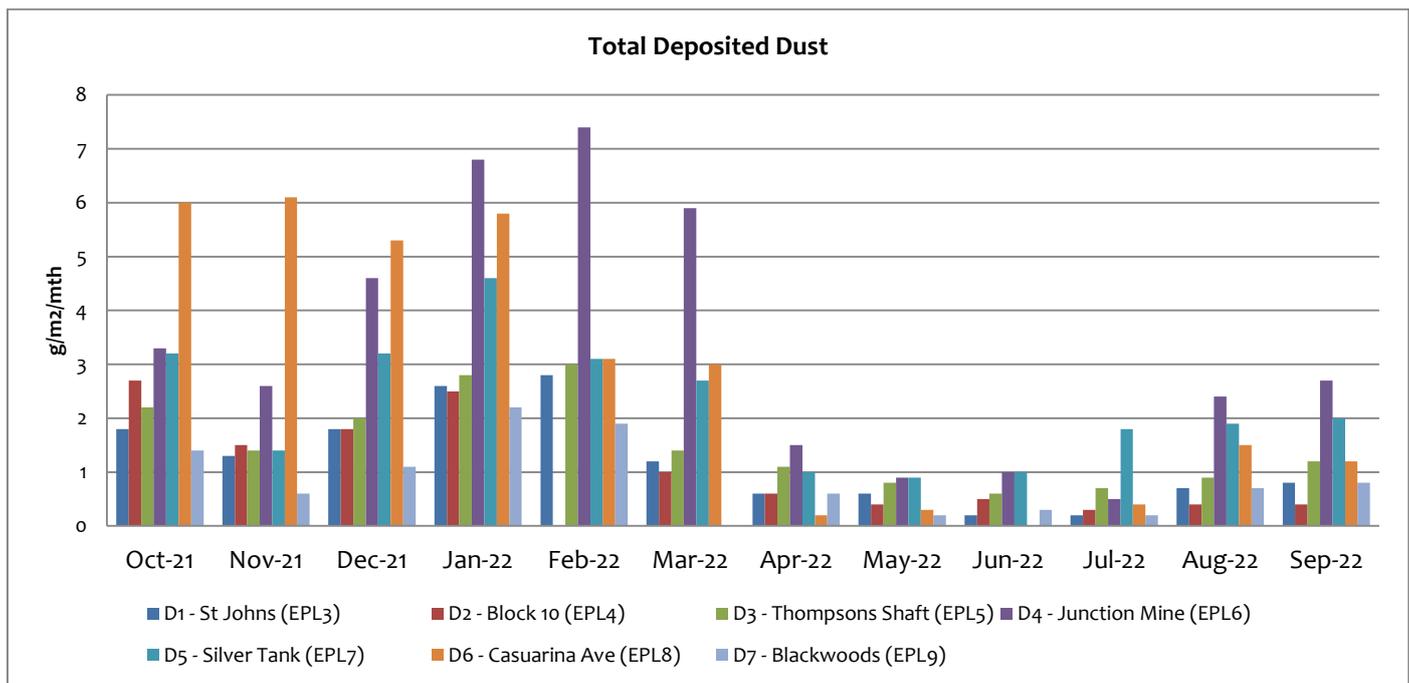
### 1.3 Dust Deposition Sampling

There are seven dust deposition gauges to measure ambient air quality at the Rasp Mine – D1 to D7. D1 and D6 are located off-site, D1 near the St Johns training facility north of the Rasp Mine and D6 in Casuarina Avenue south of the Rasp Mine. D2 to D5 and D7 are located on the mine lease in various locations. A map indicating these locations can be found on the Rasp Mine web site. Dust samples are collected monthly and analysed for total deposited dust and deposited lead dust.

#### ***Dust Deposition Gauges D1 (EPL3) to D7 (EPL9) – Results for September 2022***

Total Deposited Dust (g/m <sup>2</sup> /Month)							
Sample Period	D1 (off site)	D2 (off site)	D3 (on site)	D4 (off site)	D5 (on site)	D6 (off site)	D7 (on site)
<b>September 2022</b>	0.8	0.4	1.2	2.7	2.0	1.2	0.8
<b>Annual Rolling Average</b>	1.22	1.10	1.51	3.30	2.23	2.99	0.91
<b>Background (2010)</b>	4.0	3.1	4.3	5.7	- <sup>1</sup>	5.8	- <sup>1</sup>

Note: “1”= background not available, N/A = not applicable as dust deposition unit is located on site, NS = No sample



The dust levels recorded in Dust Gauges in September 2022 were consistent with previous months. The highest dust levels were recorded in the D4 Junction Mine gauge. The predominant wind direction for September was from the South as shown in the Wind Rose in Section 4, suggesting there may have been contribution of dust from sources on-site such as the rail loadout, Blackwood’s waste dump and TSF.

Dust Deposition Gauges that are located off-site must adhere to criteria of annually averaged deposited dust of 4 g/m<sup>2</sup>/month. All off-site Dust Deposition Gauges were compliant in September 2022.



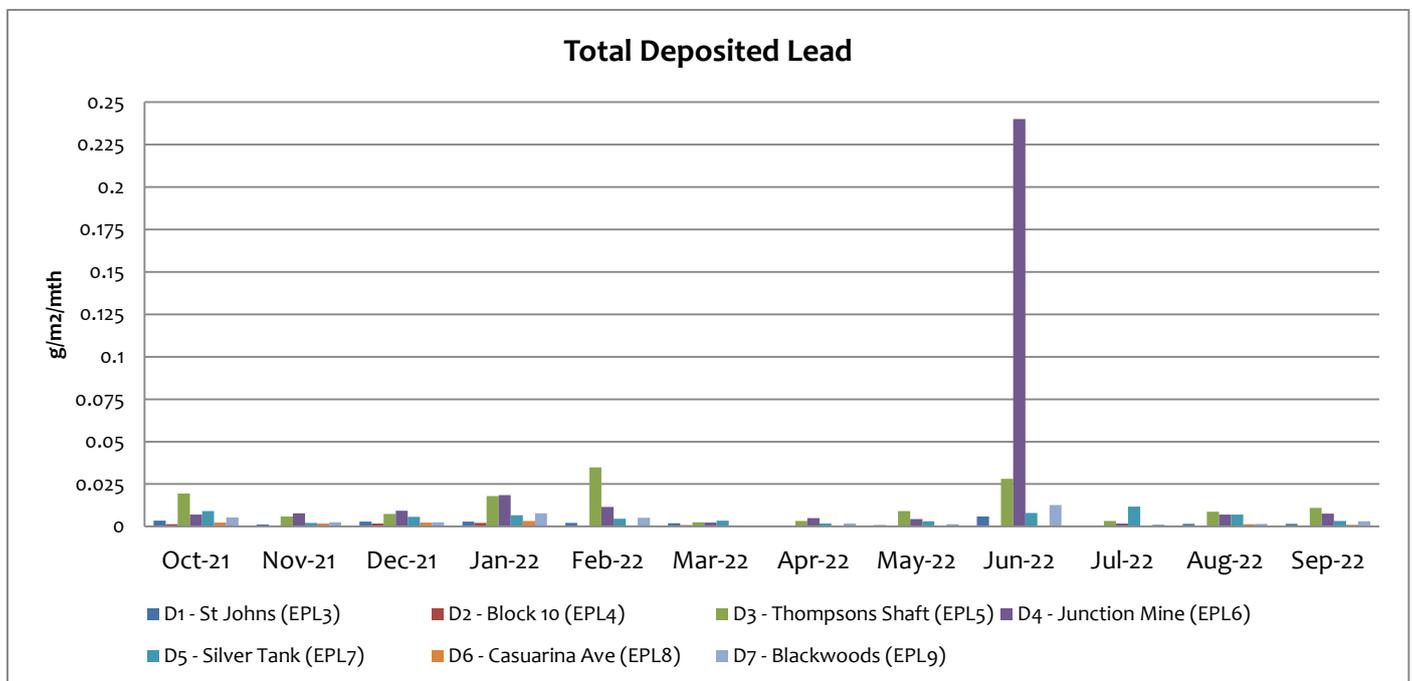
**Total Deposited Lead (g/m<sup>2</sup>/Month)**

Sample Period	D1 (off Site)	D2 (on site)	D3 (on site)	D4 (on site)	D5 (on site)	D6 (off Site)	D7 (on site)
<b>September 2022</b>	0.00158	0.00052	0.0109	0.00763	0.0033	0.00098	0.00308
<b>Background (2010)</b>	0.0034	0.005	0.005	0.006	- <sup>1</sup>	0.004	- <sup>1</sup>

Note: "<sup>1</sup>"= background not available, NS = No sample

There are no guidelines for deposited lead dust. Lead results in September 2022 were highest in the D3 Thompsons Shaft gauge. The prominent wind direction for the month of September was from the South, suggesting there may have been contribution from sources on-site such as the rail loadout, Blackwood’s waste dump and TSF.

Dust suppressant is applied to unsealed areas of the site and roads are frequently watered using water carts in an attempt to control dust emissions. The waste dump adjacent to the rail loadout is treated with dust suppressant to capture any loose dust accumulating on the lower batters and on the upper surface.





#### 1.4 Ventilation Outlets and Bag House Monitoring

There are two locations to measure pollutants from exhausts or stacks; these include the Primary Ventilation Shaft, measuring pollutants from underground firings, and the Baghouse Stack at the crusher measuring dust. Each are located on site; the Primary Ventilation Shaft is located centrally and to the north of the mine lease and the Primary Crusher Baghouse Stack is located within the area of the processing plant to the east of the lease. Shaft 6 (EPL56) was removed as a monitoring location with the variation of EPL12559 in March 2019 as it became an intake rather than an exhaust in April 2018. A map indicating these locations can be found on the Rasp Mine web site. Samples are collected quarterly and analysed for a number of parameters listed in below. Reference to the item required in the Rasp Mine Environment Protection Licence (EPL) is provided below. Emissions monitoring is conducted quarterly.

The following criteria apply:

##### Primary Ventilation Shaft (EPL1)

	Unit	Criteria
Nitrogen Oxides	mg/m <sup>3</sup>	350
Volatile Organic Compounds	mg/m <sup>3</sup>	40

##### Primary Ventilation Shaft (EPL1) and Crusher Baghouse (EPL2)

	Unit	Criteria
Total Suspended particles (TSP)	mg/m <sup>3</sup>	20
Type 1 and Type 2 <sup>1</sup>	mg/m <sup>3</sup>	1

**Note 1:** "Type 1 substance" means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements.

"Type 2 substance" means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements.



### Primary Vent Shaft (EPL1) and Crusher Baghouse (EPL2) Results for September 2022

Monitoring was conducted at the Primary Vent Shaft (EPL1) and the Crusher Baghouse (EPL2) on 6 September 2022. The monitoring results for the Primary Vent Shaft and the Crusher Baghouse from this monitoring event were below the licence criteria.

Parameter	Unit	Primary Vent Shaft	Crusher Baghouse
		(EPL1)	(EPL2)
Dry Gas Density	Kg/m <sup>3</sup>	1.29	1.29
Moisture	%	2.97	4.66
Molecular weight of stack gases	g/m <sup>3</sup>	1,288	1,288
Temperature	°C	25	21.7
Nitrogen Oxides	mg/m <sup>3</sup>	2.05	NA
Volatile Organic Compounds	mg/m <sup>3</sup>	0.474	NA
Total Suspended particles	mg/m <sup>3</sup>	2.29	12.09
Type 1 and Type 2	mg/m <sup>3</sup>	0.0326	0.4265
Velocity	m/sec	11.6	21.7
Volumetric Flowrate	m <sup>3</sup> /sec	186	9.1

## 2 Noise

### 2.1 Blasting (Vibration and Overpressure)

There are five compliance vibration monitors at various locations measuring for vibration and overpressure from blast firings. These include V1 to V5 which are located on-site and off-site. A map indicating these locations can be found on the Rasp Mine web site. In addition, there are a number of roving monitors which may be used to monitor vibration and overpressure at particular locations as required. Monitors operate continuously and are automatically triggered to record when a blast occurs. The following conditions apply as listed in the PA 07\_0018 and EPL 12559:



**Blasting Criteria (Western Mineralisation and Main Lodes excluding Block 7)**

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance (for production and development blasts)
Residence on privately owned land (7am-7pm)	115	5	5% of the total number of blasts over a 12-month period <sup>1</sup>
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Public Infrastructure	-	100	0%

**Note 1:** Does not apply until completion of Pollution Reduction Program on the EPL at the end of 2018. Applies to EPL criteria in the period for the Annual Return 3 Nov to 2 Nov the following year and to DPE criteria in the reporting period 1 Jul to 30 Jun each year.

**Blasting Criteria (Block 7)**

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance (for production and development blasts)
Residence on privately owned land (7am-7pm)	115	3 (interim)	5% of the total number of blasts over a 12-month period <sup>1</sup>
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Broken Hill Bowling Club, Italo (Bocce) Club, Heritage Items within CML7	-	50	0%
Perilya Southern Operations	-	100	0%
Public Infrastructure	-	100	0%

**Note 1:** Applies to EPL criteria in the period for the Annual Return 3 Nov to 2 Nov the following year and to DPE criteria in the reporting period 1 Jul to 30 Jun each year.

In addition the following conditions also apply:

- Production blasts may occur between 6.45 am and 7.15 pm on any day
- 1 production blast per day, with 6 per week averaged over a calendar year
- 6 development blasts per day, with 42 per week averaged over a calendar year

**Blasting Data Summary Results for September 2022 (annual period)**

**Total Blasts:**

- 0 production blasts occurred before 6.45 am or after 7.15 pm
- The number of Production blasts averaged 2.29 per week over the previous calendar year
- The number of Development blasts averaged 25.00 per week over the previous calendar year

**Western Mineralisation and Main Lodes (excluding Block 7):**

- 0 Blast recorded >5 mm/s
- 0 Blasts recorded >10 mm/s
- 0 development blasts recorded an over pressure level over 95 dBL (10pm to 7am)
- 0 development blasts recorded an over pressure level over 105 dBL (7pm to 10pm)
- 0 Blasts recorded an over pressure level over 115dBL (7am to 7pm)



- 0 Blasts recorded an over pressure level over or 120 dBL at any time
- Percentage of development blasts over 5 mm/sec for the annual period = 0%
- Percentage of production blasts over 5 mm/sec for the annual period = 0%

**Block 7:**

- 1 Blasts recorded >3 mm/s
- 0 Blasts recorded >10 mm/s
- 0 Blasts recorded >50 mm/s at V6
- 0 development blasts recorded an over pressure level over 95 dBL (10pm to 7am)
- 0 development blasts recorded an over pressure level over 105 dBL (7pm to 10pm)
- 0 Blasts recorded an over pressure level over 115 dBL (7am to 7pm)
- 0 Blasts recorded an over pressure level over or 120 dBL at any time
- Percentage of development blasts over 3mm/sec for the annual period = 0%
- Percentage of production blasts over 3mm/sec for the annual period =100%

There have been no production blasts in the Western Mineralisation and Main Lodes producing vibration at monitors over 5 mm/sec for the 12-month period.

There has been one production blast in Block 7 for the 12-month period and this blast produced vibration at one monitor of over 3 mm/sec.

## 2.2 Noise

Noise monitoring is undertaken as per the NSW Noise Policy for Industry at a frequency of once per annum. Annual noise monitoring was conducted during two consecutive night-time periods from 3 to 5 May 2021.

The monitoring assessment found that site LAeq, 15min noise contributions satisfied the relevant limits during the measurements at all assessment locations.



### 3 Water

#### 3.1 Groundwater

There are eighteen sampling locations for groundwater. GW01 (EPL37) to GW16 (EPL52) are piezometers installed at various locations around the mine site and are sampled quarterly. There are also two sampling locations for water pumped from underground mining, Shaft 7 (EPL53) and Kintore Pit (EPL54), which are sampled monthly. A map indicating these locations can be found on the Rasp Mine web site. Groundwater monitoring is scheduled for completion in March, June, September and December. No limits are applied in the EPL to the results from groundwater monitoring.

#### Groundwater Monitoring Requirements

EPA Identification Number	Frequency	Parameters to be analysed
Shaft 7 EPL53	Monthly	alkalinity (calcium carbonate (CaCO <sub>3</sub> )), cadmium (Cd), calcium (Ca), chloride (Cl), electrical conductivity (EC), iron (Fe), lead Pb), magnesium (Mg), manganese (Mn), pH, sodium (Na), sulphate (SO <sub>4</sub> ), total dissolved solids (TDS) and zinc (Zn)
Kintore Pit (U/G dewatering) EPL54	Monthly	
Piezometers EPL37 (GW01) to EPL52 (GW16)	Quarterly	

#### *Shaft 7 (EPL53) and Kintore Pit (EPL54) Results for September 2022*

Sample Point	pH	EC (µS/cm <sup>2</sup> )	TDS (mg/l)	Alkalinity (CaCO <sub>3</sub> ) (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
Shaft 7 (EPL53)	5.78	13300	12500	14	5830	1610	496	268	1560	2.86	1.01	314	962	0.33
Kintore Pit (EPL54)	5.91	15800	16300	12	6880	1970	539	336	1880	3.81	1.61	420	1240	<0.05

#### *Groundwater Bores (EPL37 - EPL52) Results for September 2022*

Sample Point	pH	EC (µS/cm <sup>2</sup> )	TDS (mg/l)	Alkalinity (CaCO <sub>3</sub> ) (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
GW01 (EPL37)	5.15	10200	9570	3	5080	1040	276	426	1460	0.2	0.113	294	280	<0.05
GW02 (EPL38)	Bore Dry													
GW03 (EPL39)	5.99	14200	12800	<1	4850	3020	539	237	2070	539	3.82	333	351	3.33
GW04 (EPL40)	6.25	13900	12100	205	4710	2740	561	491	2160	0.0498	0.045	39	21.3	<0.05
GW05 (EPL41)	5.82	13400	12200	33	5160	2670	530	365	1980	1.42	1.19	269	316	<0.05
GW06 (EPL42)	5.85	14200	13200	50	5650	2850	526	455	2080	1.15	0.049	324	243	<0.05
GW07 (EPL43)	5.93	12800	11800	8	4940	2520	526	334	1860	2.41	0.546	329	240	<0.05
GW08 (EPL44)	5.47	9770	9410	7	3900	1570	525	240	1160	2.23	1.07	206	552	<0.05



Sample Point	pH	EC (µS/cm <sup>2</sup> )	TDS (mg/l)	Alkalinity (CaCO <sub>3</sub> ) (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
GW09 (EPL45)	6.02	11000	10400	59	4530	1630	566	457	1410	1.31	0.008	114	195	<0.05
GW10 (EPL46)	5.94	16000	15000	37	5410	3440	561	508	2390	5.21	0.002	226	527	<0.05
GW11 (EPL47)	6.18	4440	3730	24	1730	490	286	105	518	1.58	1.25	28	97.7	<0.05
GW12 (EPL48)	Bore Dry													
GW13 (EPL49)	Bore Dry													
GW14 (EPL50)	Bore Dry													
GW15 (EPL51)	Bore Dry													
GW16 (EPL52)	Bore Dry													

### 3.2 Surface Water Sample Record

There are seven sampling locations for surface water, these include surface water basins located on the mine lease to capture and retain rainfall and two locations up and down stream of an ephemeral creek located south of the mine lease boundary. A map indicating these locations can be found on the Rasp Mine web site. Based on historical data, sampling is most likely to be undertaken in October (highest rainfall month as recorded by Bureau of Meteorology) and April.

#### Surface Water Monitoring Requirements

Description	Frequency	Parameters to be Analysed
Federation Way Culvert EPL29/S31-1	2 x per year, six months apart	cadmium (Cd), chloride (Cl), electrical conductivity (EC), lead Pb), manganese (Mn), pH, sodium (Na), sulphate (SO <sub>4</sub> ), total dissolved solids (TDS) and zinc (Zn)
Ryan Street Dam EPL31/S49	2 x per year, six months apart	
Adjacent Olive Grove EPL32/S1A	2 x per year, six months apart	
Adjacent Bowls Club EPL33 /S9-B2	2 x per year, six months apart	
Horwood Dam EPL34/S34	2 x per year, six months apart	
Upstream Bonanza St EPL35	2 x per year, six months apart	
Downstream Sydney Rd EPL36	2 x per year, six months apart	



Surface Water Monitoring Results for 8 September 2022

Sample Point	pH	EC ( $\mu\text{S}/\text{cm}^2$ )	TDS (mg/l)	Alkalinity ( $\text{CaCO}_3$ ) (mg/l)	SO4 (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
<b>S9B-2 (EPL 33)</b>	6.7	570	329	5	198	33	49	8	29	0.222	0.642	3.64	15.8	<0.05
<b>S31-1 (EPL 29)</b>	5.91	1850	1700	4	990	40	153	19	44	2.57	1.17	88.8	239	<0.05
<b>S1A (EPL 32)</b>	6.72	394	243	13	149	11	51	4	8	0.0814	0.104	1.91	8.84	<0.05
<b>Upstream (EPL 35)</b>	6.9	182	104	37	26	16	18	2	10	0.0096	0.011	0.457	1.21	<0.05
<b>Downstream (EPL 36)</b>	7.25	402	249	75	48	42	25	8	34	0.0013	0.002	0.026	0.17	<0.05
<b>S49 (EPL 31)</b>	6.4	486	325	5	214	5	53	4	6	0.186	0.12	10.1	26.5	<0.05
<b>S44 (EPL 30)</b>	6.92	454	248	12	156	22	51	5	17	0.162	0.307	0.833	5.36	<0.05
<b>Horwood Dam (EPL 34)</b>	6.21	9410	5860	13	3890	1250	396	217	1120	2.19	2.05	201	452	<0.05



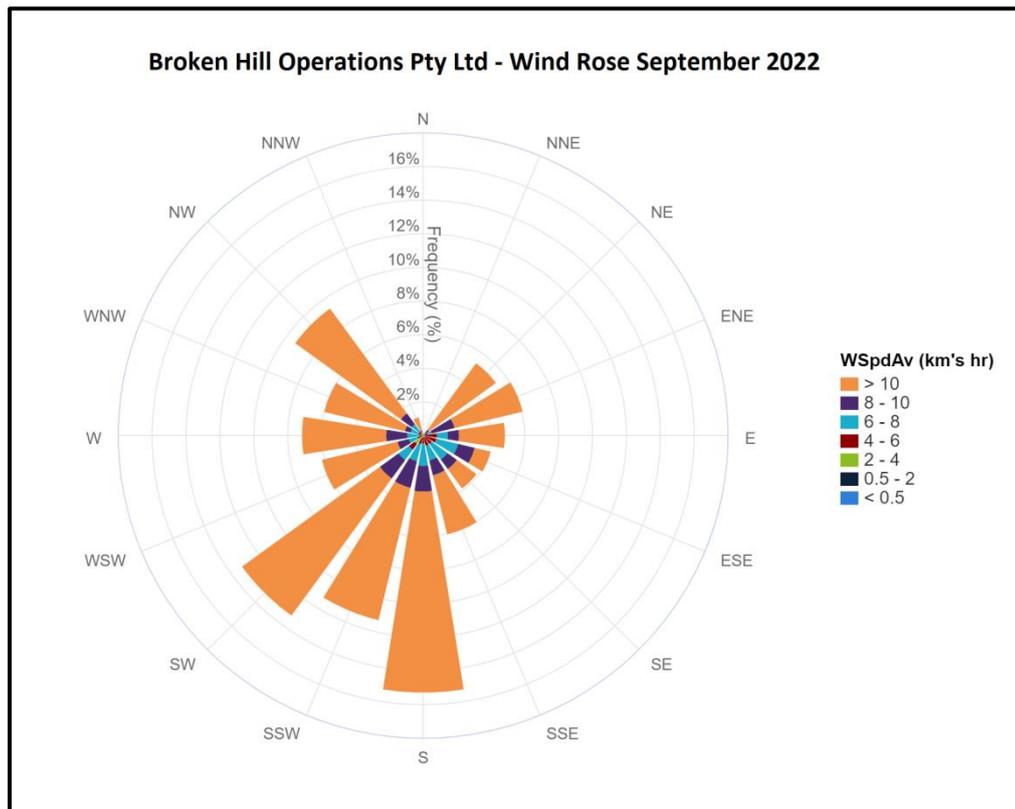
## 4 Weather Data

The weather station continuously monitors the following parameters as per Point 55 of the Environmental Protection Licence.

The following parameters are required to be recorded each month as listed in the EPL 12559:

### Rasp Mine Weather Station (EPL55) Monitoring Requirements

Parameter	Sampling method	Units of measure	Averaging period	Frequency
Temperature at 10 metres	AM-4	degrees Celsius	15 minutes	Continuous
Wind Direction at 10 metres	AM-4	degrees in a clockwise direction from True North	15 minutes	Continuous
Wind Speed at 10 metres	AM-4	metres per second	15 minutes	Continuous
Rainfall	AM-4	millimetres	1 hour	Continuous
Sigma theta	AM-2 & AM-4	degrees	15 minutes	Continuous



The wind rose provided below indicates that the prominent wind direction for the month of September was from the South and South West.



*Weather Data Summary for September 2022*

Date	Temperature @ 10m (°C)		Wind Speed @ 10m (km/hr)		Predominant Wind Direction @ 10m		Rainfall (mm)
	Min	Max	Min	Max	Cardinal	Degree	Total
01-Sep-22	10.3	17.5	1.3	17.4	South	183	0
02-Sep-22	5.4	13.6	8.4	29.8	South	179	0
03-Sep-22	2.8	13.8	9.6	40.9	SSE	162	0
04-Sep-22	5.9	16.1	6.2	23.3	SSE	155	0
05-Sep-22	5.4	16.4	3.5	15.7	ESE	118	0
06-Sep-22	8.2	19.2	2.4	21.2	NE	46	0
07-Sep-22	12.8	19.8	3.7	37.9	NE	45	23
08-Sep-22	12.0	16.7	2.1	31.3	NW	312	4.1
09-Sep-22	9.5	15.9	8.3	43.5	West	268	0
10-Sep-22	8.3	15.9	2.8	24.5	SW	222	0
11-Sep-22	8.9	17.5	2.2	11.6	South	179	0
12-Sep-22	9.1	17.9	2.5	18.7	SE	134	0
13-Sep-22	8.2	19.9	4.2	21.6	East	92	0
14-Sep-22	11.7	19.5	6.1	41.0	NE	41	4.2
15-Sep-22	10.3	19.5	4.1	25.7	West	274	0
16-Sep-22	10.3	18.2	4.7	37.3	NW	313	0.7
17-Sep-22	7.6	16.3	5.4	42.4	West	273	0
18-Sep-22	7.6	16.8	5.0	24.9	West	269	0
19-Sep-22	8.7	19.9	2.2	24.0	SSW	201	0
20-Sep-22	11.2	23.6	6.4	41.3	NE	42	4
21-Sep-22	11.2	15.9	6.0	37.2	SW	222	0
22-Sep-22	11.0	15.3	1.9	24.7	SSW	203	0
23-Sep-22	11.1	20.1	5.1	34.1	SSW	204	0
24-Sep-22	10.1	18.6	1.0	24.1	South	181	0
25-Sep-22	11.6	25.0	3.1	27.8	NE	44	0
26-Sep-22	11.5	22.5	1.7	27.3	SW	223	0.5
27-Sep-22	8.3	15.9	8.8	39.5	SW	224	0
28-Sep-22	7.9	16.5	8.8	32.3	South	182	0
29-Sep-22	7.9	17.4	7.0	26.8	South	179	0
30-Sep-22	8.0	19.5	5.2	18.9	South	179	0

Rainfall of 36.5mm in September 2022.



## 5 Data Log

Sample	Result Received
Hi Volume Samples	19-10-2022
TEOM	22-11-2022
Dust Deposition	24-10-2022
Vents & Bag House	07-10-2022
Noise	14-05-2021
Water	26-09-2022
Blast vibration and overpressure	05-10-2022
Weather	19-10-2022
Date posted to web site	25-11-2022

## 6 Correction Log

No corrections.