



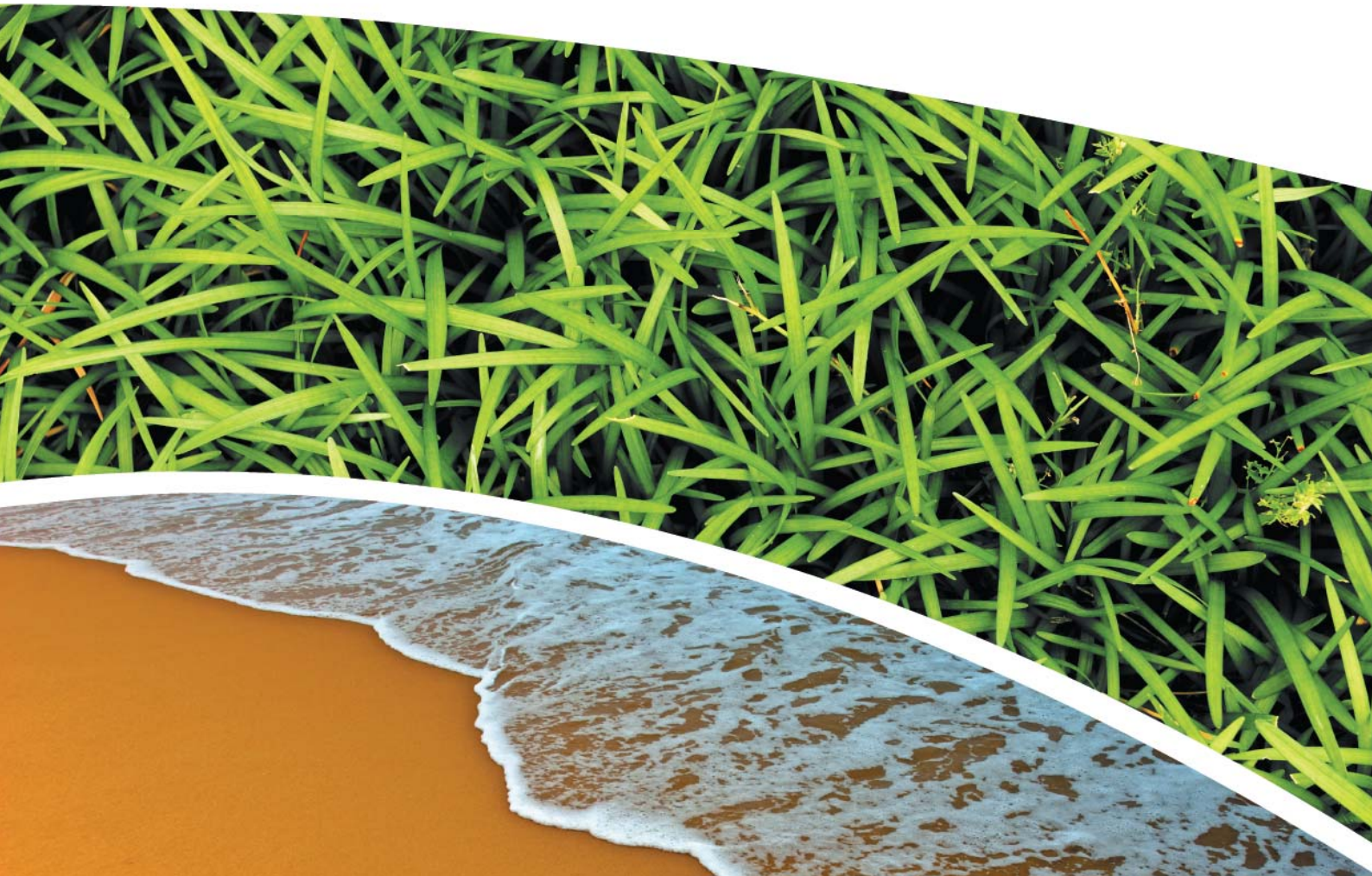
**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1707/0

February 2016



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/0	1	Electronic (email)	Lithgow City Council – Andrew Muir andrew.muir@lithgow.nsw.gov.au	16.03.16
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RCA LE ref 6880-1707/0



16 March 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
FEBRUARY 2016**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of February 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 February 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 – Quarterly Monitoring

ANALYSIS	UNITS	P6	P7
Sample Number	-	02166880011	02166880012
Date Sampled	-	09/02/16	9/02/16
Time Sampled	-	13:25	14:22
Depth to Water from Surface*	m	25.01	6.73
Water Level (AHD)	m	891.94	887.67
Temperature	°C	20.2	26.7
pH	pH	6.51	6.29
Conductivity	µS/cm	1203	733
Turbidity	NTU	28	
Dissolved Oxygen	mg/L	7.1	
TSS	mg/L	30	
Oil & Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	51	231
Total Alkalinity (CaCO ₃)	mg/L	51	231
Sulfate (as SO ₄)	mg/L	662	84
Chloride	mg/L	32	105
Calcium	mg/L	116	43
Magnesium	mg/L	59	50
Sodium	mg/L	54	51
Potassium	mg/L	17	8
Cobalt (dissolved)	mg/L	0.056	
Manganese (dissolved)	mg/L	2.48	
Nickel (dissolved)	mg/L	0.1	
Zinc (dissolved)	mg/L	0.345	
Iron (dissolved)	mg/L	25.4	<0.05

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 February 2016 at three surface water sites, EPA points 2, 3 and 14. Water quality analysis results are shown in **Table 3**.

Table 3 *EPA Surface Water Analysis 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	-	02166880009	02166880004	02166880010
Date Sampled	-	9/02/2016	9/02/2016	9/02/2016
Time Sampled	-	13:10	15:22	10:22
Temperature	°C	19.5	24.0	22.0
pH	pH	6.62	7.55	8.38
Conductivity	µS/cm	1044	1499	1241
Sulfate	NTU	424	814	95
Dissolved Iron	mg/L	0.17	0.35	<0.05
Total Suspended Solids	mg/L	<5	<5	<5
Turbidity	mg/L	2	6	3

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 4**.

PM₁₀ Suspended Particulate Matter results are shown in **Table 5**.

Table 4 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
05-Feb-16	18	02166880031	9204825	09-Feb-16	17:05	Client	24.00
11-Feb-16	16	02166880033	9204827	13-Feb-16	11:23	Client	24.00
17-Feb-16	37	02166880035	9157577	18-Feb-16	13:50	Client	24.00
23-Feb-16	19	02166880037	9157578	25-Feb-16	17:05	Client	24.00
29-Feb-16	14	02166880039	9157582	03-Mar-16	13:25	Client	24.00

Table 5 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
05-Feb-16	10	02166880032	9204826	09-Feb-16	17:10	Client	24.00
11-Feb-16	12	02166880034	9204828	13-Feb-16	11:27	Client	24.00
17-Feb-16	19	02166880036	9204829	18-Feb-16	13:56	Client	24.00
23-Feb-16	10	02166880038	9257579	25-Feb-16	17:10	Client	24.00
29-Feb-16	8	02166880040	9157583	03-Mar-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 March 2015 to February 2016) for the TSP unit is $18.7\mu\text{g}/\text{m}^3$, 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 $9.1\mu\text{g}/\text{m}^3$, 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 February 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 **Table 6**.

Table 6 *Depositional Dust Monitoring - Deposited Matter – February 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)
02166880021	D1	11/01/2016	9/02/2016	29	I	0.5	0.2	0.3
02166880022	D2	11/01/2016	9/02/2016	29	N	0.4	0.2	0.2
02166880023	D3	11/01/2016	9/02/2016	29	I	0.7	0.4	0.3
02166880024	D4	11/01/2016	9/02/2016	29	I	0.5	0.1	0.4
02166880025	D5	11/01/2016	9/02/2016	29	I	0.6	0.3	0.3
02166880026	D6	11/01/2016	9/02/2016	29	BI	1.5	0.8	0.7

Glossary of Terms Used in Notes:

I Insects (eg, Ants, Spiders)

BI Bird droppings and Insects

N No foreign material

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 1.5g/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 February 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



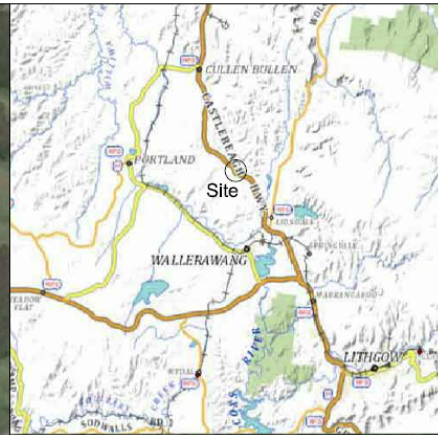
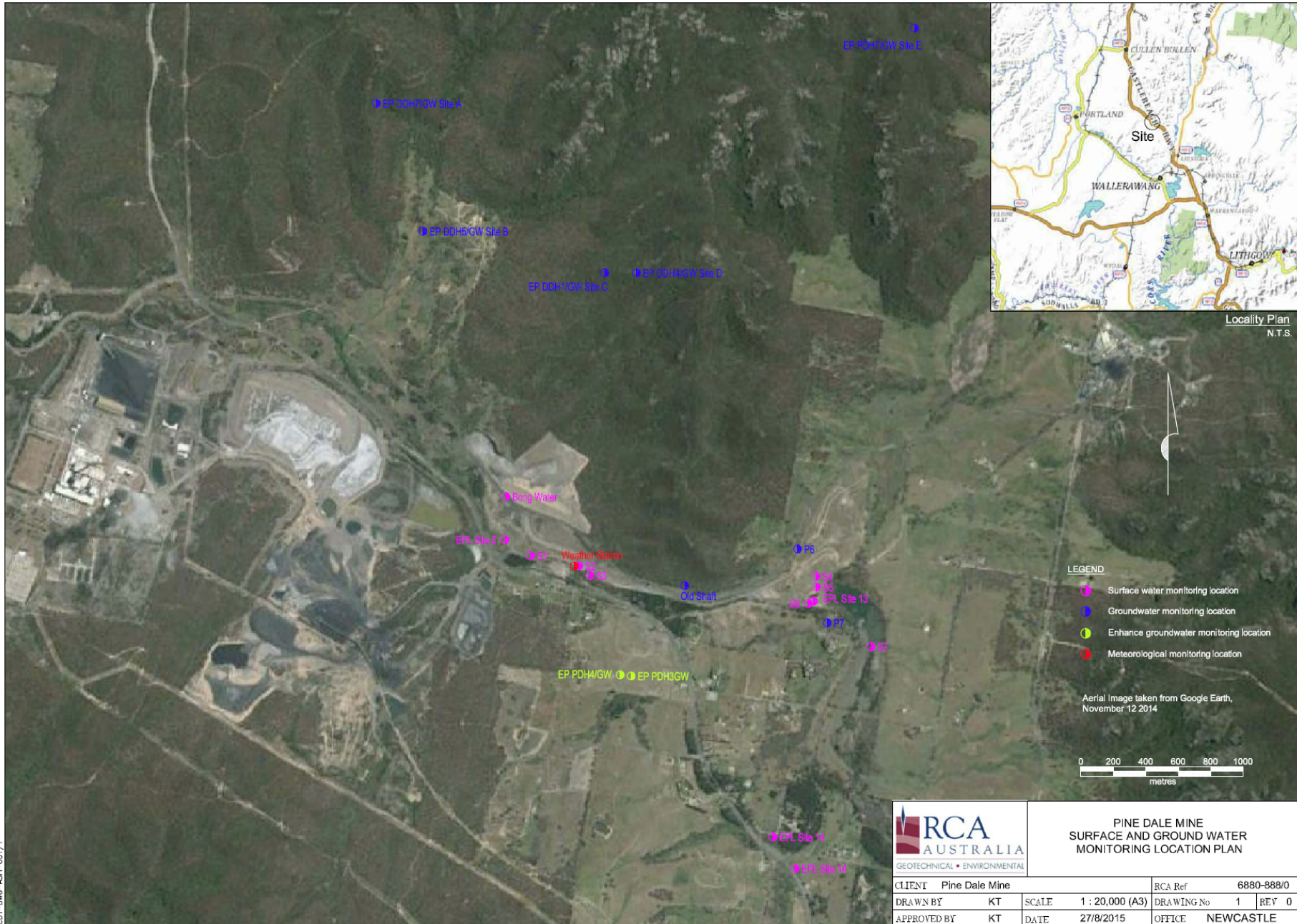
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



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



Locality Plan
N.T.S.

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

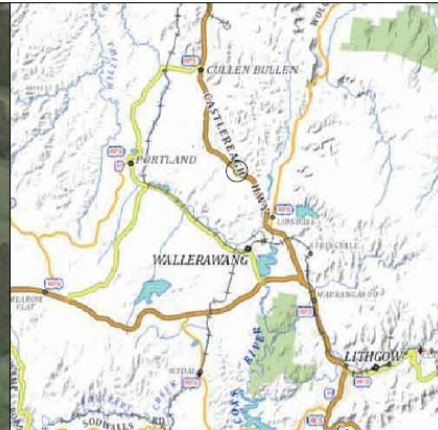
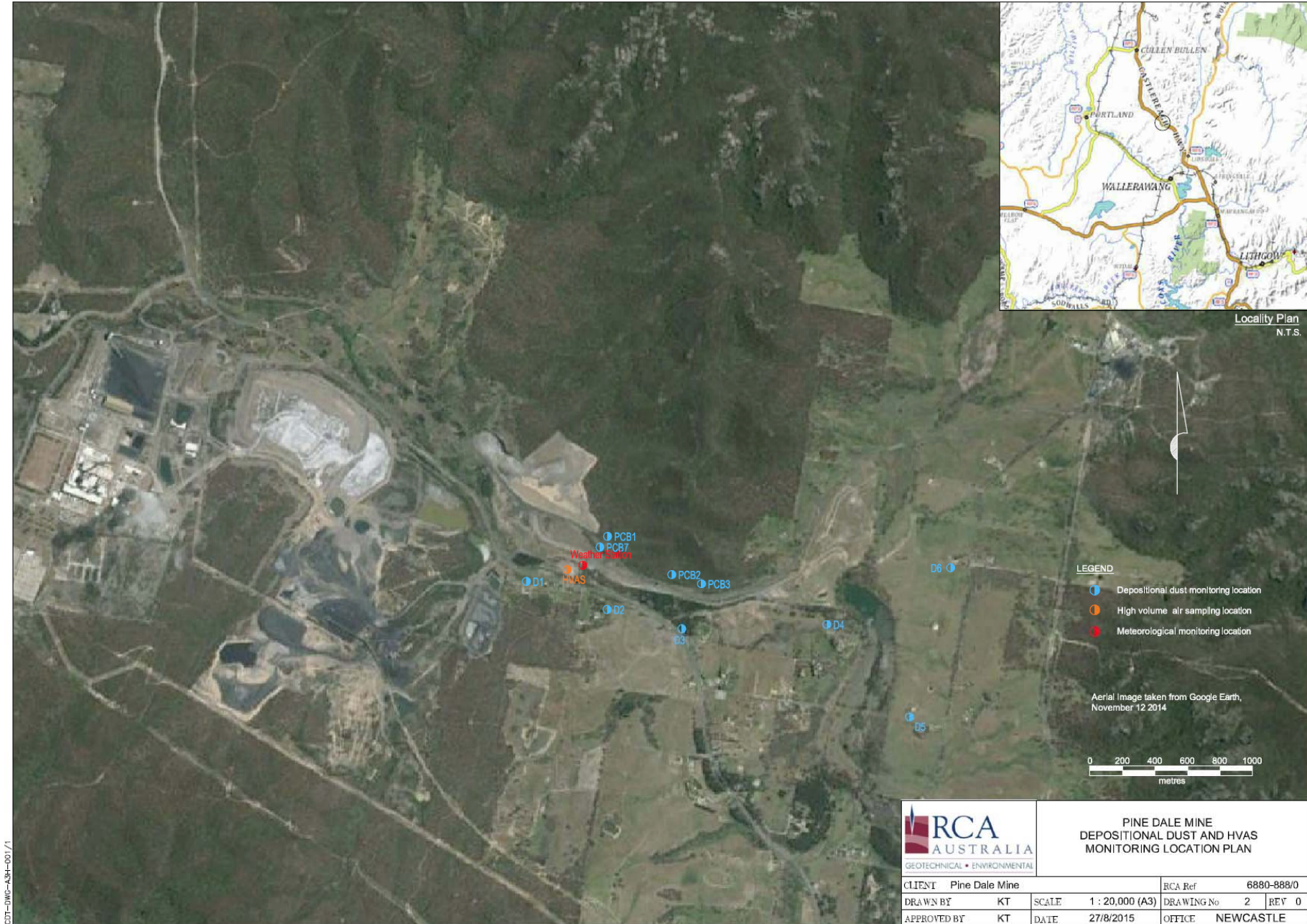
Aerial Image taken from Google Earth,
November 12 2014



**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)
APPROVED BY	KT	DATE	27/8/2015
		DRAWING No	1
		OFFICE	NEWCASTLE
		REV	0

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Locality Plan
N.T.S.

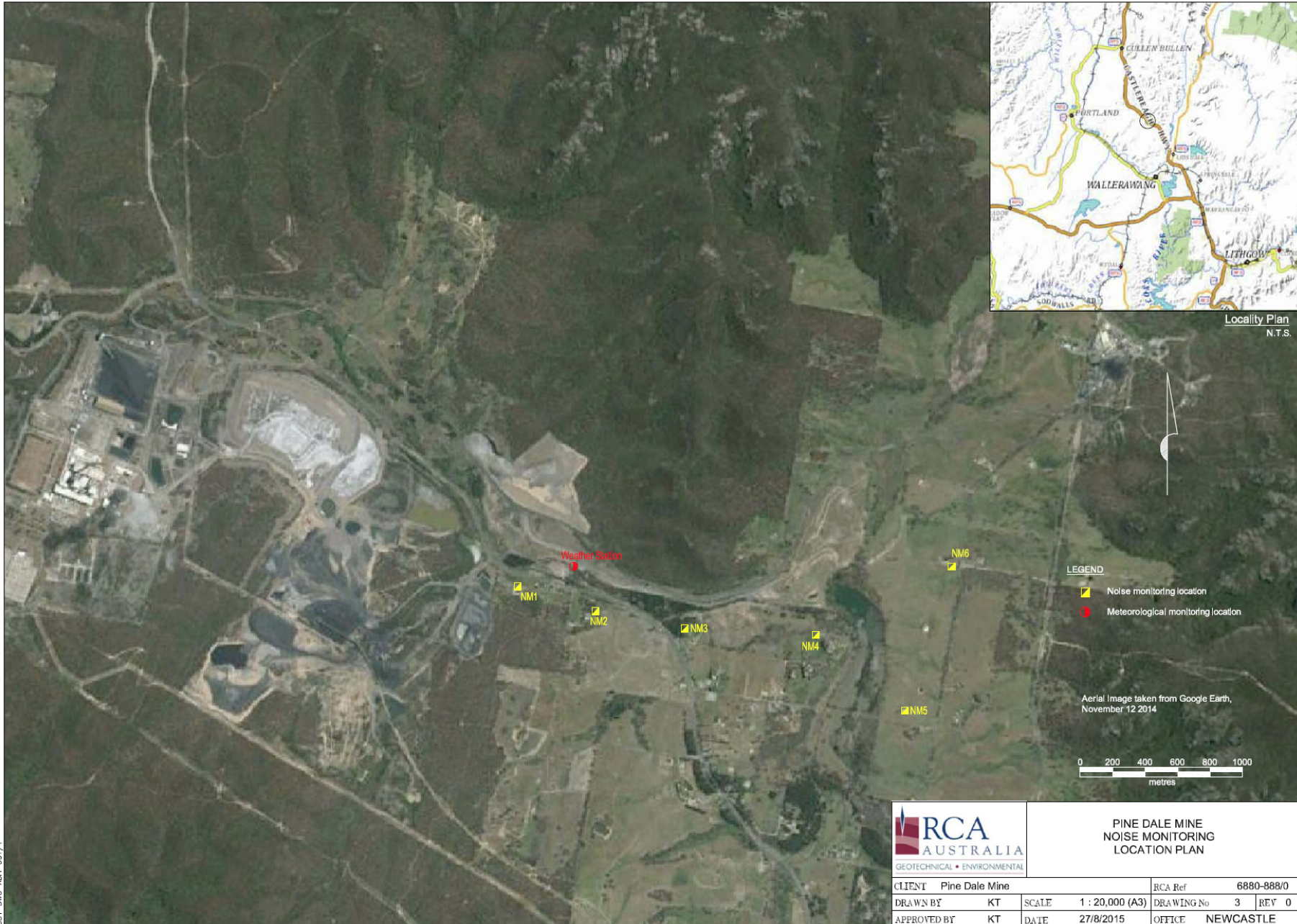
- LEGEND**
- Depositional dust monitoring location
 - High volume air sampling location
 - Meteorological monitoring location

Aerial Image taken from Google Earth,
November 12 2014



 GEOTECHNICAL • ENVIRONMENTAL		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)	DRAWING No	2
APPROVED BY	KT	DATE	27/8/2015	OFFICE	NEWCASTLE
				REV	0

COT-DWC-ASH-001/1



**PINE DALE MINE
NOISE MONITORING
LOCATION PLAN**

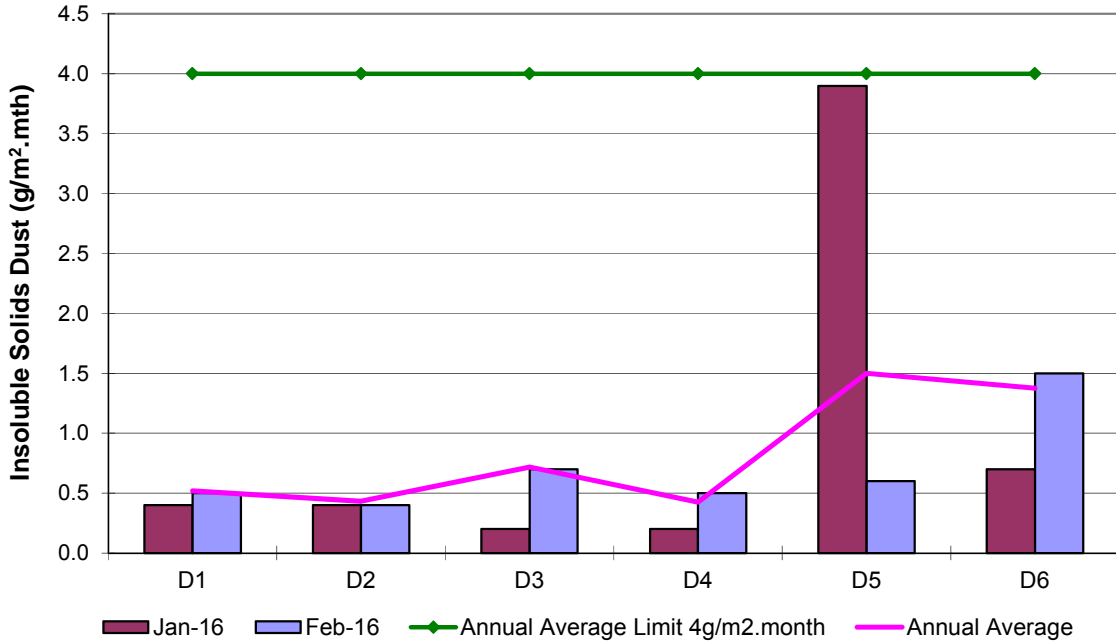
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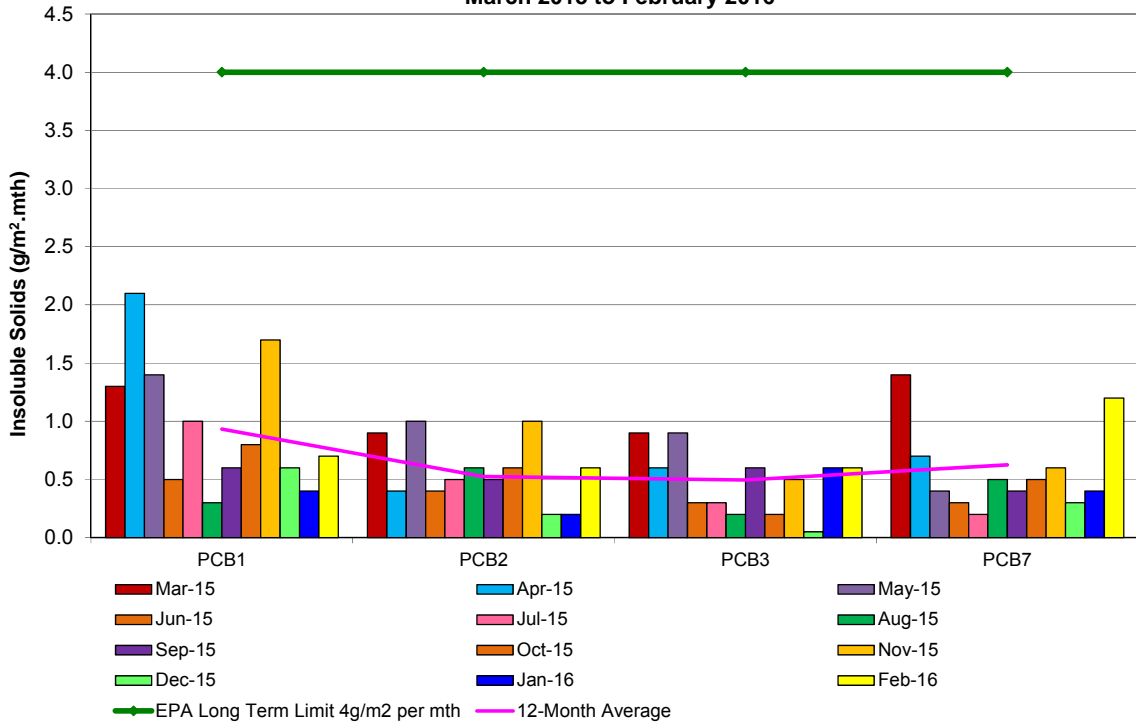
Appendix 2

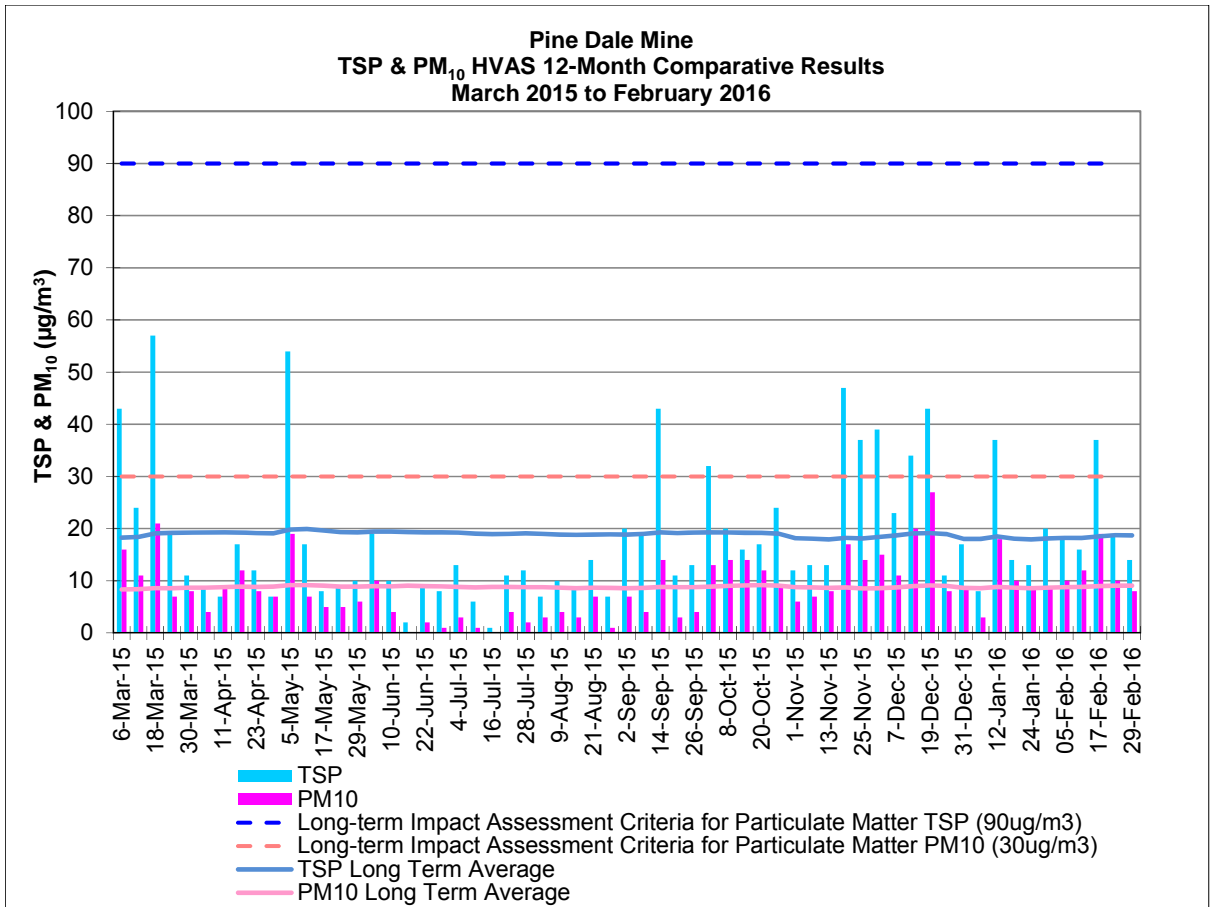
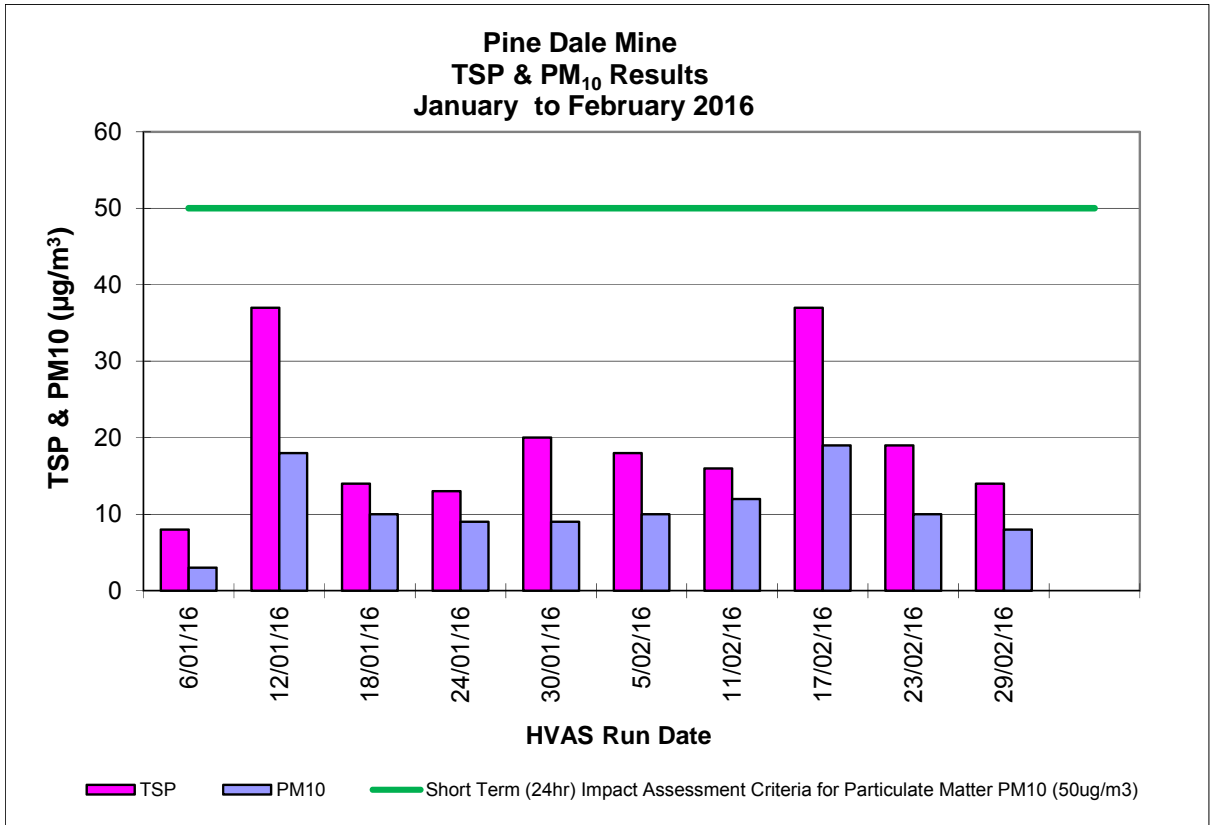
Depositional Dust and HVAS Graphs

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



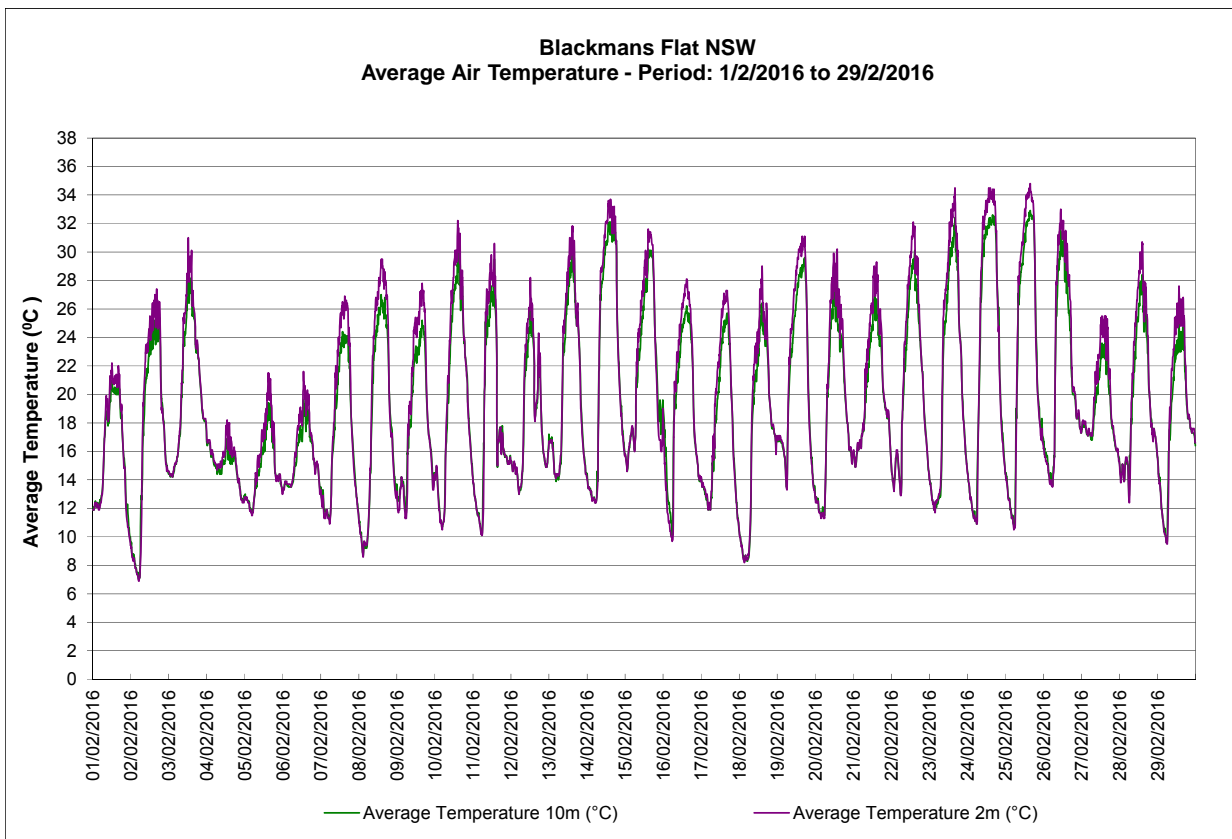
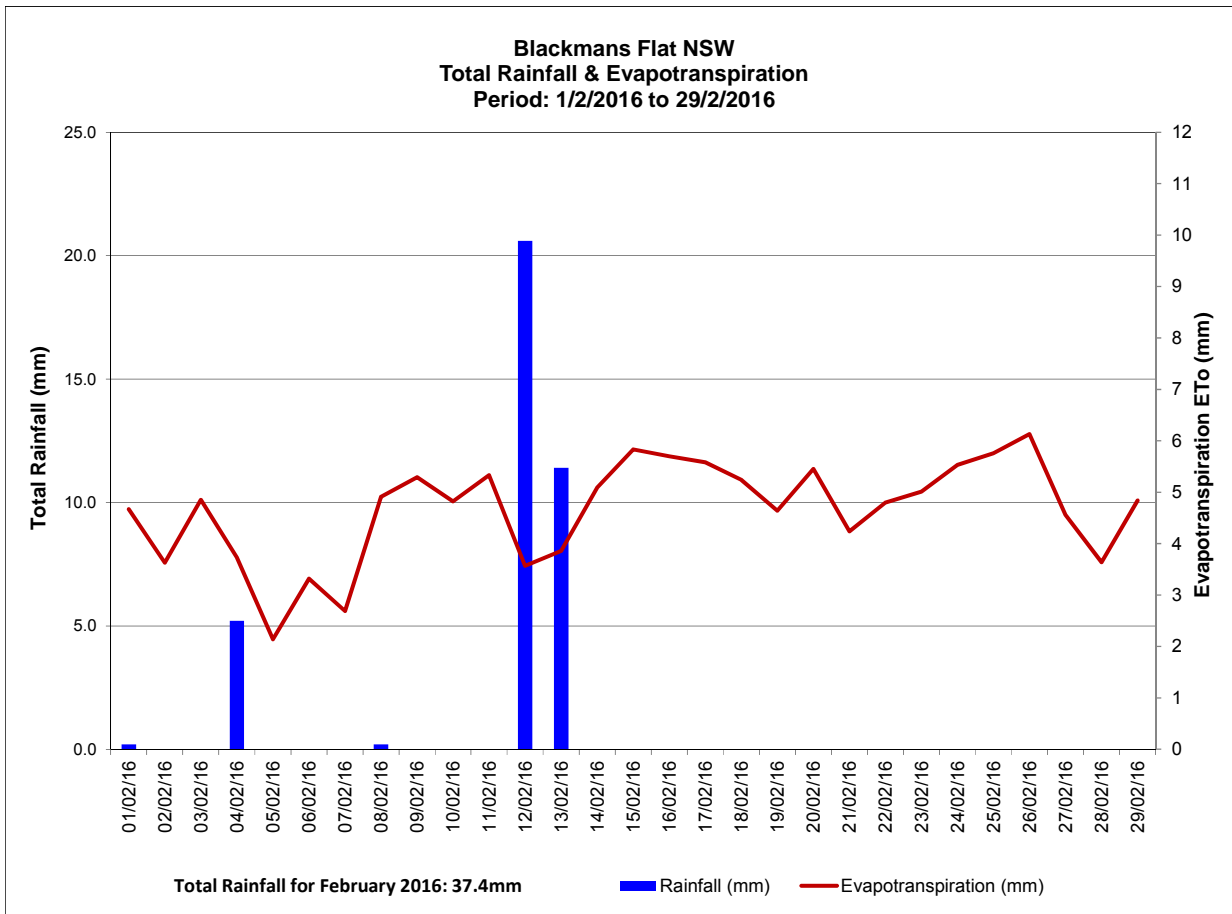
**Pine Dale Mine - PCB Project
Deposited Matter - Insoluble Solids 12 Months Comparative Results
March 2015 to February 2016**



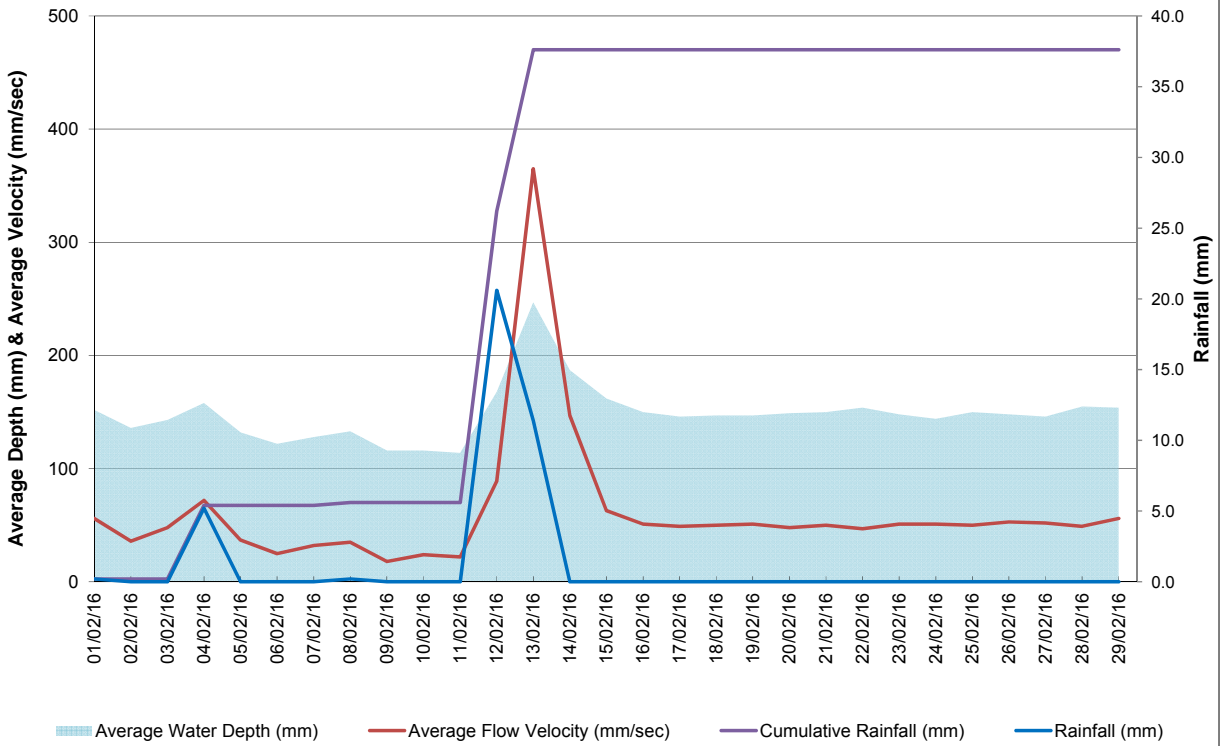


Appendix 3

Meteorological Data

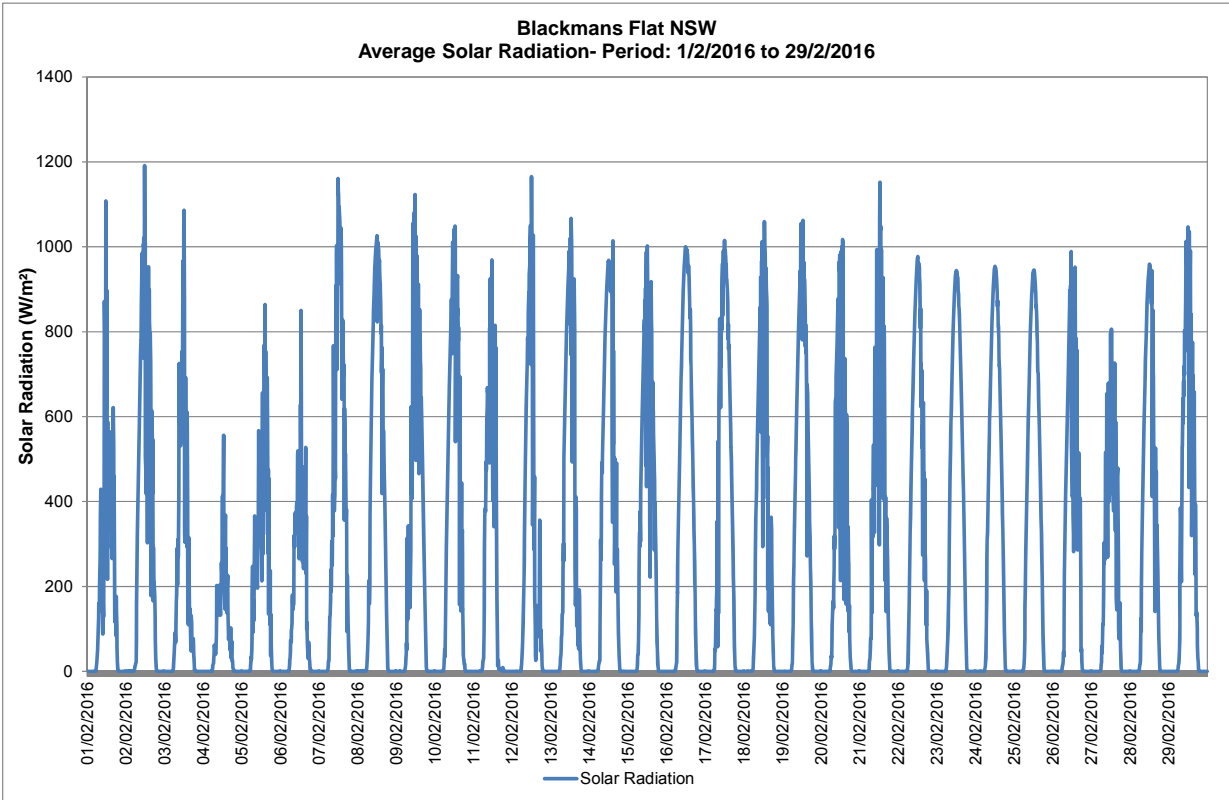
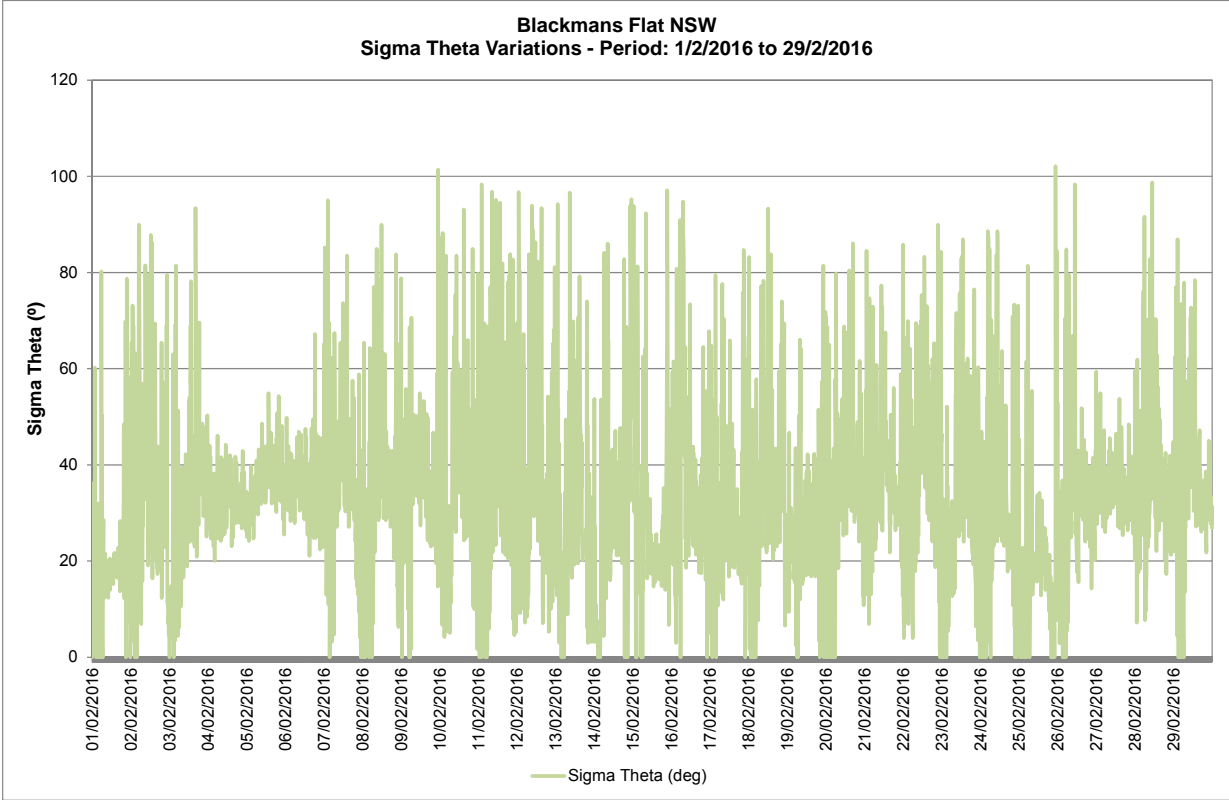


Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/2/2016 to 29/2/2016



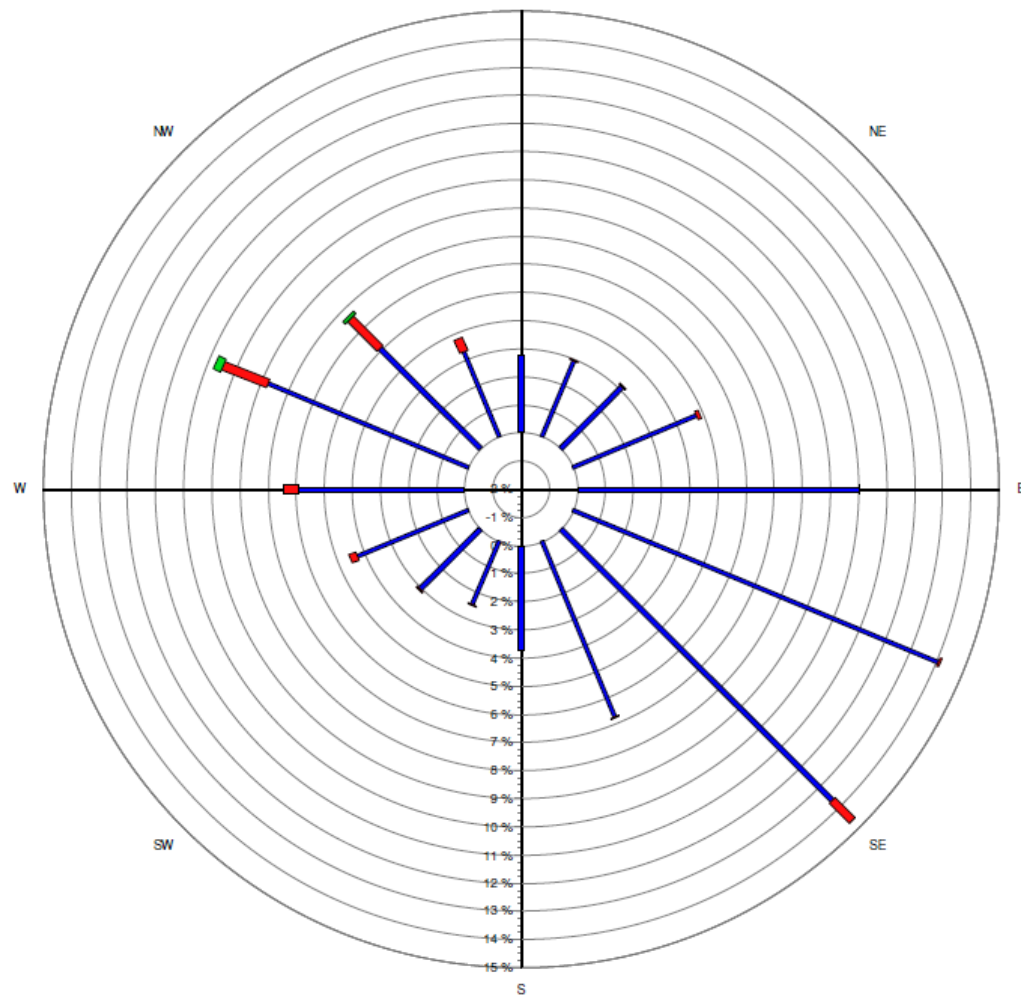
Blackmans Flat NSW
Daily Humidity Variations - Period: 1/2/2016 to 29/2/2016





Metford.SCM

1/02/2016 to 29/02/2016
N



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