

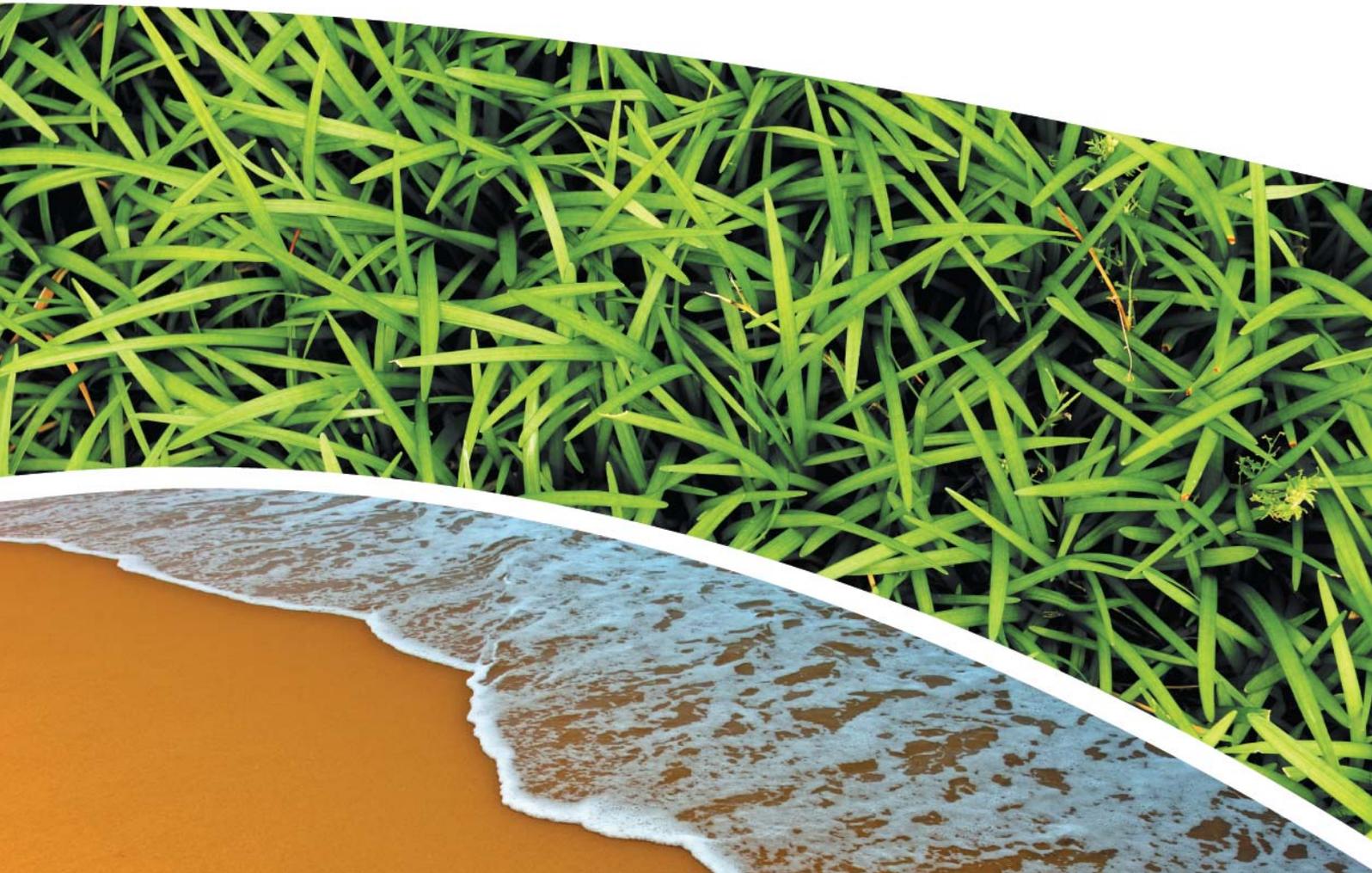
**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1720/0

August 2016



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RCA LE ref 6880-1720/0



16 September 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
AUGUST 2016**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of August 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 August 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	-	08166880011	08166880012
Date Sampled	-	9/08/2016	9/08/2016
Time Sampled	-	13:45	14:38
Depth to Water from Surface	m	24.36	6.13
Water Level (AHD)	m	892.59	888.27
Temperature	°C	15.5	15.5
pH	pH	6.29	6.41
Conductivity	µS/cm	1073	769
Turbidity	NTU	36	
Dissolved Oxygen	mg/L	9.5	
TSS	mg/L	25	
Oil and Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	49	253
Total Alkalinity (CaCO ₃)	mg/L	49	253
Sulfate (as SO ₄)	mg/L	565	67
Chloride	mg/L	33	92
Calcium	mg/L	128	48
Magnesium	mg/L	53	48
Sodium	mg/L	49	44
Potassium	mg/L	16	8
Cobalt (dissolved)	mg/L	0.05	
Manganese (dissolved)	mg/L	2.62	
Nickel (dissolved)	mg/L	0.097	
Zinc (dissolved)	mg/L	0.572	
Iron (dissolved)	mg/L	19.3	0.44
Trigger Levels			
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

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

■ Indicates analysis was not required

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

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 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 Neubecks Ck Upstream	EPA Point 3 Neubecks Ck Downstream	EPA Point 14 Coxs River Downstream
Sample Number	-	08166880009	08166880003	08166880010
Date Sampled	-	9/08/2016	9/08/2016	9/08/2016
Time Sampled	-	11:58	15:15	09:23
Temperature	°C	12.0	10.0	12.5
pH	pH	7.28	7.24	8.22
Conductivity	µS/cm	424	1790	979
Sulfate	NTU	125	766	162
Dissolved Iron	mg/L	<0.05	0.26	0.06
Total Suspended Solids	mg/L	13	11	24
Turbidity	mg/L	33	14	19
Trigger Levels**				
pH	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

Results shown in *italics* indicates exceedance of trigger level

** In a review of the Pine Dale Coal Mine water trigger levels (approved by the NSW Department of Primary Industries and Environmental Protection Authority) trigger levels for pH, conductivity and total suspended solids have been developed for EPL Point 2, 3 & 14. However, these triggers are not stipulated as part of EPL 4911.

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 (µg/m³ 0°C 101.3 kPa)

RUN DATE	TSP (µg/m ³)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
03-Aug-16	8	08166880031	9269620	05-Aug-16	13:50	Client	24.00
09-Aug-16	14	08166880033	9269621	13-Aug-16	16:00	Client	24.00
15-Aug-16	18	08166880035	9269623	19-Aug-16	17:45	Client	24.00
21-Aug-16	6	08166880037	9269625	25-Aug-16	18:55	Client	24.00
27-Aug-16	8	08166880039	9269627	30-Aug-16	14:27	Client	24.00

Table 5 Suspended Particulate Matter PM_{10} ($\mu\text{g}/\text{m}^3$ 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
03-Aug-16	6	08166880032	9203739	05-Aug-16	13:55	Client	24.00
09-Aug-16	6	08166880034	9269622	13-Aug-16	16:05	Client	24.00
15-Aug-16	8	08166880036	9269624	19-Aug-16	17:50	Client	24.00
21-Aug-16	2	08166880038	9269626	25-Aug-16	19:00	Client	24.00
27-Aug-16	3	08166880040	9269628	30-Aug-16	14:33	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 2015 to August 2016) for the TSP unit is $19.0\mu\text{g}/\text{m}^3$, 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 $9.6\mu\text{g}/\text{m}^3$, 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 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 – August 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)
08166880021	D1	7/07/2016	8/08/2016	32	I	0.3	0.1	0.2
08166880022	D2	7/07/2016	8/08/2016	32	I	0.1	<0.1	0.1
08166880023	D3	7/07/2016	8/08/2016	32	I	0.4	0.1	0.3
08166880024	D4	7/07/2016	8/08/2016	32	I	0.1	<0.1	0.1
08166880025	D5	7/07/2016	8/08/2016	32	I	1.3	0.2	1.1
08166880026	D6	7/07/2016	8/08/2016	32	I	0.3	<0.1	0.3

Glossary of Terms Used in Notes:

I Insects (eg, Ants, Spiders)

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 undertaken this month. The quarterly round of monitoring (quarter 3) was scheduled to be undertaken during July 2016; however due to inclement weather conditions noise monitoring was rescheduled for September 2016.

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 August 2016 environmental monitoring constituents were found to be generally in compliance with EPL 4911.

Site groundwater results did not exceed respective trigger values. Quarterly EPA surface water monitoring was undertaken this month. All EPA surface water results were in compliance with respective triggers with the exception of the pH result at EPA Point 14, which was shown to exceed the upper pH trigger level by 0.22pH units.

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



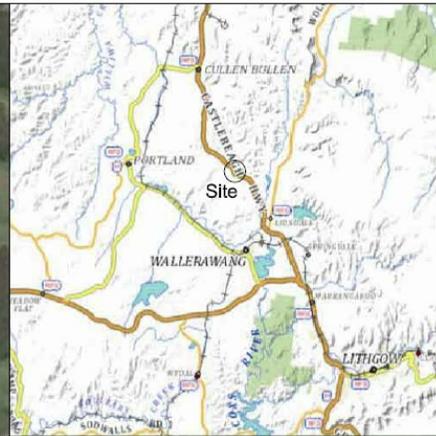
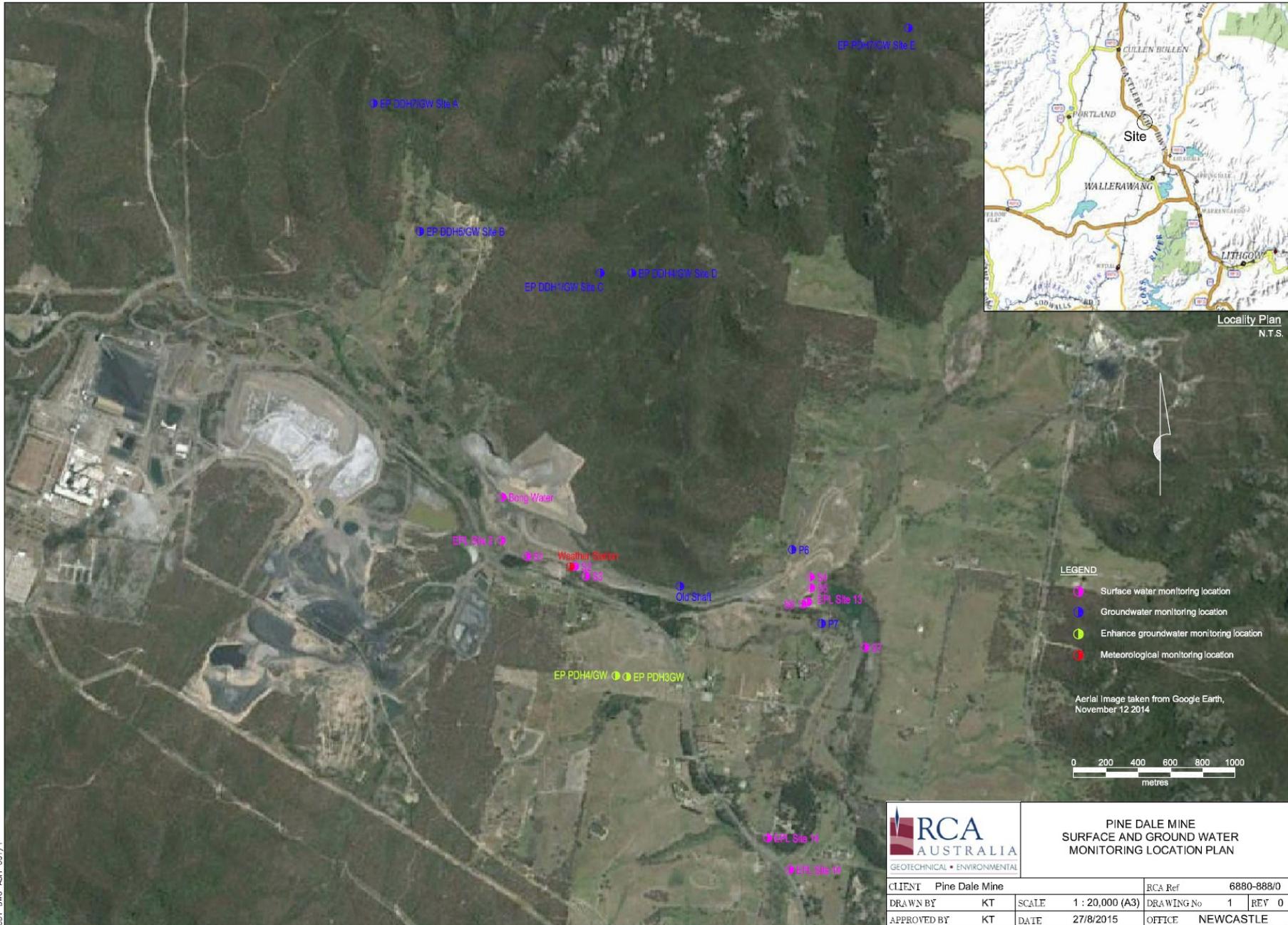
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



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

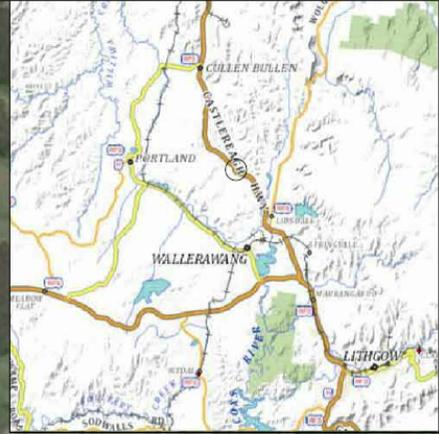
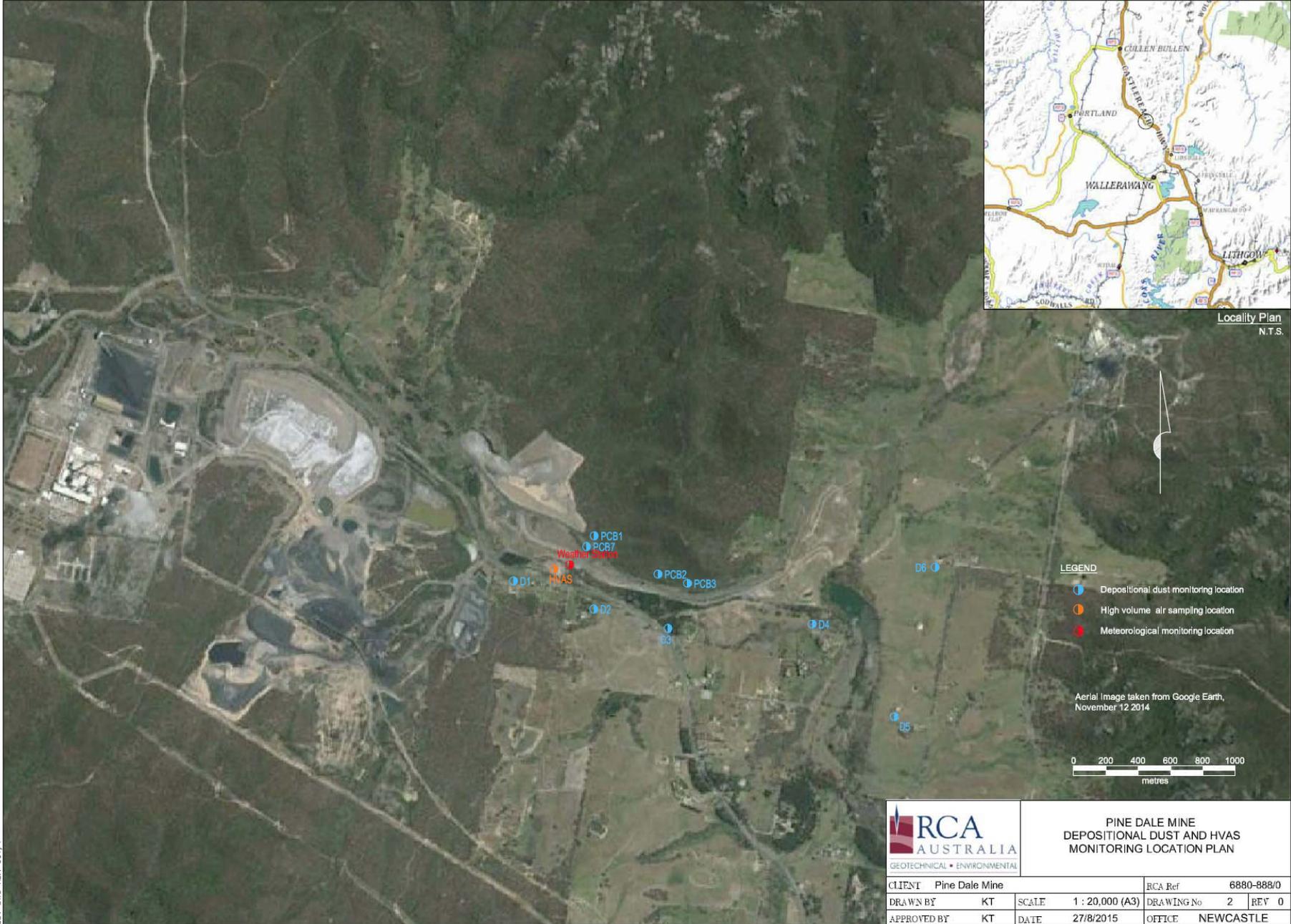
Aerial Image taken from Google Earth,
November 12 2014



**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
		REV	0
		OFFICE	NEWCASTLE

G:\Projects\2015\150000\150000.dwg



Locality Plan
N.T.S.

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

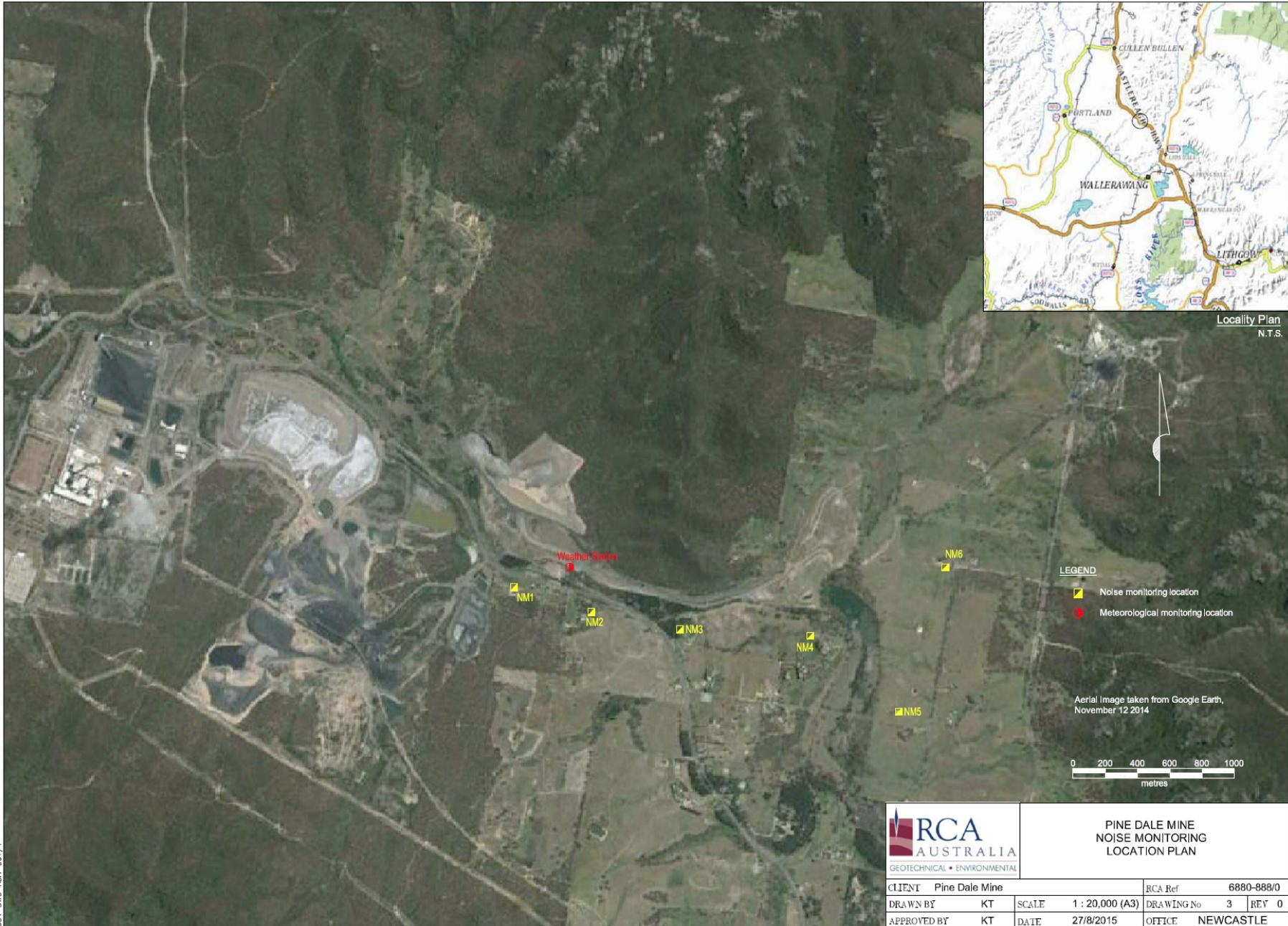
Aerial Image taken from Google Earth,
November 12 2014



**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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		REV	0
		OFFICE	NEWCASTLE

COT-DWC-ASH-001/1

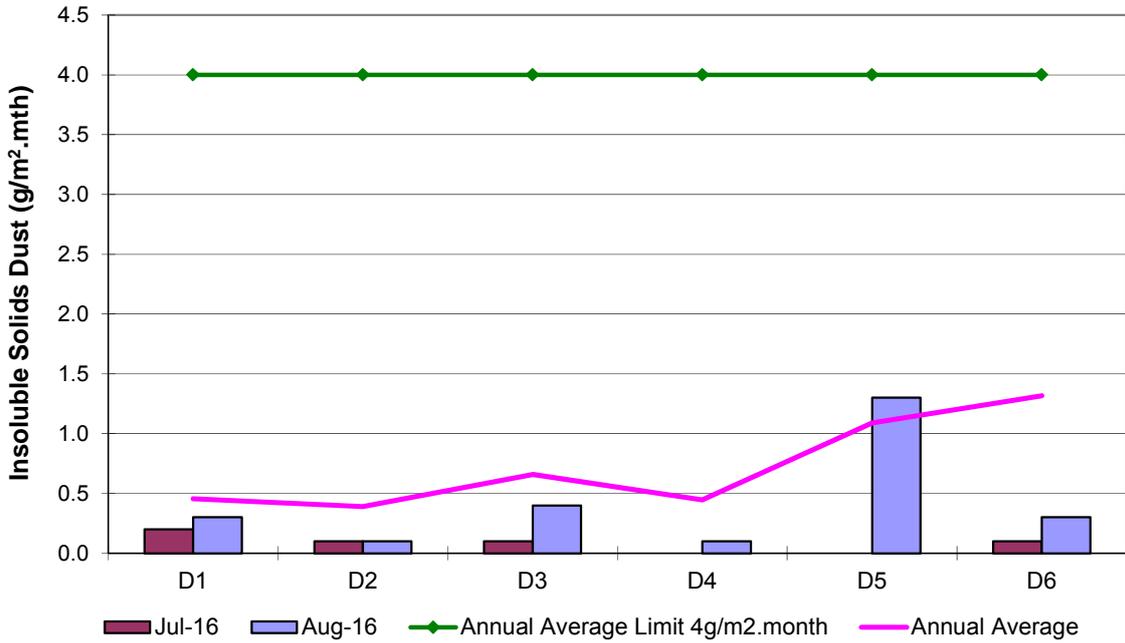


2015-08-27 10:00:00 AM

Appendix 2

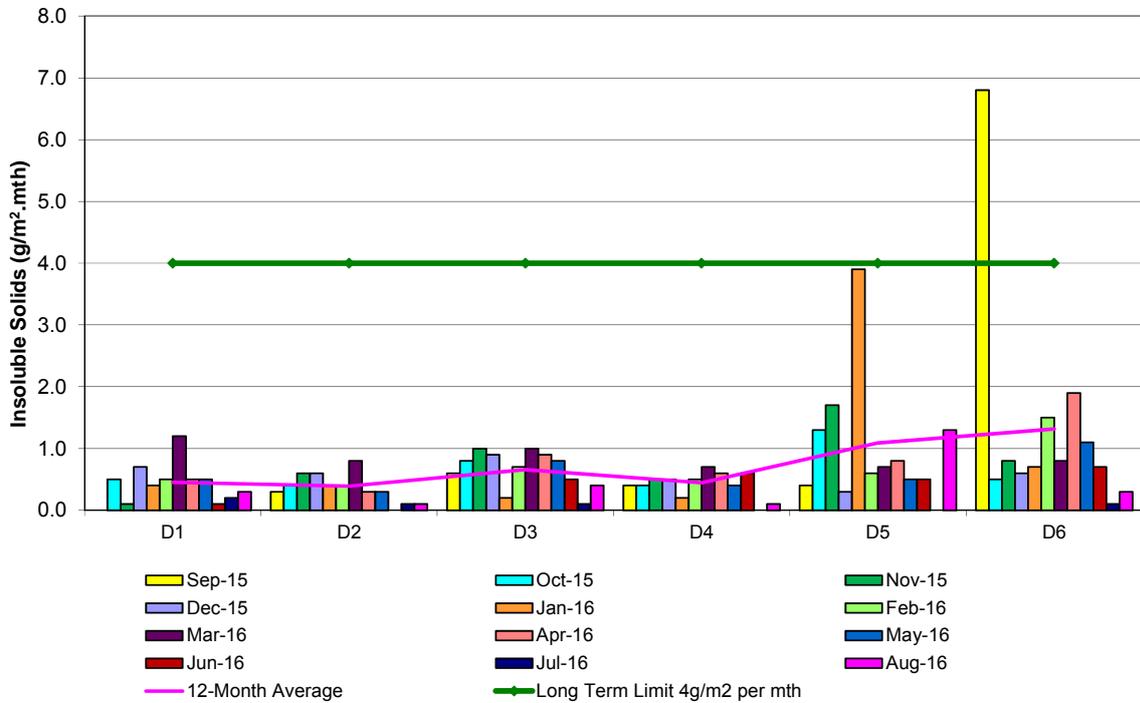
Depositional Dust and HVAS Graphs

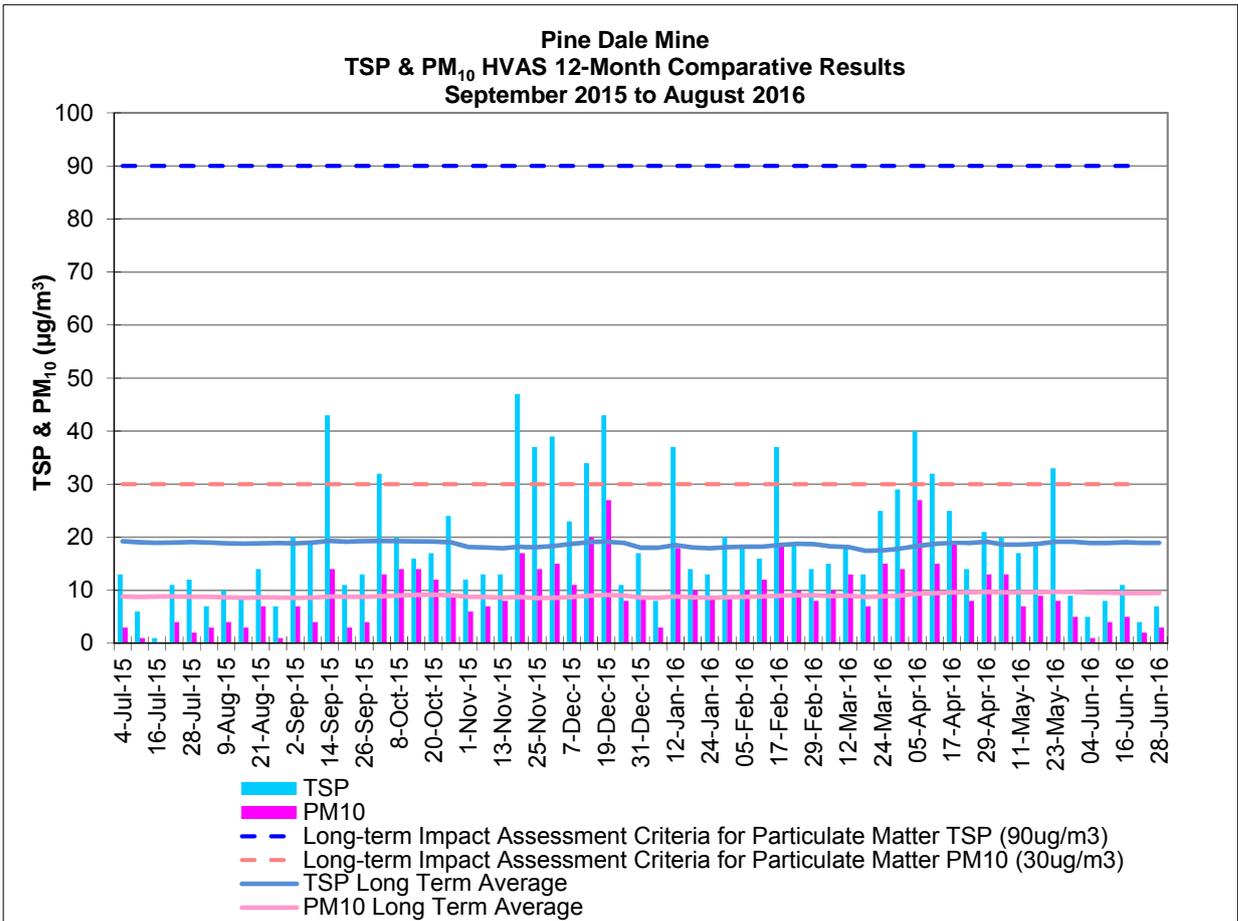
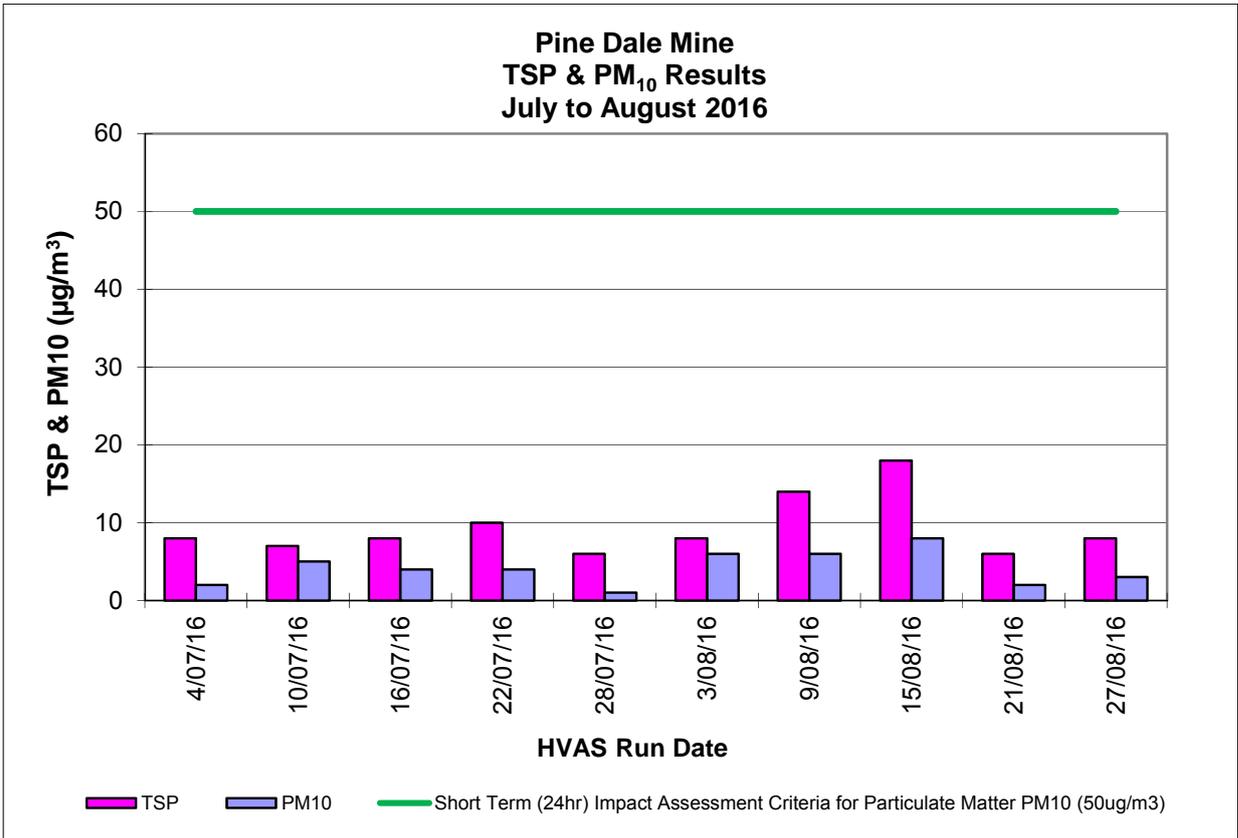
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
July to August 2016**



Note – data gaps on the graph indicate the dust result was less than laboratory detection limits.

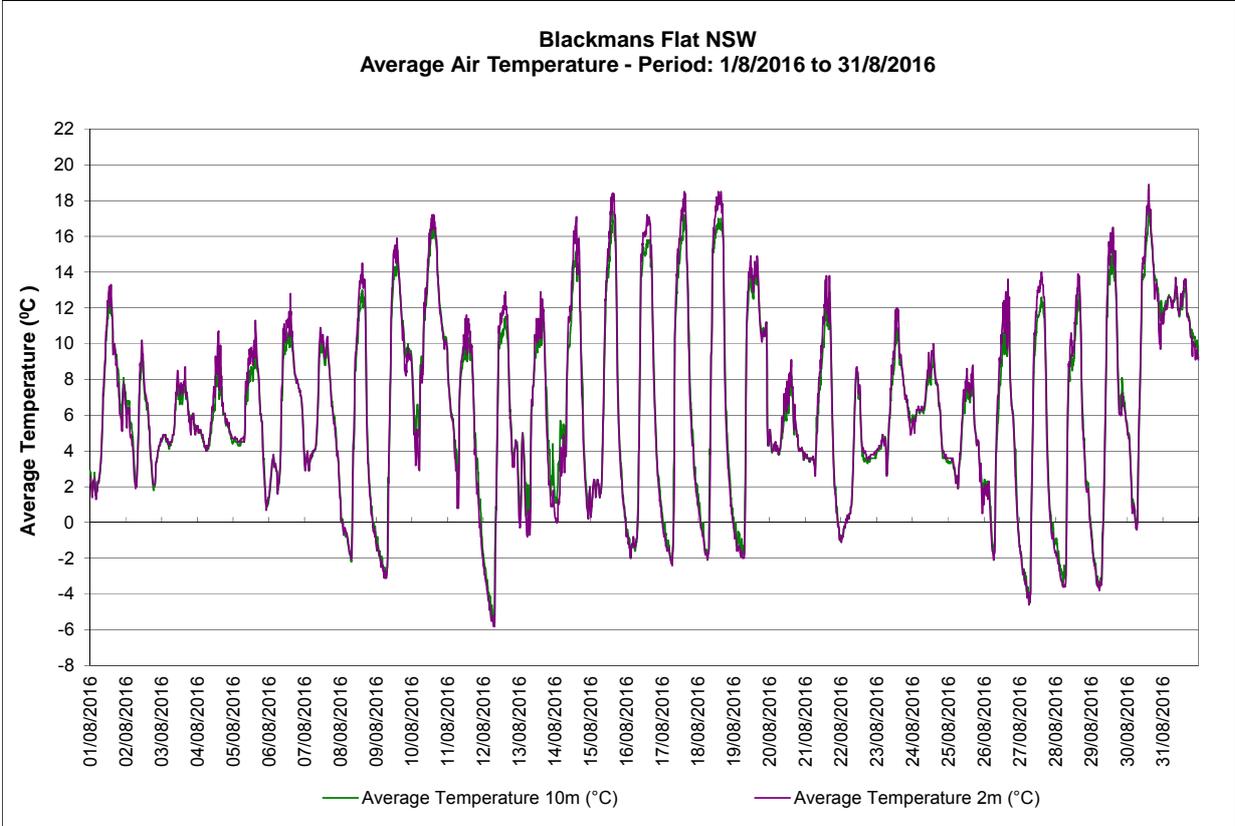
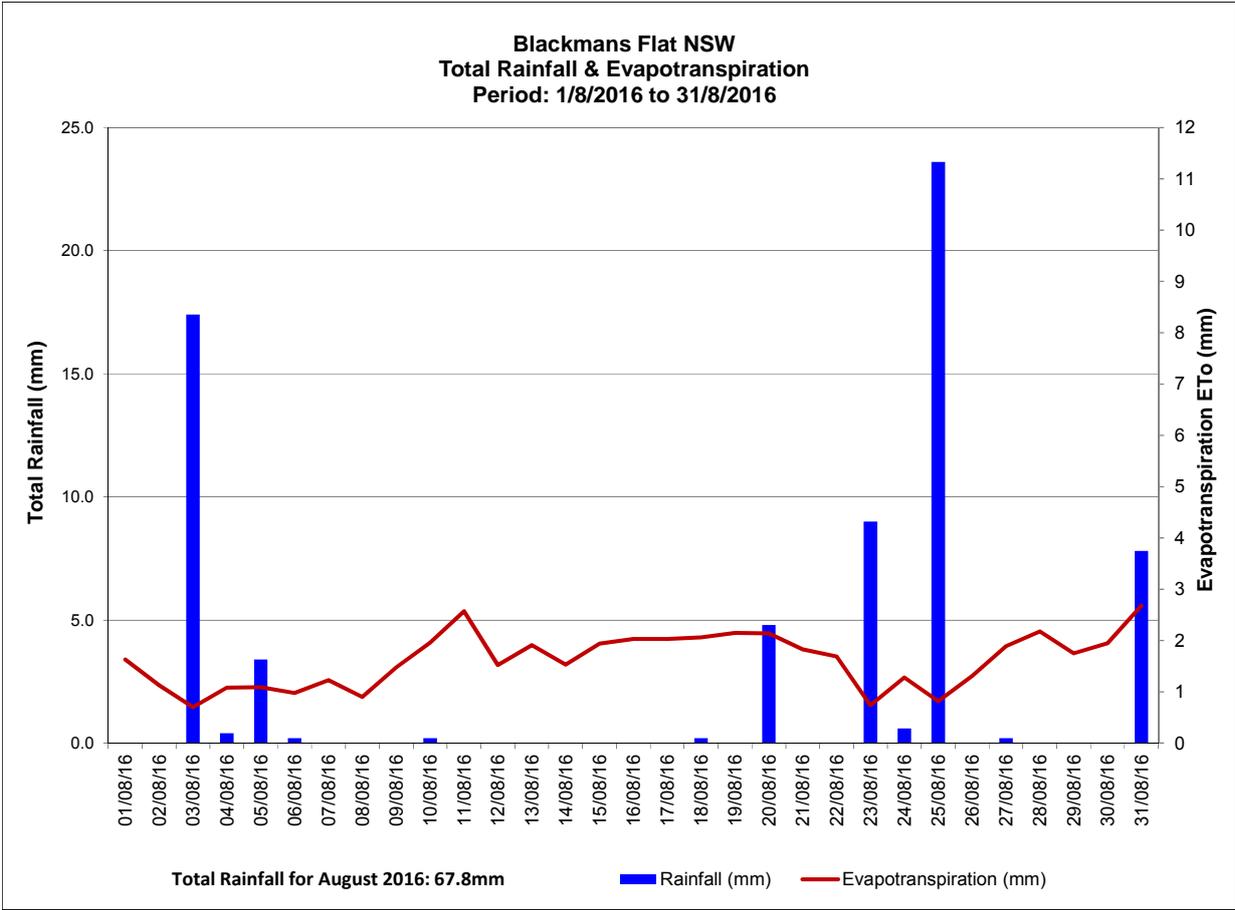
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
September 2015 to August 2016**

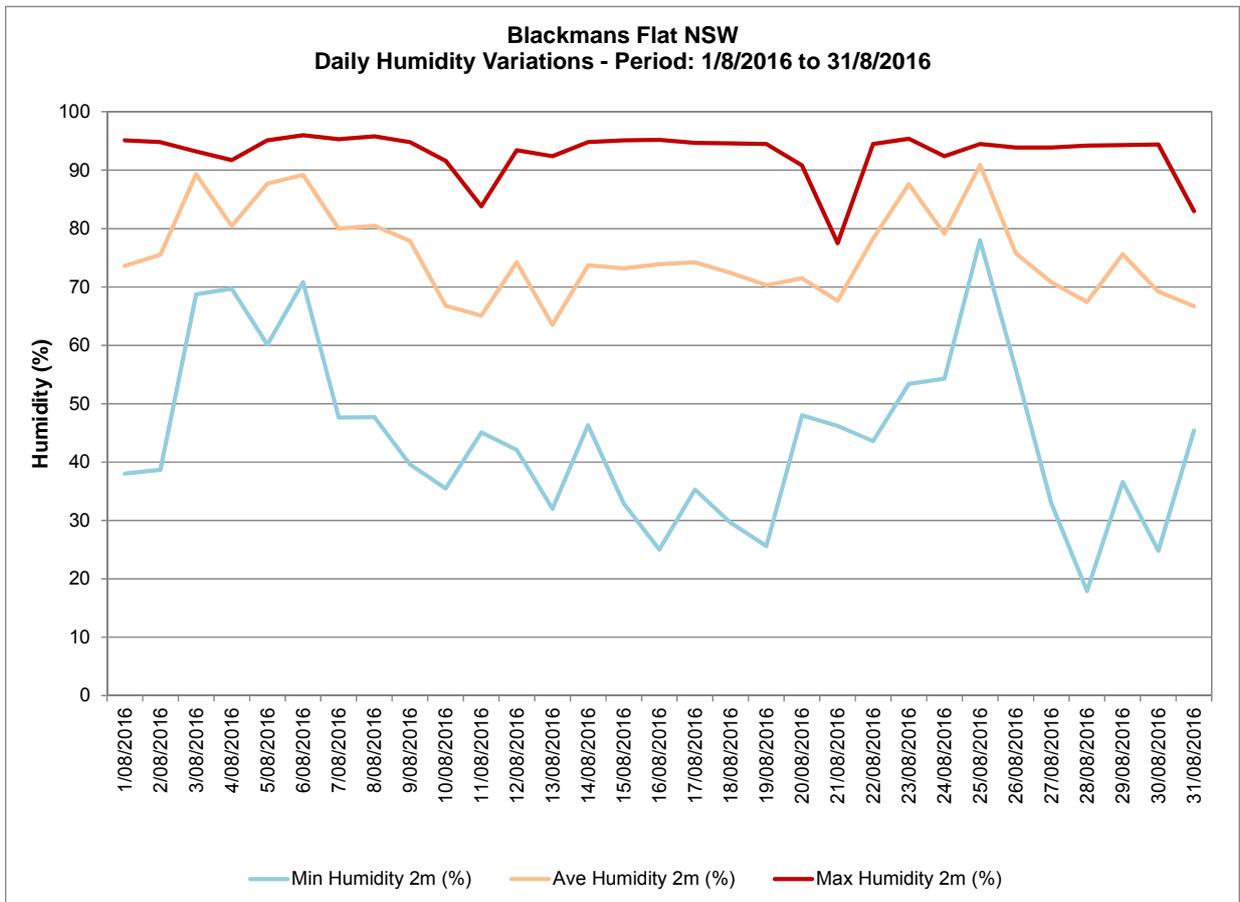
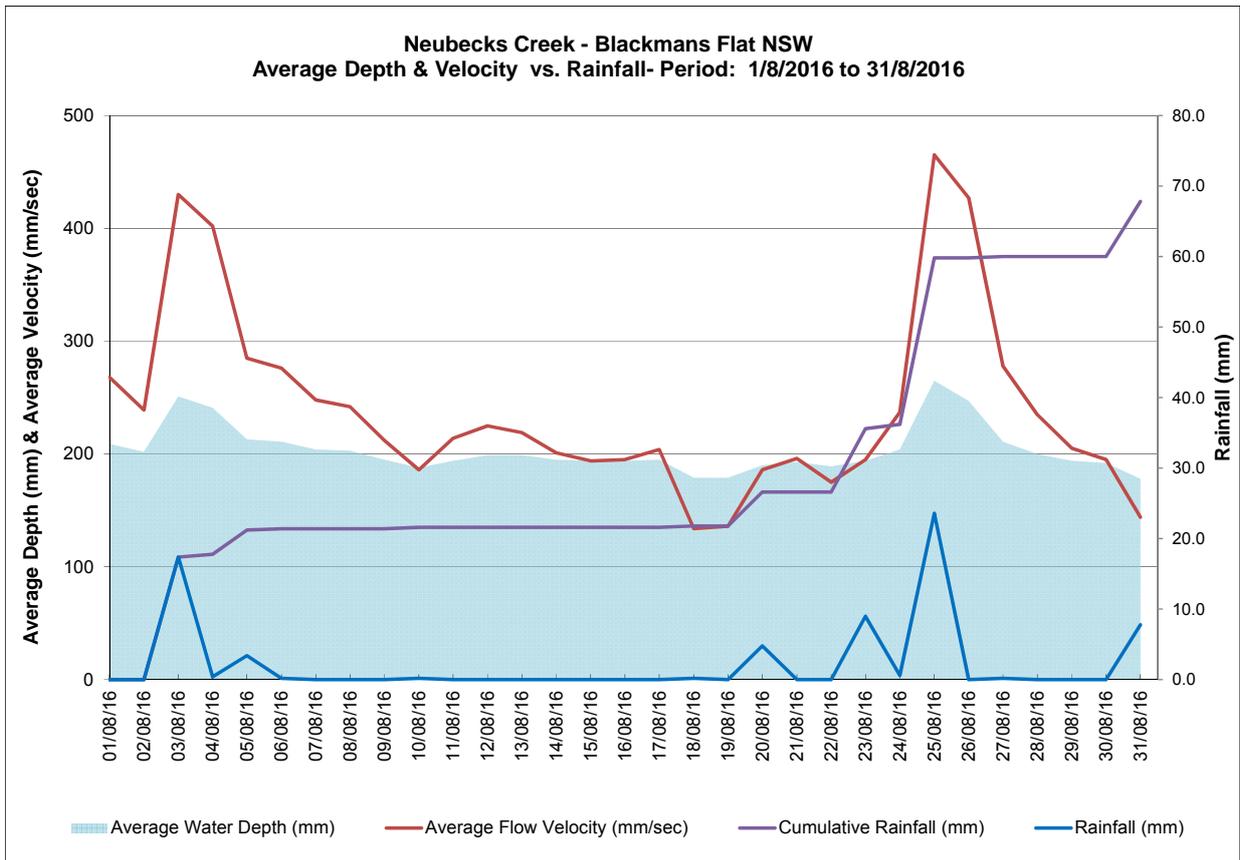


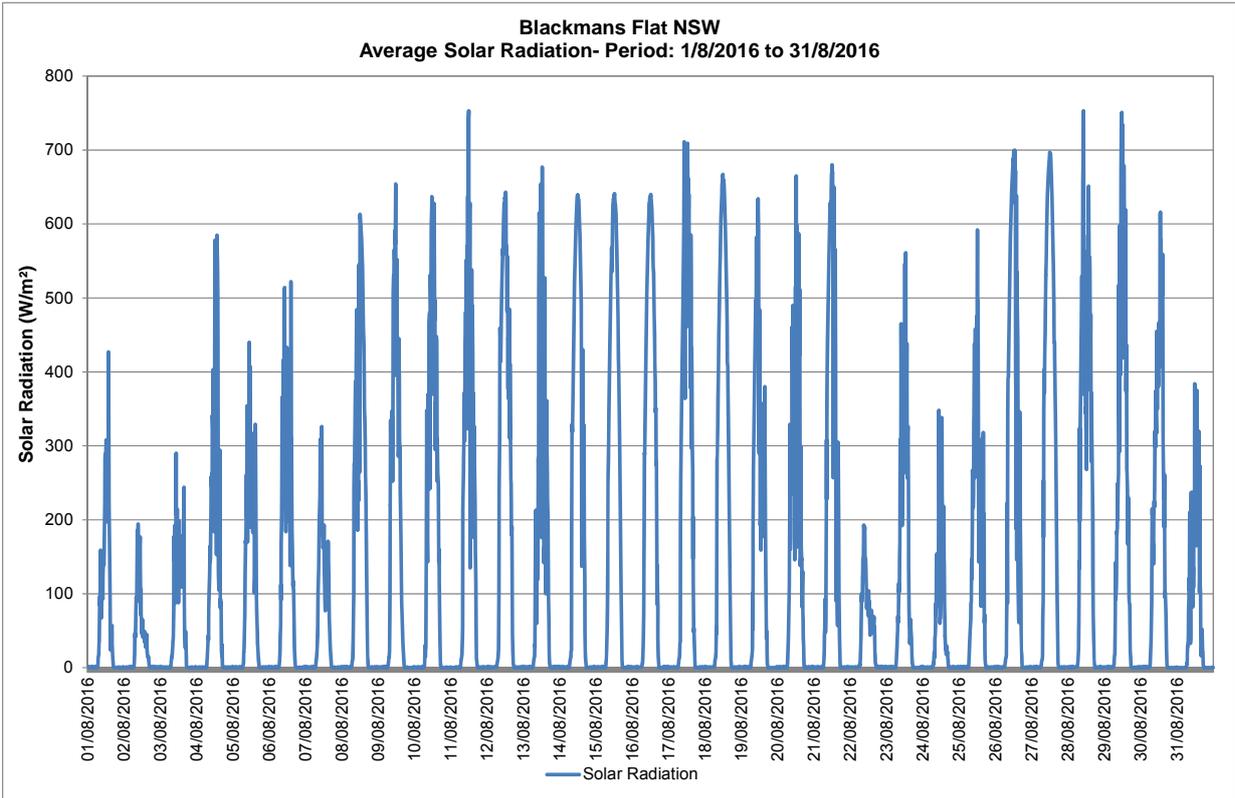
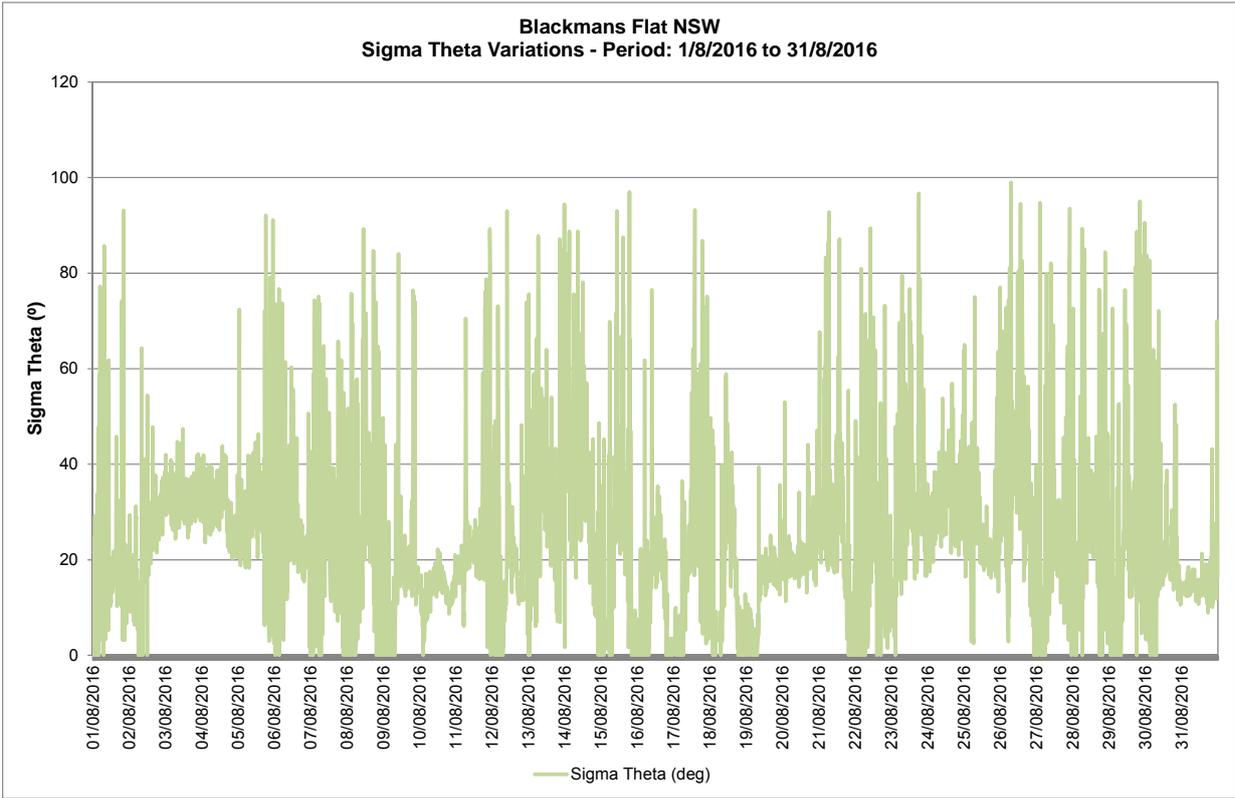


Appendix 3

Meteorological Data

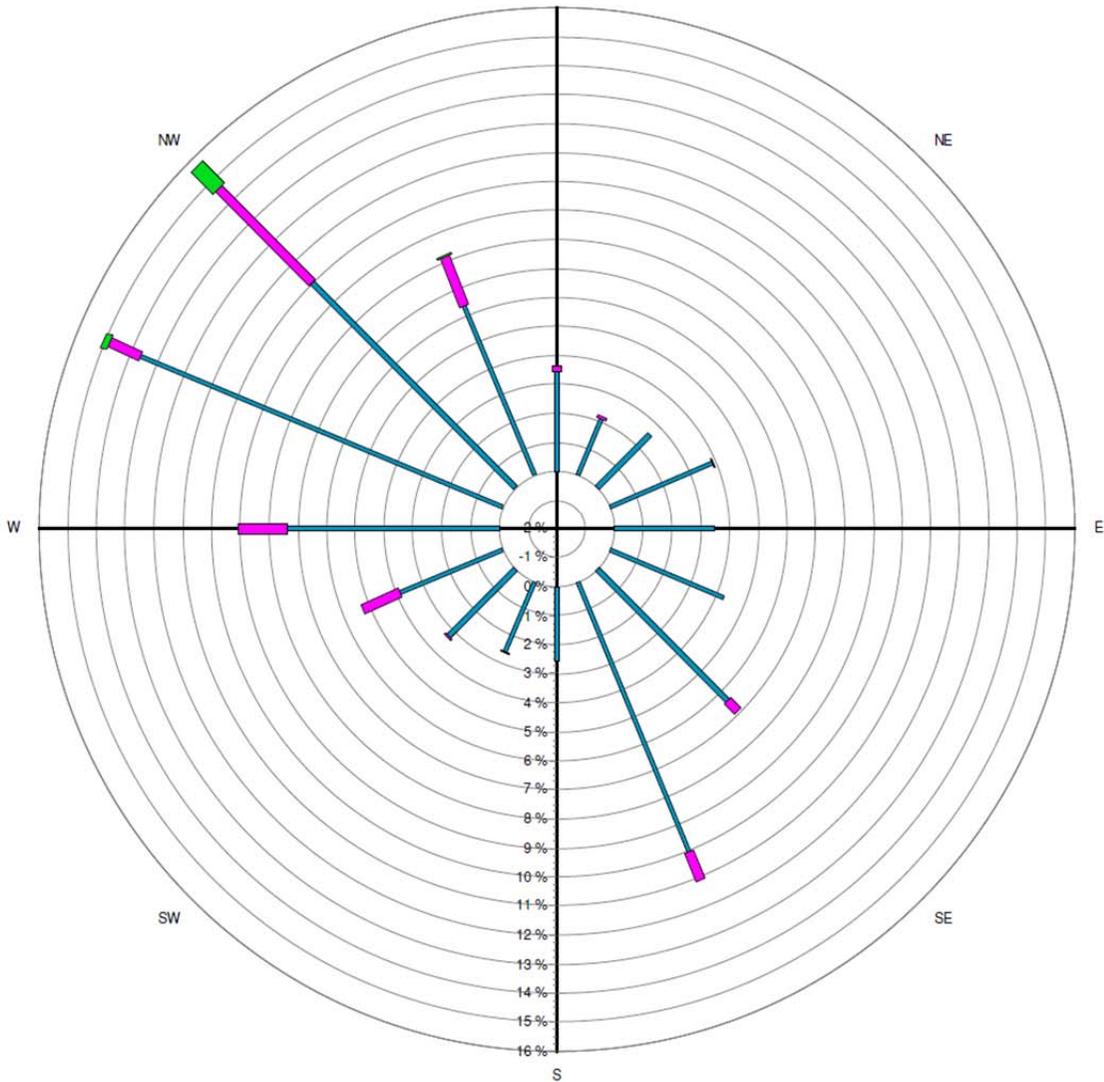






Blackmans Flat Windrose

1/08/2016 to 31/08/2016



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