AIR, WATER AND METEOROLOGICAL MONITORING – MAY 2020

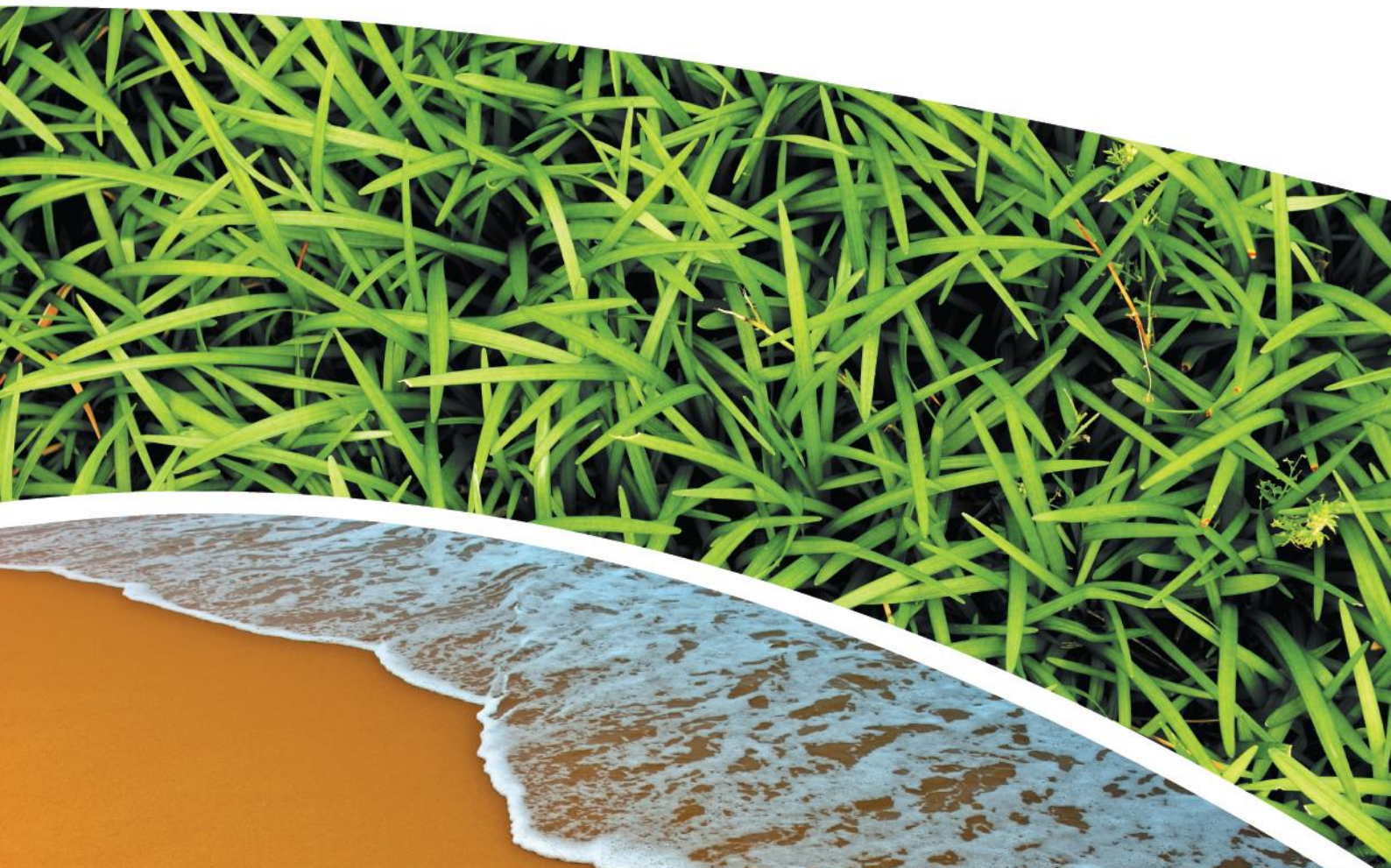
PINE DALE MINE, BLACKMANS FLAT

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1827/0

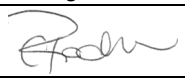
RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL



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

DOCUMENT STATUS					
Rev No	**Comment**	**Author**	**Approved for Issue (Project Manager)**		
			Name	**Signature**	**Date**
/0	Final	C Rocher	C Rocher		15.06.2020

DOCUMENT DISTRIBUTION				
Rev No	**Copies**	**Format**	**Issued to**	**Date**
/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin graham.goodwin@energyaustralia.com.au	15.06.2020
/0	1	Electronic (email)	Energy Australia- Mark Frewin mark.frewin@energyaustralia.com.au	15.06.2020
/0	1	Electronic (email)	Lithgow City Council – Andrew Muir andrew.muir@lithgow.nsw.gov.au	15.06.2020
/0	1	Electronic report	RCA – job archive	15.06.2020

Contents

RCA ref 6880-1827/0

15 June 2020

Enhance Place Pty Ltd
PO Box 202
WALLERWANG NSW 2845

Attention: Mr Graham Goodwin

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

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 MAY 2020

1 INTRODUCTION

This report presents the results of air, water and meteorological monitoring undertaken at Pine Dale Mine, Blackmans Flat during the month of May 2020.

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 May 2020. 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	-	05206880011	05206880008
Date Sampled	-	06/05/20	06/05/20
Time Sampled	-	8:55	10:11
Depth to Water from Surface	m	26.45	6.82
Water Level (AHD)	m	890.50	887.58
Temperature	°C	13.4	15.2
pH	pH	**6.02**	**6.20**
Conductivity	µS/cm	**1690**	700
Turbidity	NTU	162	
Dissolved Oxygen	mg/L	4.0	
Total Suspended Solids	mg/L	117	
Oil and Grease	mg/L	<5	
Bicarbonate Alkalinity ($CaCO_3$)	mg/L	67	213
Total Alkalinity ($CaCO_3$)	mg/L	67	213
Sulphate (as SO_4)	mg/L	801	40
Chloride	mg/L	61	124
Calcium	mg/L	161	40
Magnesium	mg/L	82	43
Sodium	mg/L	93	49
Potassium	mg/L	22	8
Cobalt (dissolved)	mg/L	0.056	
Manganese (dissolved)	mg/L	3.11	
Nickel (dissolved)	mg/L	0.114	
Zinc (dissolved)	mg/L	0.149	
Iron (dissolved)	mg/L	37.2	<0.05
Trigger Values			
pH trigger level[a]	pH	6.2 – 8.0	6.3 – 8.0
Conductivity trigger level	µS/cm	1180	852
Water Level (AHD)[b]	m	887.90	883.28
Proposed Trigger Values[c]			
pH trigger level[d]	pH	5.6	6.3

Indicates analysis was not required.

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

[b] 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.

[c] Proposed trigger values submitted to Department of Primary Industries in 2018 and are currently pending regulatory approval.

[d] pH trigger value is exceeded if pH is below the nominated value.

3.2 SURFACE WATER MONITORING

Quarterly surface water monitoring was undertaken in February 2020. Results are shown in **Table 3**.

Table 3 *Quarterly surface water results*

ANALYSIS	UNITS	EPA Point 2 Neubeck's Ck Upstream	EPA Point 3 Neubeck's Ck Downstream	EPA Point 14 Cox's River Downstream
Sample Number	-	05206880009	05206880004	05206880010
Date Sampled	-	6/05/2020	6/05/2020	7/05/2020
Time Sampled	-	08:35	10:31	07:03
Temperature	°C	8:35	10:31	7:03
pH	pH	7.27	7.42	**6.91**
Conductivity	µS/cm	598	981	1010
Sulfate	NTU	158	400	473
Dissolved Iron	mg/L	0.06	0.18	0.07
Total Suspended Solids	mg/L	5	9	7
Turbidity	mg/L	2	2	3
Trigger Values				
pH[a]	pH	7.1 – 8.0	6.4 – 8.0	7.5 – 8.0
Conductivity	µS/cm	2055	2223	1166
Total Suspended Solids	mg/L	30	30	30
Proposed Trigger Values[c]				
pH trigger level[a]	pH	6.5 – 8.0	6.5 – 8.0	--
Electrical conductivity (µs/cm)	µS/cm	5592	5592	--
TSS (mg/L)	mg/L	25	25	--

4 AIR QUALITY RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

Monitoring of particulate matter less than 10 micrometres (PM_{10}) 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**. PM_{10} results are shown in **Table 4**. HVAS Monitoring locations are shown in **Appendix A**. Graphical HVAS result presentations are shown in **Appendix B**.

Table 4 *Total Suspended Particulates (TSP)*

Run Date	TSP (µg/m3)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
02-May-20	11	05206880030	9806407	07-May-20	18:14	Client	24.13
08-May-20	19	05206880032	9806413	13-May-20	19:05	Client	24.00
14-May-20	19	05206880034	9806498	18-May-20	18:27	Client	24.00
20-May-20	8	05206880036	9806490	23-May-20	15:10	Client	24.00
26-May-20	7	05206880038	9806496	31-May-20	19:12	Client	24.00

Table 5 *Suspended Particulate Matter <10 µm (PM_{10})*

Run Date	PM_{10} (µg/m^3)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
02-May-20	6	05206880031	9806408	07-May-20	18:17	Client	24.08
08-May-20	8	05206880033	9806414	13-May-20	19:10	Client	24.00
14-May-20	9	05206880035	9806499	18-May-20	18:30	Client	24.00
20-May-20	3	05206880037	9806491	23-May-20	15:12	Client	24.00
26-May-20	3	05206880039	9806497	31-May-20	19:20	Client	24.00

4.1.1 TSP SUMMARY

The NSW EPA Annual Mean TSP allowable limit is 90µg/m^3. All TSP HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (June 2019 to May 2020) for TSP is 50.0µg/m^3, which is below the allowable limit of 90µg/m^3.

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

4.1.2 PM_{10} SUMMARY

The NSW EPA twenty-four (24) hour maximum PM_{10} allowable limit is 50µg/m^3; there were no PM_{10} concentrations in excess of this limit. The HVAS PM_{10} annual average result is above the long-term assessment criterion of 25µg/m^3. The annual average PM_{10} result was 28.0µg/m^3 (refer **Appendix B**) which is considered to be impacted by bushfire activity. During November 2019 – January 2020, the air quality in the Lithgow area was impacted by bushfires, predominantly the Gospers Mountain fire which occurred within Wollemi National Park, moving through to Ben Bullen State forest and Pine Dale Mine during December 2019.

4.2 DEPOSITIONAL DUST MONITORING

The depositional dust monitoring exposure period for May 2020 was 7 April – 5 May 2020. Depositional dust gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. The May exposure period was 28 days which is within the 30 ± 2 days dust exposure period stipulated in AS/NZS 3508.10.1:2016. Depositional dust monitoring results are shown in **Table 6**. Depositional dust monitoring locations are shown in **Appendix A**.

Table 6 *Depositional Dust Monitoring*

Deposit Gauge	Number of Days	Notes	Insoluble Solids	Ash	Combustible Matter
D1	28	IT	1.0	0.3	0.7
D3	28	I	0.4	0.2	0.2
D4	28	I	0.1	<0.1	0.1
D5	28	I	0.2	<0.1	0.2
D6	28	I	0.2	<0.1	0.2

All units are g/m^2/month

I – Insects (eg, Ants, Spiders)

4.2.1 ALLOWABLE DEPOSITIONAL DUST LIMITS

The EPA long term (annual average) deposited dust limit is 4g/m^2 per month. The rolling annual depositional dust results for all sites within the period (June 2019 – May 2020) 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/m^2 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 May 2020 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 was not required to be undertaken during May 2020.

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 May 2020 environmental monitoring results were found to be generally in compliance with EPL 4911 with the exception of:

- The pH at groundwater bore P6 and P7 were below the lower site-specific trigger value.
- Electrical conductivity in groundwater sample P6 was in excess of the site-specific trigger value.

It should be noted that the proposed trigger values pending regulatory approval do not have a limit for electrical conductivity, as such P6 would have been compliant in the event of approval of these proposed trigger values.

The rolling annual average from the TSP High Volume Air Sampler is well below the EPA Annual Mean TSP criterion of 90µg/m^3. The rolling annual average from the PM_{10} High Volume Air Sampler (28.0µg/m^3) is above the EPA Annual Mean PM_{10} criterion of 25µg/m^3. Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m^2.month based upon a rolling average of the past 12 months.

Meteorological monitoring was undertaken for the entire month of May 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

Carmen Rocher
Environmental Engineer

Appendix A

Monitoring Locations

EP PDH7/GW Site E
EP DDH7/GW Site A
EP DDH5/GW Site B
EP PDH1/GW Site C
EP DDH4/GW Site D
Water Cart Dam (The Bong sample location)
PCB1
PCB7
EPL Site 2
S1
S2
HVAS
PCB2
PCB3
NM1
DI
EPL Site 3 (S3)
The Bong
Old Shaft
NM2
D3
NM3
P6
S4
S5
S6
EPL Site 13
P7
D4
NM4
S7
NM6
D6
Blue Lake
Pine Dale Mine
D5
NM5
EPL Site 14

LEGEND

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

0 175 350 700 1,050 1,400
metres

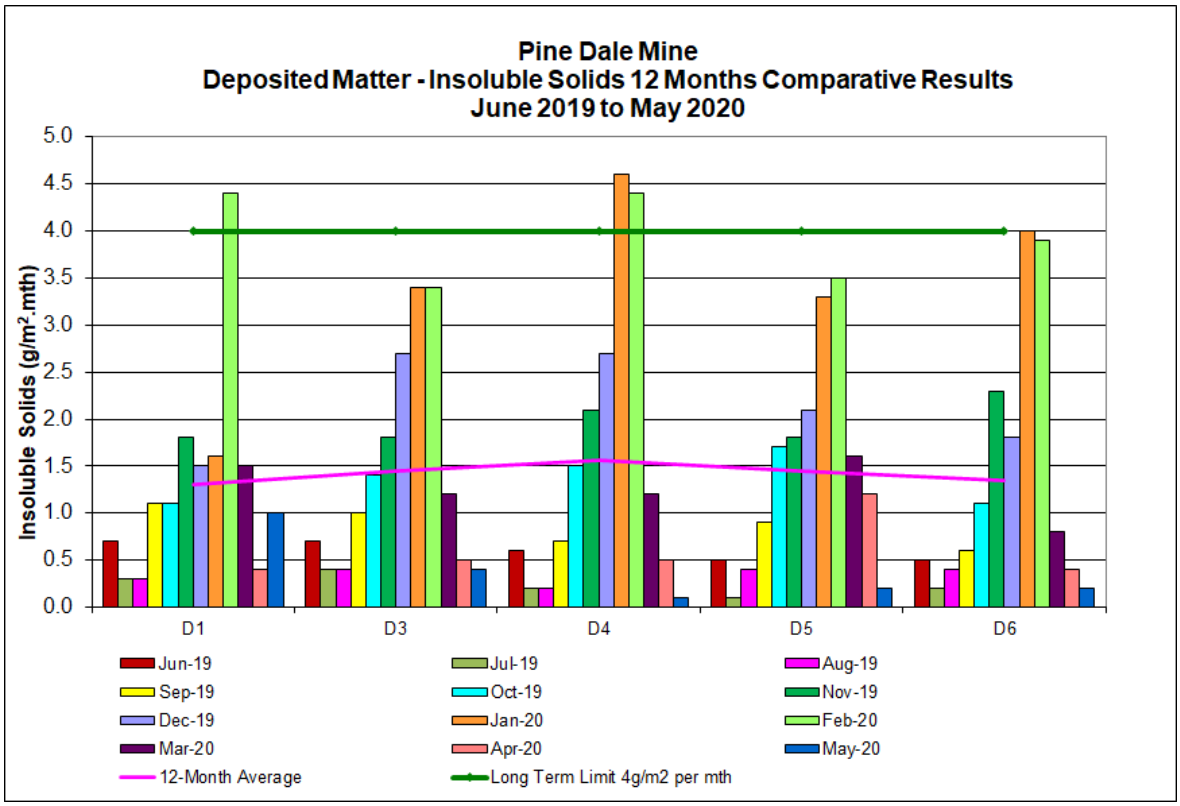
N

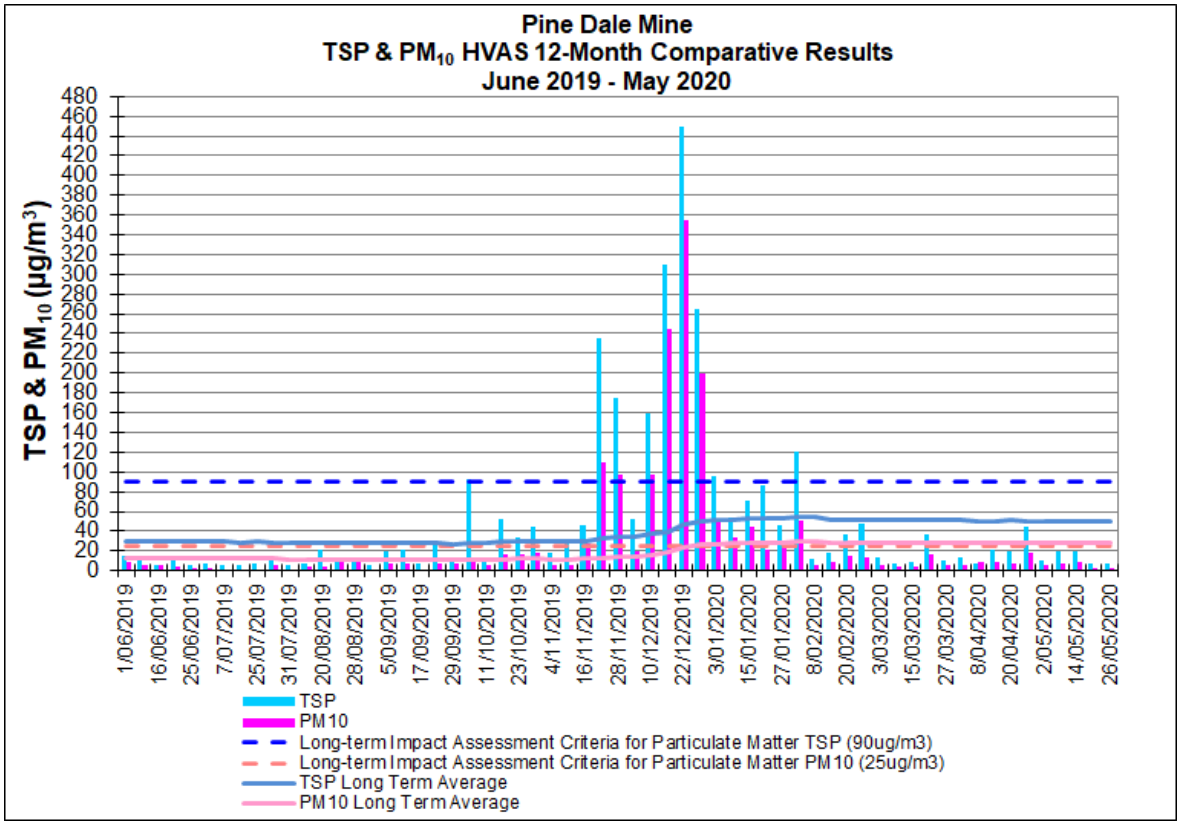
RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PINE DALE MINE ENVIRONMENTAL MONITORING LOCATION PLAN

Appendix B

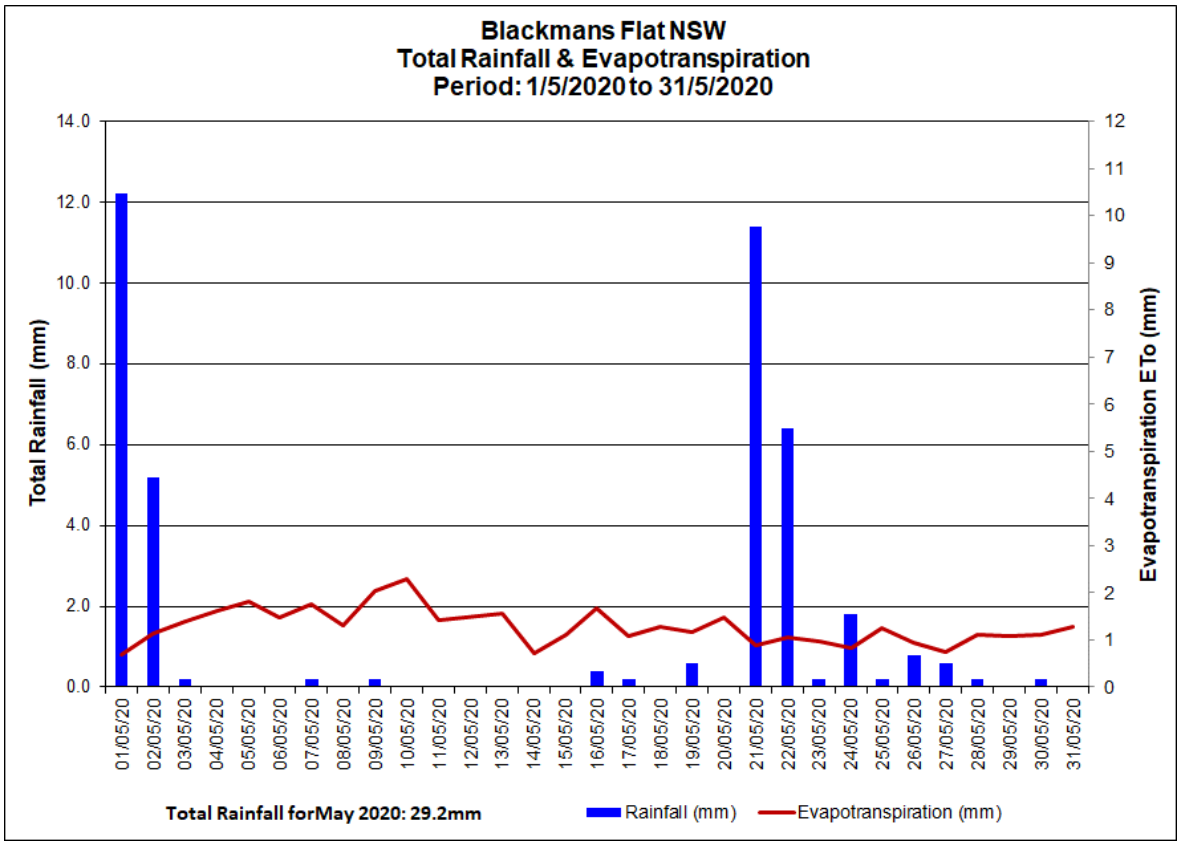
Depositional Dust and HVAS Graphs

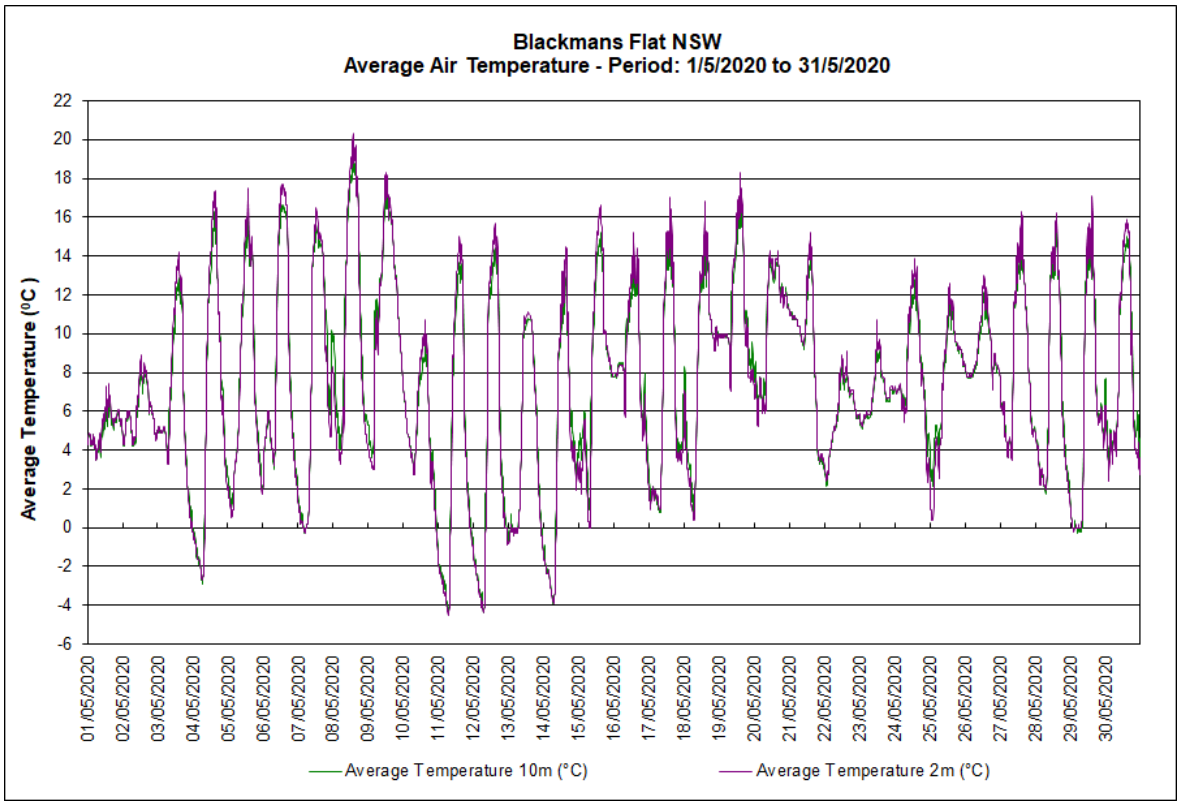

Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
June 2019 to May 2020
Insoluble Solids (g/m².mth)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D3
D4
D5
D6
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
12-Month Average
Long Term Limit 4g/m2 per mth

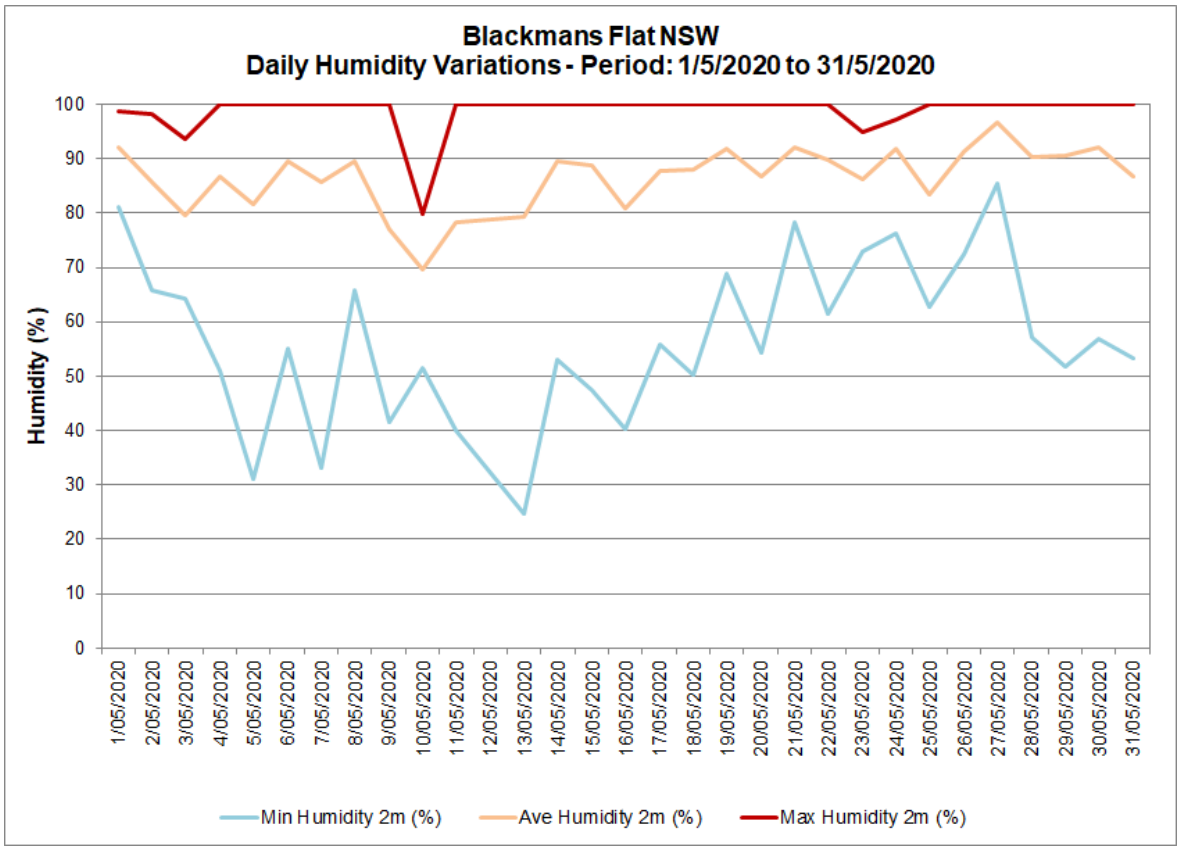

Pine Dale Mine
TSP & PM10 HVAS 12-Month Comparative Results
June 2019 - May 2020
TSP & PM10 (µg/m³)
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1/06/2019
16/06/2019
25/06/2019
7/07/2019
25/07/2019
31/07/2019
20/08/2019
28/08/2019
5/09/2019
17/09/2019
29/09/2019
11/10/2019
23/10/2019
4/11/2019
16/11/2019
28/11/2019
10/12/2019
22/12/2019
3/01/2020
15/01/2020
27/01/2020
8/02/2020
20/02/2020
3/03/2020
15/03/2020
27/03/2020
8/04/2020
20/04/2020
2/05/2020
14/05/2020
26/05/2020
TSP
PM10
Long-term Impact Assessment Criteria for Particulate Matter TSP (90ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter PM10 (25ug/m3)
TSP Long Term Average
PM10 Long Term Average

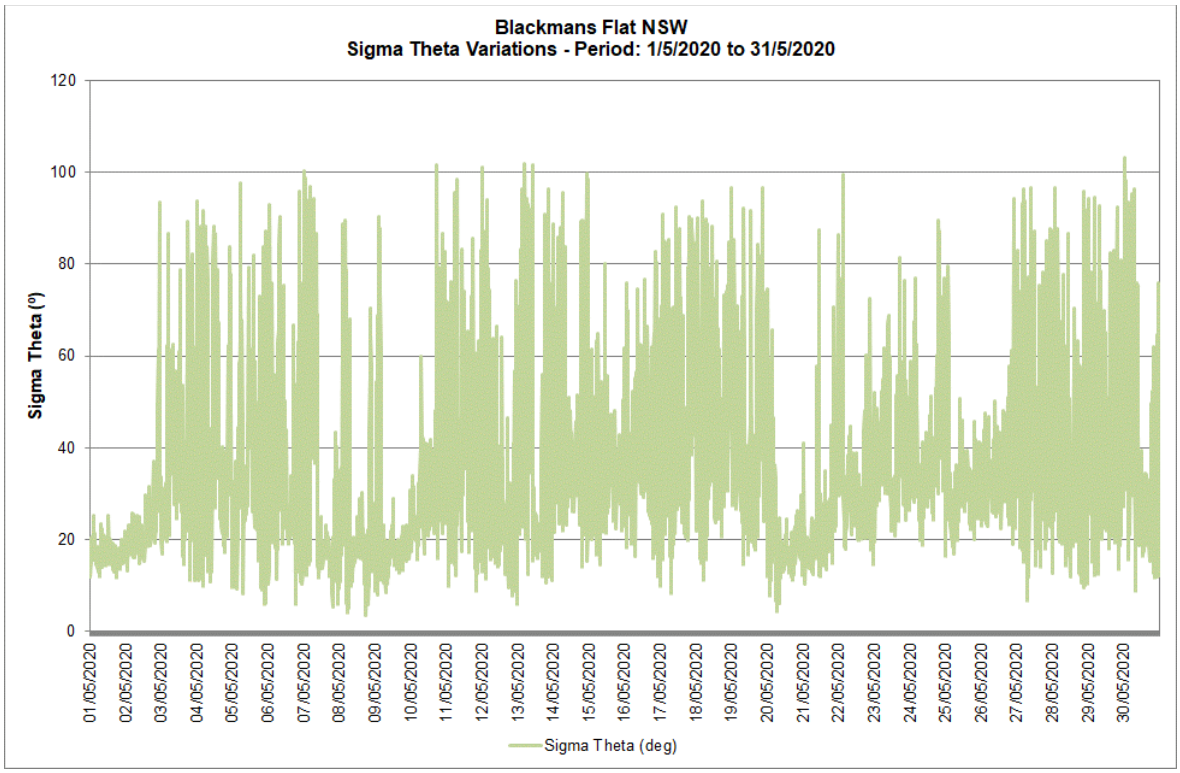
Appendix C

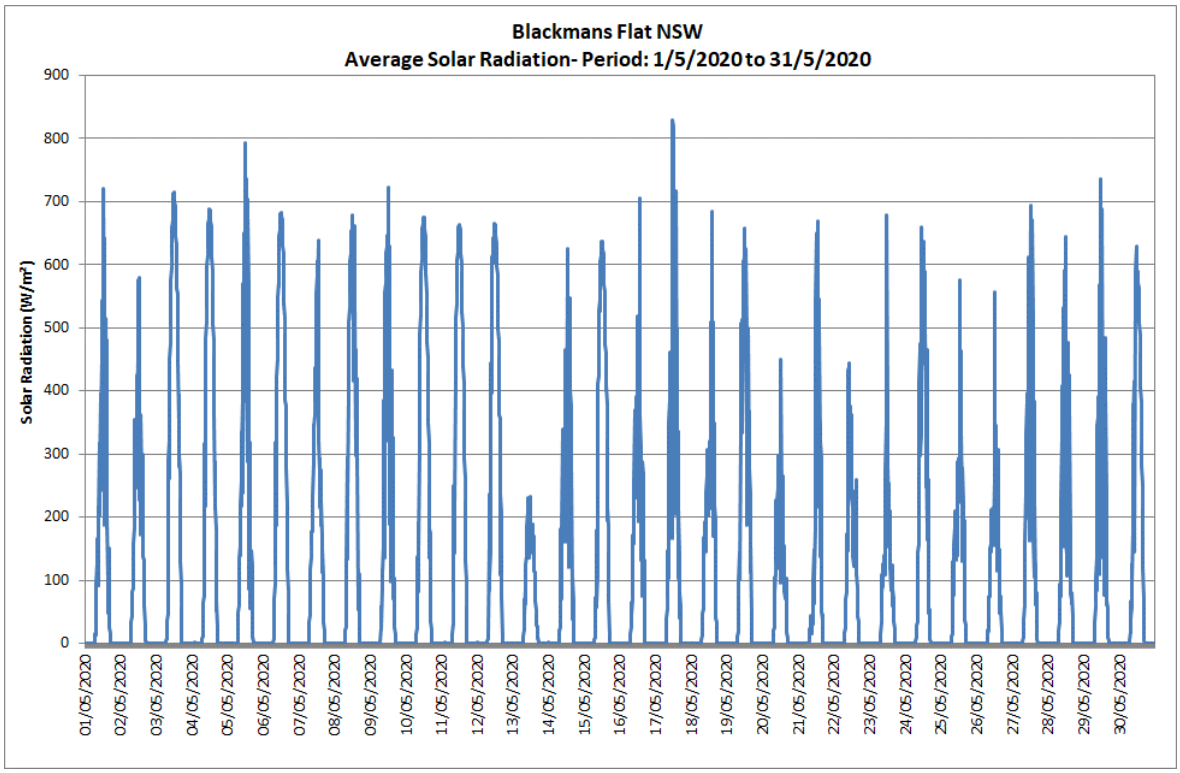
Meteorological Data

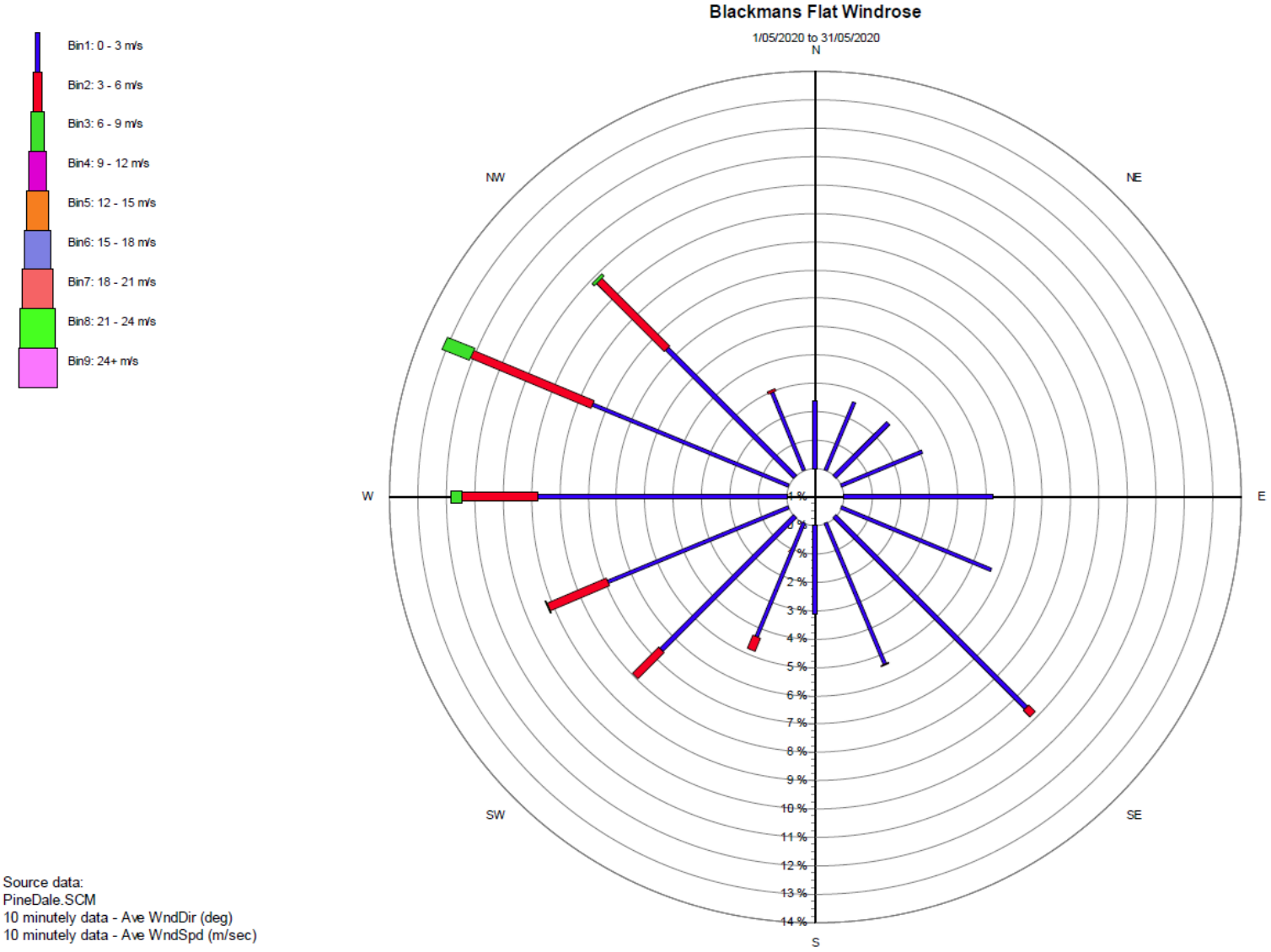

Blackmans Flat NSW
Total Rainfall & Evapotranspiration
Period: 1/5/2020 to 31/5/2020
Total Rainfall (mm)
Evapotranspiration ETo (mm)
Total Rainfall forMay 2020: 29.2mm
Rainfall (mm)
Evapotranspiration (mm)


Blackmans Flat NSW
Average Air Temperature - Period: 1/5/2020 to 31/5/2020
Average Temperature (°C)
Average Temperature 10m (°C)
Average Temperature 2m (°C)


Blackmans Flat NSW
Daily Humidity Variations - Period: 1/5/2020 to 31/5/2020
Humidity (%)
100
90
80
70
60
50
40
30
20
10
0
1/05/2020
2/05/2020
3/05/2020
4/05/2020
5/05/2020
6/05/2020
7/05/2020
8/05/2020
9/05/2020
10/05/2020
11/05/2020
12/05/2020
13/05/2020
14/05/2020
15/05/2020
16/05/2020
17/05/2020
18/05/2020
19/05/2020
20/05/2020
21/05/2020
22/05/2020
23/05/2020
24/05/2020
25/05/2020
26/05/2020
27/05/2020
28/05/2020
29/05/2020
30/05/2020
31/05/2020
Min Humidity 2m (%)
Ave Humidity 2m (%)
Max Humidity 2m (%)


Blackmans Flat NSW
Sigma Theta Variations - Period: 1/5/2020 to 31/5/2020
Sigma Theta (°)
120
100
80
60
40
20
0
01/05/2020
02/05/2020
03/05/2020
04/05/2020
05/05/2020
06/05/2020
07/05/2020
08/05/2020
09/05/2020
10/05/2020
11/05/2020
12/05/2020
13/05/2020
14/05/2020
15/05/2020
16/05/2020
17/05/2020
18/05/2020
19/05/2020
20/05/2020
21/05/2020
22/05/2020
23/05/2020
24/05/2020
25/05/2020
26/05/2020
27/05/2020
28/05/2020
29/05/2020
30/05/2020
Sigma Theta (deg)


Blackmans Flat NSW
Average Solar Radiation- Period: 1/5/2020 to 31/5/2020
Solar Radiation (W/m²)
900
800
700
600
500
400
300
200
100
0
01/05/2020
02/05/2020
03/05/2020
04/05/2020
05/05/2020
06/05/2020
07/05/2020
08/05/2020
09/05/2020
10/05/2020
11/05/2020
12/05/2020
13/05/2020
14/05/2020
15/05/2020
16/05/2020
17/05/2020
18/05/2020
19/05/2020
20/05/2020
21/05/2020
22/05/2020
23/05/2020
24/05/2020
25/05/2020
26/05/2020
27/05/2020
28/05/2020
29/05/2020
30/05/2020



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