

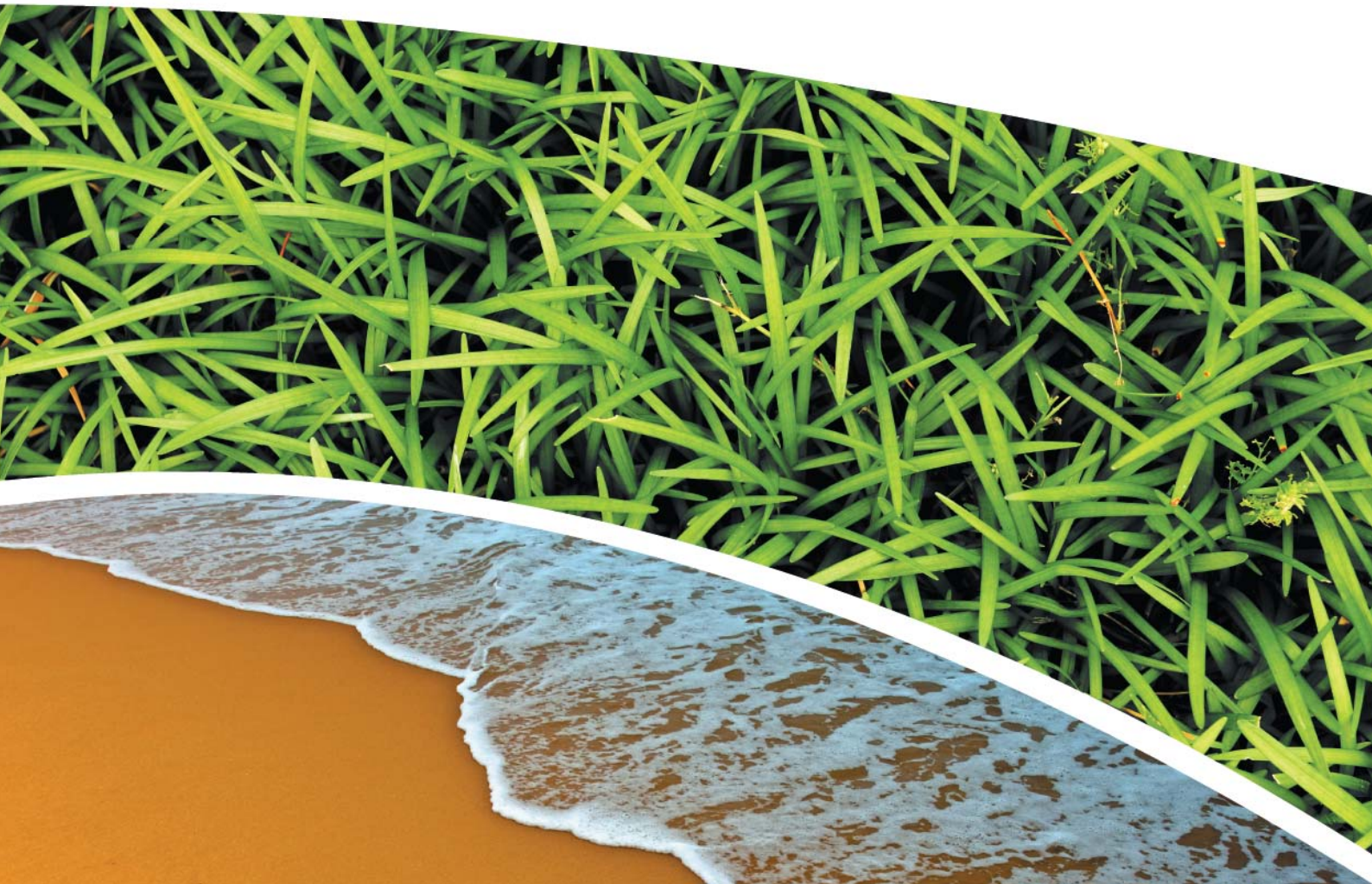
**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-889/0

August 2015



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RCA LE ref 6880-889/0



16 September 2015

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
AUGUST 2015**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of August 2015.

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 August 2015. 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). The new sampling regime commenced 1 August 2013. Water quality analysis results are shown in **Table 2**.

Table 2 Groundwater Analysis Results

ANALYSIS	UNITS	P6	P7
Sample Number	-	08156880011	08156880012
Date Sampled	-	05/08/15	05/08/15
Time Sampled	-	7:37	8:38
Depth to Water from Surface*	m	25.31	6.56
Water Level (AHD)	m	891.64	887.84
Temperature	°C	14.0	12.5
pH	pH	6.65	6.69
Conductivity	µS/cm	1231	857
Turbidity	NTU	17	
Dissolved Oxygen	mg/L	4.4	
TSS	mg/L	17	
Oil & Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	63	235
Total Alkalinity (CaCO ₃)	mg/L	63	235
Sulfate (as SO ₄)	mg/L	656	76
Chloride	mg/L	21	54
Calcium	mg/L	135	47
Magnesium	mg/L	59	48
Sodium	mg/L	51	45
Potassium	mg/L	18	7
Cobalt (dissolved)	mg/L	0.061	
Manganese (dissolved)	mg/L	2.93	
Nickel (dissolved)	mg/L	0.099	
Zinc (dissolved)	mg/L	0.277	
Iron (dissolved)	mg/L	25	3.98

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 August 2015 at three surface water sites, EPA points 2, 3 and 14. Water quality analysis results are shown in **Error! Not a valid bookmark self-reference..**

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	-	08156880009	08156880004	08156880010
Date Sampled	-	5/08/2015	5/08/2015	5/08/2015
Time Sampled	-	17:01	17:20	15:02
Temperature	°C	5.5	5.5	14.0
pH	pH	7.44	6.72	8.50
Conductivity	µS/cm	1004	1399	1025
Sulfate	NTU	467	694	71
Dissolved Iron	mg/L	0.07	1.22	<0.05
TSS	mg/L	<5	9	6
Turbidity	mg/L	<1	3	3

4 AIR QUALITY MONITORING RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

HVAS at this facility conform to AS/NZS 3580.9.3:2003, 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
03-Aug-15	7	08156880031	8901787	05-Aug-15	6:51	Client	24.00
09-Aug-15	10	08156880033	9098628	12-Aug-15	8:10	Client	24.00
15-Aug-15	9	08156880035	9098630	19-Aug-15	7:10	Client	24.00
21-Aug-15	14	08156880037	9098632	23-Aug-15	12:45	Client	24.00
27-Aug-15	7	08156880039	9098634	28-Aug-15	8:25	Client	24.00

Table 5 Suspended Particulate Matter PM_{10} ($\mu\text{g}/\text{m}^3$ @ 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
03-Aug-15	3	08156880032	9098627	05-Aug-15	6:55	Client	24.00
09-Aug-15	4	08156880034	9098629	12-Aug-15	8:14	Client	24.00
15-Aug-15	3	08156880036	9098631	19-Aug-15	7:13	Client	24.00
21-Aug-15	7	08156880038	9098633	23-Aug-15	12:50	Client	24.00
27-Aug-15	1	08156880040	9098635	28-Aug-15	8:30	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 September 2014 to August 2015) for the TSP unit is $18.9\mu\text{g}/\text{m}^3$, which is well below the allowable limit of $90\mu\text{g}/\text{m}^3$.

4.1.2 PM_{10} Summary

The EPA 24h Maximum PM_{10} allowable limit is $50\mu\text{g}/\text{m}^3$. The EPA Annual Mean PM_{10} allowable limit is $30\mu\text{g}/\text{m}^3$. All PM_{10} HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the PM_{10} unit is $8.6\mu\text{g}/\text{m}^3$, 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 August 2015.

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 August 2015*

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)
08156880021	D1	7/07/2015	5/08/2015	29	I	0.4	0.2	0.2
08156880022	D2	7/07/2015	5/08/2015	29	I	0.3	0.1	0.2
08156880023	D3	7/07/2015	5/08/2015	29	I	0.6	0.4	0.2
08156880024	D4	7/07/2015	5/08/2015	29	I	0.2	0.1	0.1
08156880025	D5	7/07/2015	5/08/2015	29	A	2.0	0.3	1.7
08156880026	D6	7/07/2015	5/08/2015	29	I	0.9	0.6	0.3

4.2.1 Glossary of Terms Used in Notes

I Insects (eg. ants, spiders)

A Animals (eg. frogs, lizards, snakes)

4.2.2 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 undertaken this month. Routine quarterly noise monitoring is next scheduled for October 2015.

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 May 2014.

8 SUMMARY

During the month of August 2015 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



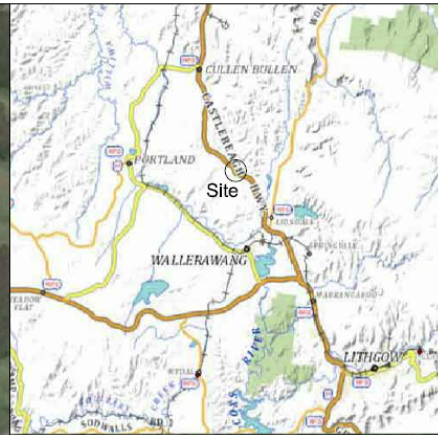
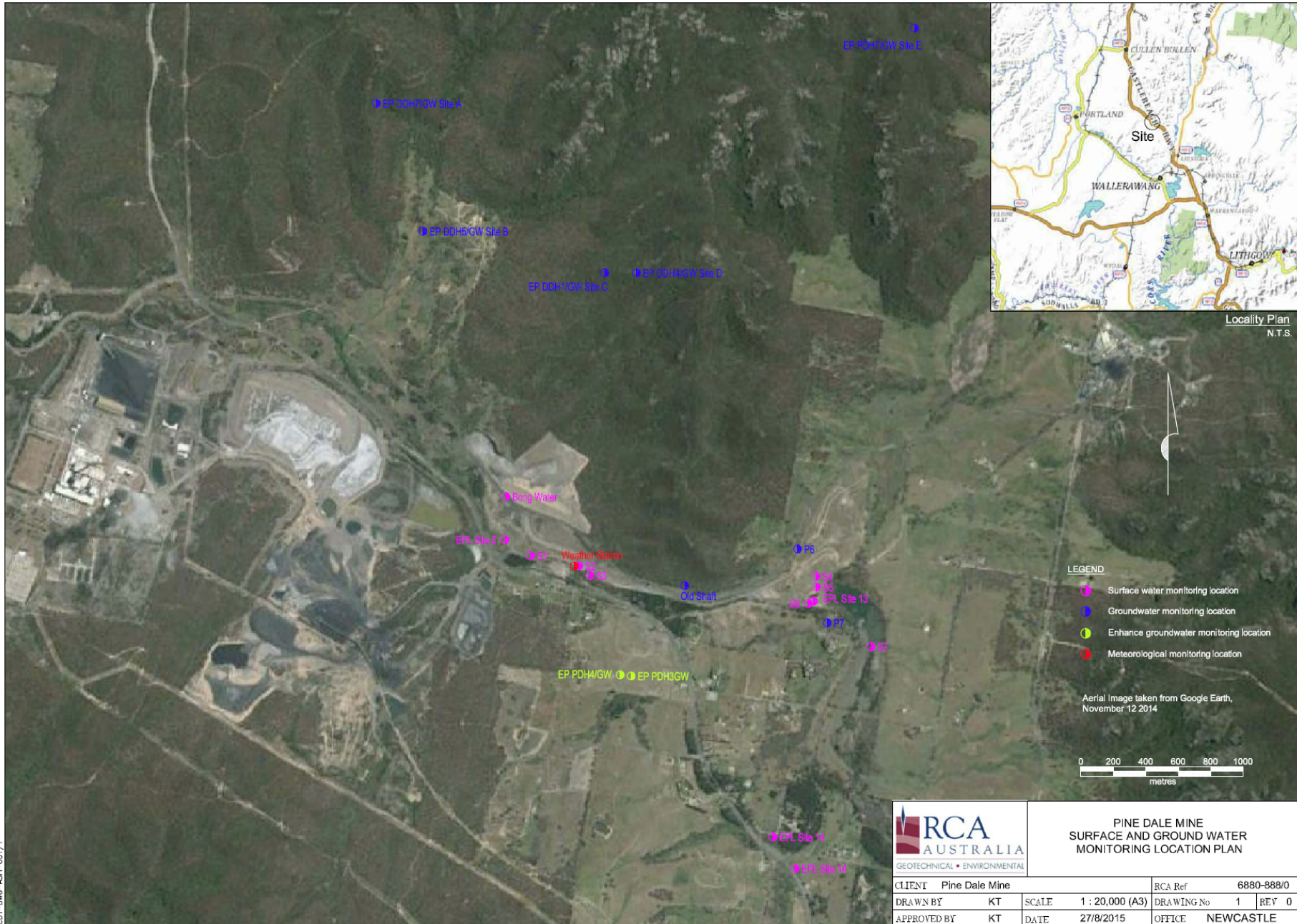
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



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

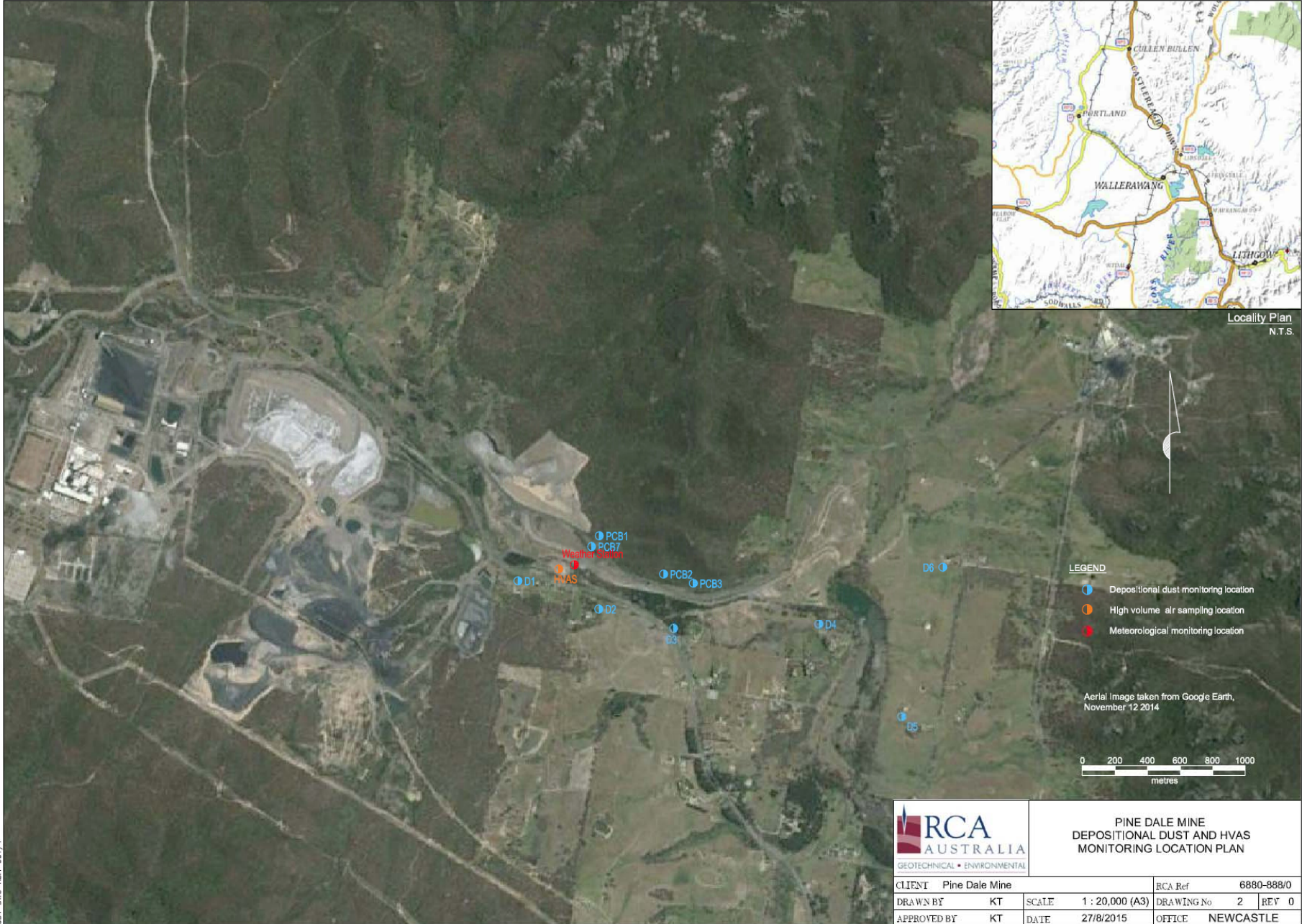
Aerial Image taken from Google Earth,
November 12 2014



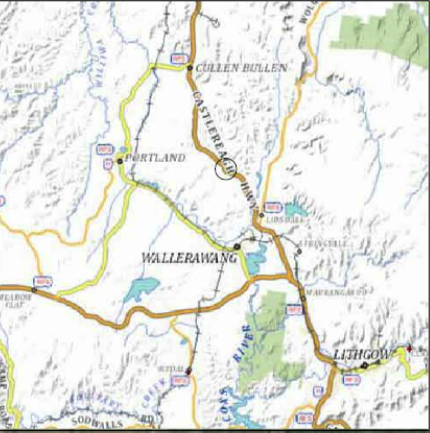
**PINE DALE MINE
SURFACE AND GROUND WATER
MONITORING LOCATION PLAN**

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

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COT-DWC-ASH-001/1



Locality Plan
N.T.S.

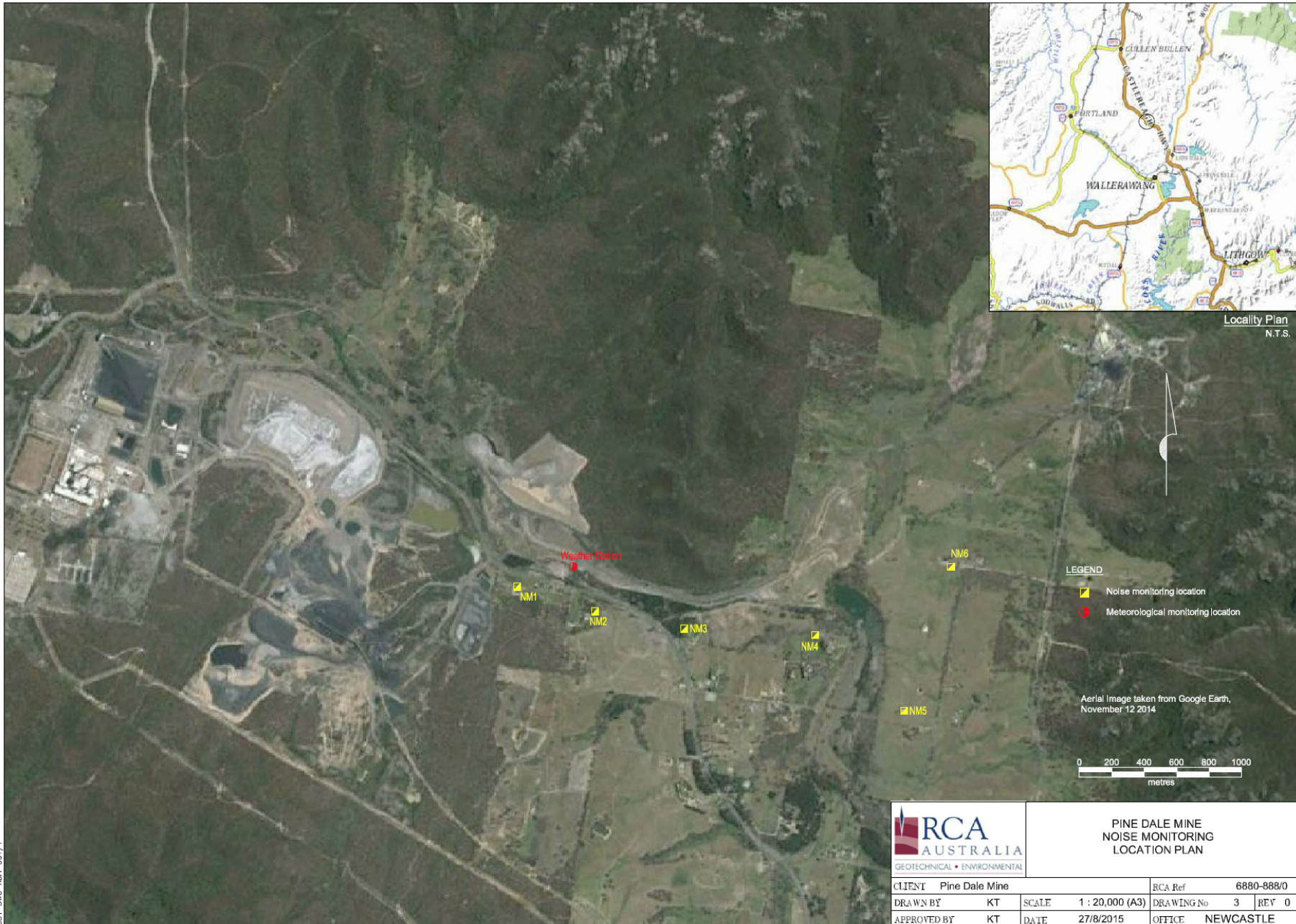
- LEGEND**
- Depositional dust monitoring location
 - High volume air sampling location
 - Meteorological monitoring location

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
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		OFFICE	NEWCASTLE

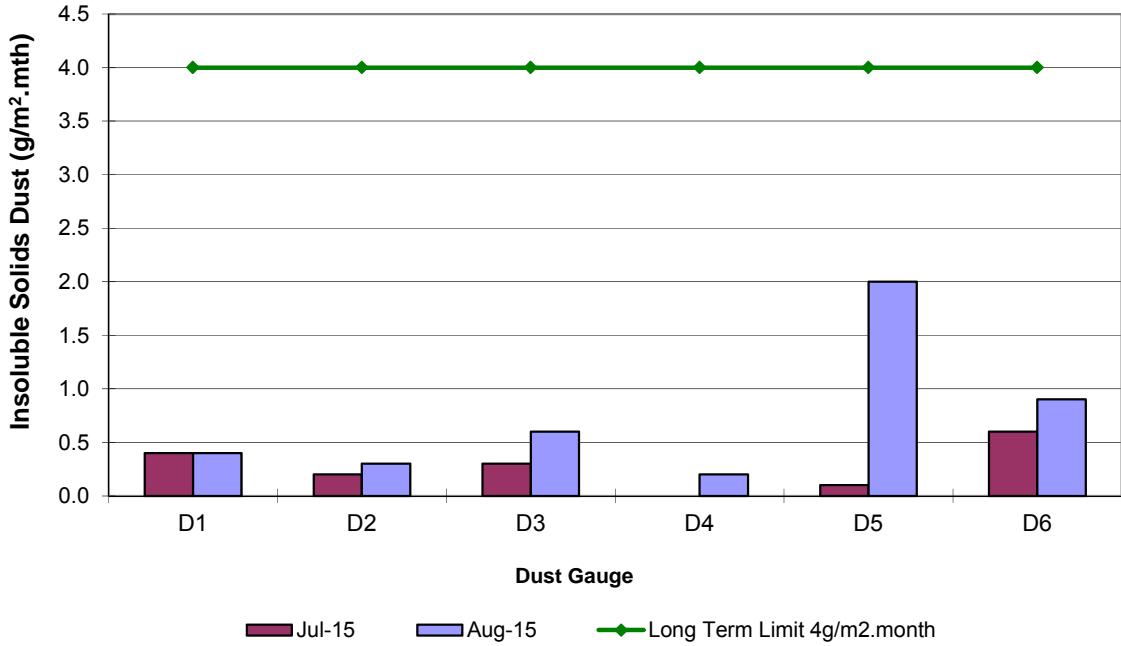


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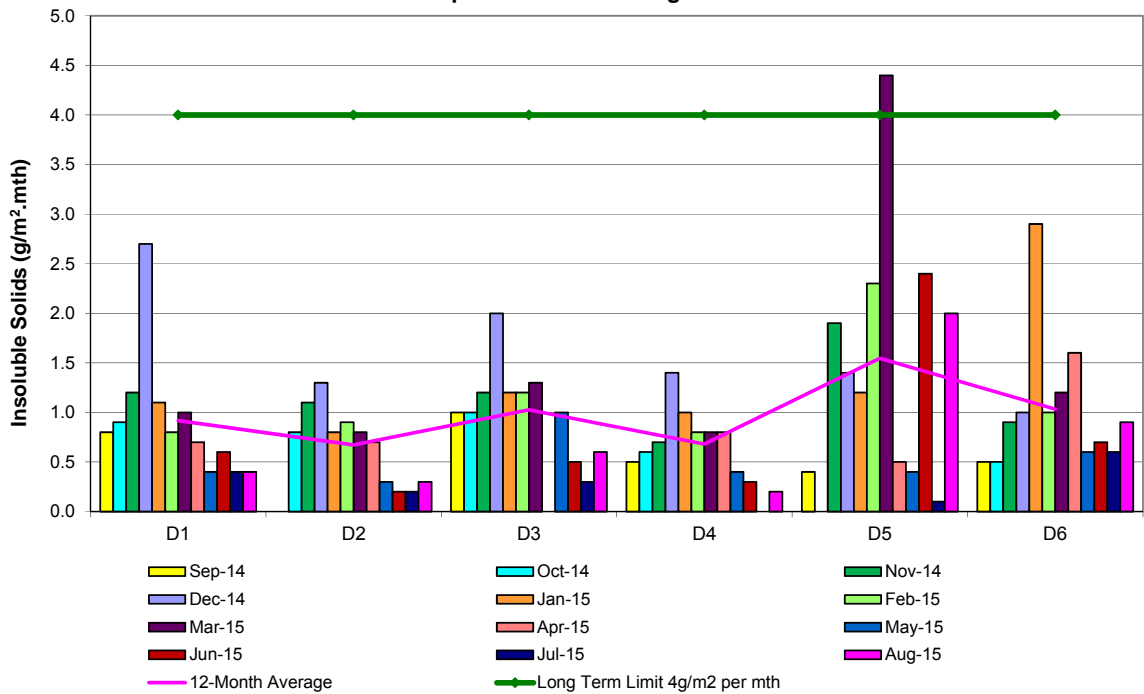
Appendix 2

Depositional Dust and HVAS Graphs

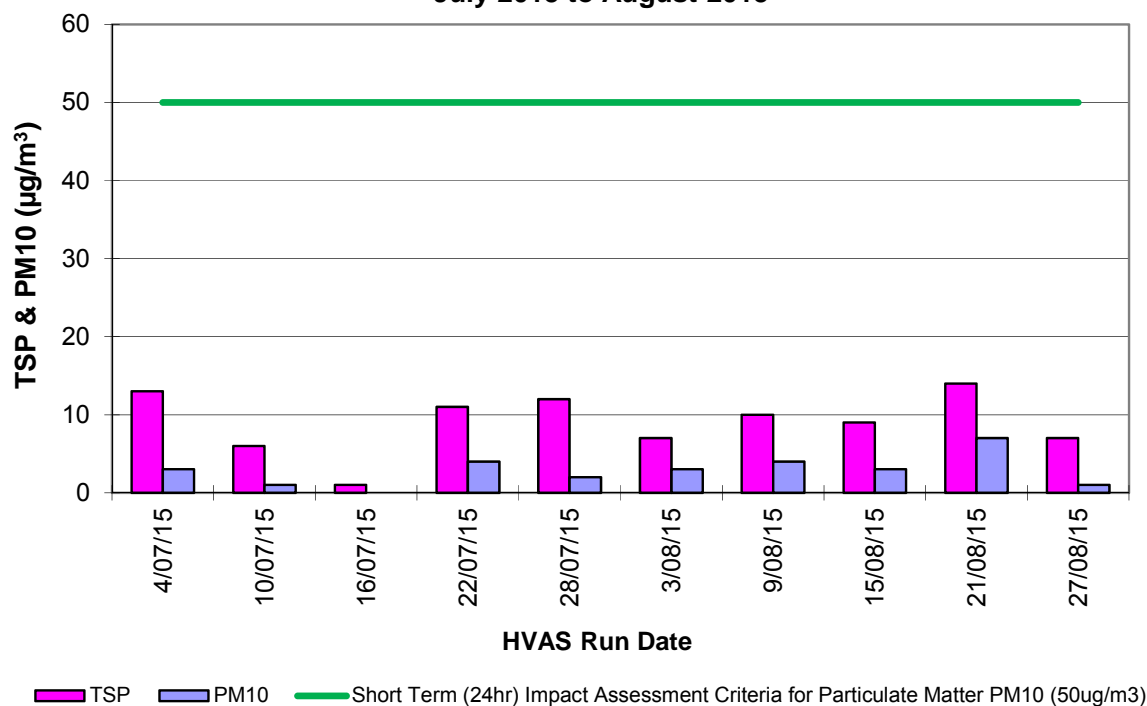
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
July 2015 to August 2015**



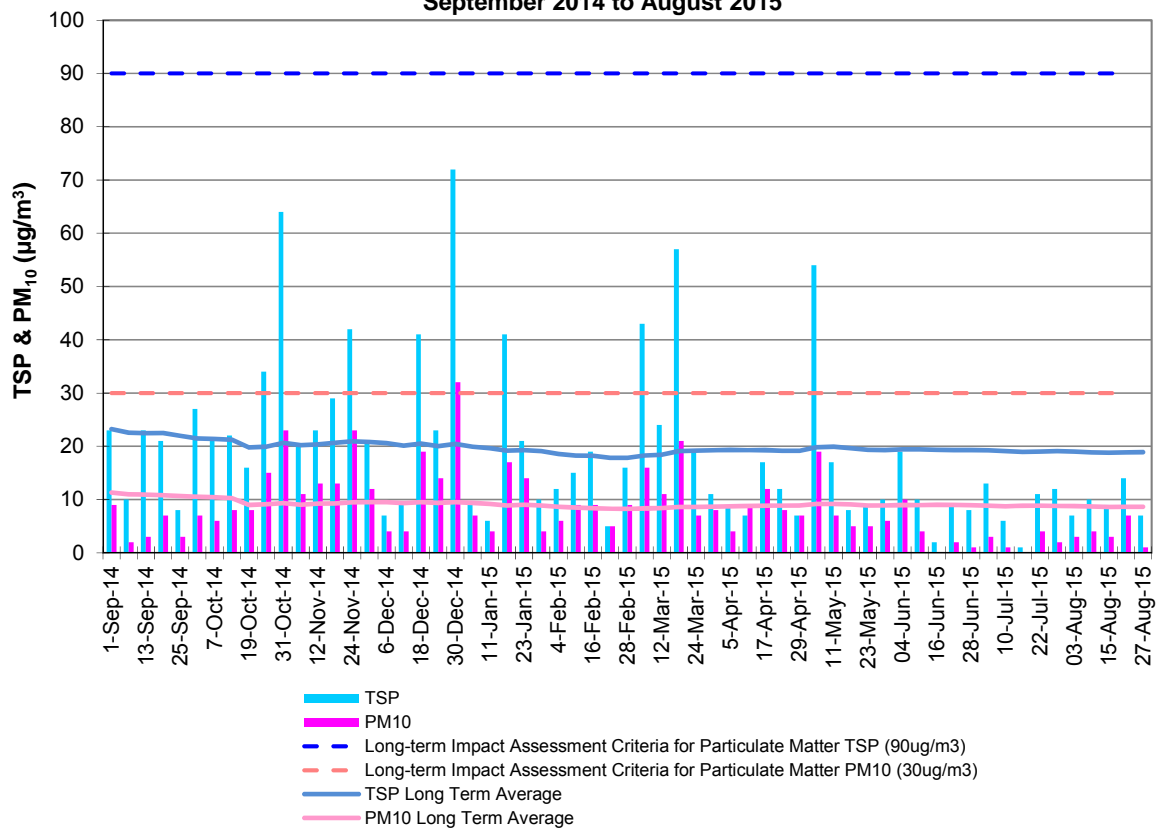
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
September 2014 to August 2015**



Pine Dale Mine TSP & PM₁₀ Results July 2015 to August 2015

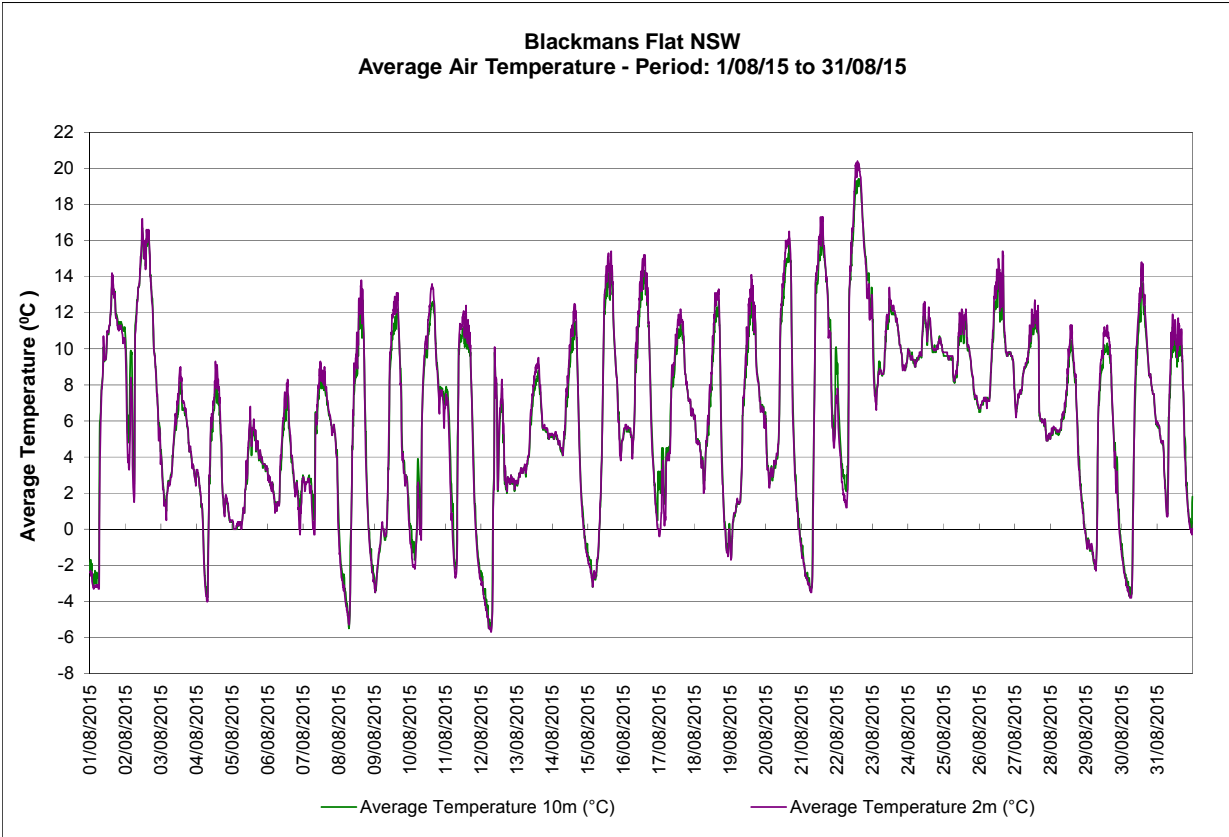
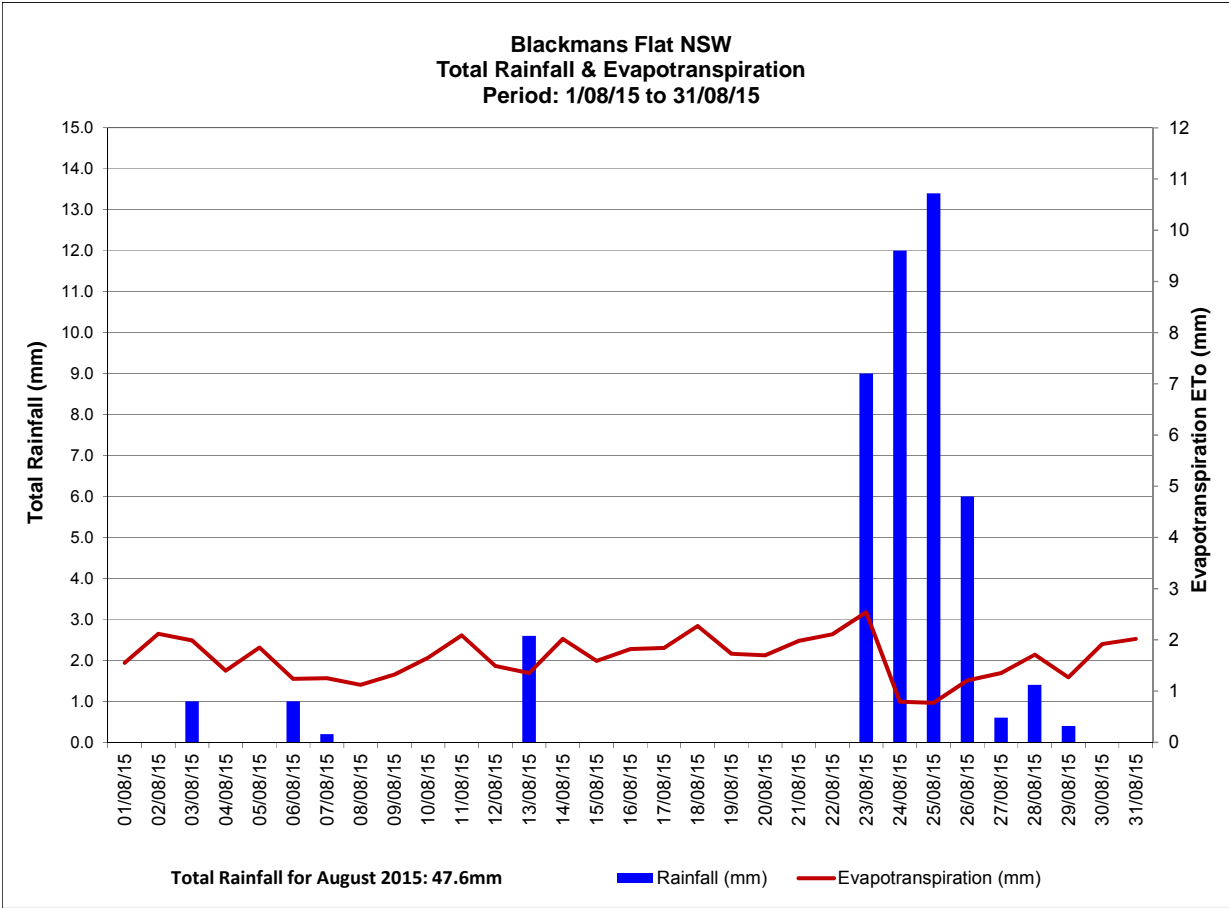


Pine Dale Mine TSP & PM₁₀ HVAS 12-Month Comparative Results September 2014 to August 2015

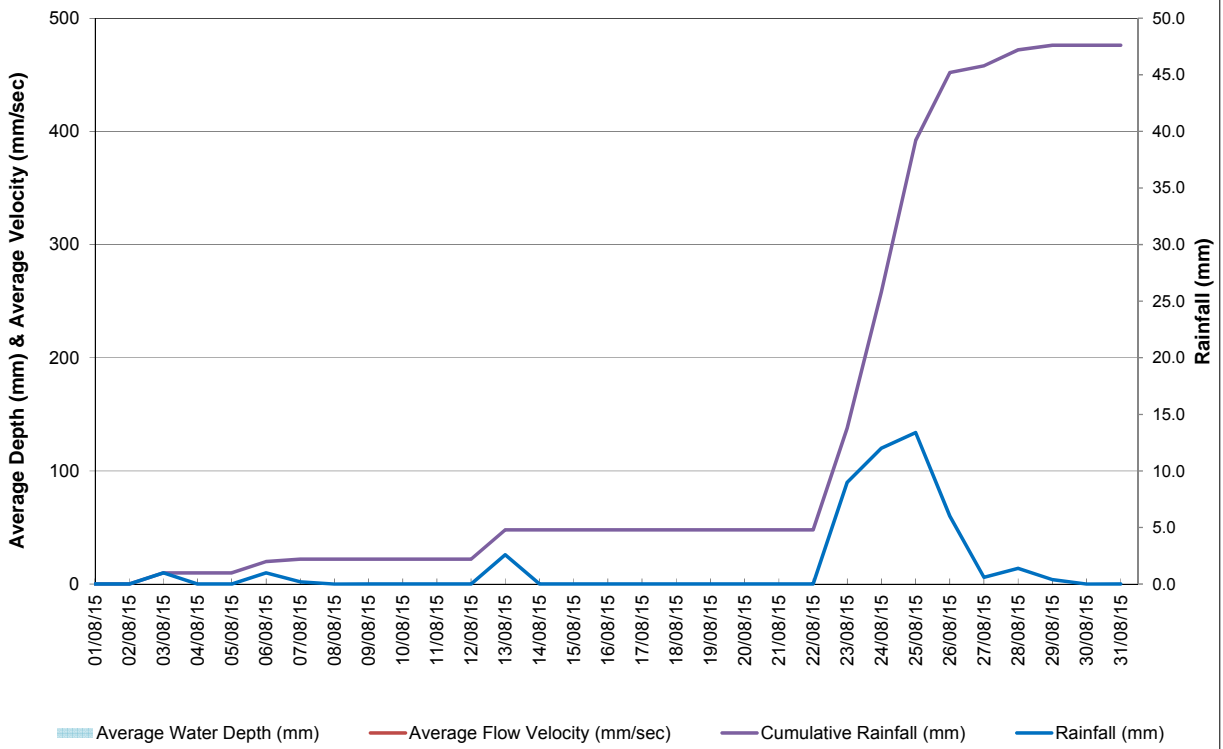


Appendix 3

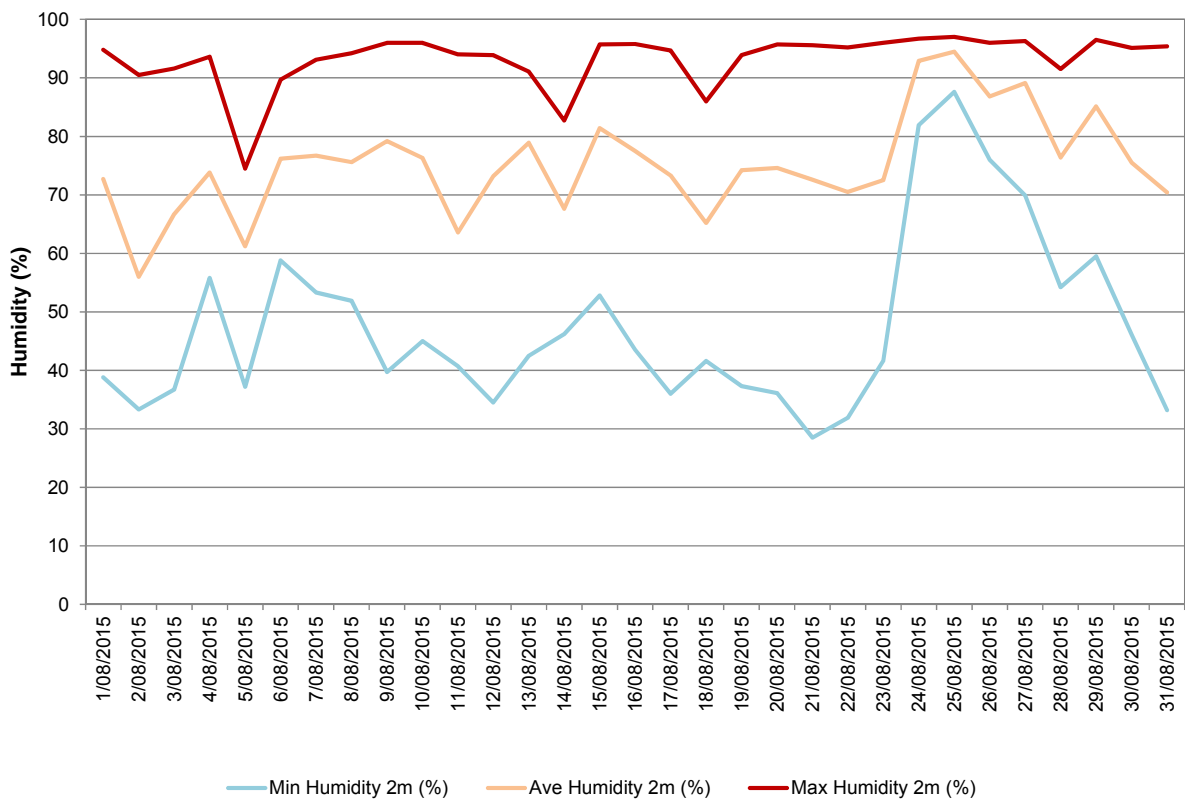
Meteorological Data

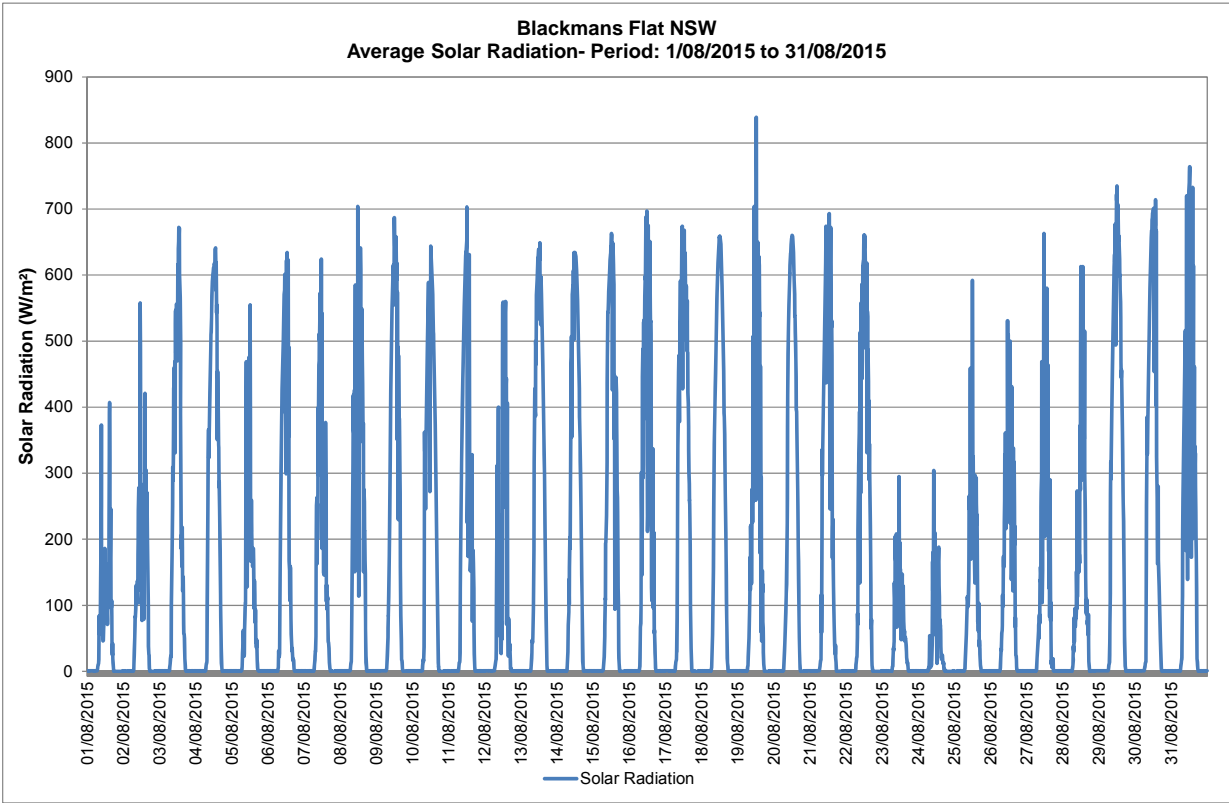
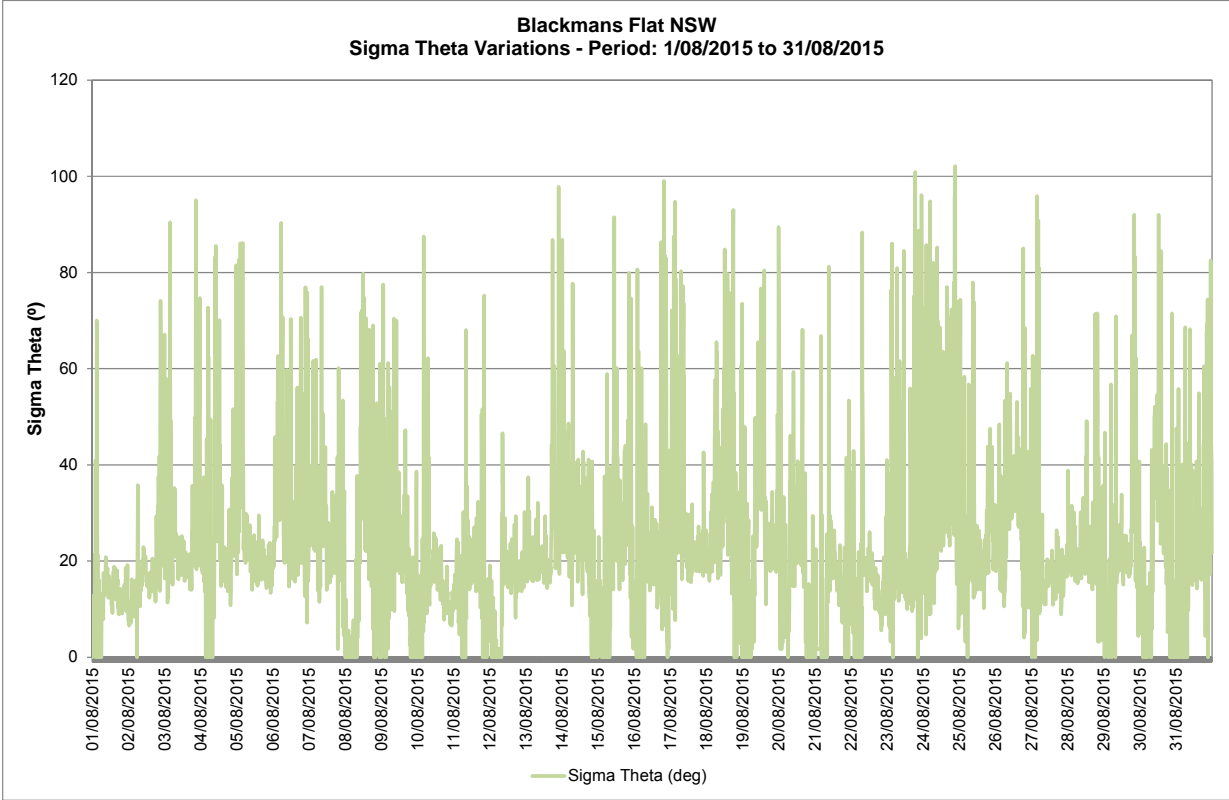


Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/08/2015 to 31/08/2015



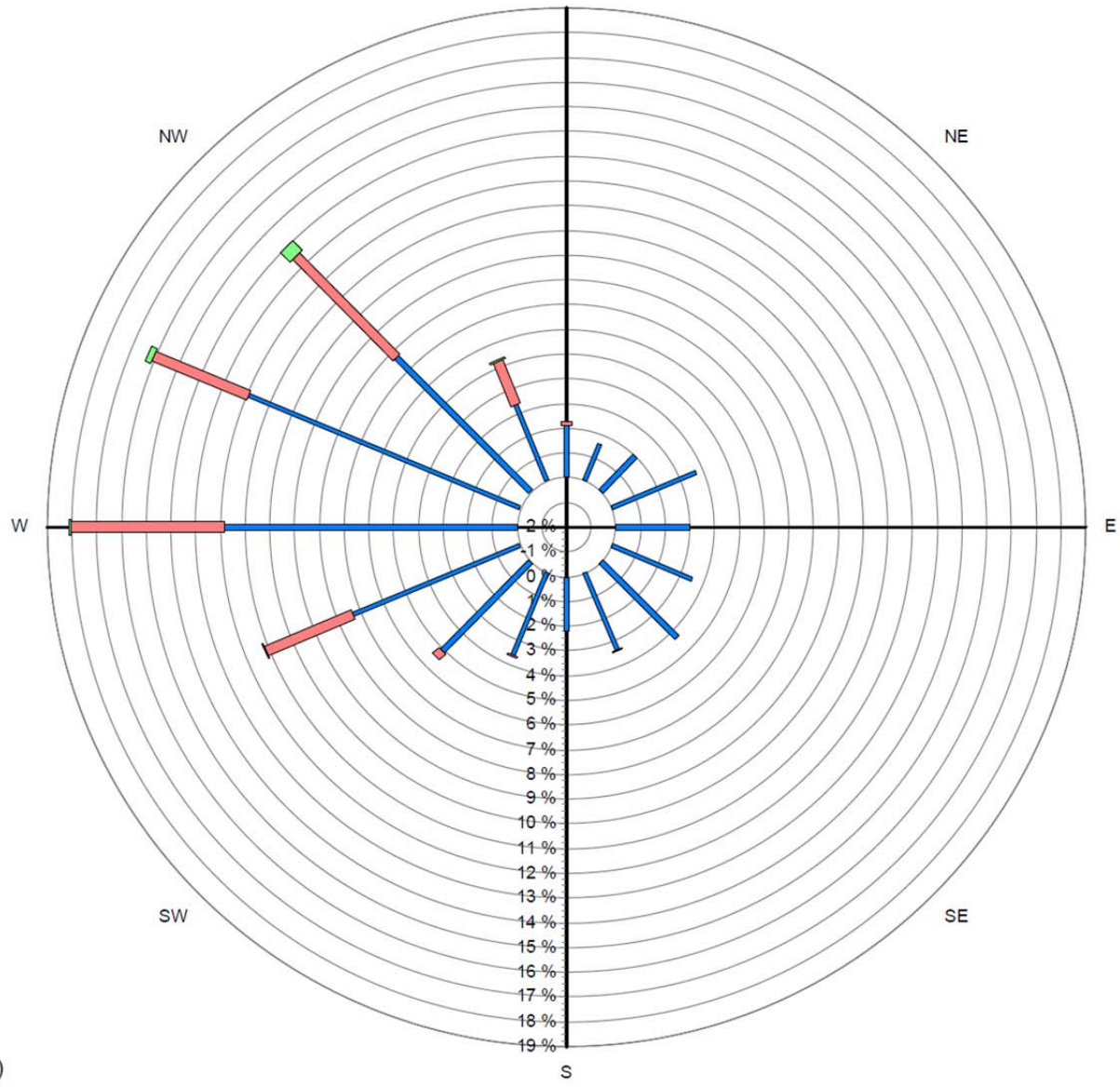
Blackmans Flat NSW
Daily Humidity Variations - Period: 1/08/2015 to 31/08/2015





Blackmans Flat Windrose

1/08/2015 to 31/08/2015
N



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