

Rasp Mine  
Monthly Environmental Monitoring Report  
March 2021



## **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.

## **TABLE OF CONTENTS**

<b>1</b>	<b>AIR QUALITY .....</b>	<b>3</b>
1.1	HIGH VOLUME AIR SAMPLERS .....	3
1.2	TAPERED ELEMENT OSCILLATING MICROBALANCE SAMPLING (TEOM).....	10
1.3	DUST DEPOSITION SAMPLING .....	13
1.4	VENTILATION OUTLETS AND BAG HOUSE MONITORING .....	15
<b>2</b>	<b>NOISE.....</b>	<b>15</b>
2.1	BLASTING (VIBRATION AND OVERPRESSURE) .....	15
2.2	NOISE .....	17
<b>3</b>	<b>WATER .....</b>	<b>17</b>
3.1	GROUNDWATER.....	17
3.2	SURFACE WATER SAMPLE RECORD .....	19
<b>4</b>	<b>WEATHER DATA .....</b>	<b>19</b>
<b>5</b>	<b>DATA LOG .....</b>	<b>22</b>
<b>6</b>	<b>CORRECTION LOG.....</b>	<b>22</b>



## 1 Air Quality

The following criteria as listed in the Project Approval (DA 07\_0018 MOD7 July 2019) apply to air quality monitoring:

### 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

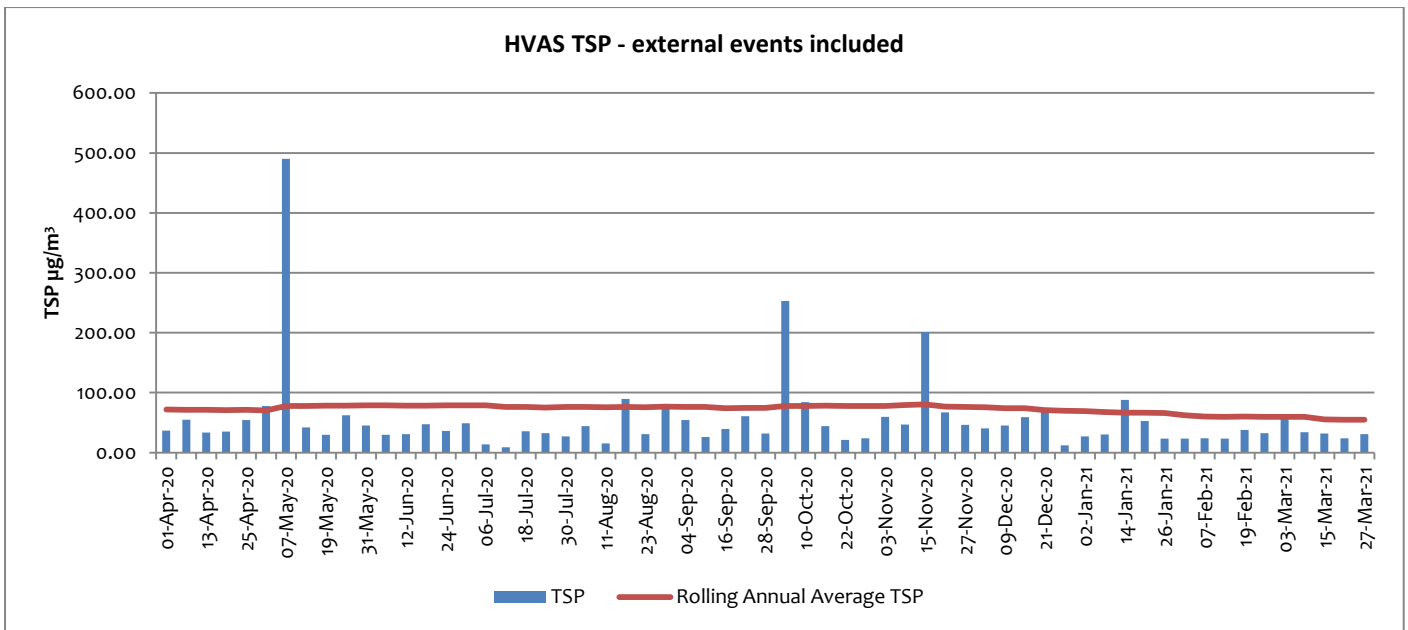
Pollutant	Averaging Period	Maximum Project Contribution	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

### 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 March 2021*

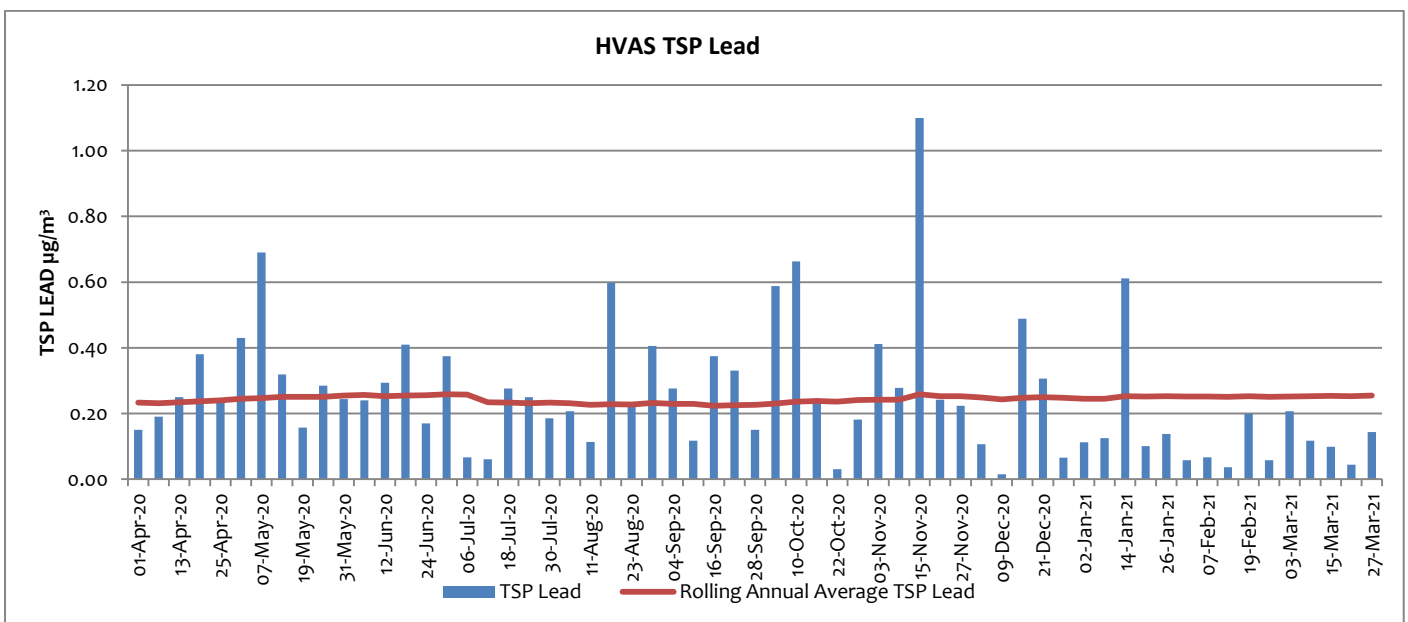
DATE	TSP (µg/m <sup>3</sup> )	Lead (µg/m <sup>3</sup> )
3-3-2021	58.90	0.21
9-3-2021	34.10	0.12
15-3-2021	31.80	0.10
21-3-2021	23.70	0.04
27-3-2021	30.90	0.14

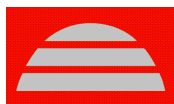


HVAS (EPL10) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.

TSP dust results at HVAS were low for the month of March compared to previous months. The annual rolling average for TSP at this location is  $54.96 \mu\text{g}/\text{m}^3$  at the end of March 2021, significantly lower than the average at the beginning of April 2020 which was  $71.10 \mu\text{g}/\text{m}^3$ . Minor rainfall and fewer extreme dust events than the previous year contributed to the low dust levels measured in March.

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





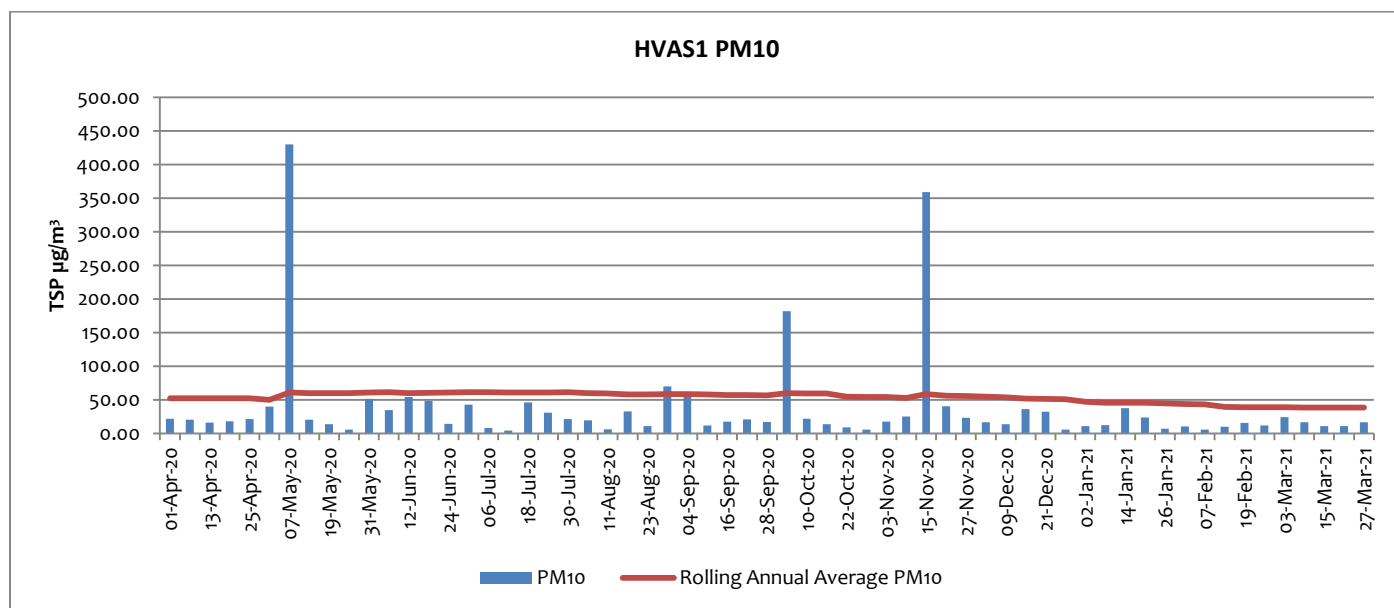
There were elevated TSP Lead levels of  $0.21 \mu\text{g}/\text{m}^3$  on 3 March. The predominant wind direction on 3 March was from the South which suggests there was contribution of lead dust from off-site sources. The rolling annual average for TSP Lead in March 2021 was  $0.25 \mu\text{g}/\text{m}^3$ , slightly higher than the level of  $0.23 \mu\text{g}/\text{m}^3$  in April 2020.

Dust is controlled on site using the application of dust suppressant on free (unused) areas and side tracks, and from the frequent watering of haul roads.

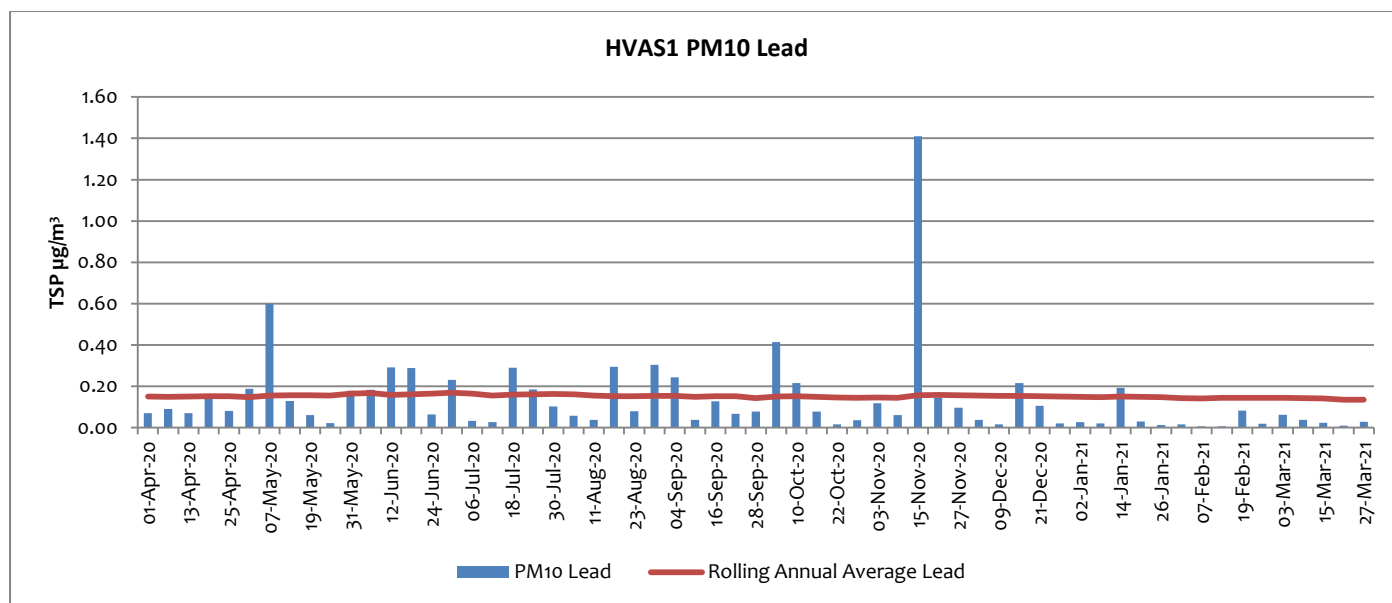
#### HVAS1 (EPL11) - Silver Tank (On Site) Results for March 2021

DATE	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> Lead ( $\mu\text{g}/\text{m}^3$ )
3-3-2021	24.10	0.06
9-3-2021	16.50	0.04
15-3-2021	10.80	0.02
21-3-2021	10.90	0.01
27-3-2021	16.70	0.03

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 were low for the month of March. The annual rolling average for PM<sub>10</sub> dust at this location is  $38.4 \mu\text{g}/\text{m}^3$  at the end of March 2021, lower than the average at the beginning of April 2020 which was  $52.4 \mu\text{g}/\text{m}^3$ . External dust events are recorded in measurements.



PM<sub>10</sub> lead levels were low in the month of March. The predominant wind direction in March was from the South and wind speeds were mild. The rolling annual average for PM<sub>10</sub> Lead in March 2021 was 0.13 µg/m<sup>3</sup>, down from 0.15 µg/m<sup>3</sup> in April 2020.

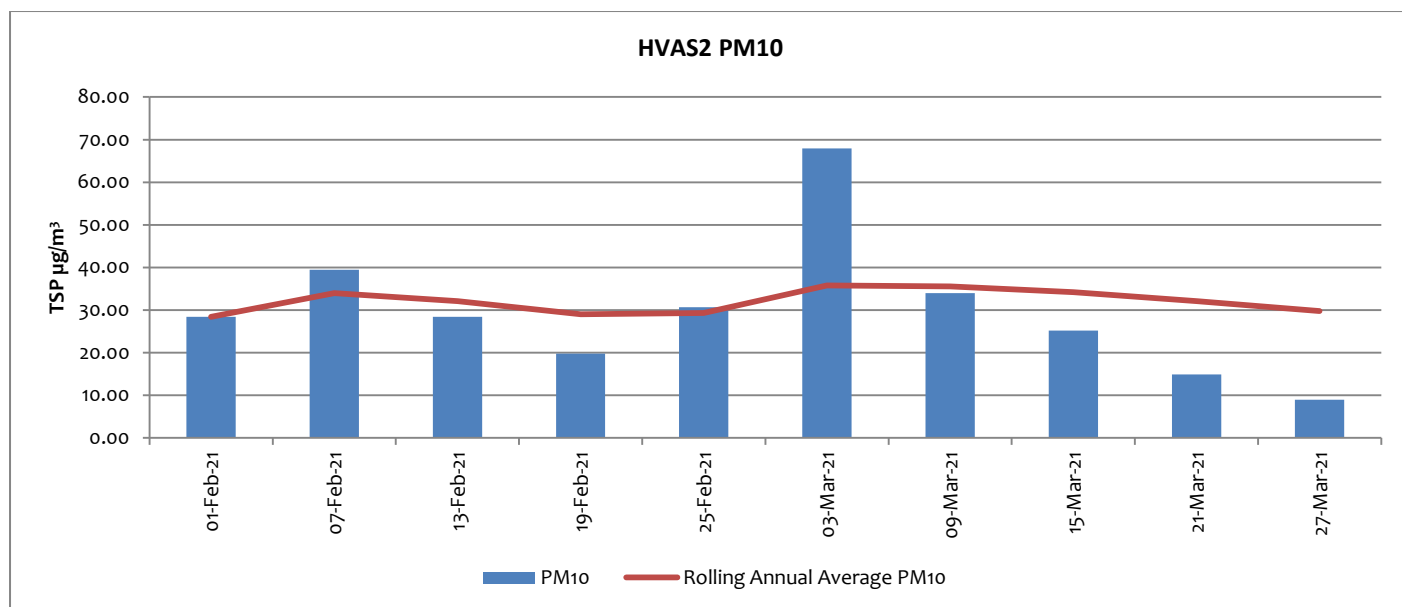
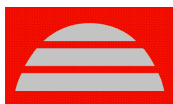
#### ***HVAS 2 (EPL12) - Blackwood Pit (On Site) Results for March 2021***

DATE	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> Lead (µg/m <sup>3</sup> )
3-3-2021	67.90	0.31
9-3-2021	34.00	0.18
15-3-2021	25.20	0.08
21-3-2021	14.90	0.05
27-3-2021	9.00	0.02

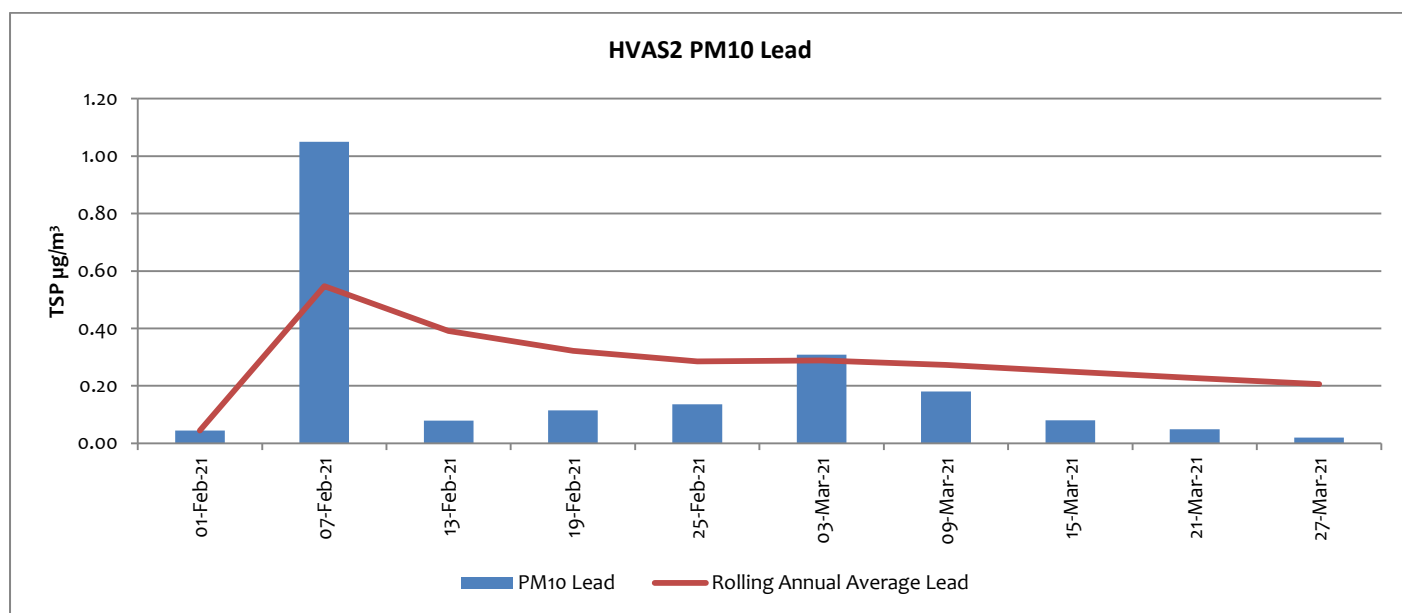
HVAS2 (EPL12) is located on the northern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location. HVAS2 was decommissioned in June 2019 while Embankment 2 TSF2 construction works were undertaken and reinstalled in February 2021.

The annual rolling average for PM<sub>10</sub> dust at this location is 29.78 µg/m<sup>3</sup> at the end of March 2021, however due to the unit being reinstalled after 19 months decommissioned, annual rolling average is calculated using data from February and March only.

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 were low in March. The predominant wind direction in March was from the South and wind speeds were mild. The rolling annual average for PM<sub>10</sub> Lead in March 2021 was 0.21 µg/m<sup>3</sup>, however due to the unit being reinstalled after 19 months decommissioned, annual rolling average is calculated using data from February and March only.



#### ***HVAS 3 (EPL57) - Blackwood Pit (On Site) Results for March 2021***

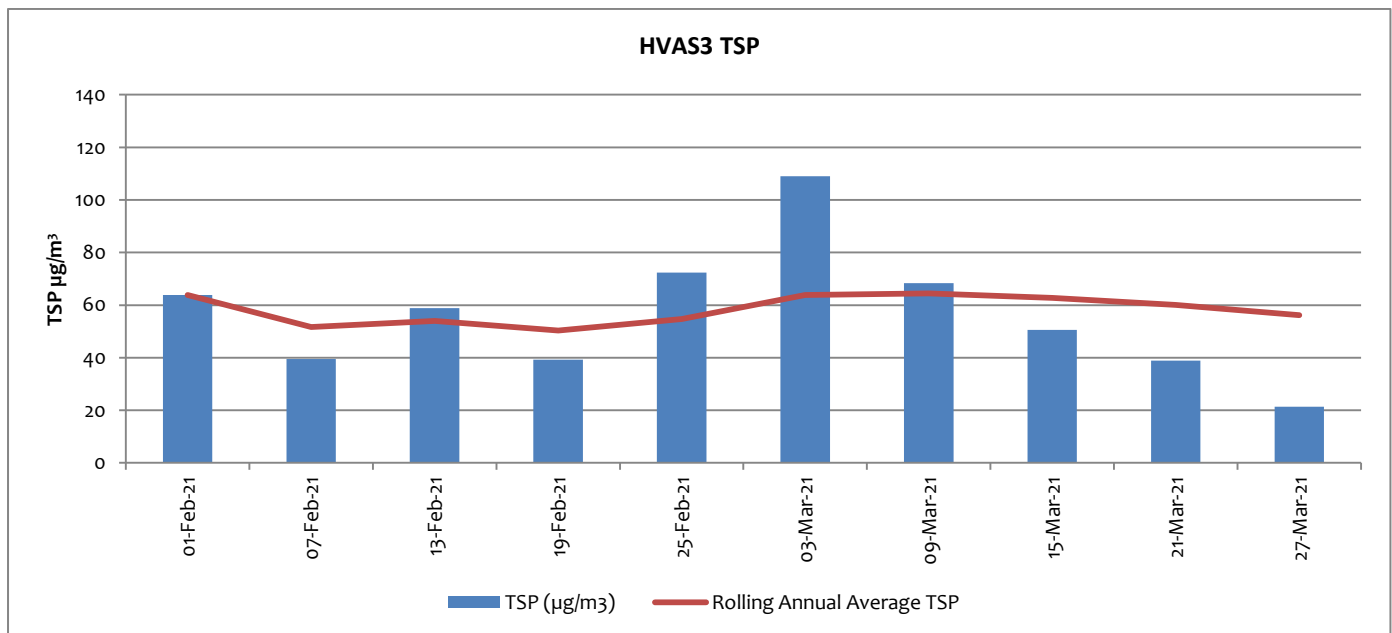
DATE	TSP (µg/m <sup>3</sup> )	Lead (µg/m <sup>3</sup> )
3-3-2021	109	0.398
9-3-2021	68.4	0.399
15-3-2021	50.6	0.173
21-3-2021	38.9	0.277
27-3-2021	21.4	0.08



HVAS3 (EPL57) 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. 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. HVAS3 was decommissioned in June 2019 while Embankment 2 TSF2 construction works were undertaken and reinstalled in February 2021.

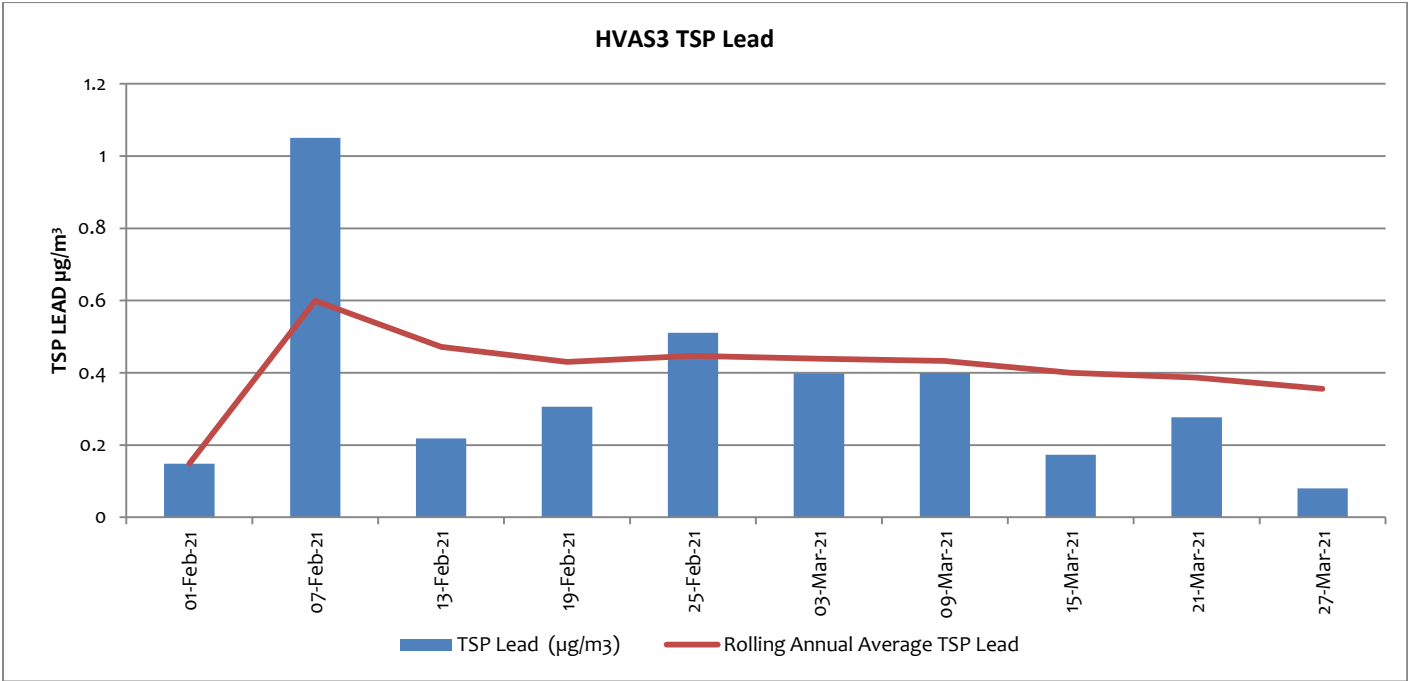
There were elevated TSP levels of  $109 \mu\text{g}/\text{m}^3$  on 3 March. The predominant wind direction on 3 March was from the South which suggests there was contribution of lead dust from on-site sources as well as from a quarry to the south of the site, particularly as TSP lead levels were not excessive. The annual rolling average for TSP at this location is  $56.20 \mu\text{g}/\text{m}^3$  at the end of March 2021, however due to the unit being reinstalled after 19 months decommissioned, annual rolling average is calculated using data from February and March only.

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



The rolling annual average for  $\text{PM}_{10}$  Lead in March 2021 was  $0.36 \mu\text{g}/\text{m}^3$ , however due to the unit being reinstalled after 19 months decommissioned, annual rolling average is calculated using data from February and March only.







## **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 PM10 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 PM10, a 24 hour average criteria of 50 ug/m<sup>3</sup> and an annual average criteria of 25 ug/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 March 2021**

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-Mar-21	15.2	Y	19.8	Y
2-Mar-21	16.3	Y	24.1	Y
3-Mar-21	19.9	Y	49.3	Y
4-Mar-21	15.4	Y	24.0	Y
5-Mar-21	14.2	Y	19.1	Y
6-Mar-21	19.4	Y	20.6	Y
7-Mar-21	23.9	Y	30.8	Y
8-Mar-21	24.8	Y	23.4	Y
9-Mar-21	11.5	Y	24.8	Y
10-Mar-21	16.3	Y	14.4	Y
11-Mar-21	11.3	Y	10.4	Y
12-Mar-21	10.5	Y	9.4	Y
13-Mar-21	17.2	Y	23.6	Y
14-Mar-21	10.4	Y	89.9	Y
15-Mar-21	11.3	Y	12.9	Y
16-Mar-21	12.0	Y	13.3	Y
17-Mar-21	13.5	Y	18.8	Y
18-Mar-21	6.9	Y	9.2	Y
19-Mar-21	7.4	Y	15.1	Y
20-Mar-21	7.1	Y	14.3	Y
21-Mar-21	10.7	Y	9.0	Y
22-Mar-21	5.9	Y	3.4	Y
23-Mar-21	6.4	Y	5.4	Y
24-Mar-21	13.7	Y	12.7	Y
25-Mar-21	10.6	Y	11.7	Y
26-Mar-21	11.3	Y	9.0	Y
27-Mar-21	7.3	Y	5.4	Y
28-Mar-21	8.7	Y	6.1	Y
29-Mar-21	8.0	Y	15.1	Y
30-Mar-21	11.3	Y	22.5	Y
31-Mar-21	13.7	Y	13.4	Y

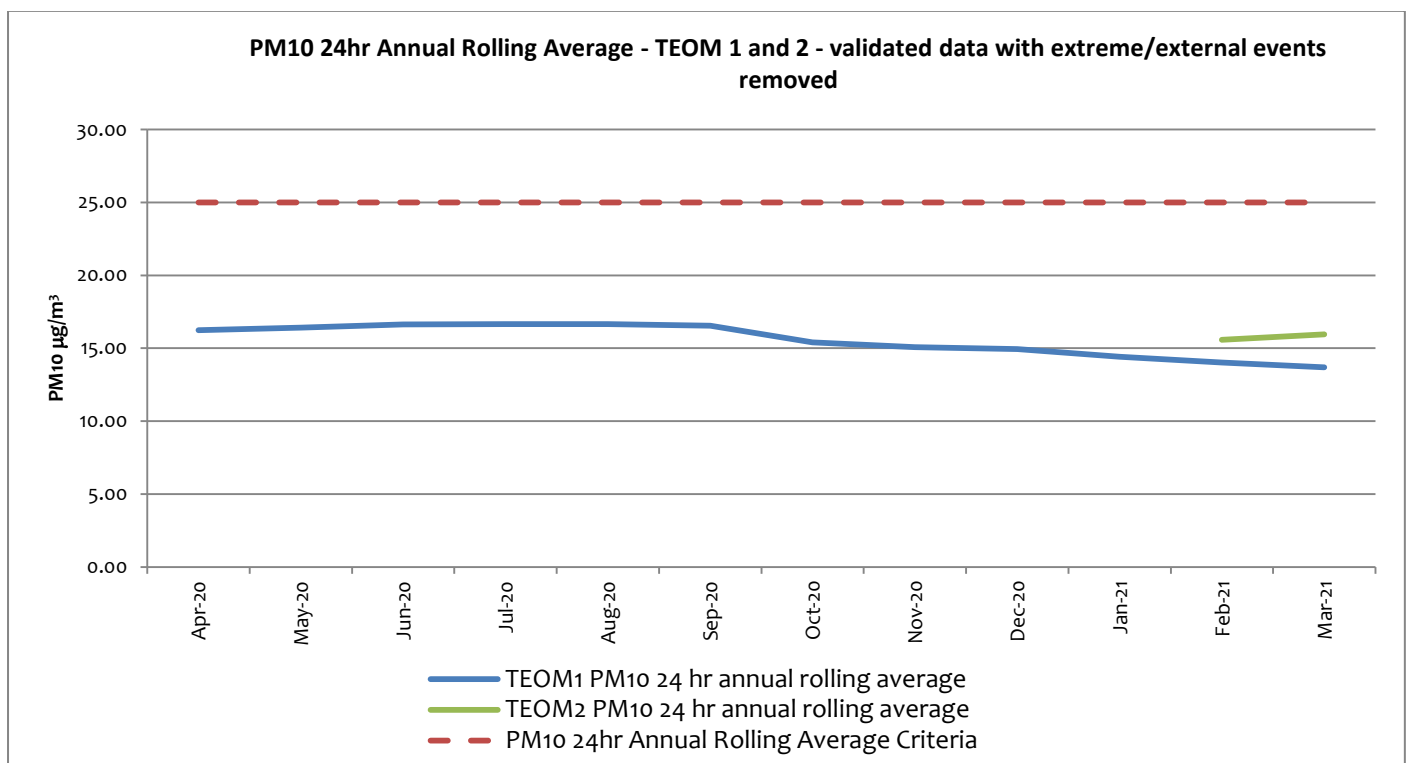
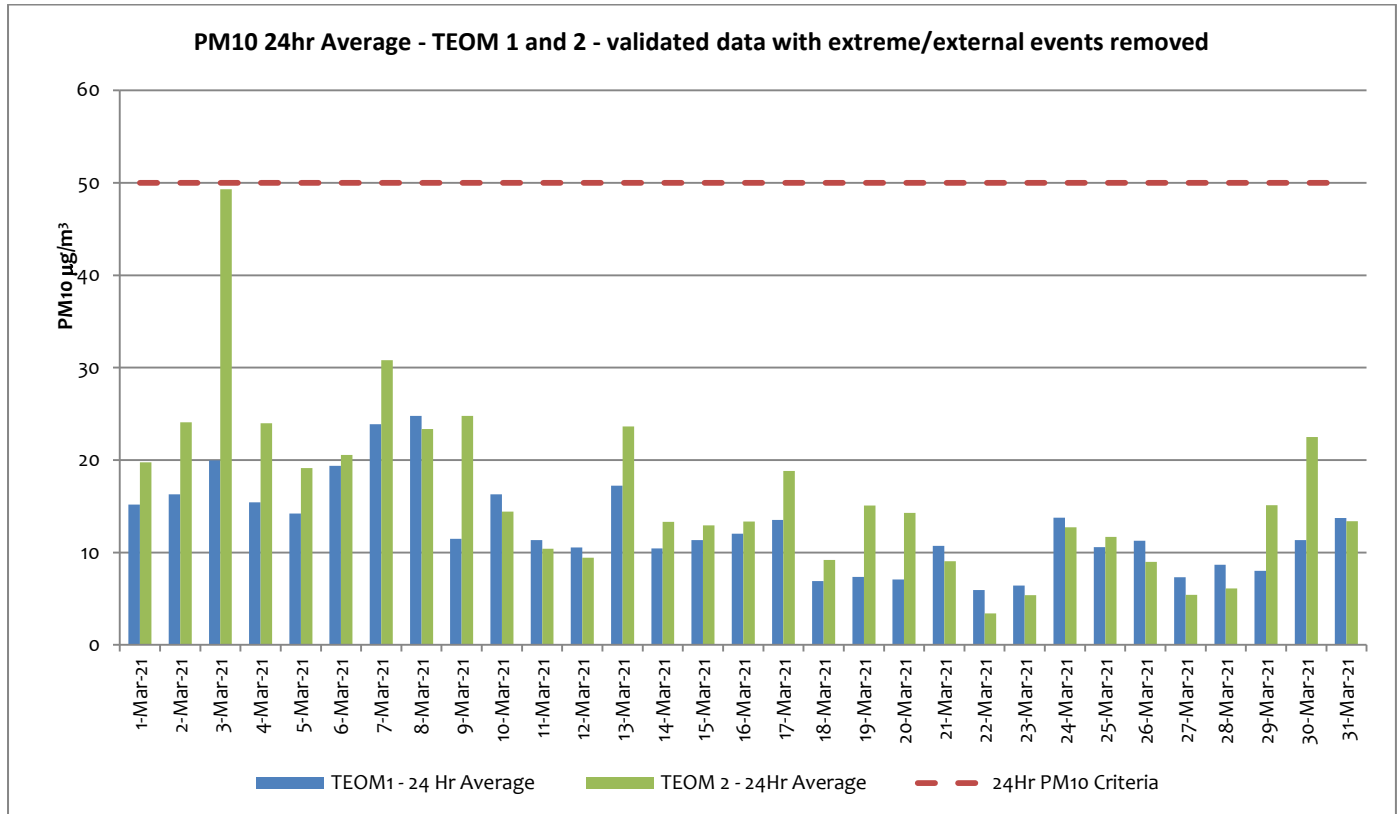
NS – no sample collected.

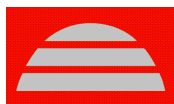
TEOM2 was decommissioned since June 2019 while Embankment 2 TSF2 construction works were undertaken and reinstalled in February 2021. Servicing, calibration and zeroing of both TEOM1 and TEOM2 were undertaken from 1<sup>st</sup> to 3<sup>rd</sup> of February. A portable PM10 monitor was operating adjacent to the TEOM2 location while servicing was being undertaken.

On 14 March, dust levels at TEOM2 were elevated during business hours while wind was blowing from the SSE which suggests the dust may have come from a neighbouring quarry. High readings from this period were removed for the data presentation in the graphs below.



The PM<sub>10</sub> 24-hour rolling annual average for data with external elevated dust events removed at March 2021 is 13.7 µg/m<sup>3</sup> for TEOM1. The PM<sub>10</sub> 24-hour rolling annual average for data with external elevated dust events removed at March 2021 is 15.96 µg/m<sup>3</sup> for TEOM2. 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>.





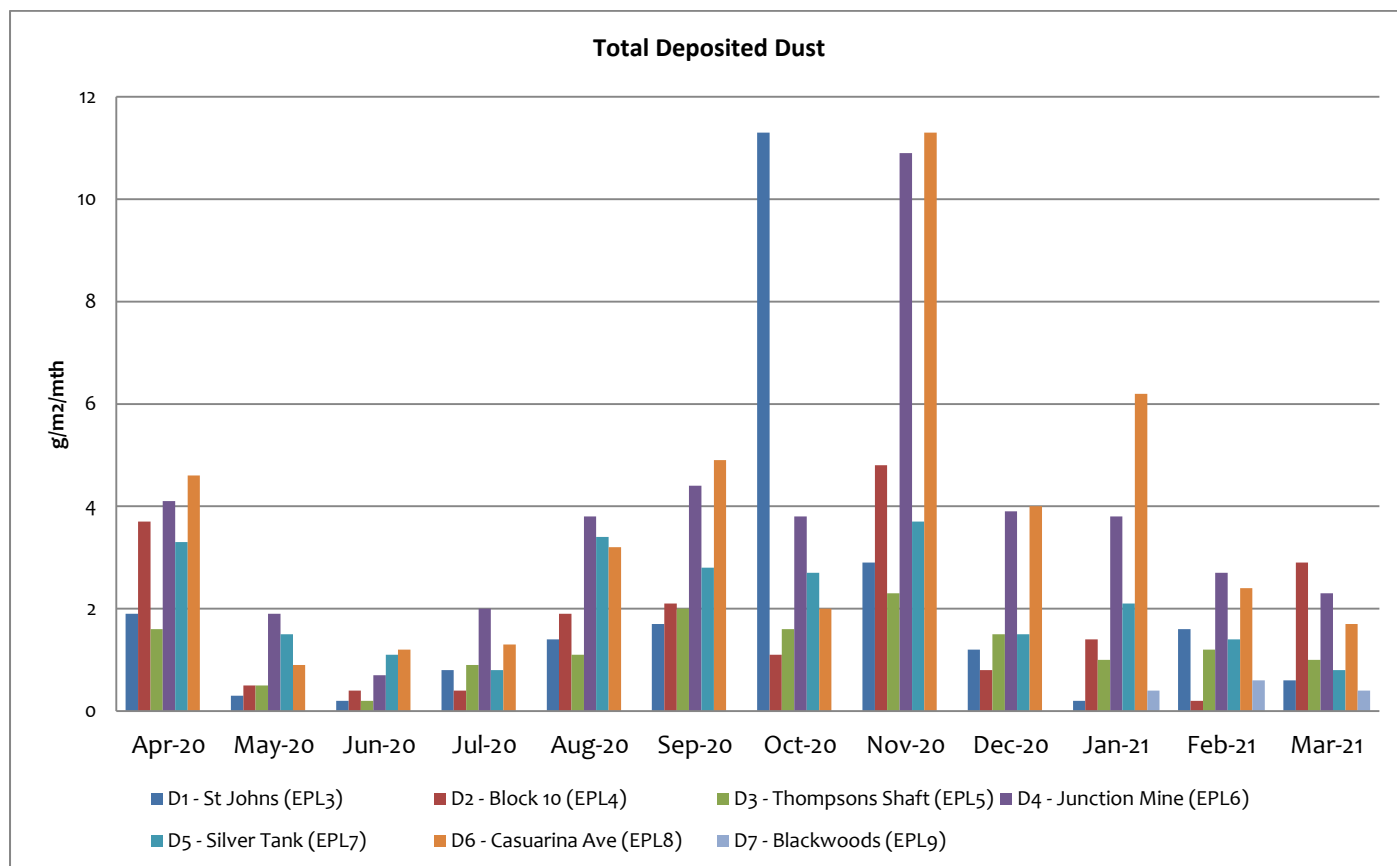
### 1.3 Dust Deposition Sampling

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. DDG7 was decommissioned from June 2019 to January 2021 due to works on TSF Embankment 2.

#### *Dust Deposition Gauges D1 (EPL3) to D7 (EPL9) – Results for March 2021*

Total Deposited Dust (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)
March 2021	0.6	2.9	1.0	2.3	0.8	1.7	0.4
Background (2010)	4.0	3.1	4.3	5.7	-1	5.8	-1
Compliant?	Y	N/A	N/A	N/A	N/A	Y	N/A

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 March 2021 are low compared to the previous months. The highest dust levels were recorded in the D2 Block 10, D4 Junction Mine and D6 Casuarina Avenue gauges. The predominant wind direction for March 2021 was from the South as shown in the Wind Rose in Section 4. The D4 Junction Mine site is

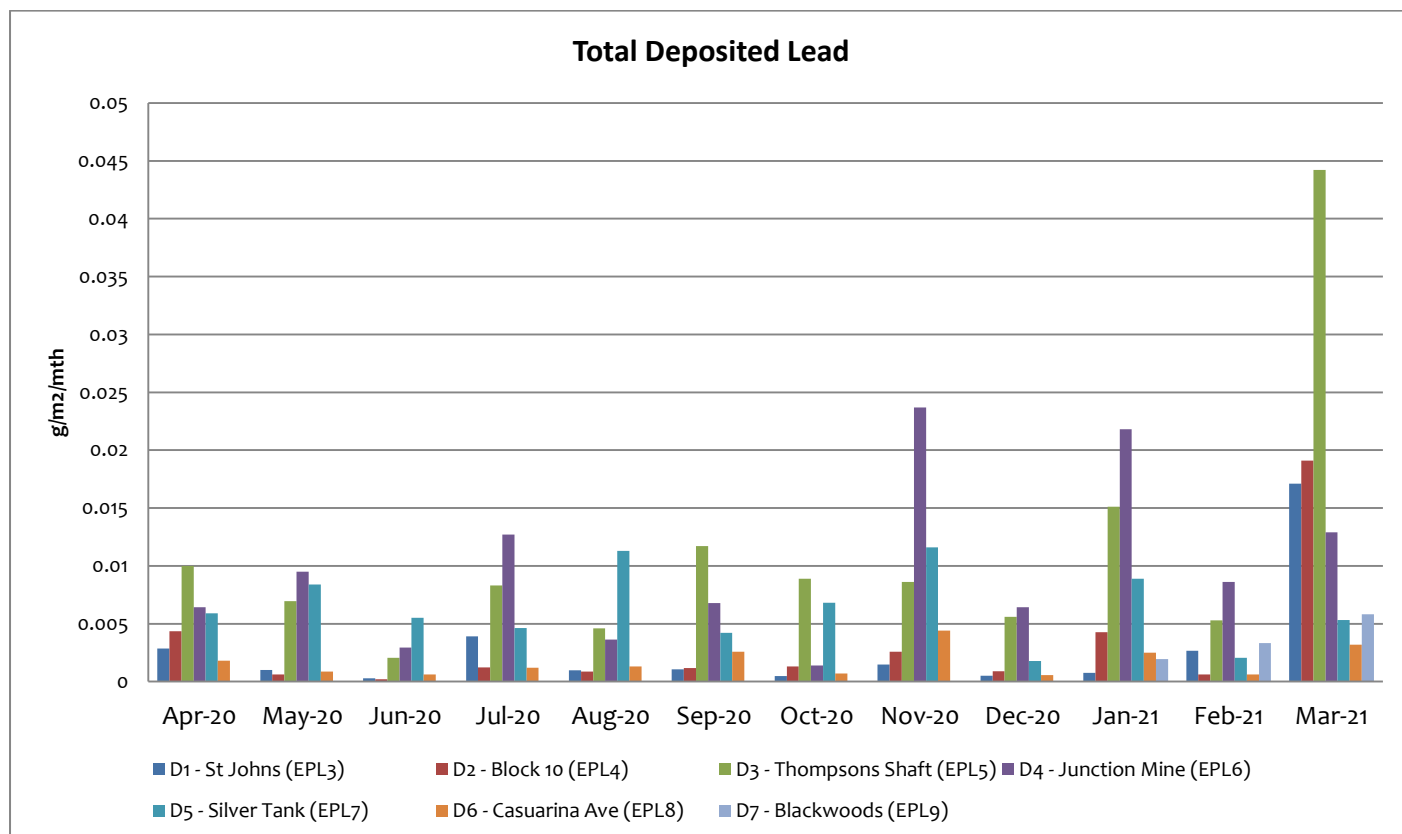


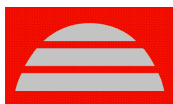
north of the site and impacted by both on-site and off-site activities. Much of the area around the gauge is bare of cover and characterised by historical mining activities. D6 Casuarina Avenue is a control site in the southern residential area of Broken Hill and can be impacted by regional dust storms and local activities. The D2 Block 10 gauge is located on grounds owned by a public utility and may be impacted by works conducted there. D1 St Johns and D6 Casuarina Ave were both compliant against the requirement of less than 4 g/m<sup>2</sup>/month total dust deposited.

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)
March 2021	0.0171	0.0191	0.0442	0.013	0.00531	0.00318	0.00583
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 March 2021 were highest in the D1 St Johns, D2 Block 10, D3 Thompsons Shaft and D4 Junction Mine gauges. The predominant wind direction for March 2021 was from the South as shown in the Wind Rose in Section 4. Site activities around the Rail Loadout area may contribute to elevated Lead levels at D3 Thompsons Shaft, but only minimally, as the concentrate containers are loaded with concentrate in an enclosed shed under negative pressure, and the loading area alongside the train is a concrete pad which is regularly swept and watered. A water cart will also attend to the haul road between the concentrate loading shed at the Mill and the rail loadout area when concentrate containers are being transported on site. The D4 Junction Mine site is north of the site and impacted by both on-site and off-site activities. Much of the area around the D3 and D4 gauges is bare of cover and characterised by historical mining activities. Works in the rail yards and Block 10 may have contributed to the elevated lead levels recorded in the D1 and D2 gauges.





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 March 2021

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The next round of compliance monitoring was scheduled for April 2021.

## 2 Noise

### 2.1 Blasting (Vibration and Overpressure)

There are 5 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 March 2021**

##### **Total Blasts:**

- 0 production blasts occurred before 6.45 am or after 7.15 pm
- The number of Production blasts averaged 2.63 per week over the previous calendar year





- The number of Development blasts averaged 28.81 per week over the previous calendar year

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

- 0 Blasts 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 = 2.4%

**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 percentage of production blasts in the Western Mineralisation and Main Lodes producing vibration at monitors over 5 mm/sec for the 12-month period is 2.4%.

The percentage of production blasts in Block 7 producing vibration at monitors over 3 mm/sec for the 12-month period is 100%. There have been 3 production blasts conducted in the period and all recorded more than 3 mm/s at a compliance monitor. No complaints have been received about Block 7 blasts.

## **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 last conducted during two consecutive night-time periods from 15 to 17 December 2020.

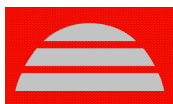
The monitoring assessment found that site LAeq, 15min noise contributions satisfied the relevant limits during the measurements at all assessment locations.

## **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.

After a decrease in EC levels in August and September 2020, levels have risen to normal levels for Shaft 7 and Kintore in November and December. Results for Kintore Pit/UG in March were consistent with long-term results. Shaft 7 was not pumping to the surface in March.



### 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 March 2021*

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)	Dry													
Kintore Pit (EPL54)	5.94	13400	14900	6	6120	1710	478	320	1730	5.73	1.28	500	1590	0.54

### *Groundwater Bores (EPL37 - EPL52) Results for March 2021*

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)	-Bore Dry-													
GW02 (EPL38)	-Bore Dry-													
GW03 (EPL39)	5.96	14400	11800	5	4570	2950	489	354	2260	1.19	0.869	229	209	<0.05
GW04 (EPL40)	6.51	14200	11400	186	4690	2650	502	531	2340	0.0631	<0.001	41.1	3.15	<0.05
GW05 (EPL41)	5.82	16100	14600	97	6210	2710	446	634	2260	0.728	0.059	328	293	<0.05
GW06 (EPL42)	5.88	14400	12700	47	5280	2610	457	480	2260	1.63	0.09	382	261	<0.05
GW07 (EPL43)	5.94	12700	10900	31	4500	2370	472	329	1890	2.45	0.068	253	284	<0.05
GW08 (EPL44)	5.64	12200	11600	12	4820	2200	465	336	1890	1.58	0.749	528	598	<0.05
GW09 (EPL45)	6.06	11900	10400	55	4480	2130	528	524	1520	1.87	<0.001	127	198	<0.05



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)
GW10 (EPL46)	6.44	14000	11200	232	4520	2730	522	550	2260	0.181	<0.001	7.15	3.96	<0.05
GW11 (EPL47)	6.48	5850	4600	71	2550	637	284	196	786	0.626	0.019	35.5	41.7	<0.05
GW12 (EPL48)	5.68	13600	11800	73	5350	2150	414	606	2170	1.65	0.002	84.2	181	<0.05
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 March 2021

No sampling of surface waters was possible in March due to lack of rainfall.

### 4 Weather Data

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

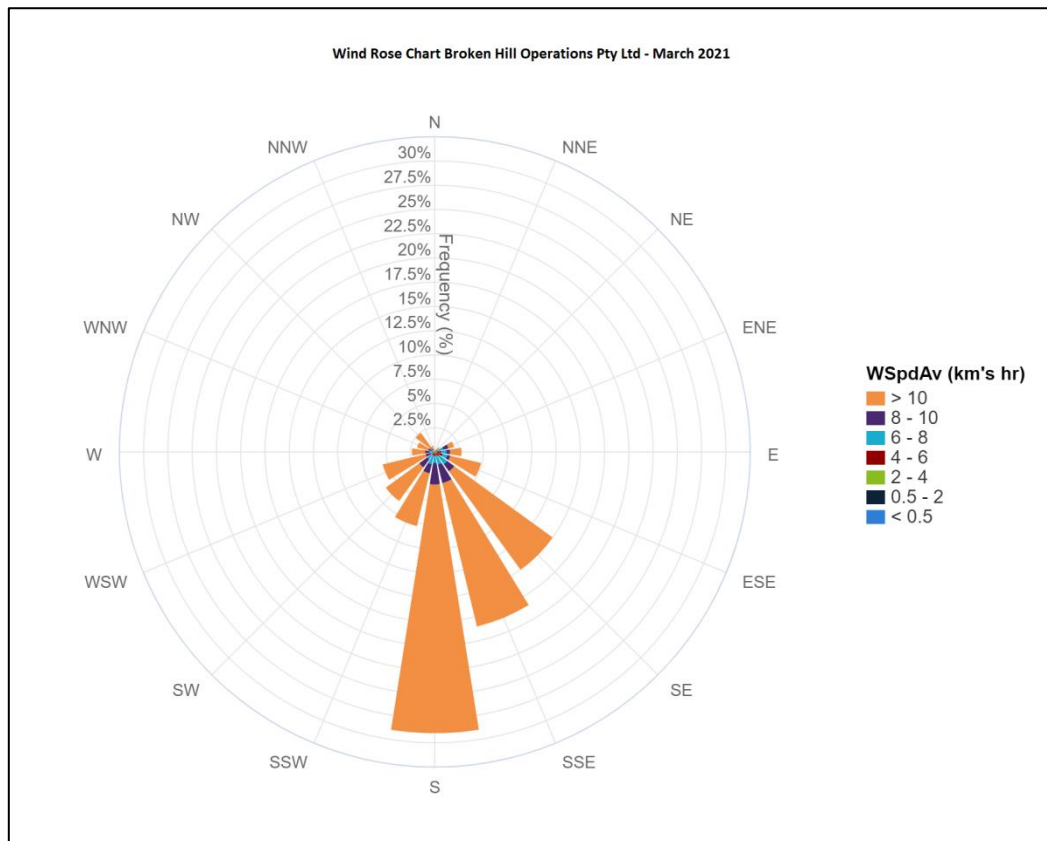


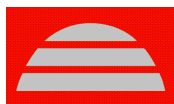
The following parameters are required to be recorded each month as listed in the EPL 12559:-

## 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 windrose provided below indicates the main wind direction for the month of March was from the South.





## Rasp Mine Monthly Environment Monitoring Report

### Weather Data Summary for March 2021

Date	Temperature @ 10m (°C)		Wind Speed @ 10m (km/hr)		Predominant Wind Direction @ 10m		Rainfall (mm)
	Min	Max	Min	Max	Cardinal	Degree	Total
01-Mar-21	17.7	29.8	3.7	31.5	South	180	0.00
02-Mar-21	13.4	25.6	8.7	32.6	SSE	161	0.00
03-Mar-21	14.1	27.5	0.9	19.3	South	181	0.00
04-Mar-21	22.4	32.2	5.6	36.8	NE	42	0.00
05-Mar-21	16.1	27.9	5.9	36.5	NW	311	0.00
06-Mar-21	16.0	26.0	8.5	29.2	WSW	251	0.00
07-Mar-21	15.5	25.2	10.9	30.9	South	179	0.00
08-Mar-21	15.0	26.8	6.8	23.9	SSE	159	0.00
09-Mar-21	17.7	30.4	3.1	18.9	SSE	158	0.00
10-Mar-21	22.7	35.5	2.2	16.7	SE	135	0.00
11-Mar-21	25.7	36.7	6.3	32.7	NE	41	0.00
12-Mar-21	19.3	27.9	2.9	25.7	South	181	0.60
13-Mar-21	14.5	25.7	10.0	31.2	South	178	0.00
14-Mar-21	14.7	27.5	8.0	28.5	SSE	161	0.00
15-Mar-21	16.4	31.0	4.1	23.9	ESE	114	0.00
16-Mar-21	21.0	31.6	3.9	28.8	ESE	115	0.00
17-Mar-21	23.9	32.5	3.3	29.7	ESE	108	0.00
18-Mar-21	21.8	31.6	4.0	22.3	ENE	68	0.00
19-Mar-21	23.8	34.4	2.6	25.0	NE	45	0.00
20-Mar-21	26.6	35.4	1.4	29.0	East	91	0.00
21-Mar-21	20.8	33.5	4.6	33.9	South	181	0.30
22-Mar-21	14.7	25.1	18.0	39.6	South	181	0.00
23-Mar-21	12.1	21.4	11.9	38.5	SSE	162	0.00
24-Mar-21	10.7	22.1	7.5	26.6	South	181	0.00
25-Mar-21	11.7	24.4	7.8	27.0	South	179	0.00
26-Mar-21	12.9	25.6	4.1	25.4	SSE	156	0.00
27-Mar-21	18.7	30.3	4.2	17.8	SSE	159	0.10
28-Mar-21	22.1	33.1	4.5	22.0	South	182	0.00
29-Mar-21	13.5	23.8	7.4	24.0	SSE	158	0.00
30-Mar-21	14.8	25.1	3.0	30.8	SSE	159	0.00
31-Mar-21	15.1	26.2	4.2	21.9	SE	135	0.00

Rainfall of 1.0mm fell in March.



## 5 Data Log

Sample	Result Received
Hi Volume Samples	15-04-2021
TEOM	28-04-2021
Dust Deposition	23-04-2021
Vents & Bag House	4-01-2021
Water	1-04-2021
Blast vibration and overpressure	1-04-2021
Weather	1-04-2021
Date posted to web site	08-07-2022

## 6 Correction Log

Total deposited dust for DG1 was incorrectly labelled as non-compliance against the criteria for deposited dust, corrected and analysis of compliance added to discussion in Section 1.3.