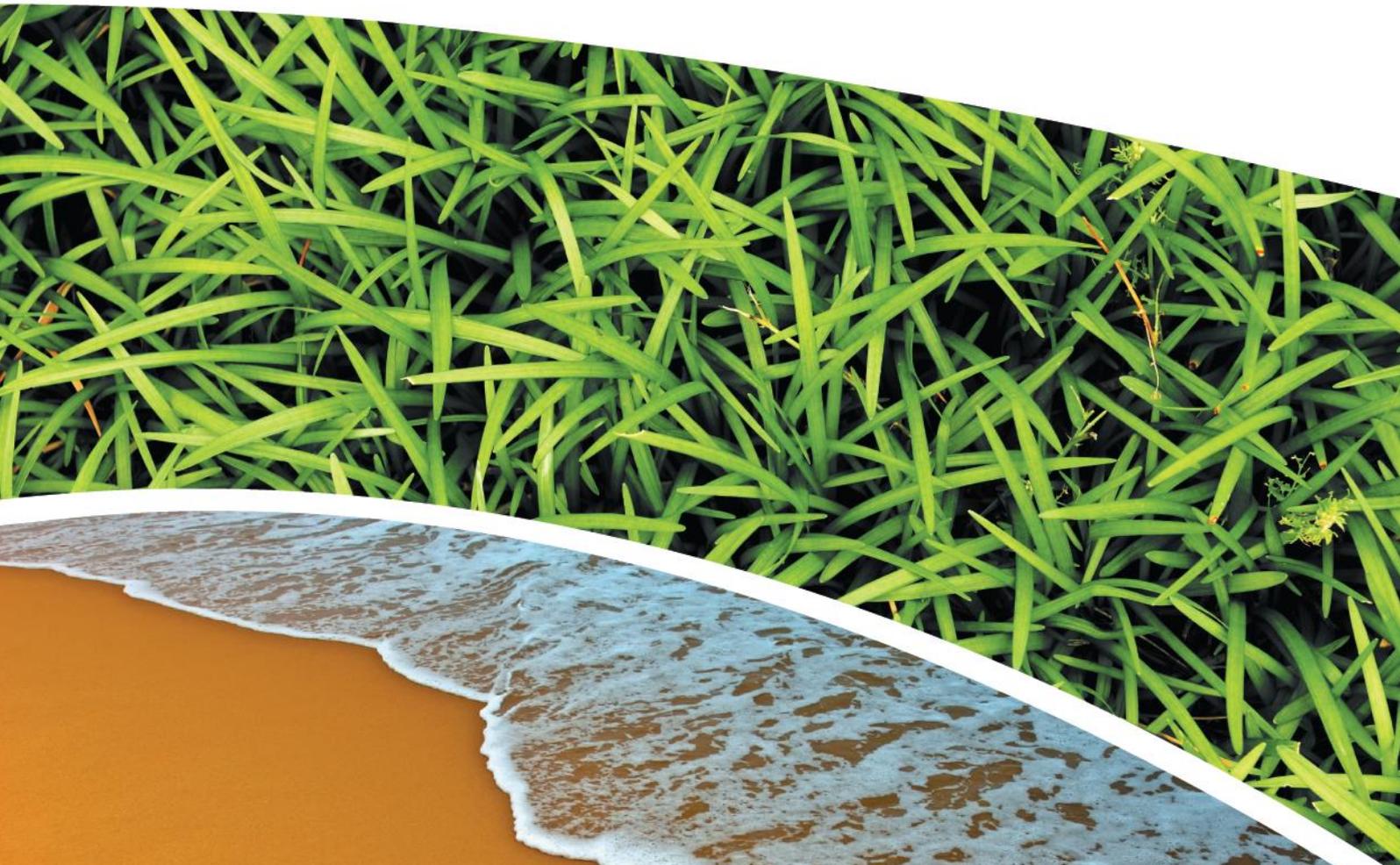


AIR, WATER AND METEOROLOGICAL MONITORING – JULY 2019
PINE DALE MINE, BLACKMANS FLAT

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1804/0



RCA AUSTRALIA

ABN 53 063 515 711

92 Hill Street, CARRINGTON NSW 2294

Telephone: +61 2 4902 9200

Facsimile: +61 2 4902 9299

Email: administrator@rca.com.au

Internet: www.rca.com.au

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METEOROLOGICAL DATA

RCA ref 6880-1804/0

15 August 2019

Enhance Place Pty Ltd
PO Box 202
WALLERWANG NSW 2845

Attention: Mr Graham Goodwin

Geotechnical Engineering

Engineering Geology

Environmental Engineering

Hydrogeology

Construction Materials Testing

Environmental Monitoring

Sound & Vibration

Occupational Hygiene

**REPORT COMPILED FOR COMMUNITY CONSULTATIVE COMMITTEE
DETAILING AIR, WATER AND METEOROLOGICAL MONITORING AT PINE DALE
JULY 2019**

1 INTRODUCTION

This report presents the results of air, water and meteorological monitoring undertaken at Pine Dale Mine, Blackmans Flat during the month of July 2019.

Air and water samples were collected by RCA Laboratories – Environmental staff. Meteorological data was obtained from the site weather station.

This report satisfies the requirements to monitor environmental parameters as presented in the Pine Dale Mine Environmental Protection Licence (EPL 4911).

2 ANALYTICAL PROCEDURES

The analytical procedures used by RCA Laboratories – Environmental (NATA Accreditation number 9811) are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**.

Table 1 *Analytical Test Methods*

Analysis	Method	Units	Analysing Laboratory	NATA Accreditation Status
Determination of Suspended Particulate Matter	ENV-LAB003	µg/m ³	RCA Laboratories – Environmental	NATA Analysis
Determination of Particulate Matter – Deposited Matter	ENV-LAB004	g/m ² per month	RCA Laboratories – Environmental	NATA Analysis
pH	ENV-LAB006	pH	RCA Laboratories – Environmental	NATA Analysis
Conductivity	ENV-LAB010	µS/cm	RCA Laboratories – Environmental	NATA Analysis
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories – Environmental	NATA Analysis
Turbidity	ENV-LAB037	NTU	RCA Laboratories - Environmental	NATA Analysis
Oil and Grease	ENV-LAB022	mg/L	RCA Laboratories - Environmental	Non-NATA Analysis
Major Anions (Alkalinity, Cl, SO ₄)	ED037, ED041, ED045	mg/L	ALS	NATA Analysis
Major Cations (Ca, Mg, Na, K)	ED093	mg/L	ALS	NATA Analysis
Dissolved Metals	EG020F	mg/L	ALS	NATA Analysis

ALS Environmental has been used to obtain analysis of anions, cations and dissolved metals (NATA Accreditation number 825).

3 WATER MONITORING RESULTS

3.1 GROUNDWATER

A total of two (2) groundwater samples were collected from within the Pine Dale Mine site during July 2019. Water quality analysis results are shown in **Table 2**. Groundwater monitoring locations are shown in **Appendix A**.

Table 2 Groundwater Analysis Results

ANALYSIS	UNITS	P6	P7
Sample Number	-	07196880009	07196880010
Date Sampled	-	04/07/19	04/07/19
Time Sampled	-	9:50	10:35
Depth to Water from Surface	m	25.76	7.84
Water Level (AHD)	m	891.19	886.56
Temperature	°C	14.5	14.5
pH	pH	6.93	6.94
Conductivity	µS/cm	1840	843
Turbidity	NTU	30	
Dissolved Oxygen	mg/L	2.2	
Total Suspended Solids	mg/L	33	
Oil and Grease	mg/L	<5	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	58	
Total Alkalinity (CaCO ₃)	mg/L	58	
Sulphate (as SO ₄)	mg/L	794	
Chloride	mg/L	47	
Calcium	mg/L	159	
Magnesium	mg/L	78	
Sodium	mg/L	81	
Potassium	mg/L	22	
Cobalt (dissolved)	mg/L	0.065	
Manganese (dissolved)	mg/L	3.24	
Nickel (dissolved)	mg/L	0.113	
Zinc (dissolved)	mg/L	0.045	
Iron (dissolved)	mg/L	40.2	
Trigger Values			
pH trigger level [^]	pH	6.2 – 8.0	6.3 – 8.0
Conductivity trigger level	µS/cm	1180	852
Water Level (AHD) #	m	887.90	883.28

☐ Indicates analysis was not required.

[^] pH trigger value is exceeded if the pH is outside the nominated range.

Water Level trigger is exceeded if the AHD water level drops below the nominated trigger level.

Results shown in ***bold italics*** indicates exceedance of trigger level.

3.2 SURFACE WATER MONITORING

Quarterly surface water monitoring was not required to be undertaken in July. The next event is scheduled for August 2019.

4 AIR QUALITY RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

Monitoring of particulate matter less than 10 micrometres (PM₁₀) and total suspended particulates (TSP) is undertaken at Pine Dale Mine using High Volume Air Samplers (HVAS). HVAS at this facility conform to AS/NZS 3580.9.3:2015, AS/NZS 3580.9.6:2015 and AS/NZS 3580.1.1:2016. The HVAS run on a one in six-day cycle, as stipulated in the *Air Quality and Greenhouse Gas Management Plan for the Pine Dale Coal Mine*. The locations of the HVAS units are shown in **Appendix A**.

HVAS Total Suspended Particulate results are shown in **Table 3**. PM₁₀ results are shown in **Table 4**. HVAS Monitoring locations are shown in **Appendix A**. Graphical HVAS result presentations are shown in **Appendix B**.

Table 3 Total Suspended Particulates (TSP)

Run Date	TSP (µg/m ³)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
1-Jul-19	7	07196880031	9711414	05-Jul-19	6:30	Client	14.78
7-Jul-19	6	07196880033	9711482	12-Jul-19	16:40	Client	24.00
13-Jul-19	6	07196880035	9711410	14-Jul-19	11:30	Client	24.00
25-Jul-19	7	07196880039	9711407	26-Jul-19	7:05	Client	15.31
27-Jul-19 [^]	13	07196880044	9711487	30-Jul-19	6:11	Client	24.00
31-Jul-19	5	07196880041	9711488	01-Aug-19	13:55	Client	24.02

Table 4 Suspended Particulate Matter <10 µm (PM₁₀)

Run Date	PM ₁₀ (µg/m ³)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
1-Jul-19	3	07196880032	9711409	05-Jul-19	6:35	Client	24.09
13-Jul-19	1	07196880036	9711411	14-Jul-19	11:32	Client	24.00
15-Jul-19 [^]	<1	07196880043	9711412	18-Jul-19	6:29	Client	24.00
25-Jul-19	<1	07196880040	9711485	26-Jul-19	7:10	Client	31.41
27-Jul-19 [^]	5	07196880045	9711486	30-Jul-19	6:15	Client	24.00
31-Jul-19	1	07196880042	9711489	01-Aug-19	14:00	Client	24.02

[^]The TSP HVAS run event scheduled for the 19 July 2019, did not complete the 24 ± 1 hours run time as described in AS/NZS 3580.9.6:2015. This HVAS run was re-scheduled and conducted on the 27 July 2019. The PM₁₀ HVAS run events scheduled for the 7 and 19 July 2019 went over the 24± 1 hours run time as described in AS/NZS 3580.9.6:2015. These run events were re-scheduled and conducted on the 15 and 27 July 2019 respectively.

The TSP HVAS run events conducted on the 1 and 25 July 2019 did not complete the 24 ± 1 hours run time as described in AS/NZS 3580.9.6:2015 due to a suspected electrical fault. The PM₁₀ HVAS run event conducted on the 25 July 2019 went over the 24 ± 1 hours run time as described in AS/NZS 3580.9.6:2015 due to the same suspected electrical fault.

4.1.1 TSP SUMMARY

The NSW EPA Annual Mean TSP allowable limit is $90 \mu\text{g}/\text{m}^3$. All TSP HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (August 2018 to July 2019) for TSP is $28.6 \mu\text{g}/\text{m}^3$, which is below the allowable limit of $90 \mu\text{g}/\text{m}^3$.

The twelve-monthly graph is provided in **Appendix B**.

4.1.2 PM₁₀ SUMMARY

The NSW EPA 24-hour maximum PM₁₀ allowable limit is $50 \mu\text{g}/\text{m}^3$. The EPA annual mean PM₁₀ allowable limit is $25 \mu\text{g}/\text{m}^3$. All PM₁₀ HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the PM₁₀ unit is $12.1 \mu\text{g}/\text{m}^3$, which is below the allowable annual limit (refer **Appendix B**). The 24-hour maximum allowable limit of $50 \mu\text{g}/\text{m}^3$ was not exceeded on any sampling event during the month of July 2019.

4.2 DEPOSITIONAL DUST MONITORING

The depositional dust monitoring exposure period for July 2019 was 5 June – 3 July 2019. Depositional dust gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. Depositional dust monitoring results are shown in **Table 5**. Depositional dust monitoring locations are shown in **Appendix A**.

Dust gauge D2 has been removed from EPL 4911 and monitoring is no longer required at this location.

Table 5 *Depositional Dust Monitoring*

Deposit Gauge	Number of Days	Notes	Insoluble Solids	Ash	Combustible Matter
D1	28	I	0.7	0.3	0.2
D3	28	I	0.7	0.4	0.2
D4	28	I	0.6	0.2	0.1
D5	28	I	0.5	0.1	<0.1
D6	28	I	0.5	0.2	<0.1

All units are $\text{g}/\text{m}^2/\text{month}$

I indicates insects noted to be present in sample.

4.2.1 ALLOWABLE DEPOSITIONAL DUST LIMITS

The EPA long term (annual average) deposited dust limit is 4g/m² per month. The rolling annual depositional dust results for all sites within the period (August 2018 – July 2019) are in compliance with consent conditions. The annual average for dust gauges D1, D3, D4, D5 and D6 are all less than or equal to 1.6g/m² per month. Annual averages are shown in the depositional dust gauge graphs provided in **Appendix B**.

5 METEOROLOGICAL MONITORING

Pine Dale Mine records meteorological data continuously via an onsite weather station. Details of the weather data recorded during the period 1 to 31 July 2019 are shown in **Appendix C**.

Data availability during this period was 100%.

6 BLASTING RESULTS

No blasting was undertaken during this month as mining operations have ceased since the end of March 2014.

7 NOISE MONITORING RESULTS

Quarterly noise monitoring is required to be undertaken on a quarterly basis and was not required to be undertaken during July 2019.

8 OPERATIONAL ACTIVITIES

All of the approved minable reserves at the Pine Dale Mine have now been exhausted. Operational mining and the last coal sales ceased as of the end of March 2014.

All former operators have been made redundant; however, some statutory positions still remain. Pine Dale Mine has been placed in care and maintenance since April 2014.

9 SUMMARY

During the month of July 2019 environmental monitoring results were found to be generally in compliance with EPL 4911 with the exception of:

- Electrical conductivity in groundwater sample P6 was in excess of the of the site-specific trigger value.

Rolling annual averages from both the TSP and PM₁₀ High Volume Air Samplers are currently below the EPA Annual Mean TSP and PM₁₀ criterion of 90µg/m³ and 25µg/m³ respectively. Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m².month based upon a rolling average of the past 12 months.

Meteorological monitoring was undertaken for the entire month of July with 100% data capture.

Pine Dale Mine ceased operation in March 2014 and therefore no blasting occurred at the site.

10 LIMITATIONS

This report has been prepared for Enhance Place Pty Ltd in accordance with an agreement with RCA Australia (RCA). The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Enhance Place. The report may not contain sufficient information for purposes of other uses or for parties other than Enhance Place. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is used following a significant period of time after the date of issue.

Yours faithfully

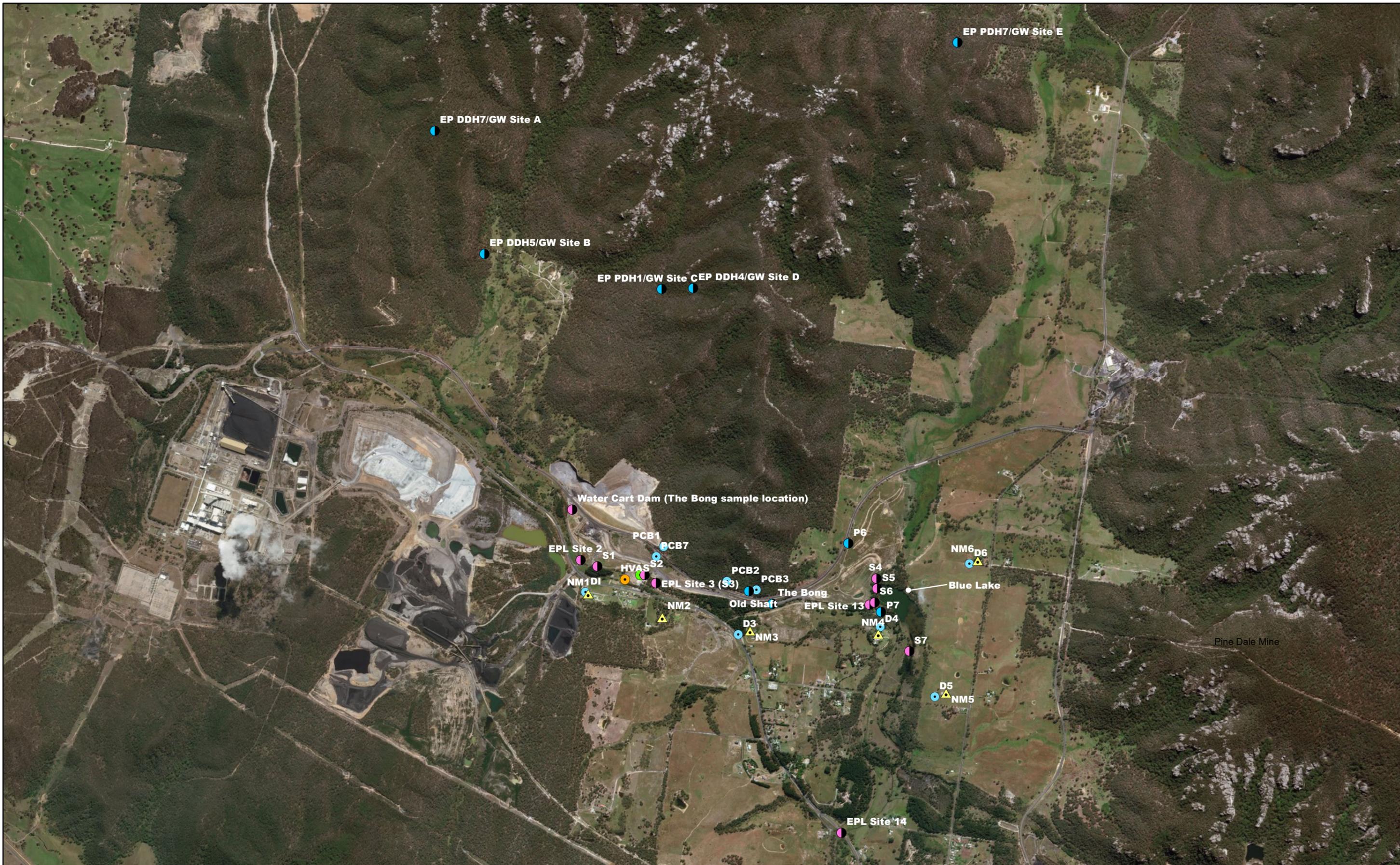
RCA AUSTRALIA



Kirsty Nealon
Senior Environmental Scientist

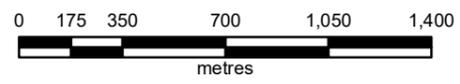
Appendix A

Monitoring Locations



LEGEND

- ▲ Noise Monitoring Location
- Depositional Dust Monitoring Location
- Groundwater Monitoring Location
- High Volume Air Sampling Location
- Meteorological Monitoring Location
- Surface Water Monitoring Location

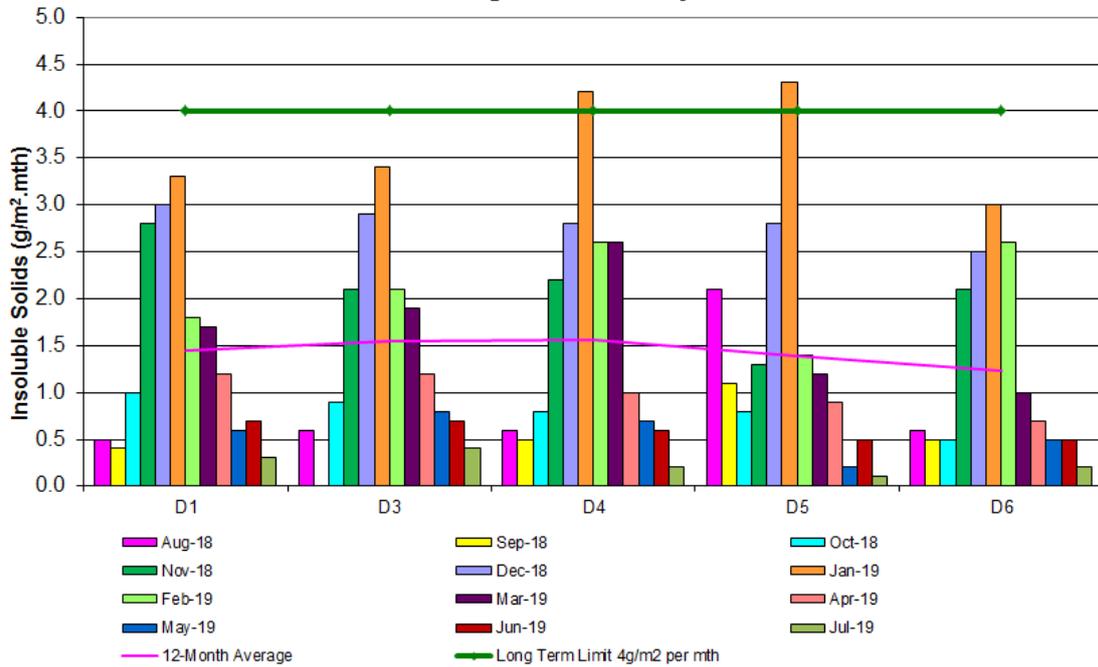


**PINE DALE MINE
ENVIRONMENTAL MONITORING
LOCATION PLAN**

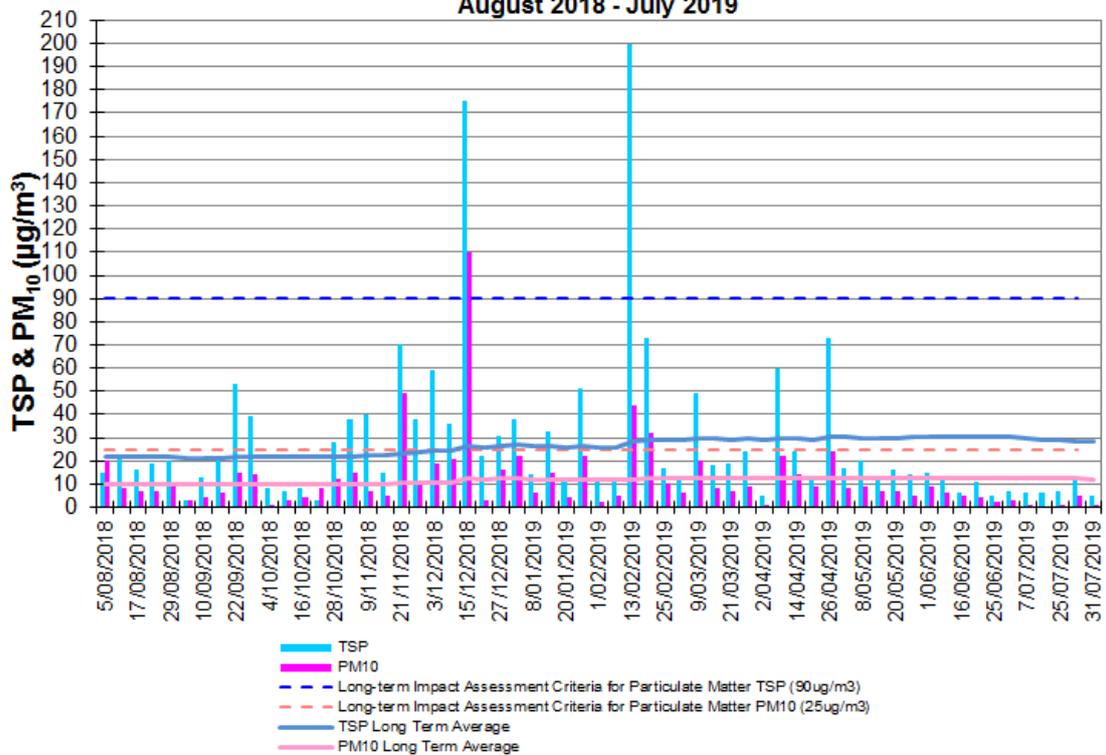
Appendix B

Depositional Dust and HVAS Graphs

**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
August 2018 to July 2019**

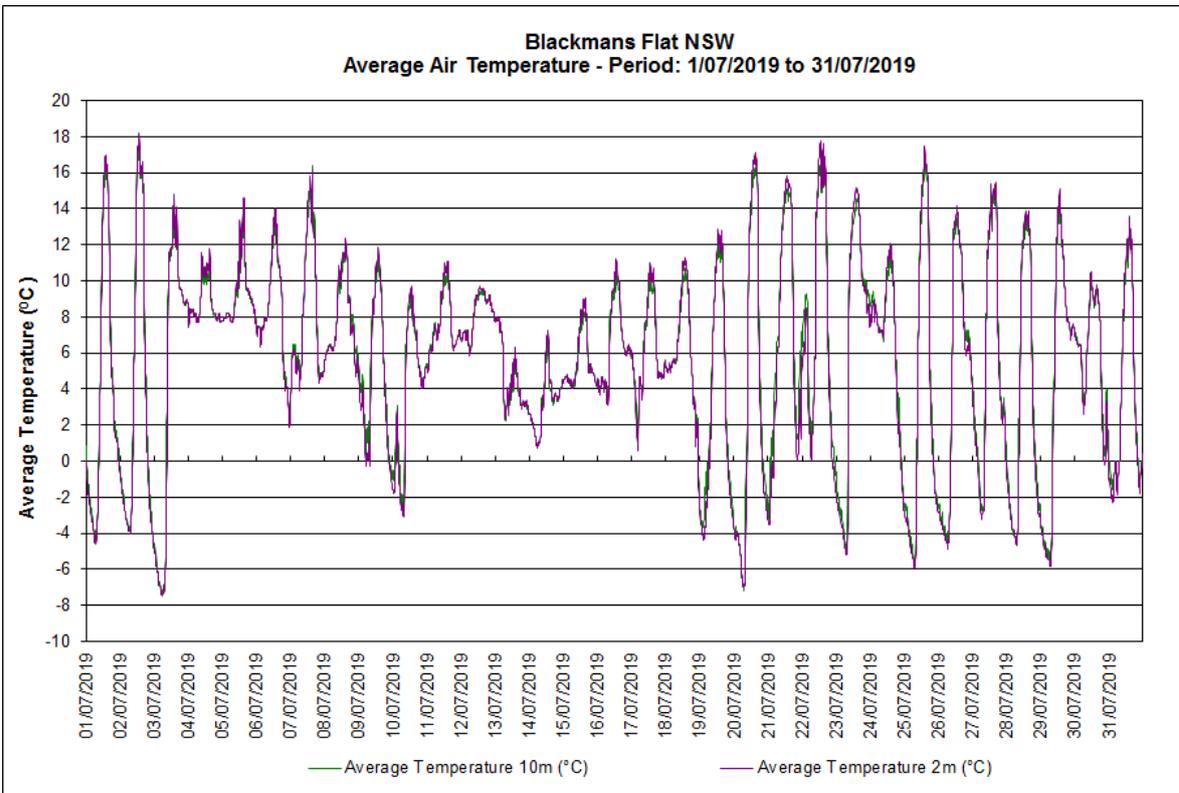
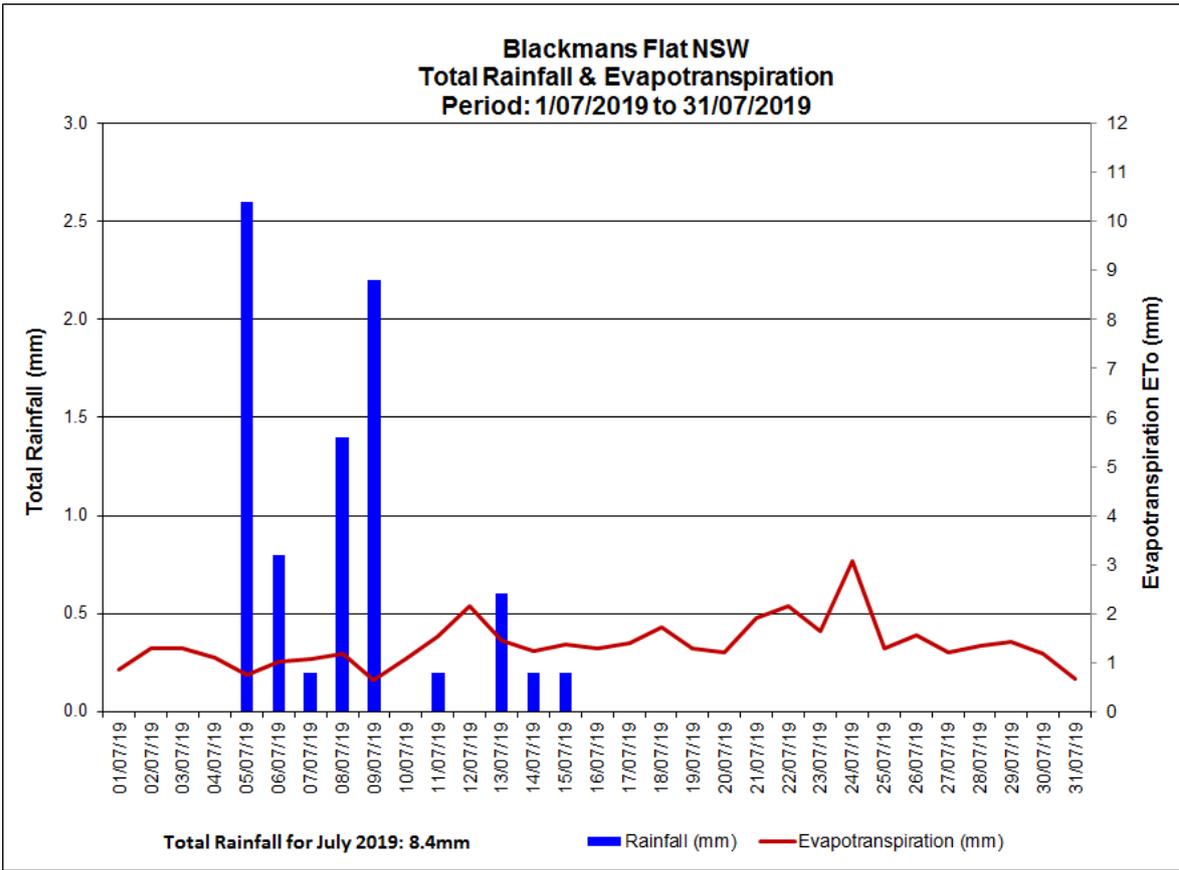


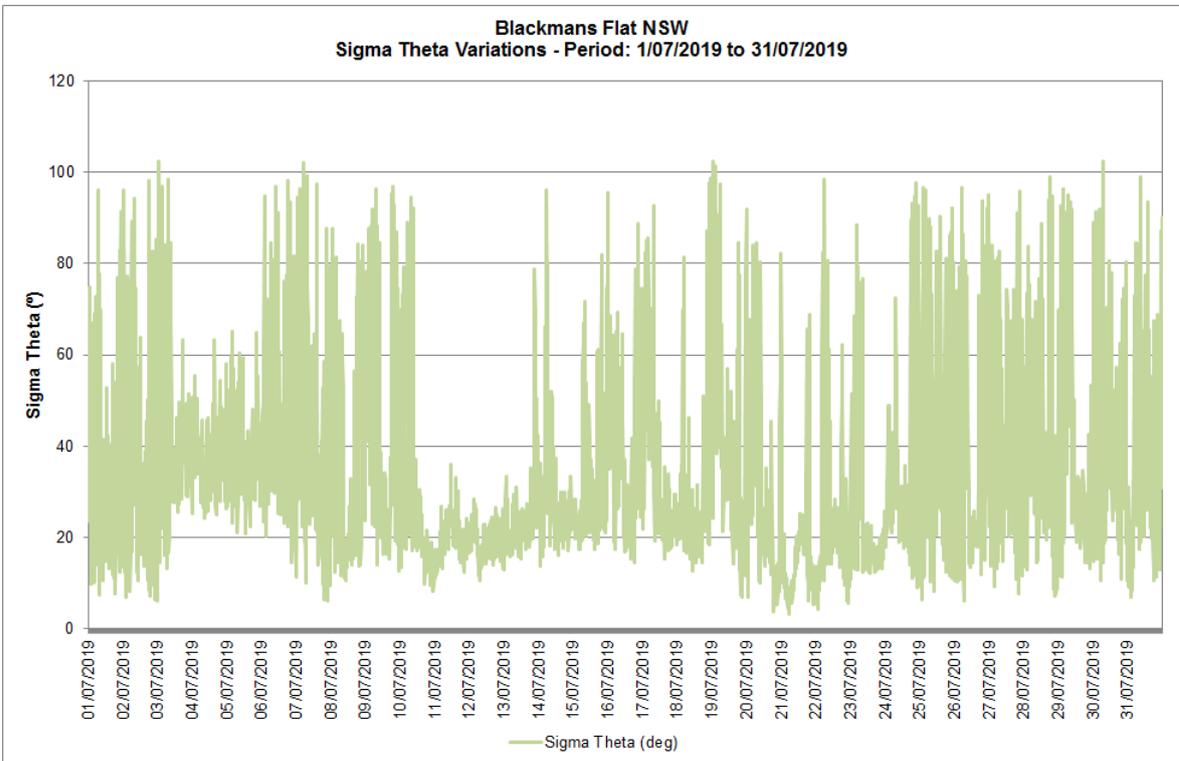
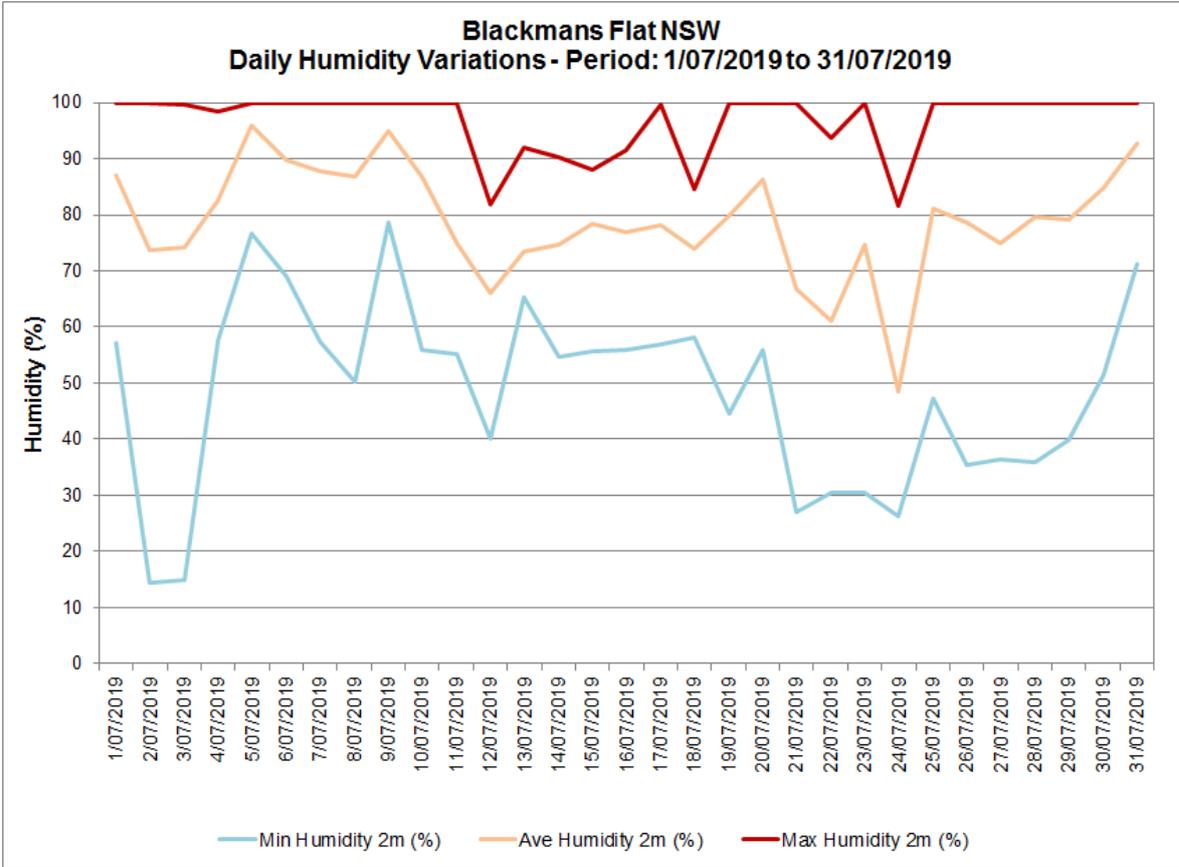
**Pine Dale Mine
TSP & PM₁₀ HVAS 12-Month Comparative Results
August 2018 - July 2019**



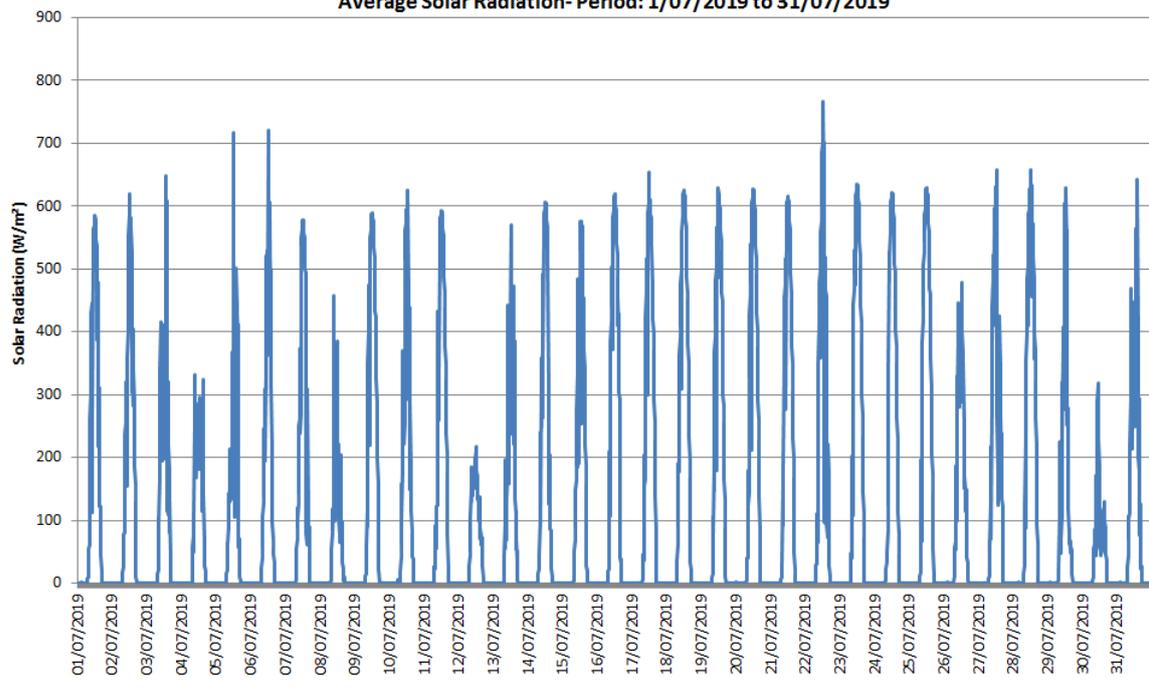
Appendix C

Meteorological Data





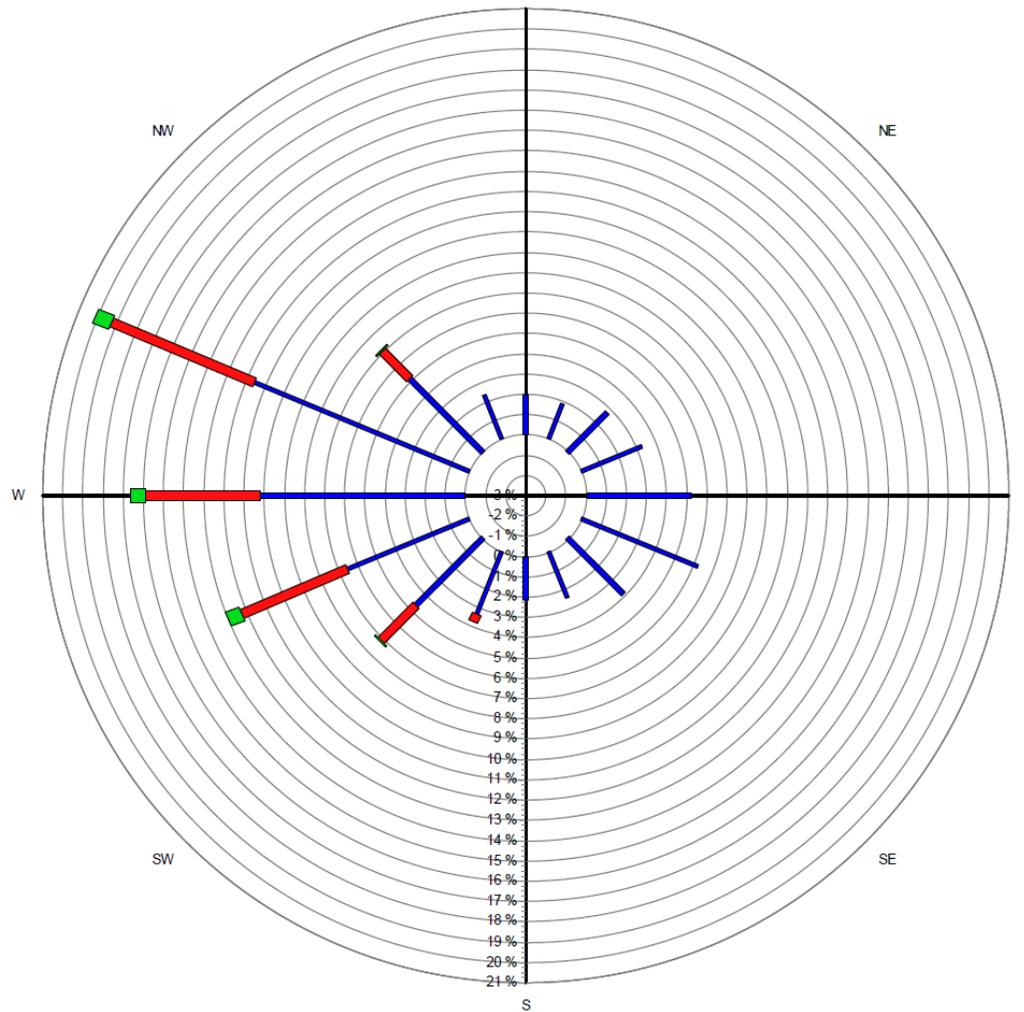
Blackmans Flat NSW
Average Solar Radiation- Period: 1/07/2019 to 31/07/2019



Blackmans Flat Windrose

1/07/2019 to 31/07/2019

N



Source data:
 PineDale.SCM
 10 minutely data - Ave WndDir (deg)
 10 minutely data - Ave WndSpd (m/sec)