



**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1709/0

March 2016



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/0	1	Electronic (email)	Lithgow City Council – Andrew Muir andrew.muir@lithgow.nsw.gov.au	18.04.16
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RCA LE ref 6880-1709/0

18 April 2016

Pine Dale Mine
PO Box 202
WALLERAWANG NSW 2845

Attention: Mr Graham Goodwin

**REPORT COMPILED FOR
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE
DETAILING SURFACE WATER, GROUNDWATER DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING
MARCH 2016**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of March 2016.

Samples received were sampled by RCA Laboratories – Environmental staff.

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 are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**. When an external testing laboratory is used to obtain the analysis of samples which become a part of this report, then the details of that laboratory's official report will be attached in an Appendix.

Table 1 *Analytical Test Methods*

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA / NON-NATA ANALYSIS
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 .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

3 WATER MONITORING RESULTS

3.1 GROUNDWATER

A total of 2 on-site groundwater samples were collected during the month of March 2016. Sampling at Bores P2, P3 and P7a are no longer required under the new sampling regime undertaken in accordance with Project Approval (PA 10_0041) and the Pine Dale Mine Water Management Plan (Report No. 613/20). This sampling regime commenced 1 August 2013. Water quality analysis results are shown in **Table 2**.

Table 2 Groundwater Analysis Results – Monthly Monitoring

ANALYSIS	UNITS	P6	P7
Sample Number	-	03166880009	03166880010
Date Sampled	-	08/03/16	8/03/16
Time Sampled	-	14:58	15:40
Depth to Water from Surface*	m	25.08	6.65
Water Level (AHD)	m	891.87	887.75
Temperature	°C	20.2	17.0
pH	pH	6.19	6.29
Conductivity	µS/cm	1101	748
Turbidity	NTU	15	
Dissolved Oxygen	mg/L	6.2	
TSS	mg/L	32	
Oil & Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	40	
Total Alkalinity (CaCO ₃)	mg/L	40	
Sulfate (as SO ₄)	mg/L	712	
Chloride	mg/L	32	
Calcium	mg/L	127	
Magnesium	mg/L	64	
Sodium	mg/L	51	
Potassium	mg/L	18	
Cobalt (dissolved)	mg/L	0.058	
Manganese (dissolved)	mg/L	2.64	
Nickel (dissolved)	mg/L	0.101	
Zinc (dissolved)	mg/L	0.469	
Iron (dissolved)	mg/L	25.9	

NOTES: *Depth relative to ground level (not standpipe height).

■ Indicates analysis was not required

Groundwater monitoring locations are shown in **Appendix 1**.

3.2 EPA SURFACE WATER MONITORING

Routine quarterly surface water monitoring was undertaken during the month of March 2016. The next EPA quarterly monitoring event is scheduled to be undertaken in May 2016.

4 AIR QUALITY MONITORING RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

HVAS at this facility conform to AS/NZS 3580.9.3:2015, AS/NZS 3580.9.6:2003 and AS/NZS 3580.1.1:2007.

HVAS Total Suspended Particulate analysis results are shown in **Table 3**.

PM₁₀ Suspended Particulate Matter results are shown in **Table 4**.

Table 3 Total Suspended Particulates ($\mu\text{g}/\text{m}^3$ 0°C 101.3 kPa)

RUN DATE	TSP ($\mu\text{g}/\text{m}^3$)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
06-Mar-16	15	03166880029	9157584	07-Mar-16	10:05	Client	24.00
12-Mar-16	18	03166880031	9157586	15-Mar-16	17:20	Client	24.70
18-Mar-16	13	03166880033	9252129	22-Mar-16	19:35	Client	24.00
24-Mar-16	25	03166880035	9252131	25-Mar-16	12:45	Client	24.00
30-Mar-16	29	03166880037	9252134	01-Apr-16	13:25	Client	24.00

Table 4 Suspended Particulate Matter PM₁₀ ($\mu\text{g}/\text{m}^3$ 0°C 101.3 kPa)

RUN DATE	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
06-Mar-16	10	03166880030	9157585	07-Mar-16	10:10	Client	24.00
12-Mar-16	13	03166880032	9252128	15-Mar-16	17:25	Client	24.20
18-Mar-16	7	03166880034	9252130	22-Mar-16	19:40	Client	24.00
24-Mar-16	15	03166880036	9252132	25-Mar-16	12:50	Client	24.00
30-Mar-16	14	03166880038	9252133	01-Apr-16	13:30	Client	24.00

4.1.1 TSP Summary

The 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* (from April 2015 to March 2016) for the TSP unit is $17.8\mu\text{g}/\text{m}^3$, which is well below the allowable limit of $90\mu\text{g}/\text{m}^3$.

4.1.2 PM₁₀ Summary

The EPA 24h Maximum PM₁₀ allowable limit is $50\mu\text{g}/\text{m}^3$. The EPA Annual Mean PM₁₀ allowable limit is $30\mu\text{g}/\text{m}^3$. All PM₁₀ HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the PM₁₀ unit is $9.0\mu\text{g}/\text{m}^3$, which is below the allowable limit of $30\mu\text{g}/\text{m}^3$. The 24 hour maximum allowable limit of $50\mu\text{g}/\text{m}^3$ was not exceeded during the month of March 2016.

4.1.3 Comments

HVAS monitoring locations are shown in **Appendix 1**.

Graphical HVAS results presentations are shown in **Appendix 2**.

4.2 DEPOSITIONAL DUST

Depositional Dust Gauges at this facility conform to AS/NZS 3580.10.1:2003 and AS/NZS 3580.1.1:2007. Depositional Dust monitoring results are shown in **Error! Reference source not found.5**.

Table 5 *Depositional Dust Monitoring - Deposited Matter – March 2016*

SAMPLE NUMBER	DEPOSIT GAUGE	DATE SAMPLE STARTED	DATE SAMPLE COMPLETED	NUMBER OF DAYS	NOTES	INSOLUBLE SOLIDS (g/m ² .month)	ASH (g/m ² .month)	COMBUSTIBLE MATTER (g/m ² .month)
03166880019	D1	9/02/2016	8/03/2016	28	IT	1.2	0.4	0.8
03166880020	D2	9/02/2016	8/03/2016	28	I	0.8	0.4	0.4
03166880021	D3	9/02/2016	8/03/2016	28	I	1.0	0.6	0.4
03166880022	D4	9/02/2016	8/03/2016	28	I	0.7	0.3	0.4
03166880023	D5	9/02/2016	8/03/2016	28	I	0.7	0.4	0.3
03166880024	D6	9/02/2016	8/03/2016	28	I	0.8	0.5	0.3

Glossary of Terms Used in Notes:

I Insects (eg, Ants, Spiders)

IT Insects and Tree Litter

4.2.1 Allowable Depositional Dust Limits

The EPA Long Term (Annual Average) Dust Limit is 4g/m² per month. All Depositional Dust results during this monitoring period are in compliance with consent conditions. The Annual Average for Dust Gauges D1, D2, D3, D4, D5 and D6 are all less than or equal to 1.3g/m² per month, which is below the allowable Annual Average Long Term Limit of 4g/m² per month.

Depositional Dust monitoring locations are shown in **Appendix 1**. Graphical Depositional Dust results are shown in **Appendix 2**.

5 BLASTING RESULTS

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

6 NOISE MONITORING RESULTS

Routine quarterly noise monitoring was not required to be undertaken this month.

7 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.

8 SUMMARY

During the month of March 2016 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Rolling annual averages from both the TSP and PM₁₀ High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM₁₀ criterion of 90µg/m³ and 30µg/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.

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

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Please contact the undersigned if you have any queries.

Yours sincerely



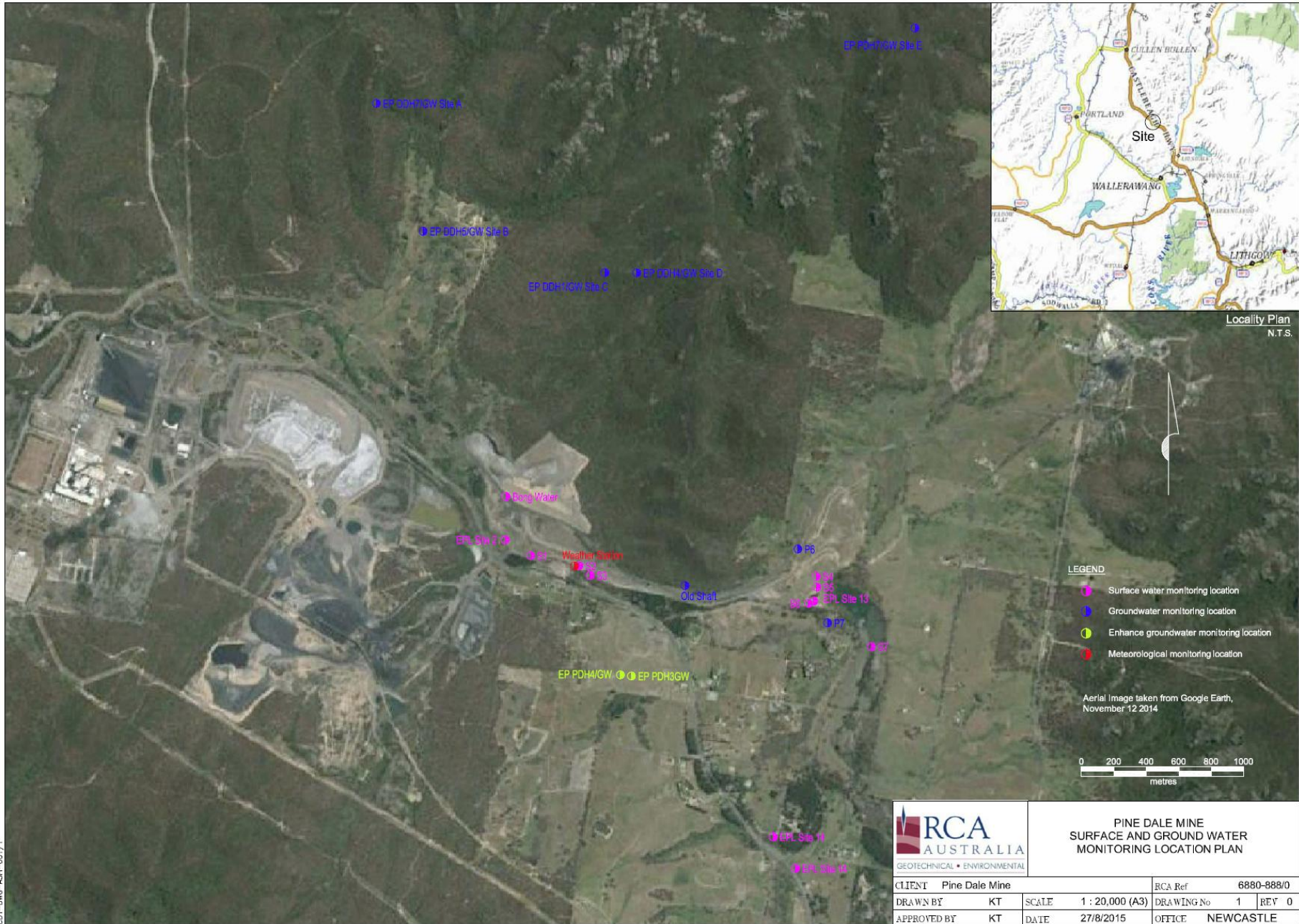
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



Karen Tripp
Senior Environmental Scientist/Hygienist
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental

Appendix 1


Surface Water Groundwater and Air Quality Monitoring Locations



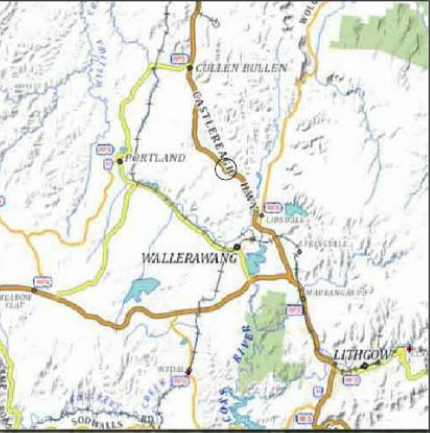
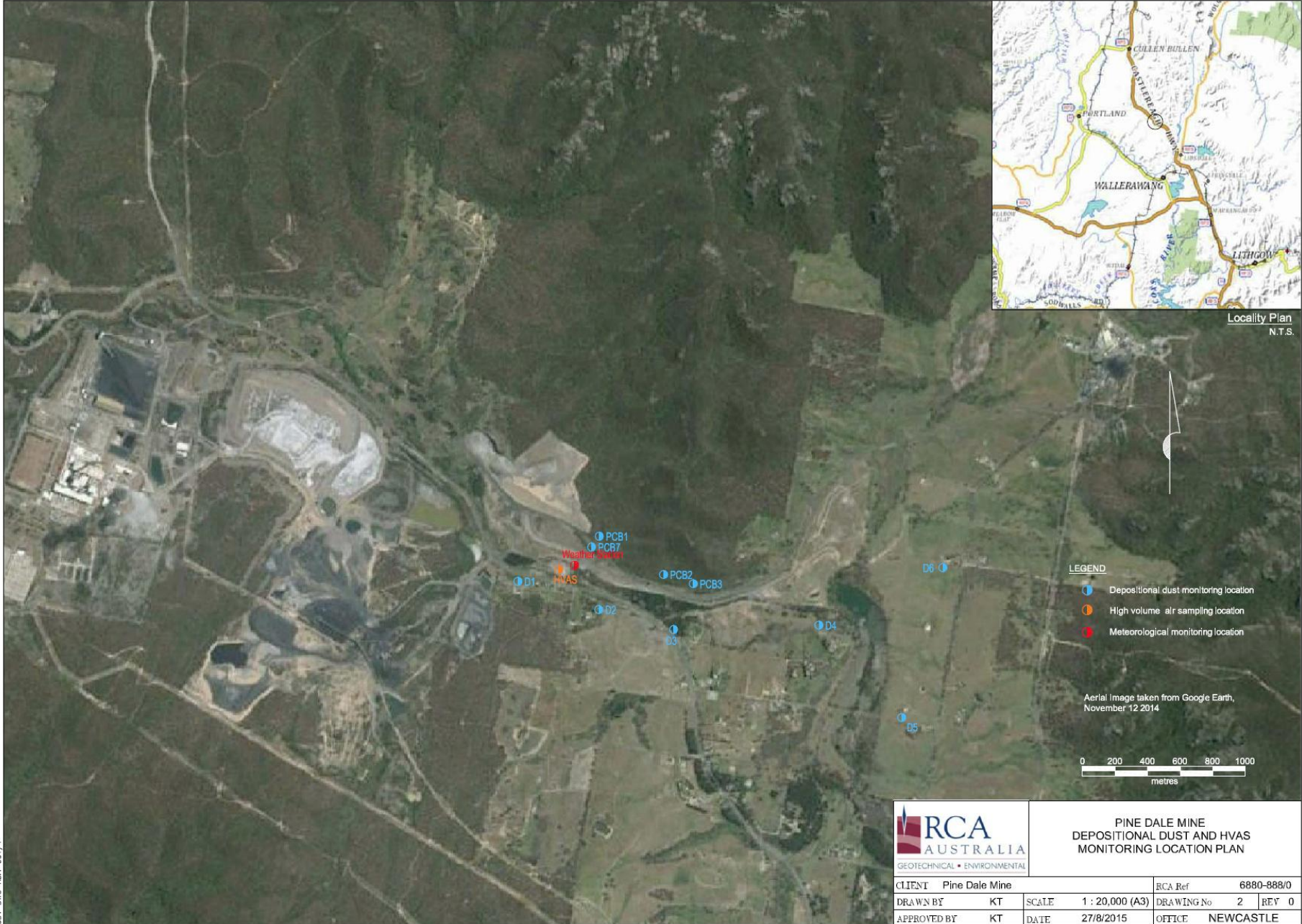
- LEGEND**
- Surface water monitoring location
 - Groundwater monitoring location
 - Enhance groundwater monitoring location
 - Meteorological monitoring location

Aerial Image taken from Google Earth, November 12 2014



 GEOTECHNICAL • ENVIRONMENTAL		PINE DALE MINE SURFACE AND GROUND WATER MONITORING LOCATION PLAN			
		CLIENT	Pine Dale Mine	RCA Ref	6880-888/0
DRAWN BY	KT	SCALE	1 : 20,000 (A3)	DRAWING No	1
APPROVED BY	KT	DATE	27/8/2015	OFFICE	NEWCASTLE
				REV	0

01/2015/2015/01/1



Locality Plan
N.T.S.

- LEGEND**
- Depositional dust monitoring location
 - High volume air sampling location
 - Meteorological monitoring location

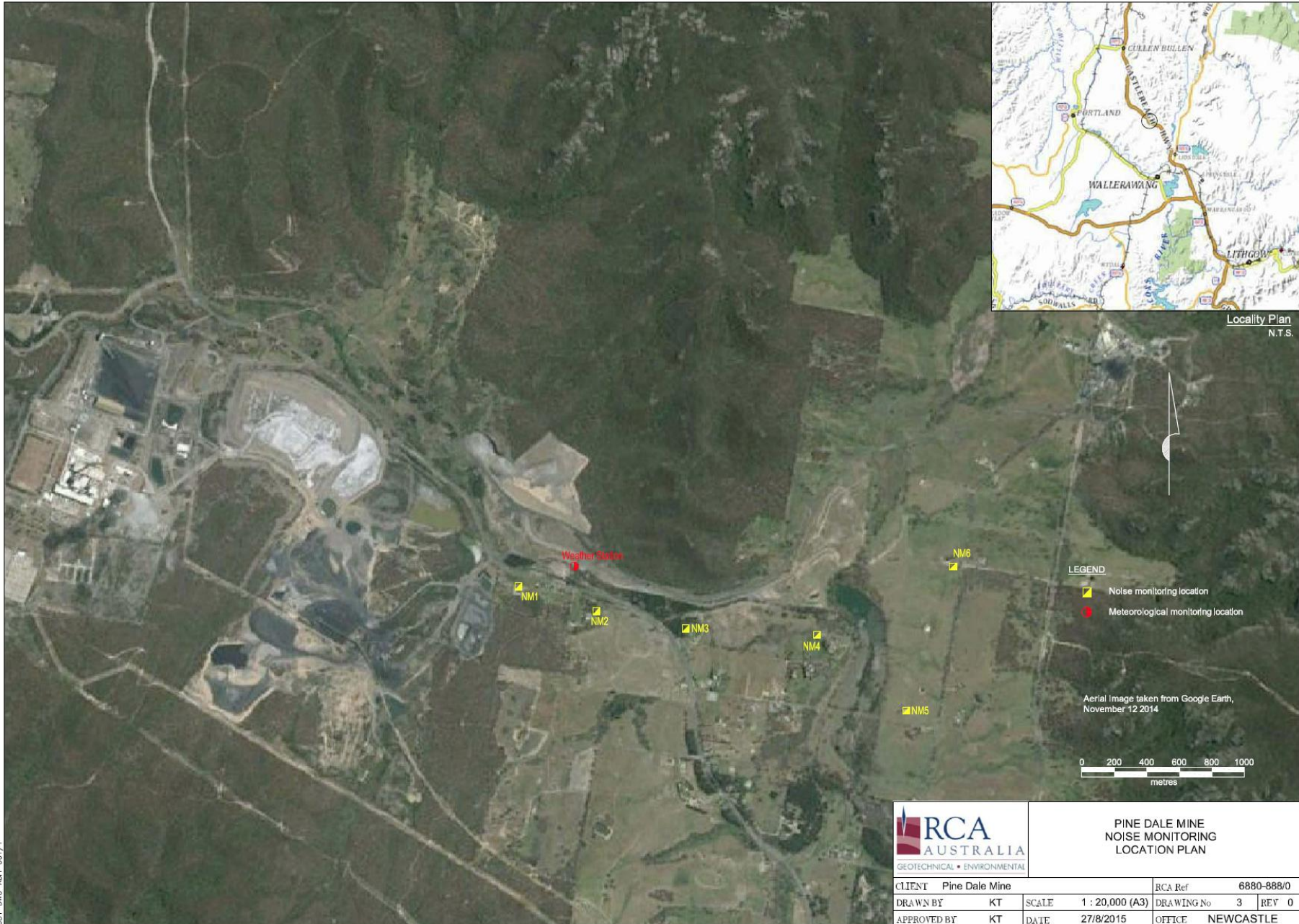
Aerial Image taken from Google Earth, November 12 2014



**PINE DALE MINE
DEPOSITIONAL DUST AND HVAS
MONITORING LOCATION PLAN**

CLIENT	Pine Dale Mine	RCA Ref	6880-888/0
DRAWN BY	KT	SCALE	1 : 20,000 (A3)
APPROVED BY	KT	DATE	27/8/2015
		DRAWING No	2
		OFFICE	NEWCASTLE
		REV	0

COT-DWC-ASH-001/1



Locality Plan
N.T.S.

- LEGEND**
- Noise monitoring location
 - Meteorological monitoring location

Aerial Image taken from Google Earth,
November 12 2014



**PINE DALE MINE
NOISE MONITORING
LOCATION PLAN**

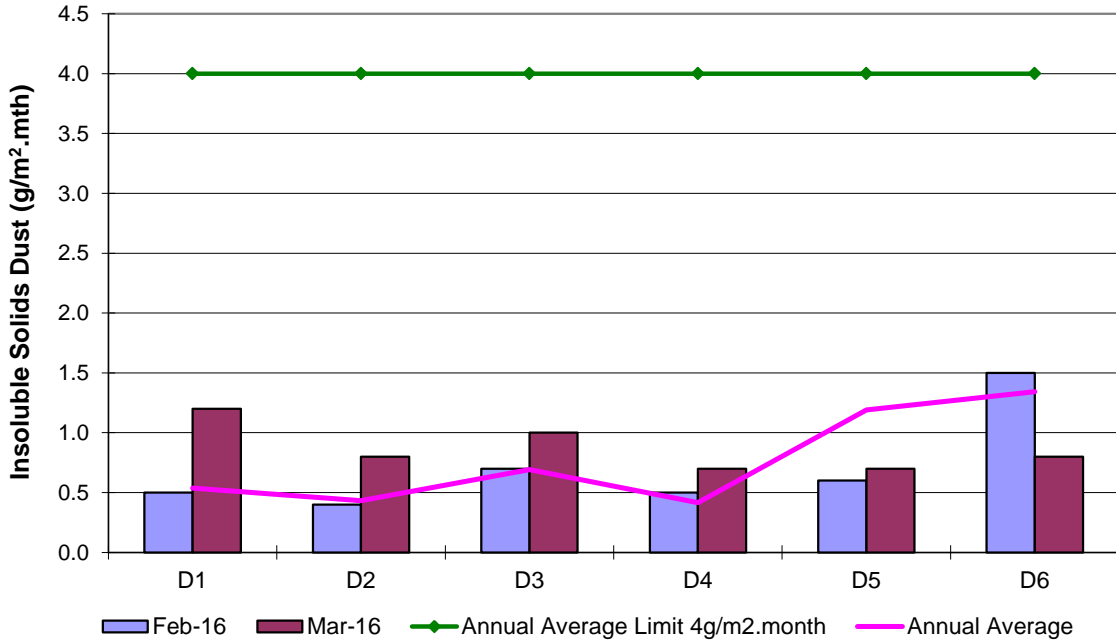
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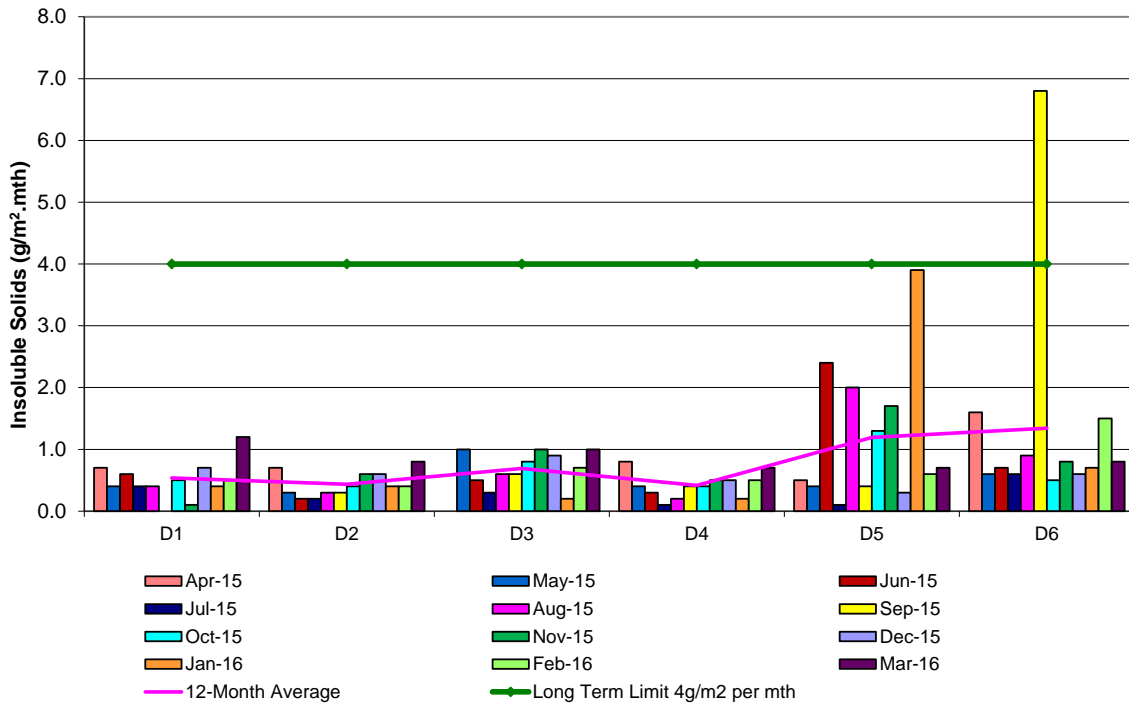
Appendix 2

Depositional Dust and HVAS Graphs

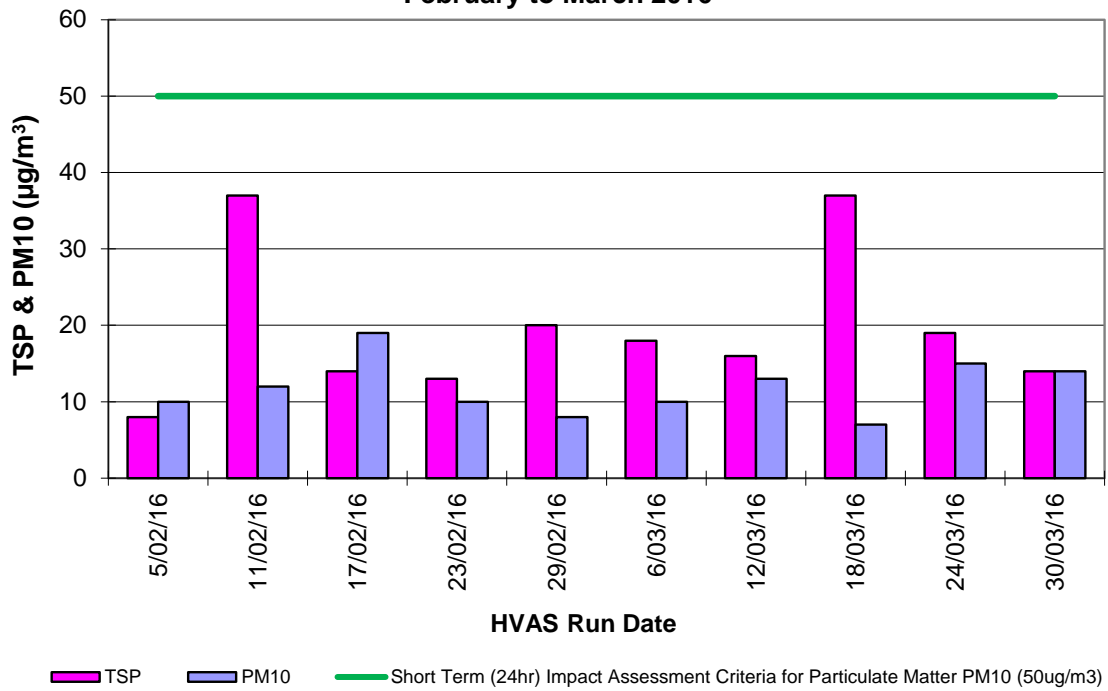
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
February to March 2016**



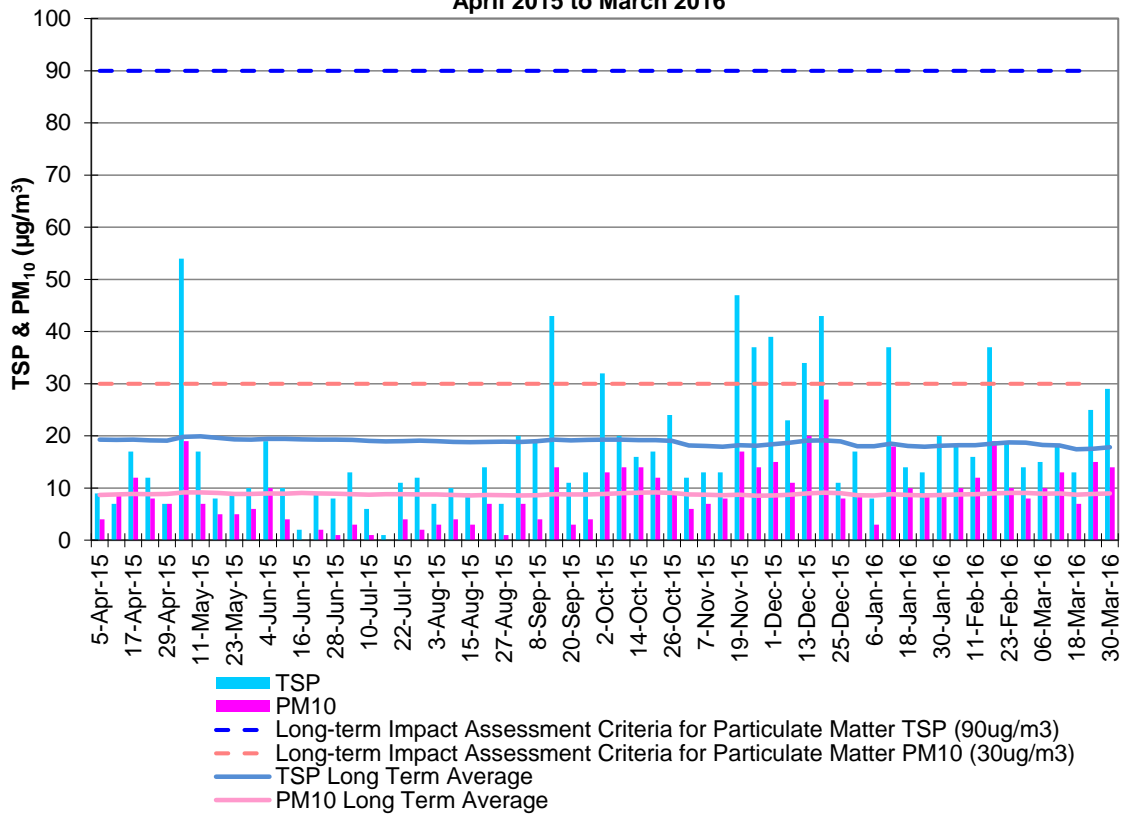
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
April 2015 to March 2016**



**Pine Dale Mine
TSP & PM₁₀ Results
February to March 2016**

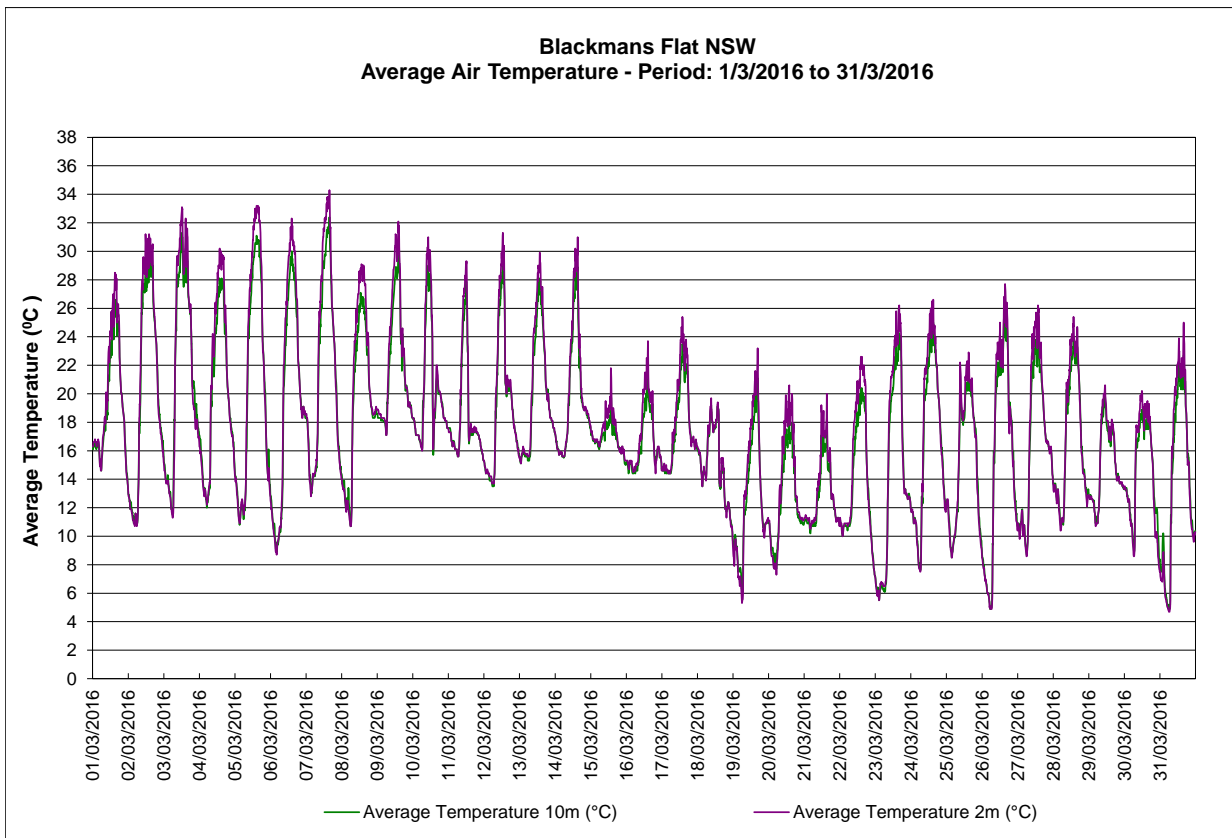
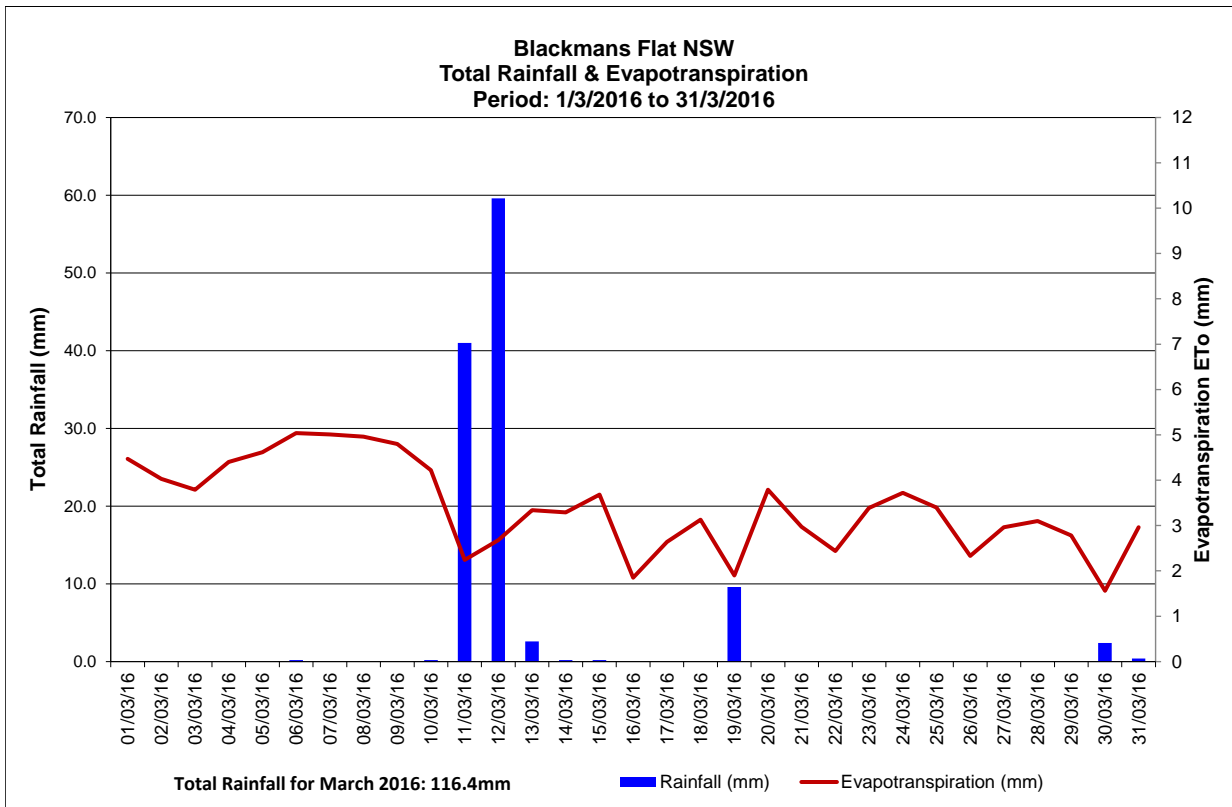


**Pine Dale Mine
TSP & PM₁₀ HVAS 12-Month Comparative Results
April 2015 to March 2016**

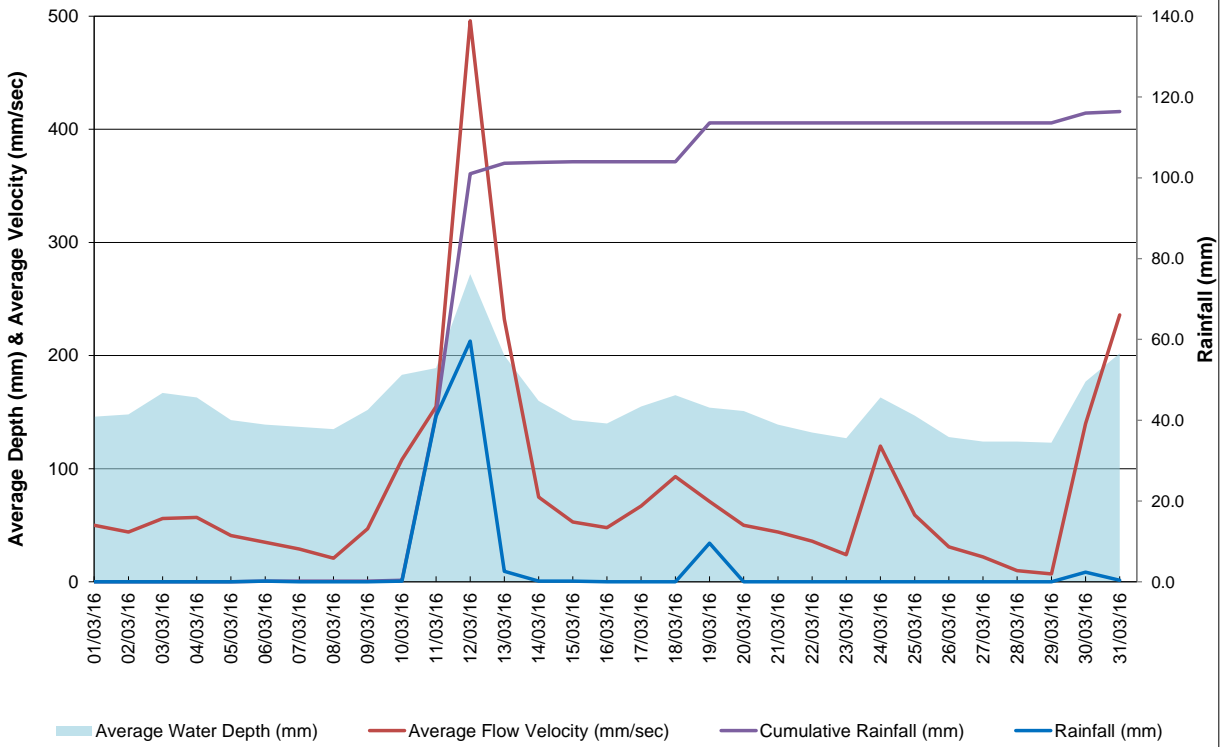


Appendix 3

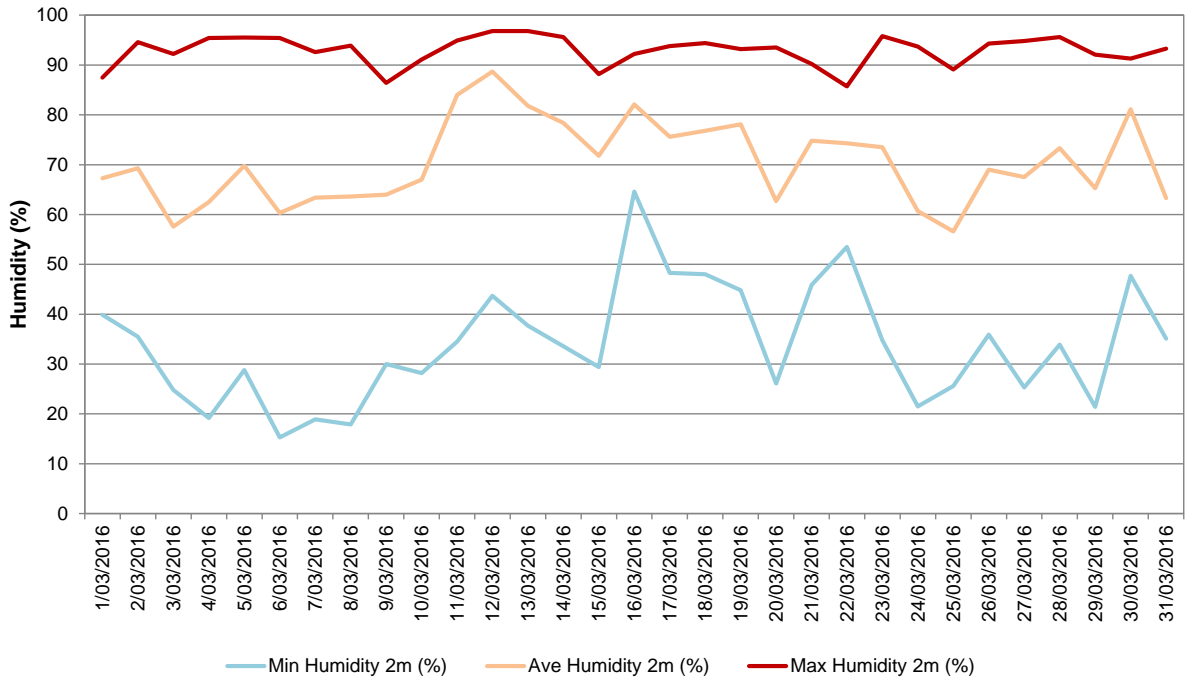
Meteorological Data

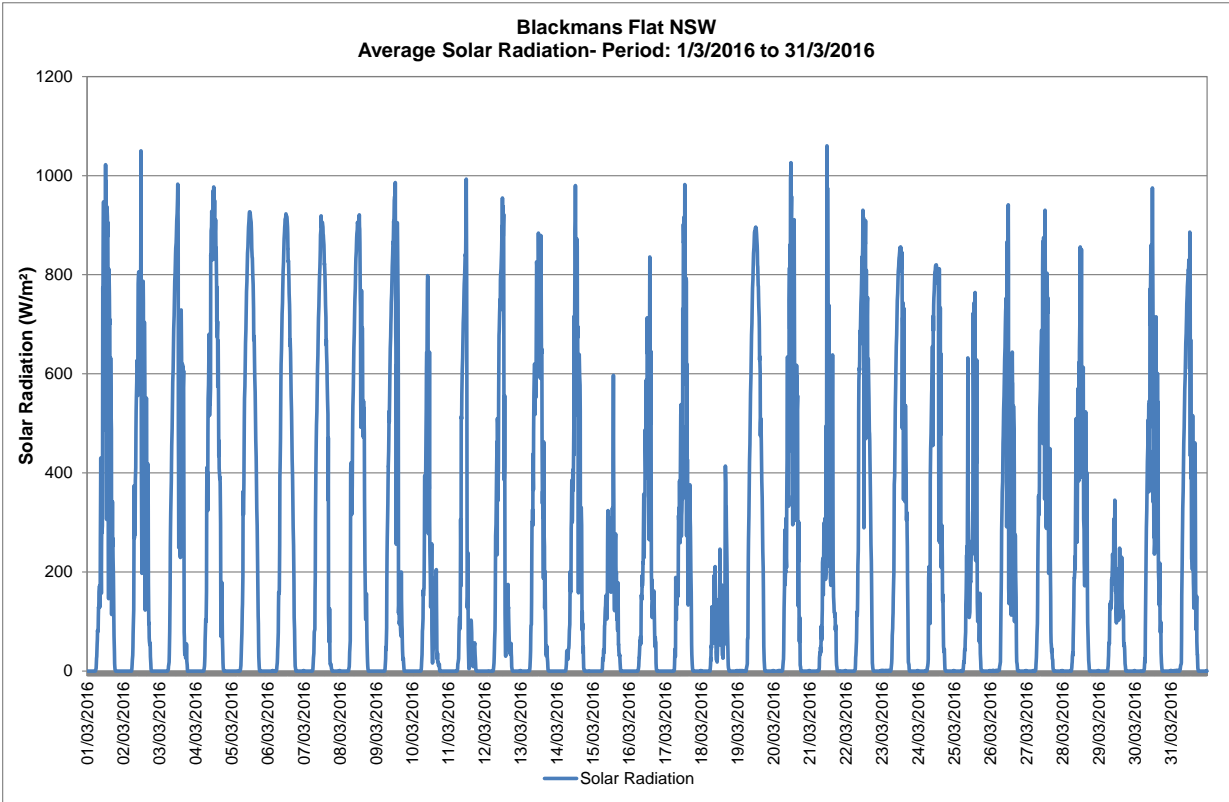
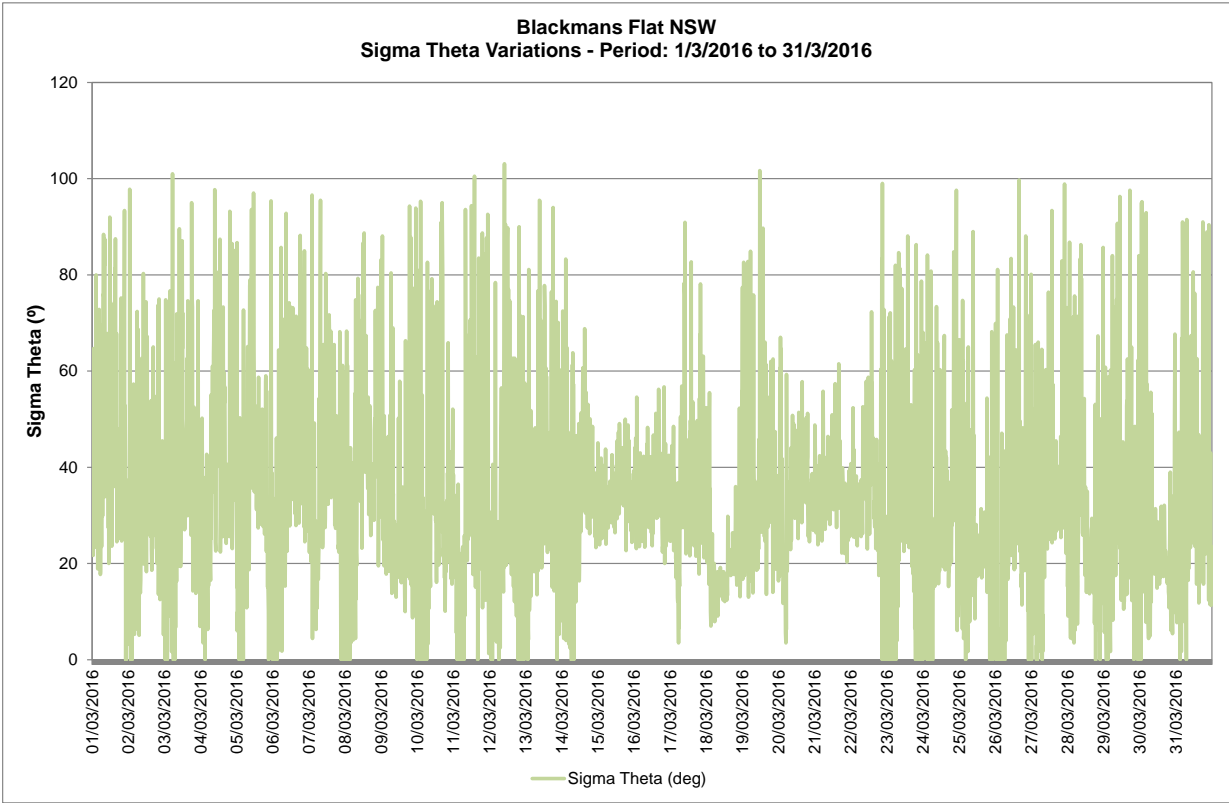


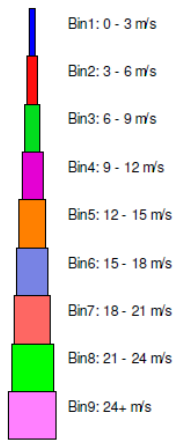
Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/3/2016 to 31/3/2016



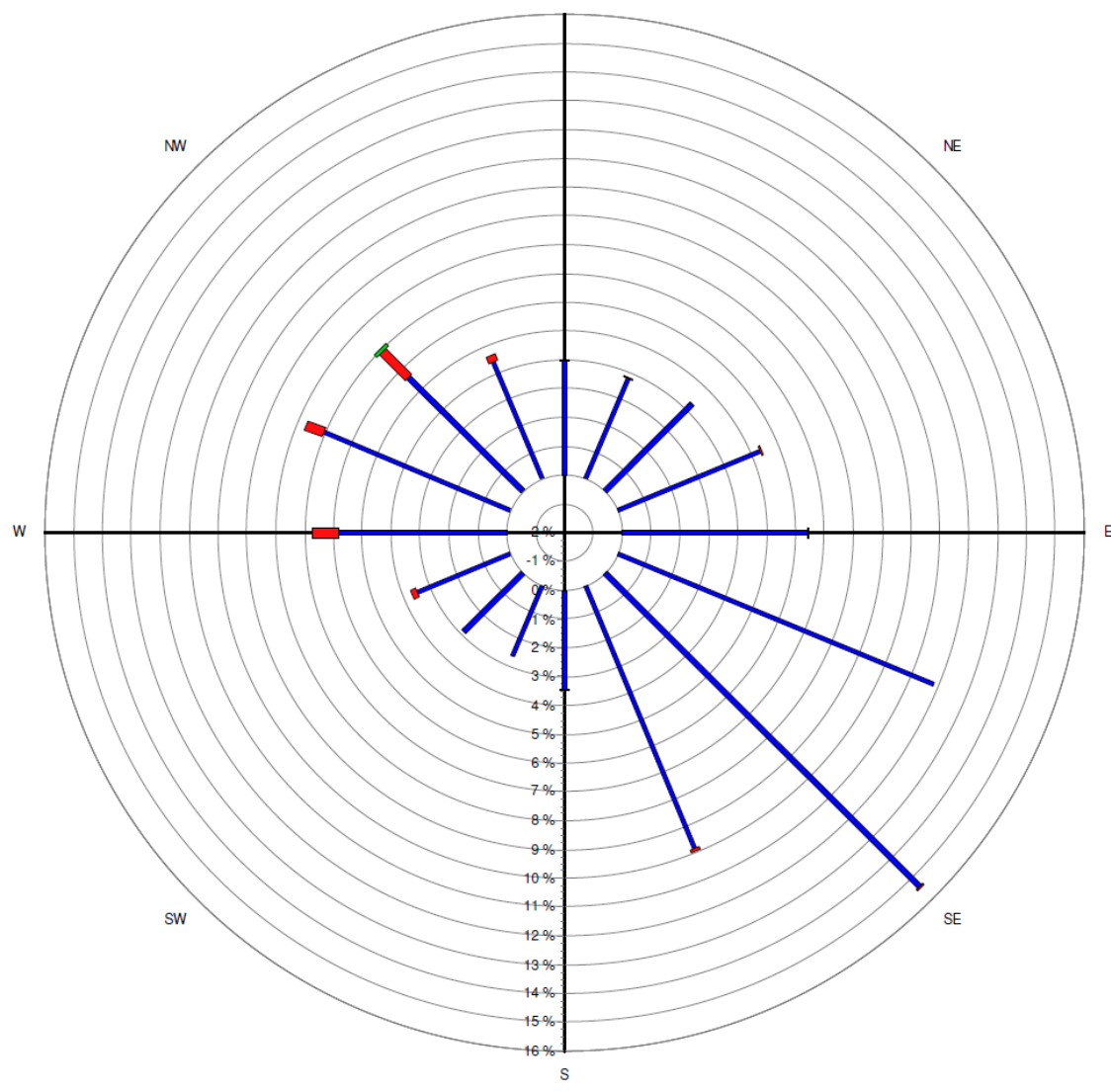
Blackmans Flat NSW
Daily Humidity Variations - Period: 1/3/2016 to 31/3/2016







Metford.SCM
1/03/2016 to 31/03/2016



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