



Rasp Mine  
Monthly Environmental Monitoring Report  
December 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 $\mu\text{g}/\text{m}^3$
Particulate matter < 10 $\mu\text{m}$ (PM <sub>10</sub> )	Annual	25 $\mu\text{g}/\text{m}^3$

### Short Term Criterion for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10 $\mu\text{m}$ (PM <sub>10</sub> )	24 hour	50 $\mu\text{g}/\text{m}^3$

### Long Term Criteria for Deposited Dust

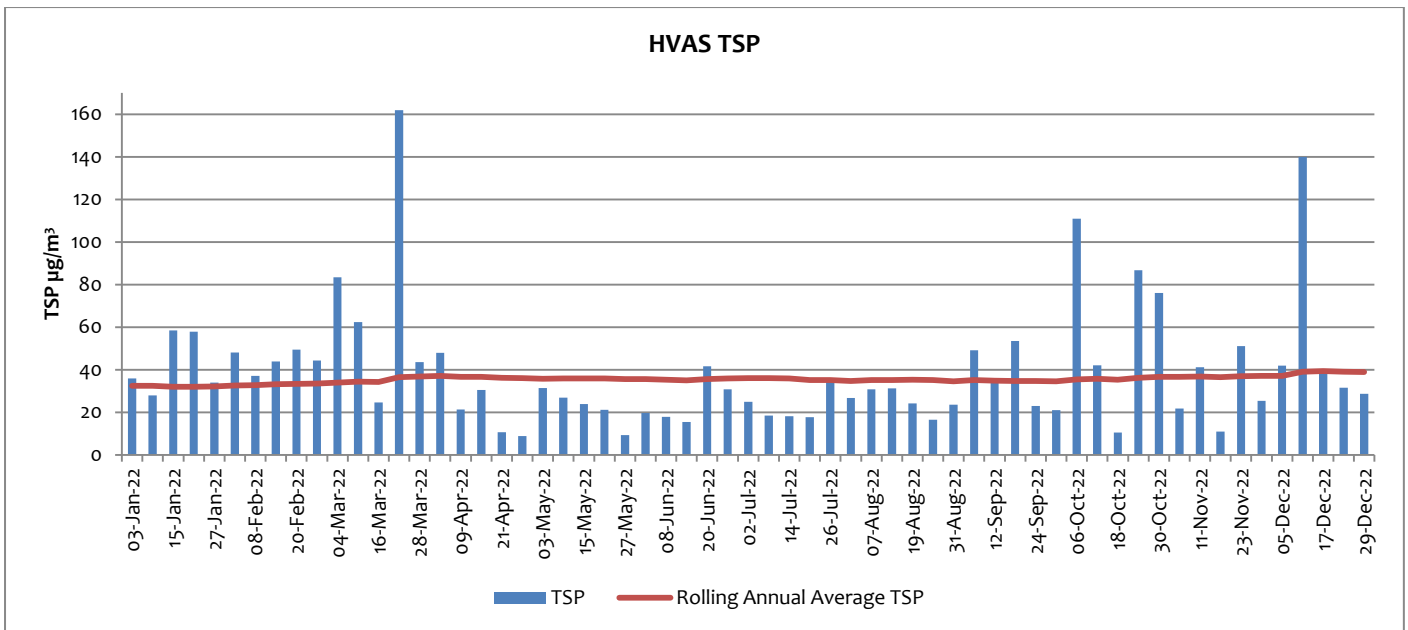
Pollutant	Averaging Period	Maximum Project Contribution	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

### 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 December 2022*

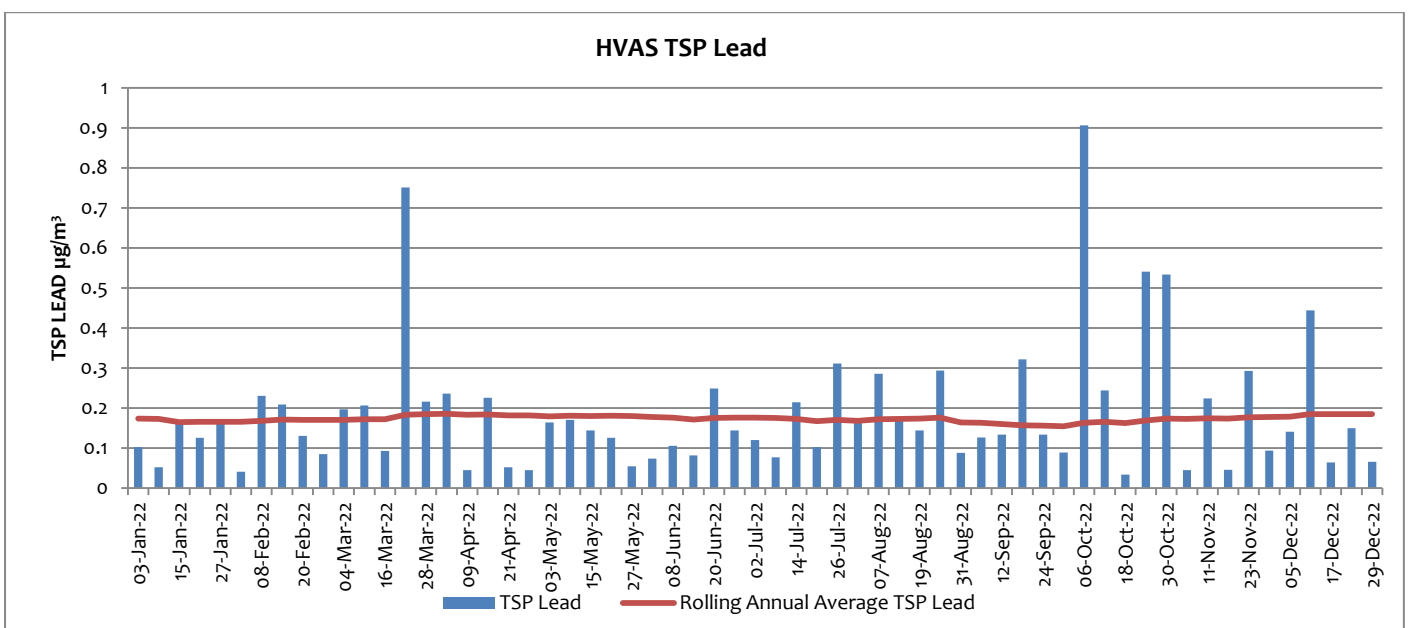
DATE	TSP ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
05-December-22	41.90	0.14
11-December-22	140.00	0.44
17-December-22	26.90	0.06
23-December-22	31.50	0.15
29-December-22	28.70	0.07



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 December were elevated compared to previous months. The highest TSP result for December was 140.00  $\mu\text{g}/\text{m}^3$  on 11 December when winds were predominantly from the SW. There was a dust storm on this day with high dust levels also recorded at TEOM1; however there may have also been contribution from site sources. 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 38.97  $\mu\text{g}/\text{m}^3$  at the end of December, higher than the average at the beginning of January 2022 which was 32.34  $\mu\text{g}/\text{m}^3$ .

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



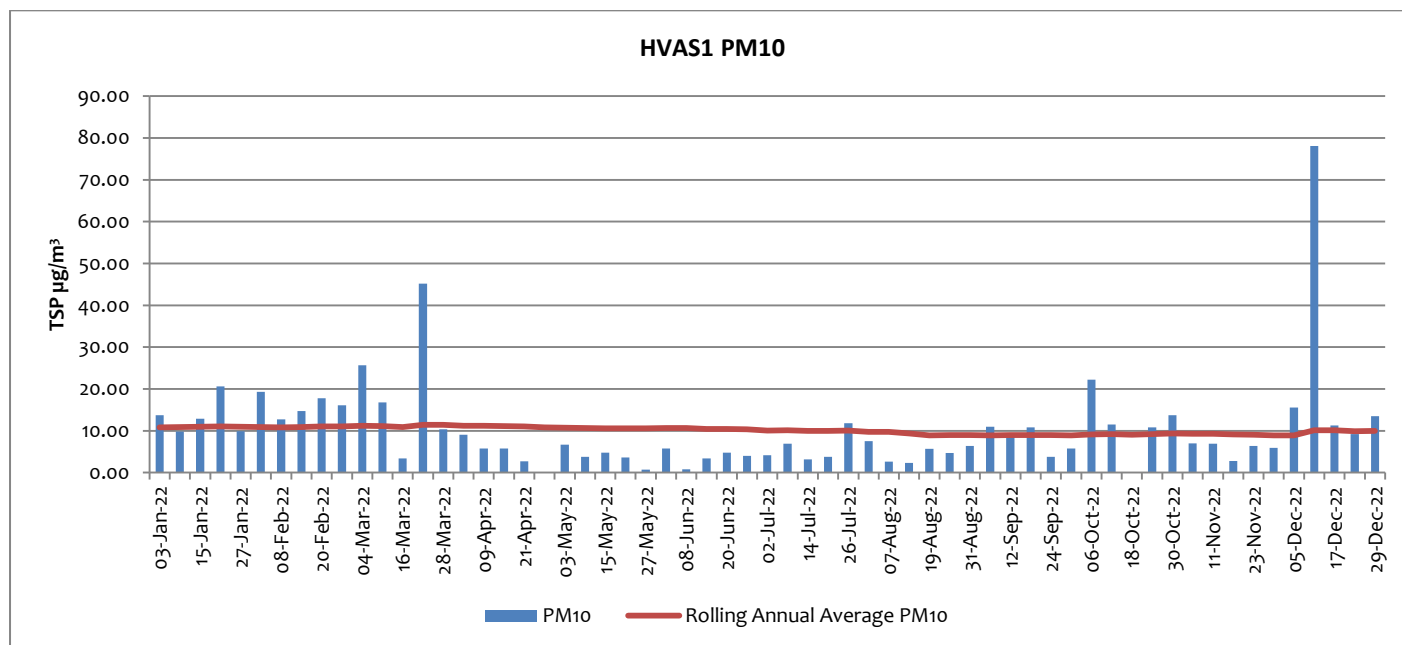


TSP Lead dust results at HVAS for the month of December were consistent with results seen in previous months. The highest TSP Lead level for December was  $0.44 \mu\text{g}/\text{m}^3$  on 11 December when winds were predominately from the SW. There was a dust storm on this day which was recorded at TEOM1, however there may have been contribution from site sources. 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 December 2022 was  $0.19 \mu\text{g}/\text{m}^3$  higher than the rolling annual average of  $0.17 \mu\text{g}/\text{m}^3$  for TSP Lead in January 2022.

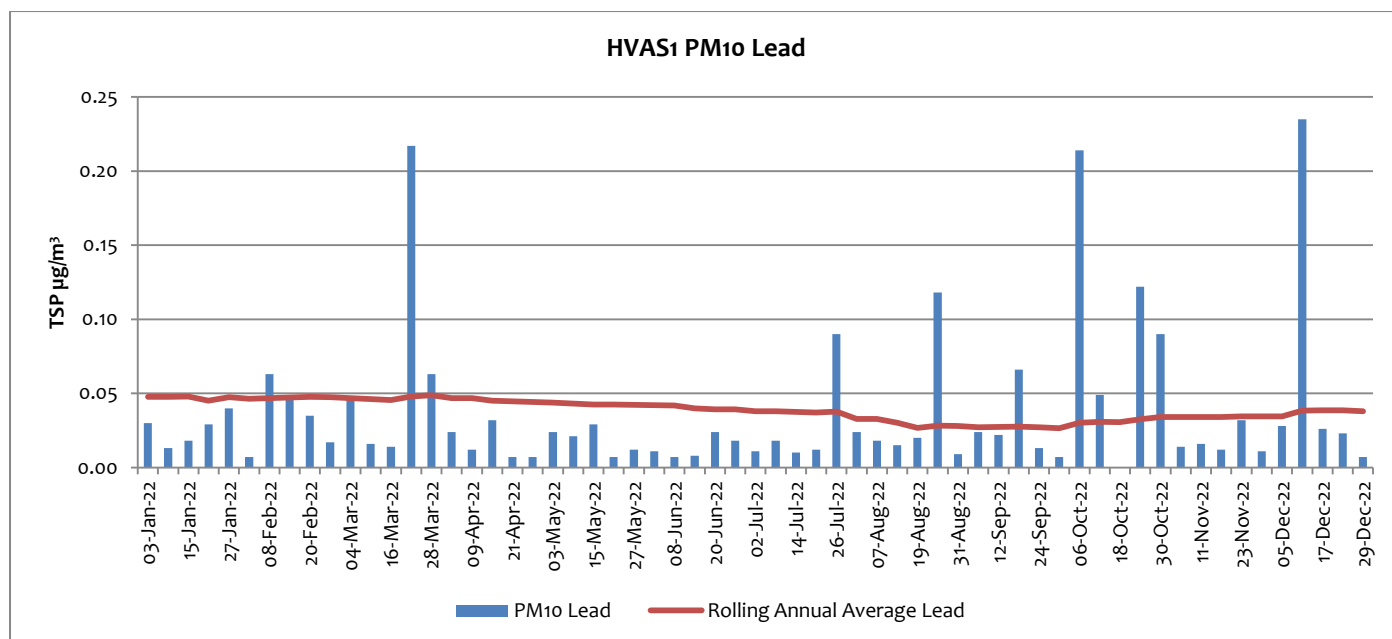
#### ***HVAS1 (EPL11) - Silver Tank (On Site) Results for December 2022***

DATE	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> Lead ( $\mu\text{g}/\text{m}^3$ )
05-December-22	15.60	0.03
11-December-22	78.10	0.24
17-December-22	11.30	0.03
23-December-22	9.20	0.02
29-December-22	13.50	0.01

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 December were consistent with previous months. The highest PM<sub>10</sub> dust level for December was  $78.10 \mu\text{g}/\text{m}^3$  on 11 December when winds were predominantly from the SW and a dust storm moved through the region. 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  $10.0 \mu\text{g}/\text{m}^3$  at the end of December 2022, consistent with the annual rolling average at the beginning of January 2022 which was  $10.8 \mu\text{g}/\text{m}^3$ . External and extreme dust events are recorded in measurements.



PM<sub>10</sub> Lead dust results at HVAS1 in the month of December were consistent with previous months. The highest Lead PM<sub>10</sub> result for December was 0.24 µg/m<sup>3</sup> on 11 December. There was a dust storm on this day with high dust levels also recorded at TEOM1; however there may have also been contribution of Lead dust from site sources due to the high winds and variability of wind directions during the day. 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 December was 0.04 µg/m<sup>3</sup>, down from 0.05 µg/m<sup>3</sup> in January 2022.

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

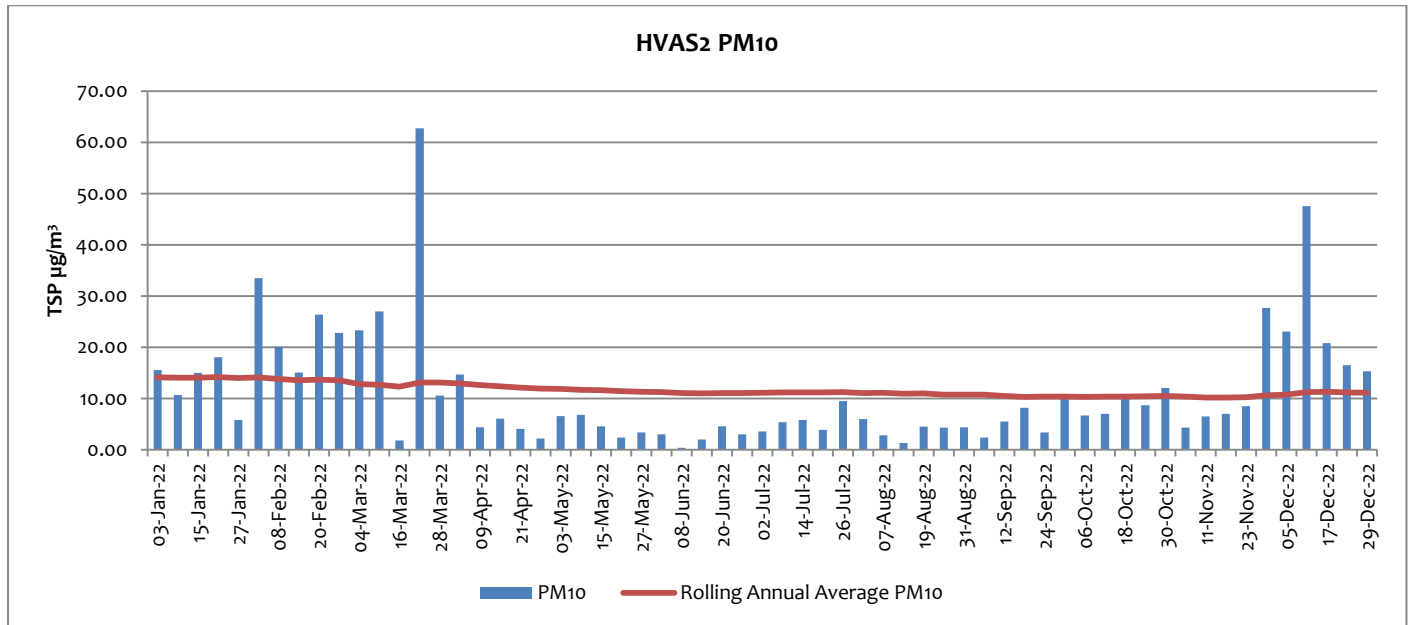
DATE	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> Lead (µg/m <sup>3</sup> )
05-December-22	23.10	0.09
11-December-22	47.60	0.09
17-December-22	20.80	0.09
23-December-22	16.50	0.11
29-December-22	15.30	0.02

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.

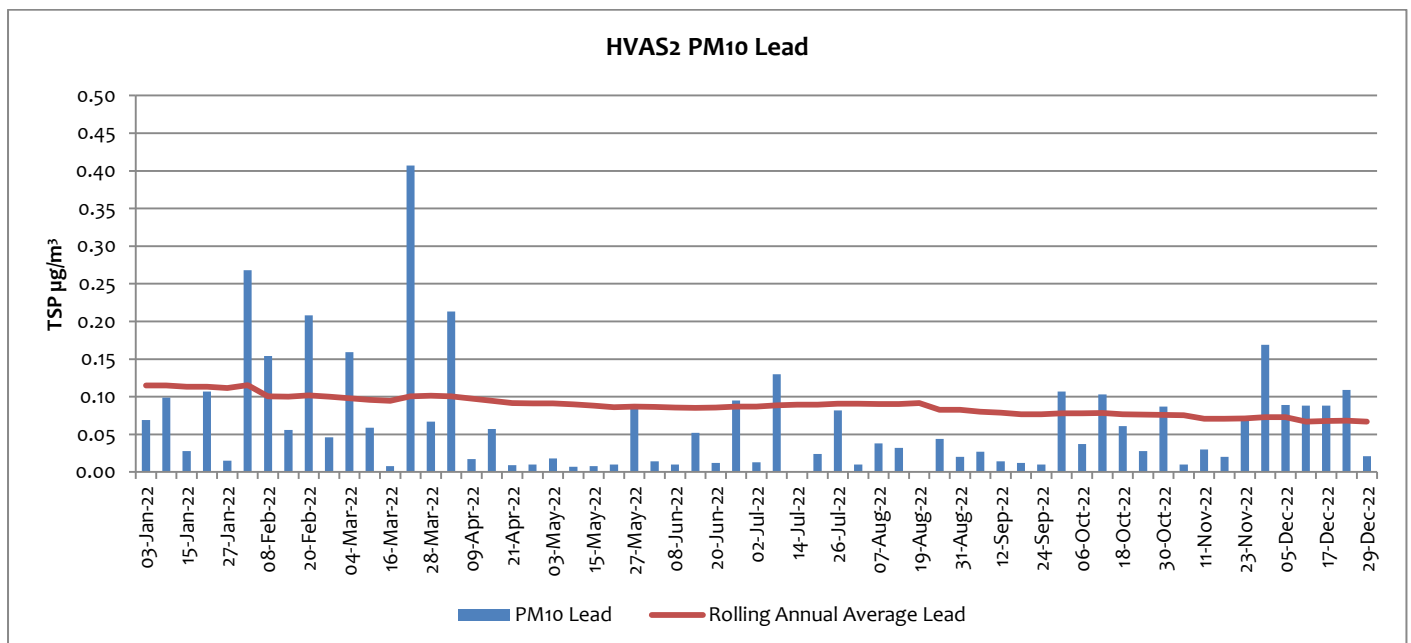
In December PM<sub>10</sub> levels at HVAS2 were elevated compared with previous months. The highest recorded PM<sub>10</sub> dust reading for December was 47.60 µg/m<sup>3</sup> on the 11 December when winds were from the SW allowing for contribution from Blackwoods TSF2. A dust storm on the day caused high results at HVAS, HVAS1 and TEOM1 when winds were from the SW. 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 11.14 µg/m<sup>3</sup> at the end of December 2022, down from 14.15 µg/m<sup>3</sup> in January 2022. A TSF spray system is to be installed after MOD10 approved works preparing the TSF for dry stacking operations and will improve dust control on the TSF surface.

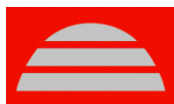


The annual rolling average for PM<sub>10</sub> dust is determined using data with extreme dust events included.



PM<sub>10</sub> lead levels in December were elevated compared with previous months. The highest recorded PM<sub>10</sub> Lead dust reading for December was 0.11  $\mu\text{g}/\text{m}^3$  on the 23 December when winds were from the South suggesting Blackwoods TSF2 was the likely source of the dust. A TSF spray system is to be installed after MOD10 approved works preparing the TSF for dry stacking operations and will improve dust control on the TSF surface. The rolling annual average for PM<sub>10</sub> Lead in December 2022 was 0.07  $\mu\text{g}/\text{m}^3$  down from 0.12  $\mu\text{g}/\text{m}^3$  in January 2022.





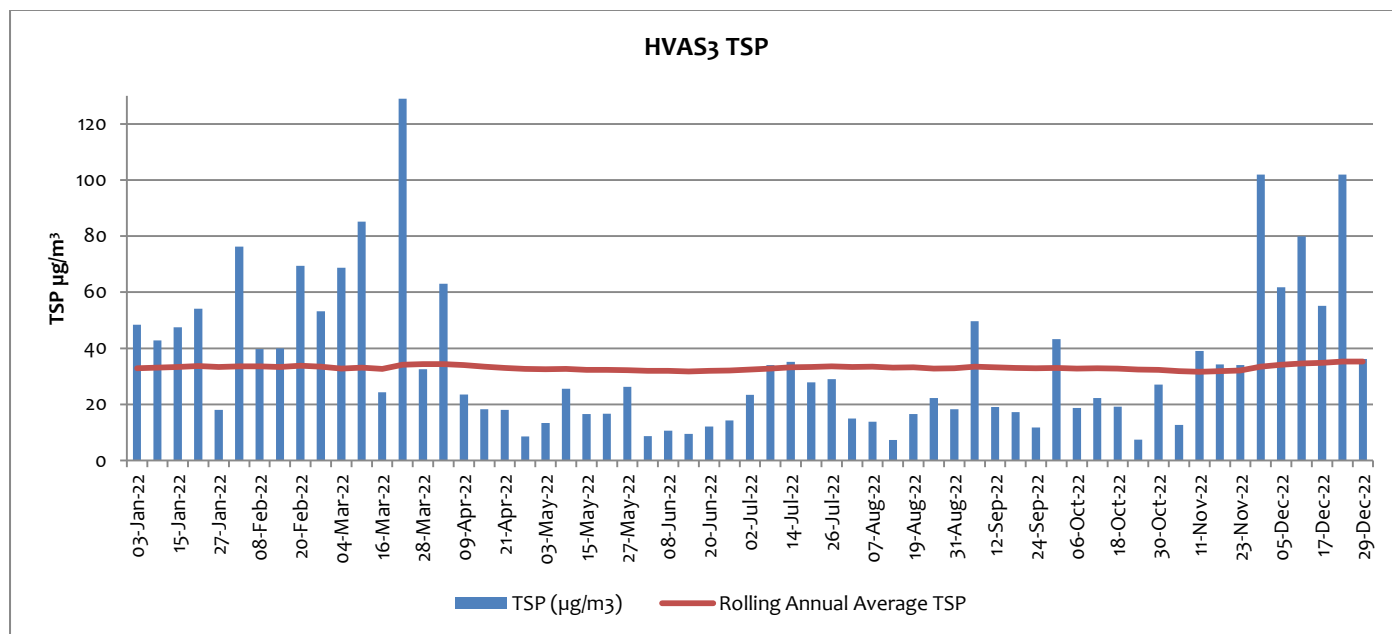
### HVAS 3 (EPL57) - Blackwood Pit (On Site) Results for December 2022

DATE	TSP ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
05-December-22	61.80	0.31
11-December-22	79.90	0.19
17-December-22	55.10	0.31
23-December-22	102.00	0.53
29-December-22	36.20	0.12

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.

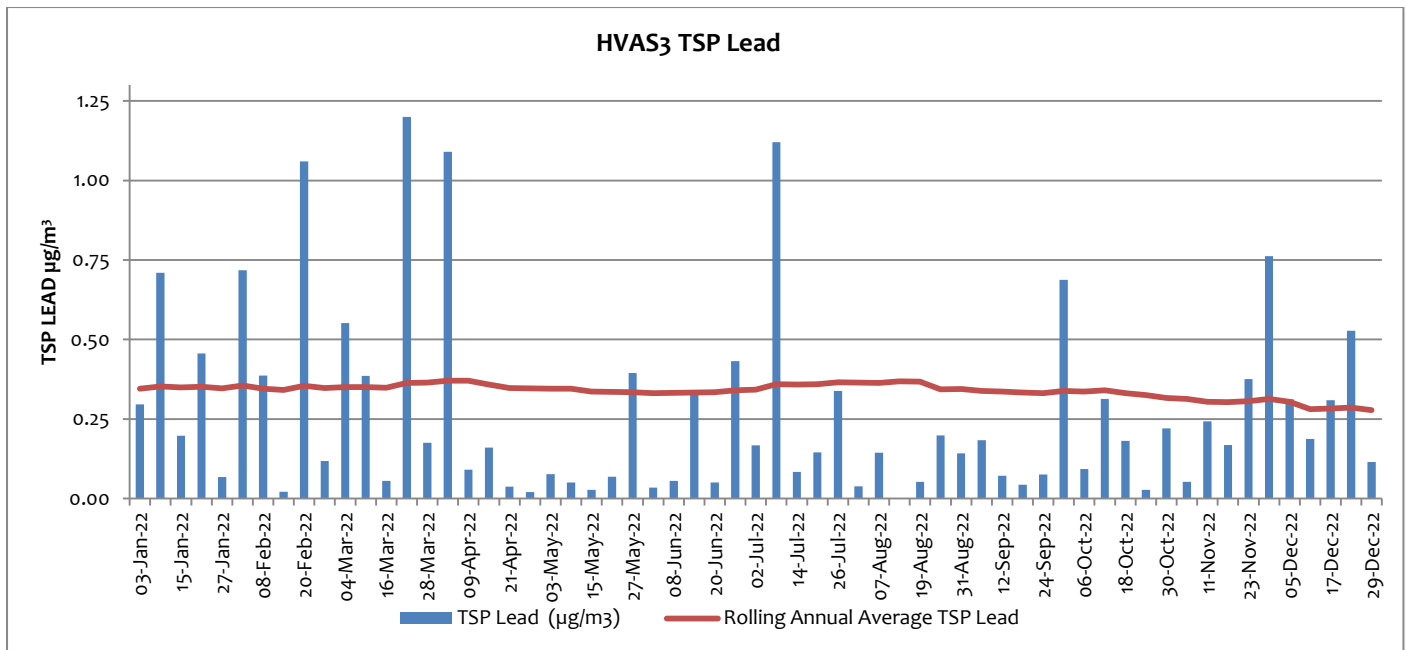
TSP levels at HVAS3 were highest on 23 December with a result of  $102.00 \mu\text{g}/\text{m}^3$ , when winds were from the South, meaning that the dust source was likely Blackwoods TSF2. A TSF spray system is to be installed after MOD10 approved works preparing the TSF for dry stacking operations and will improve dust control on the TSF surface. The annual rolling average for TSP dust at this location is  $35.23 \mu\text{g}/\text{m}^3$  at the end of December 2022, up from  $32.88 \mu\text{g}/\text{m}^3$  in January 2022.

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



TSP Lead levels in December were higher than previous months, with the highest result of  $0.53 \mu\text{g}/\text{m}^3$  recorded on 23 December when winds were predominantly from the South suggesting contribution from Blackwoods TSF2. The rolling annual average for TSP Lead in December was  $0.28 \mu\text{g}/\text{m}^3$ , down from  $0.35 \mu\text{g}/\text{m}^3$  in January 2022. A TSF spray system is to be installed after MOD10 approved works preparing the TSF for dry stacking operations and will improve dust control on the TSF surface.





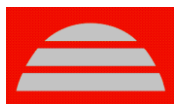
## 1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

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 December 2022

The validated results for December 2022 are being reviewed by a third party and not available for this report so they will be presented in the next report.

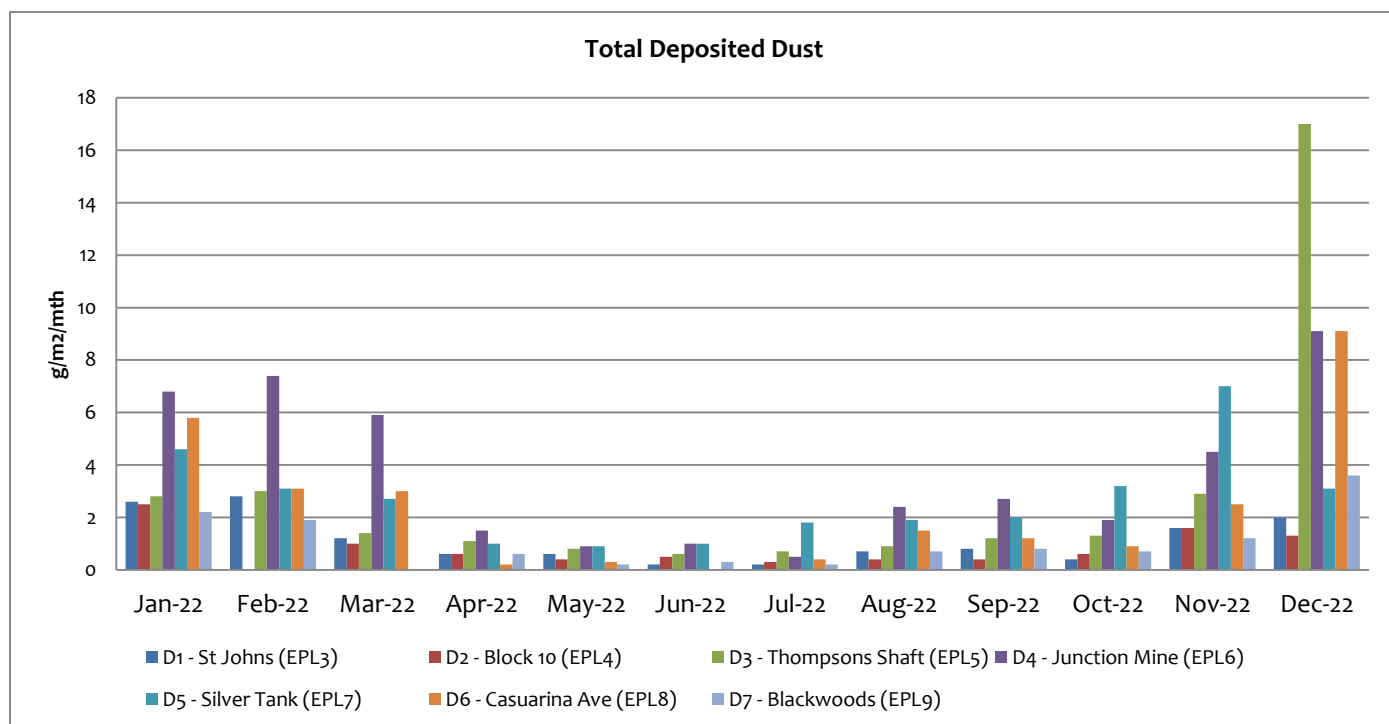
## 1.3 Dust Deposition Sampling

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 December 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)
December 2022	2.0	1.3	17.0	9.1	3.1	9.1	3.6
Annual Rolling Average	1.14	0.87	2.81	3.72	2.69	2.55	1.13
Background (2010)	4.0	3.1	4.3	5.7	- <sup>1</sup>	5.8	- <sup>1</sup>

Note: "<sup>1</sup>" = 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 December 2022 were higher compared with previous months. The highest dust levels were recorded in the D3 Thompsons Shaft gauge. The predominant wind direction for December



was from the South as shown in the Wind Rose in Section 4. Works on and around Blackwoods TSF2 likely contributed to this result, as well as hot dry conditions and a dust storm on 11 December.

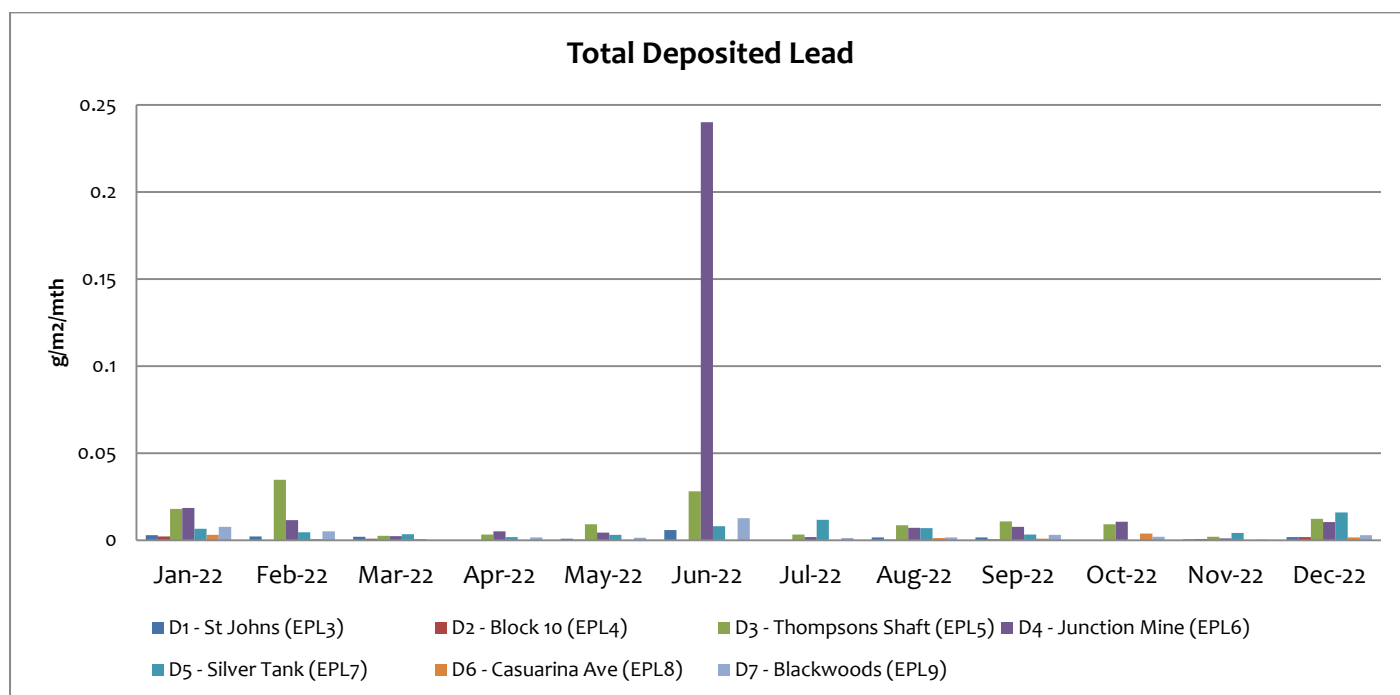
Dust Deposition Gauges that are located off-site must adhere to criteria for annually averaged deposited dust of  $4 \text{ g/m}^2/\text{month}$ . All off-site Dust Deposition Gauges were compliant in the reporting period.

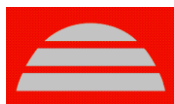
Total Deposited Lead ( $\text{g/m}^2/\text{Month}$ )							
Sample Period	D1 (off Site)	D2 (on site)	D3 (on site)	D4 (on site)	D5 (on site)	D6 (off Site)	D7 (on site)
December 2022	0.00185	0.00178	0.0122	0.0104	0.0159	0.00163	0.00285
Background (2010)	0.0034	0.005	0.005	0.006	- <sup>1</sup>	0.004	- <sup>1</sup>

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

There are no guidelines for deposited lead dust. Lead results in December 2022 were highest in the D5 Silver Tank gauge. The prominent wind direction for the month of December was from the South. A combination of on and off-site contributions are likely to have led to this result, including regional dust events such as the dust storm of 11 December, and fly off from works in Little Kintore Pit. Elevated Lead Dust results for D3 Thompsons Shaft and D4 Junction Mine were likely influenced by activities around the rail loadout and loadout haul road traffic..

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 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

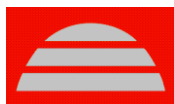
**Note 1:** "Type 1 substance" means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements.

"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 December 2022***

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Monitoring was conducted at the Primary Vent Shaft (EPL1) and the Crusher Baghouse (EPL2) on 22 November 2022. The monitoring results for the Primary Vent Shaft and the Crusher Baghouse from this monitoring event were below the licence criteria.



## 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, Italio (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 December 2022 (annual period)***

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**Total Blasts:**

- 0 production blasts occurred before 6.45 am or after 7.15 pm
- The number of Production blasts averaged 2.04 per week over the previous calendar year
- The number of Development blasts averaged 23.96 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%

The 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 blasts 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 27 to 29 October 2022.

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.

GW01 has showed decreases in metals such as Lead, Zinc and Cadmium, a decrease in EC and an increase in Total Alkalinity which is likely the result of the heavy rainfall throughout the year flushing the water table at this location.

Iron levels in GW03 have fallen to <0.05mg/L after being elevated in the previous months as the heavy rainfall events have diminished towards the end of the year.

Lead levels have increased in GW04 while Zinc and Manganese levels have fallen significantly and the results at the next sample event will be monitored. Other parameters have remained stable.

Zinc and Manganese levels in GW09 have fallen significantly which may be due to the transfer of rainfall runoff from surface storage ponds to the nearby Horwoods Dam.

#### Groundwater Monitoring Requirements

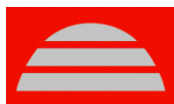
EPA Identification Number	Frequency	Parameters to be analysed
Shaft 7 EPL53	Monthly	alkalinity (calcium carbonate (CaCO <sub>3</sub> )), cadmium (Cd), calcium (Ca), chloride (Cl), electrical conductivity (EC), iron (Fe), lead Pb), magnesium (Mg), manganese (Mn), pH, sodium (Na), sulphate (SO <sub>4</sub> ), 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 December 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)	5.92	13000	14200	9	6100	1860	510	342	1760	3.14	2.12	398	935	<0.05
Kintore Pit (EPL54)	5.74	11300	12500	26	5630	1390	488	302	1490	1.66	1.51	335	860	<0.05

#### Groundwater Bores (EPL37 - EPL52) Results for December 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)
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## Rasp Mine Monthly Environment Monitoring Report

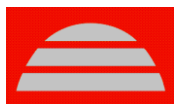
Sample Point	pH	EC ( $\mu\text{S}/\text{cm}^2$ )	TDS (mg/l)	Alkalinity ( $\text{CaCO}_3$ ) (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
GW01 (EPL37)	6.07	5820	5790	116	3000	386	357	307	684	0.0736	<0.001	98	58.6	<0.05
GW02 (EPL38)	Bore Dry													
GW03 (EPL39)	5.89	14900	13700	5	5000	3070	537	348	2100	0.655	3.38	396	320	<0.05
GW04 (EPL40)	6.29	14300	12200	212	4780	2660	545	512	2240	0.036	26.8	0.004	1.42	<0.05
GW05 (EPL41)	6	13800	12500	53	4990	2650	521	382	2030	1.49	0.716	227	244	<0.05
GW06 (EPL42)	5.86	14300	13200	58	5250	2830	510	456	2140	0.975	0.058	282	175	<0.05
GW07 (EPL43)	5.91	12700	12100	9	4890	200	504	326	1820	2.16	1.16	295	241	<0.05
GW08 (EPL44)	5.42	12700	13200	45	4800	2420	532	286	1700	1.74	0.581	409	512	<0.05
GW09 (EPL45)	6.23	10500	8820	140	3300	1870	603	386	1280	0.267	<0.001	25.7	6.17	<0.05
GW10 (EPL46)	5.96	16000	14900	65	5580	3250	533	501	2430	3.68	0.003	197	375	<0.05
GW11 (EPL47)	5.81	4140	3580	30	1580	457	268	100	483	1.25	0.414	20.1	65.6	<0.05
GW12 (EPL48)	Insufficient sample													
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.

Results for the locations sampled were consistent with previous samples.





### 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 27 December 2022

Sample Point	pH	EC ( $\mu\text{S}/\text{cm}^2$ )	TDS (mg/l)	Alkalinity ( $\text{CaCO}_3$ ) (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)
S9B-2 (EPL 33)	Insufficient sample													
S31-1 (EPL 29)	5.94	1780	1940	5	1030	39	173	14	50	2.59	1.97	70.4	250	<0.05
S1A (EPL 32)	6.53	648	528	17	266	28	81	8	30	0.159	0.242	4.63	16.9	<0.05
Upstream (EPL 35)	Insufficient sample													
Downstream (EPL 36)	Insufficient sample													
S49 (EPL 31)	5.87	1010	1010	11	535	12	102	11	21	0.701	1.97	70.4	104	<0.05
S44 (EPL 30)	Insufficient sample													
Horwood Dam (EPL 34)	6.19	11600	13500	10	5310	1570	494	318	1720	2.66	2.38	308	652	<0.05



## 4 Weather Data

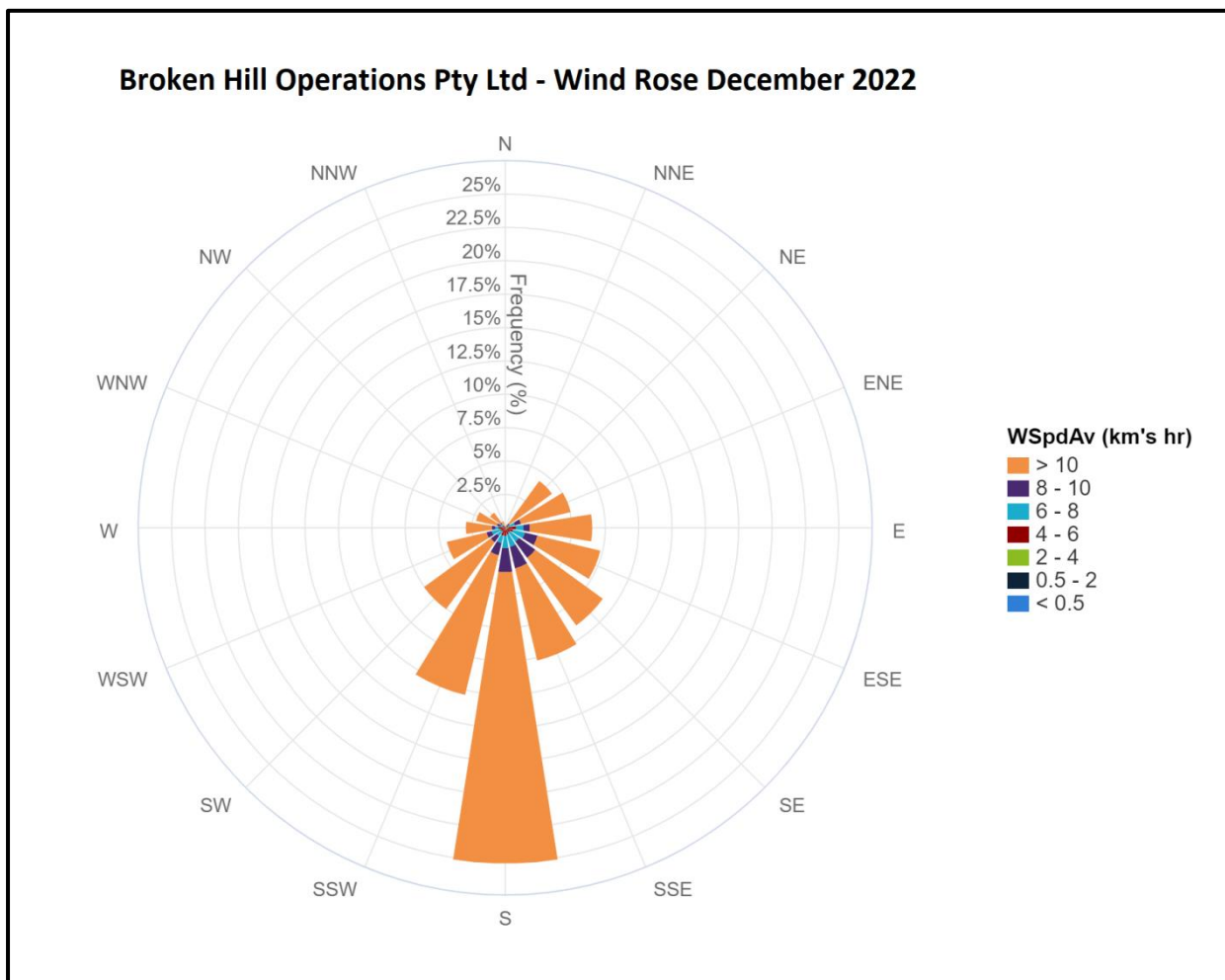
The weather station continuously monitors the following parameters as per Point 55 of the Environmental Protection Licence.

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 December was from the South.





*Weather Data Summary for December 2022*

Date	Temperature @ 10m (°C)		Wind Speed @ 10m (km/hr)		Predominant Wind Direction @ 10m		Rainfall (mm)
	Min	Max	Min	Max	Cardinal	Degree	Total
01-Dec-22	12.7	25.2	8.1	30.6	SSE	158	0.00
02-Dec-22	15.4	27.5	2.4	20.1	East	89	0.00
03-Dec-22	21.3	30.2	1.1	24.0	NNE	21	0.00
04-Dec-22	21.9	33.0	1.6	19.0	South	182	0.00
05-Dec-22	16.8	26.6	5.3	31.1	ESE	114	0.00
06-Dec-22	14.9	25.6	2.9	18.9	SSW	202	0.00
07-Dec-22	15.5	24.7	1.5	36.4	South	177	0.50
08-Dec-22	8.6	20.2	5.1	35.7	SSE	158	0.00
09-Dec-22	12.7	22.1	3.8	19.7	NE	45	0.00
10-Dec-22	15.0	31.2	3.9	22.4	SW	224	0.00
11-Dec-22	18.9	36.7	11.3	50.4	SW	225	1.50
12-Dec-22	11.3	21.2	7.5	38.7	South	182	0.10
13-Dec-22	10.4	21.4	5.5	38.3	South	179	0.00
14-Dec-22	7.9	19.9	7.6	36.2	South	179	0.00
15-Dec-22	8.9	20.3	7.5	33.4	SSE	158	0.00
16-Dec-22	11.0	22.3	7.8	29.3	SE	132	0.00
17-Dec-22	14.2	26.8	4.3	28.4	ESE	115	0.00
18-Dec-22	17.7	28.6	7.6	26.9	ESE	109	0.00
19-Dec-22	17.3	28.6	3.9	26.9	ENE	66	0.00
20-Dec-22	19.2	30.5	8.1	27.2	SSE	157	0.00
21-Dec-22	17.8	31.1	3.5	43.1	SSW	203	5.00
22-Dec-22	17.6	29.2	2.7	23.5	South	178	0.20
23-Dec-22	17.1	30.4	1.3	24.6	South	182	0.00
24-Dec-22	19.0	29.9	1.8	28.7	NE	46	0.00
25-Dec-22	22.0	33.3	3.6	28.6	NNE	28	23.70
26-Dec-22	24.5	34.3	2.4	28.7	NE	44	0.20
27-Dec-22	25.7	35.7	5.9	27.4	South	182	0.00
28-Dec-22	16.8	32.5	8.0	40.8	SSE	159	0.00
29-Dec-22	13.8	27.5	8.5	29.8	South	179	1.40
30-Dec-22	16.0	31.7	4.0	24.5	South	176	0.00

Rainfall of 32.6mm in December 2022.



## 5 Data Log

Sample	Result Received
Hi Volume Samples	20-01-2023
TEOM	TBC
Dust Deposition	24-01-2023
Vents & Bag House	23-11-2022
Noise	5-12-2021
Water	25-01-2023
Blast vibration and overpressure	06-01-2023
Weather	06-01-2023
Date posted to web site	10-03-2023

## 6 Correction Log

No corrections.