

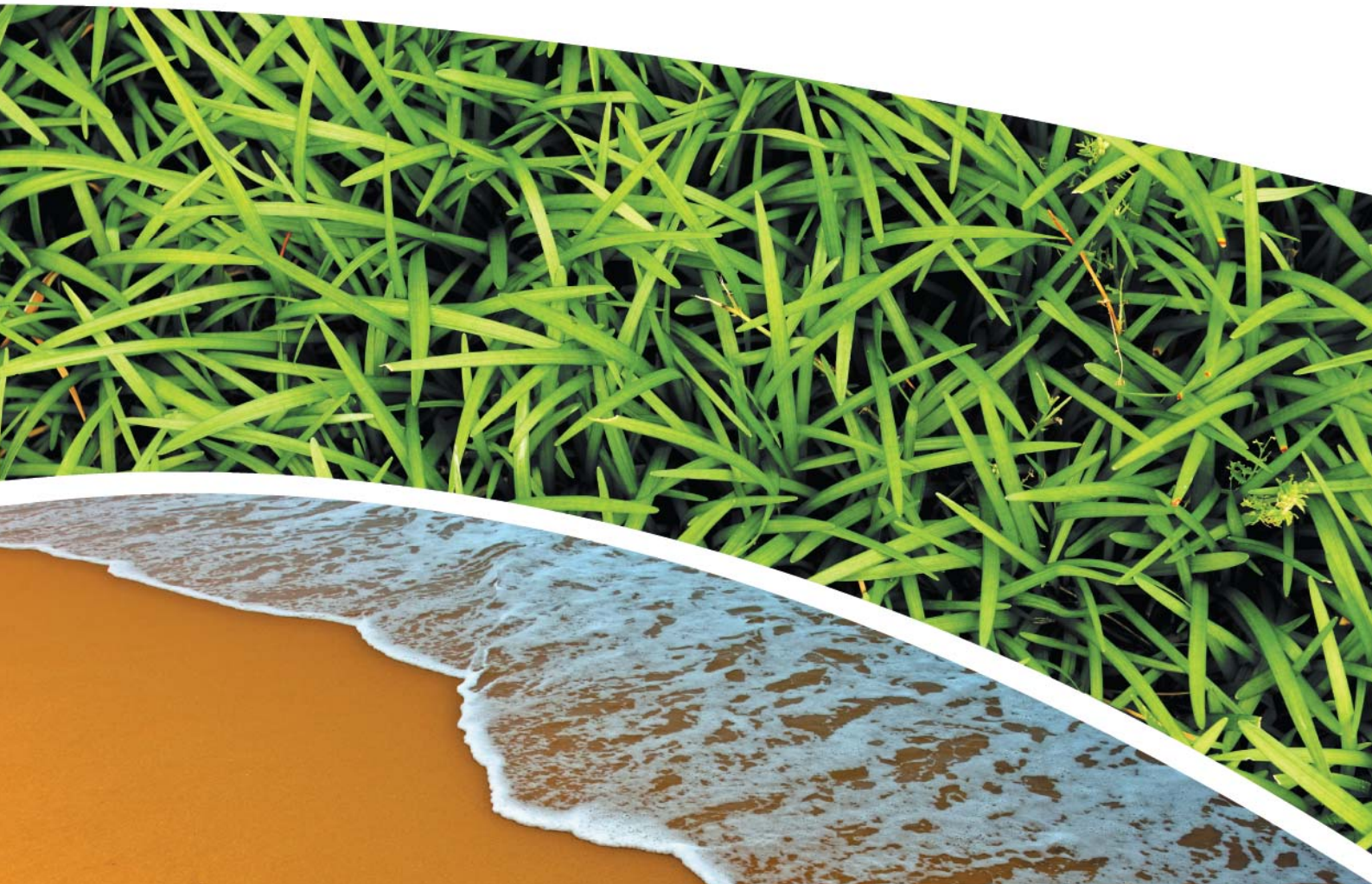
**SURFACE WATER, DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING**

**Prepared for Pine Dale Mine Community Consultative Committee**

**Prepared by RCA Australia**

**RCA ref 6880-896/0**

**November 2015**



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/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin <a href="mailto:graham.goodwin@energyaustralia.com.au">graham.goodwin@energyaustralia.com.au</a>	16.12.15
/0	1	Electronic (email)	EnergyAustralia- Mark Frewin <a href="mailto:mark.frewin@energyaustralia.com.au">mark.frewin@energyaustralia.com.au</a>	16.12.15
/0	1	Electronic (email)	Lithgow City Council – Andrew Muir <a href="mailto:andrew.muir@lithgow.nsw.gov.au">andrew.muir@lithgow.nsw.gov.au</a>	16.12.15
/0	1	Electronic report	RCA – job archive	16.12.15



RCA LE ref 6880-896/0



16 December 2015

Pine Dale Mine  
PO Box 202  
WALLERAWANG NSW 2845

Attention: Mr Graham Goodwin

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**REPORT COMPILED FOR  
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE  
DETAILING SURFACE WATER, GROUNDWATER DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING  
NOVEMBER 2015**

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## 1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of November 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 <sup>3</sup>	RCA Laboratories – Environmental	NATA Analysis
Determination of Particulate Matter – Deposited Matter	ENV-LAB004	g/m <sup>2</sup> .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 <sub>4</sub> )	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 November 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 – Quarterly Analytes

ANALYSIS	UNITS	P6	P7
Sample Number	-	11156880011	11156880012
Date Sampled	-	09/11/15	09/11/15
Time Sampled	-	13:46	14:43
Depth to Water from Surface*	m	25.32	6.55
Water Level (AHD)	m	891.63	887.85
Temperature	°C	16.5	15.3
pH	pH	6.37	6.50
Conductivity	µS/cm	1175	810
Turbidity	NTU	65	
Dissolved Oxygen	mg/L	4.0	
TSS	mg/L	40	
Oil & Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO <sub>3</sub> )	mg/L	34	204
Total Alkalinity (CaCO <sub>3</sub> )	mg/L	34	204
Sulfate (as SO <sub>4</sub> )	mg/L	645	78
Chloride	mg/L	28	74
Calcium	mg/L	128	43
Magnesium	mg/L	60	49
Sodium	mg/L	52	48
Potassium	mg/L	17	7
Cobalt (dissolved)	mg/L	0.058	
Manganese (dissolved)	mg/L	2.46	
Nickel (dissolved)	mg/L	0.105	
Zinc (dissolved)	mg/L	0.192	
Iron (dissolved)	mg/L	20	<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 November 2015 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	-	11156880009	11156880004	11156880010
Date Sampled	-	9/11/2015	9/11/2015	9/11/2015
Time Sampled	-	15:04	11:50	09:52
Temperature	°C	19.1	19.4	18.4
pH	pH	7.33	7.39	7.97
Conductivity	µS/cm	567	842	1118
Sulfate	NTU	186	313	147
Dissolved Iron	mg/L	0.06	0.26	0.08
TSS	mg/L	5	8	8
Turbidity	mg/L	8	8	7

## 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**.

PM<sub>10</sub> 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
01-Nov-15	12	11156880031	9098687	03-Nov-15	6:42	Client	24.00
07-Nov-15	13	11156880033	9100554	09-Nov-15	16:14	Client	24.01
13-Nov-15	13	11156880035	9157664	16-Nov-15	6:41	Client	24.13
19-Nov-15	47	11156880037	9157665	23-Nov-15	6:10	Client	24.04
25-Nov-15	37	11156880039	9157667	30-Nov-15	6:50	Client	24.00

**Table 5** Suspended Particulate Matter  $PM_{10}$  ( $\mu\text{g}/\text{m}^3$  @  $0^\circ\text{C}$  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
01-Nov-15	6	11156880032	9098688	03-Nov-15	6:42	Client	24.00
07-Nov-15	7	11156880034	9100564	09-Nov-15	16:14	Client	24.00
13-Nov-15	8	11156880036	9157663	16-Nov-15	6:41	Client	24.13
19-Nov-15	17	11156880038	9157666	23-Nov-15	6:10	Client	24.00
25-Nov-15	14	11156880040	9157668	30-Nov-15	6:50	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 December 2014 to November 2015) for the TSP unit is  $18.1\mu\text{g}/\text{m}^3$ , 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 November 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 November 2015*

SAMPLE NUMBER	DEPOSIT GAUGE	DATE SAMPLE STARTED	DATE SAMPLE COMPLETED	NUMBER OF DAYS	NOTES	INSOLUBLE SOLIDS (g/m <sup>2</sup> .month)	ASH (g/m <sup>2</sup> .month)	COMBUSTIBLE MATTER (g/m <sup>2</sup> .month)
11156880021	D1	8/10/2015	9/11/2015	32	T	0.1	0.1	<0.1
11156880022	D2	8/10/2015	9/11/2015	32	I	0.6	0.2	0.4
11156880023	D3	8/10/2015	9/11/2015	32	I	1.0	0.4	0.6
11156880024	D4	8/10/2015	9/11/2015	32	I	0.5	0.2	0.3
11156880025	D5	8/10/2015	9/11/2015	32	B	1.7	0.5	1.2
11156880026	D6	8/10/2015	9/11/2015	32	BI	0.8	0.4	0.4

### 4.2.1 Glossary of Terms Used in Notes

I	Insects (eg, Ants, Spiders)	T	Tree Litter
BI	Bird droppings and Insects	B	Bird droppings

### Allowable Depositional Dust Limits

The EPA Long Term (Annual Average) Dust Limit is 4g/m<sup>2</sup> 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 1.6g/m<sup>2</sup> per month, which is below the allowable Annual Average Long Term Limit of 4g/m<sup>2</sup> 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 January 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 November 2015 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Rolling annual averages from both the TSP and PM<sub>10</sub> High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM<sub>10</sub> criterion of 90µg/m<sup>3</sup> and 30µg/m<sup>3</sup> respectively.

Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m<sup>2</sup>.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

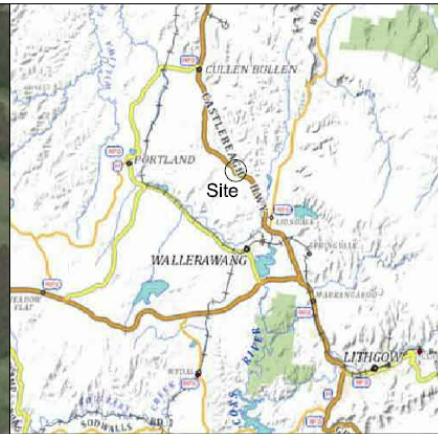
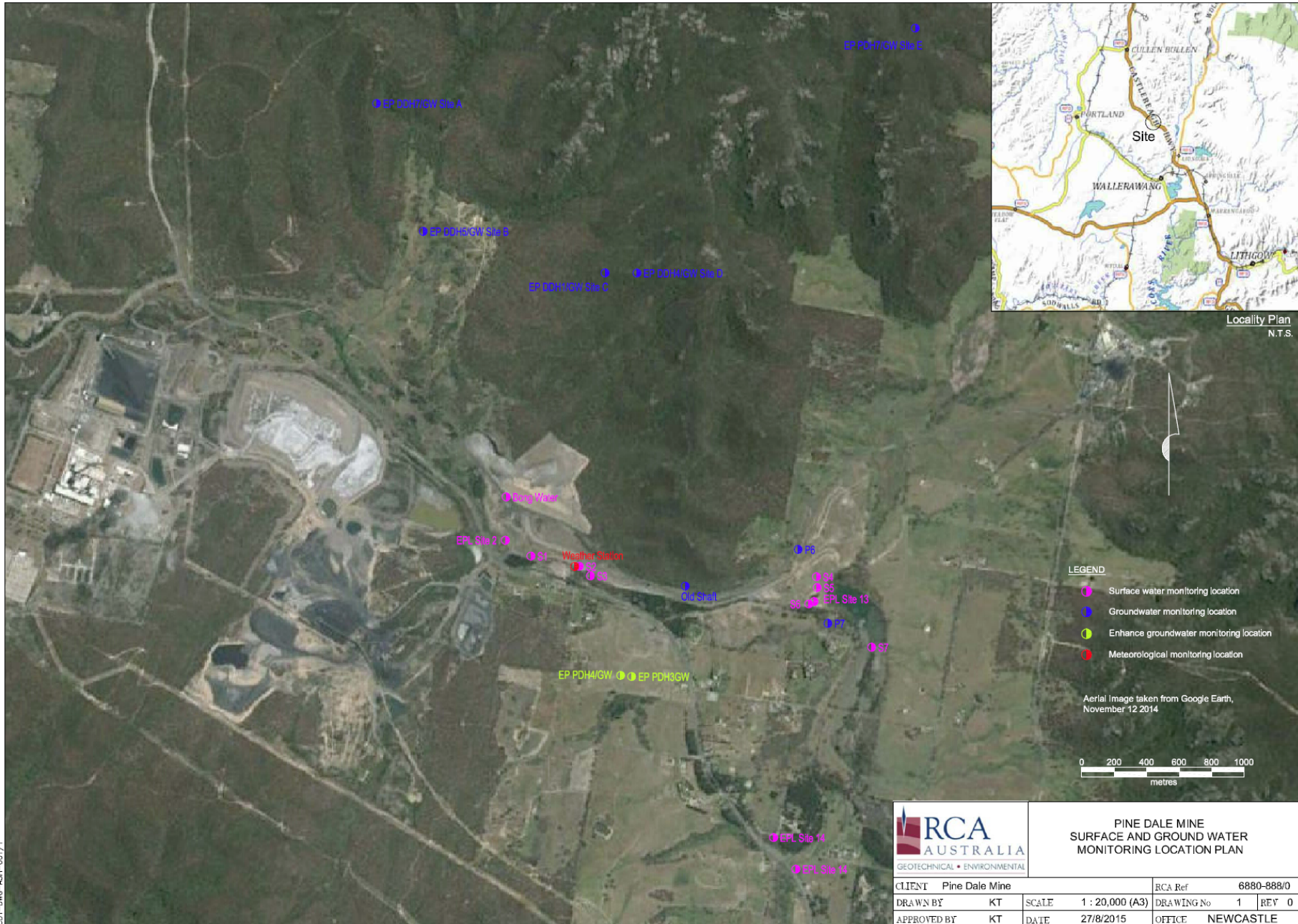


Karen Tripp  
Senior Environmental Scientist/Hygienist  
RCA Australia Pty Ltd trading as  
RCA Laboratories – Environmental

# Appendix 1

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## 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

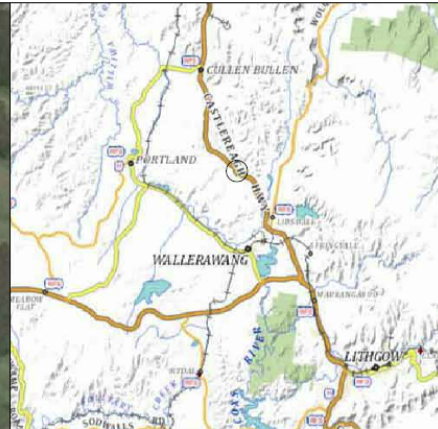
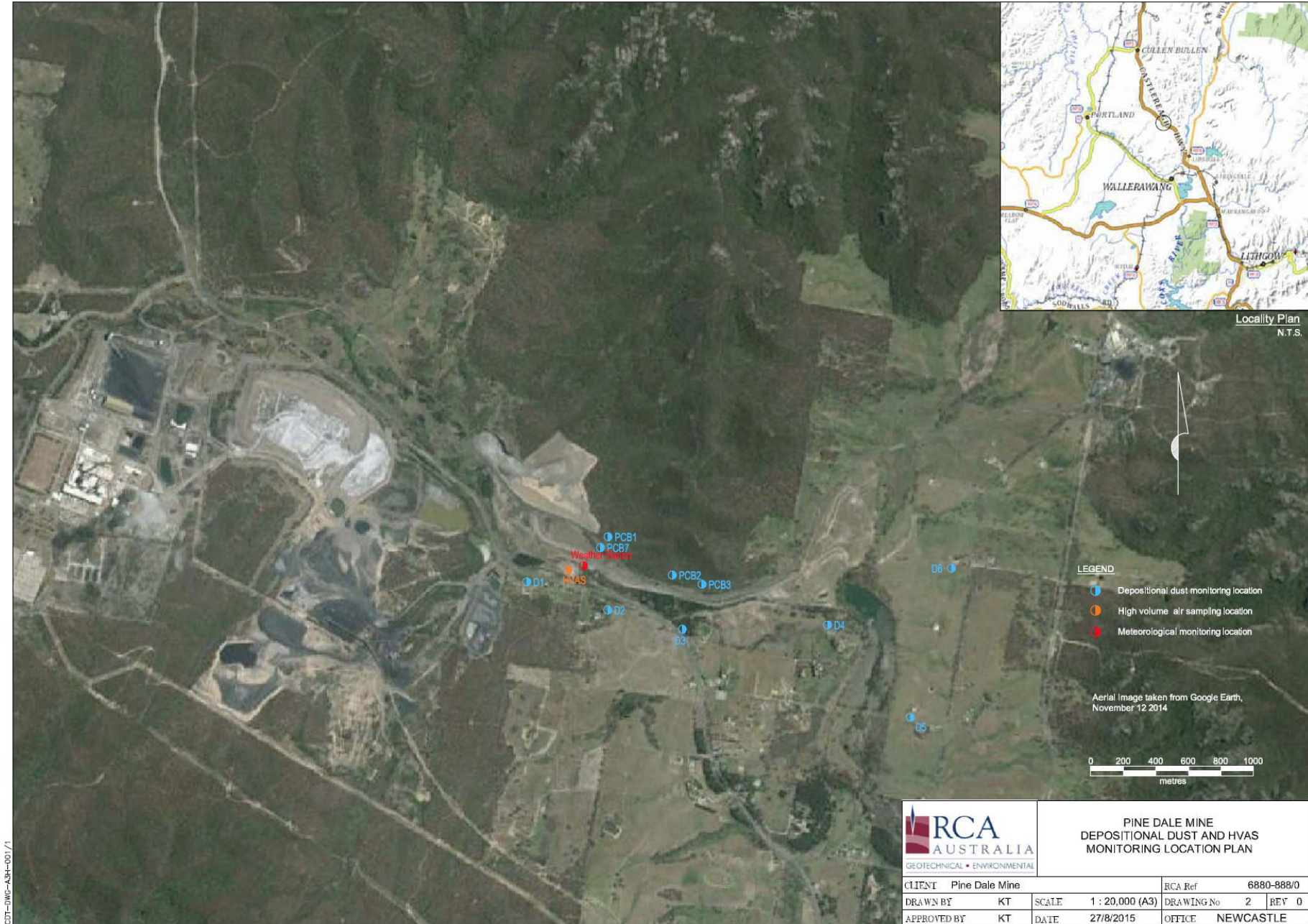
Aerial Image taken from Google Earth,  
November 12 2014



**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
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		REV	0
		OFFICE	NEWCASTLE

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Locality Plan  
N.T.S.

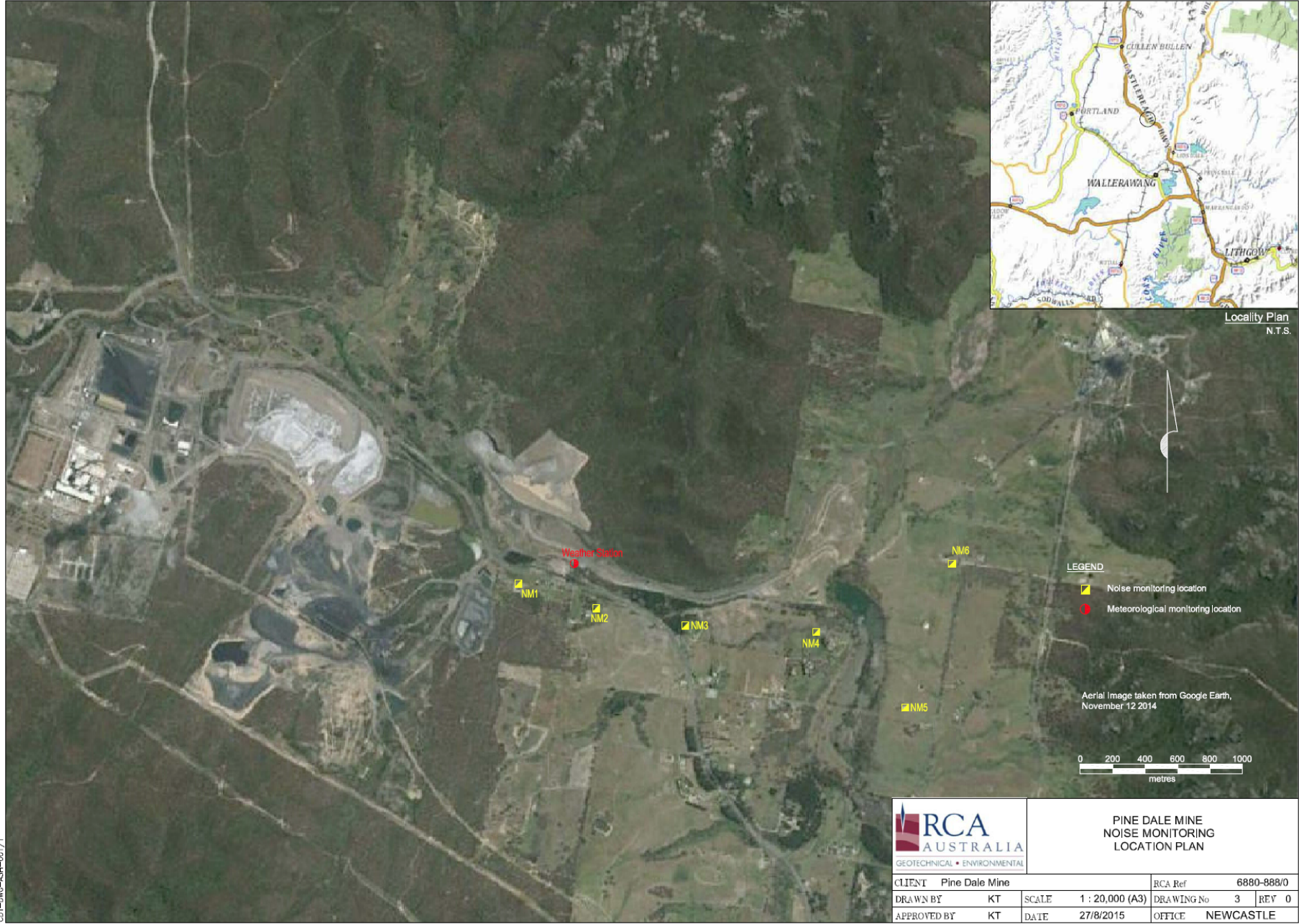
- LEGEND**
- Depositional dust monitoring location
  - High volume air sampling location
  - Meteorological monitoring location

Aerial Image taken from Google Earth,  
November 12 2014



		<b>PINE DALE MINE DEPOSITIONAL DUST AND HVAS MONITORING LOCATION PLAN</b>			
		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



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**

<b>CLIENT</b> Pine Dale Mine			RCA Ref	6880-888/0
<b>DRAWN BY</b>	KT	<b>SCALE</b>	1 : 20,000 (A3)	<b>DRAWING No</b> 3 <b>REV</b> 0
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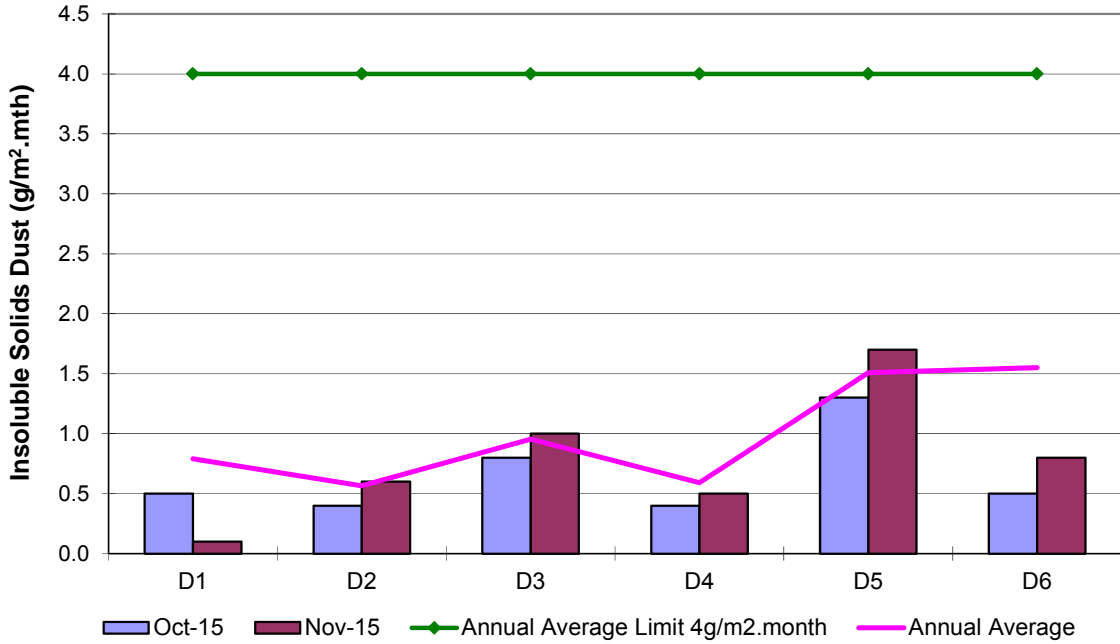
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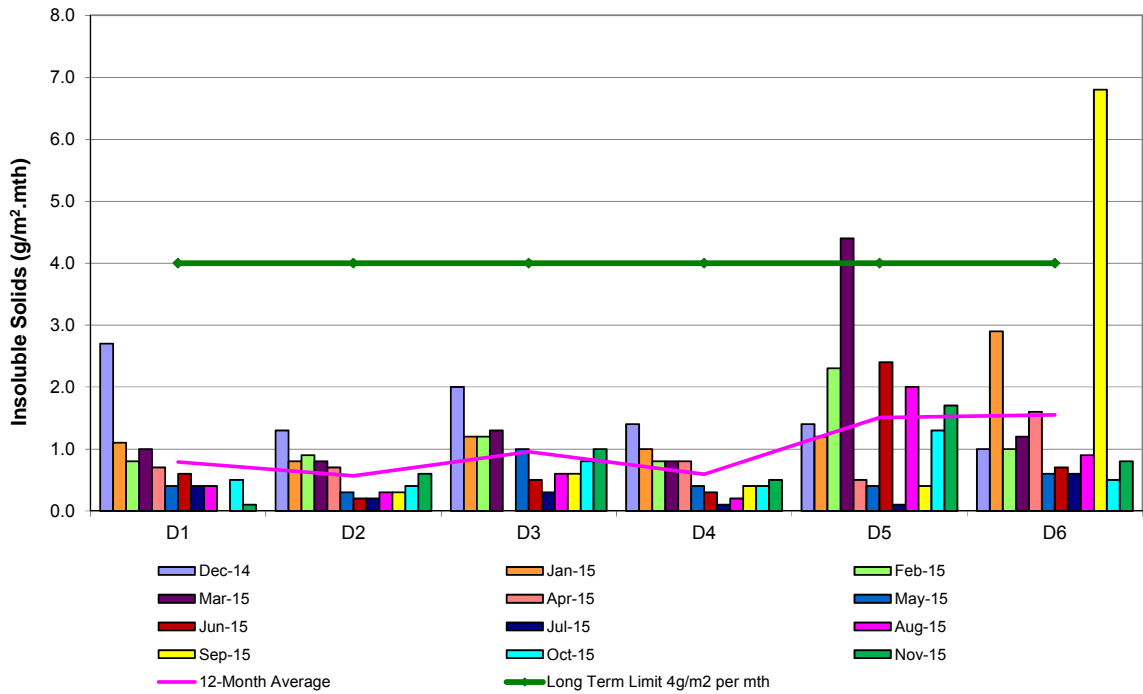
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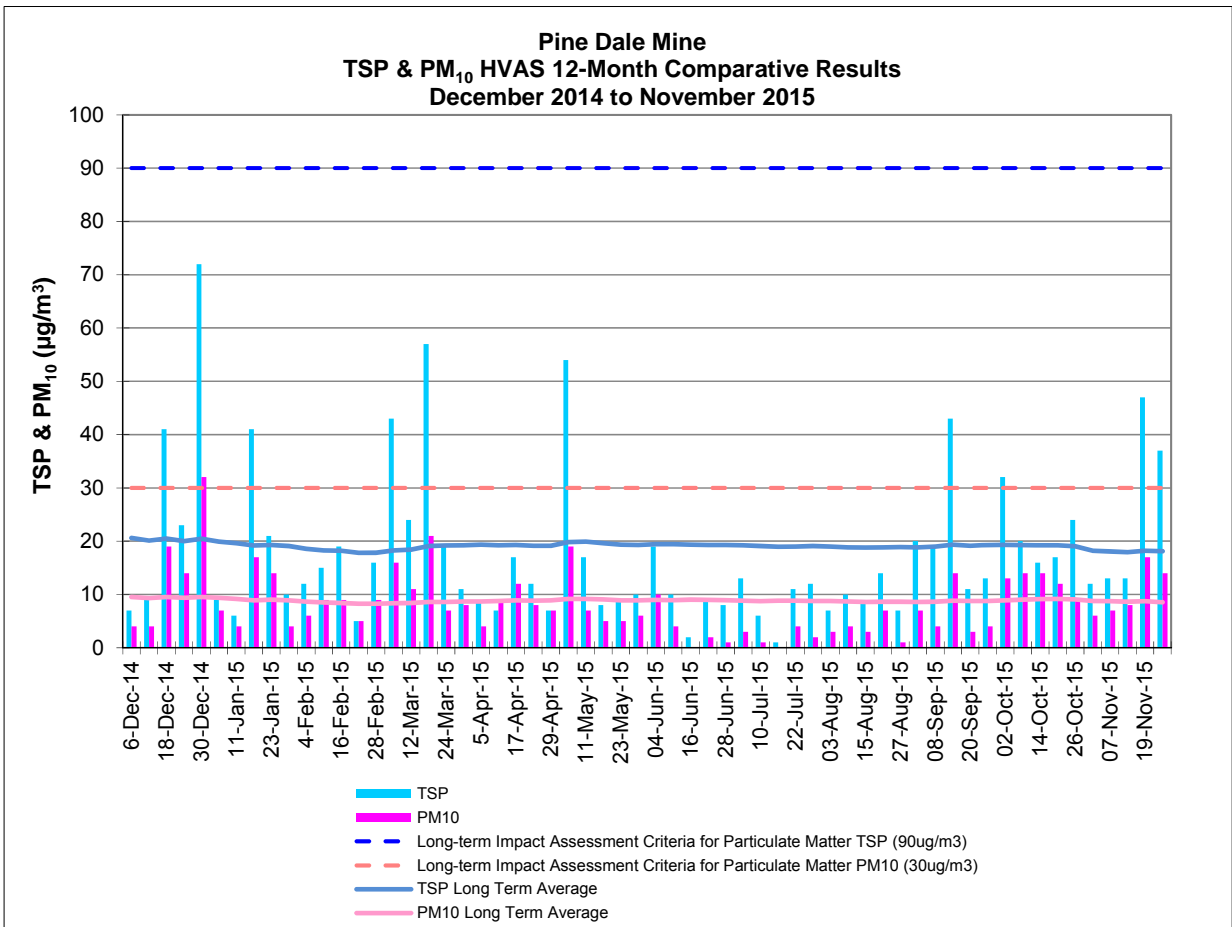
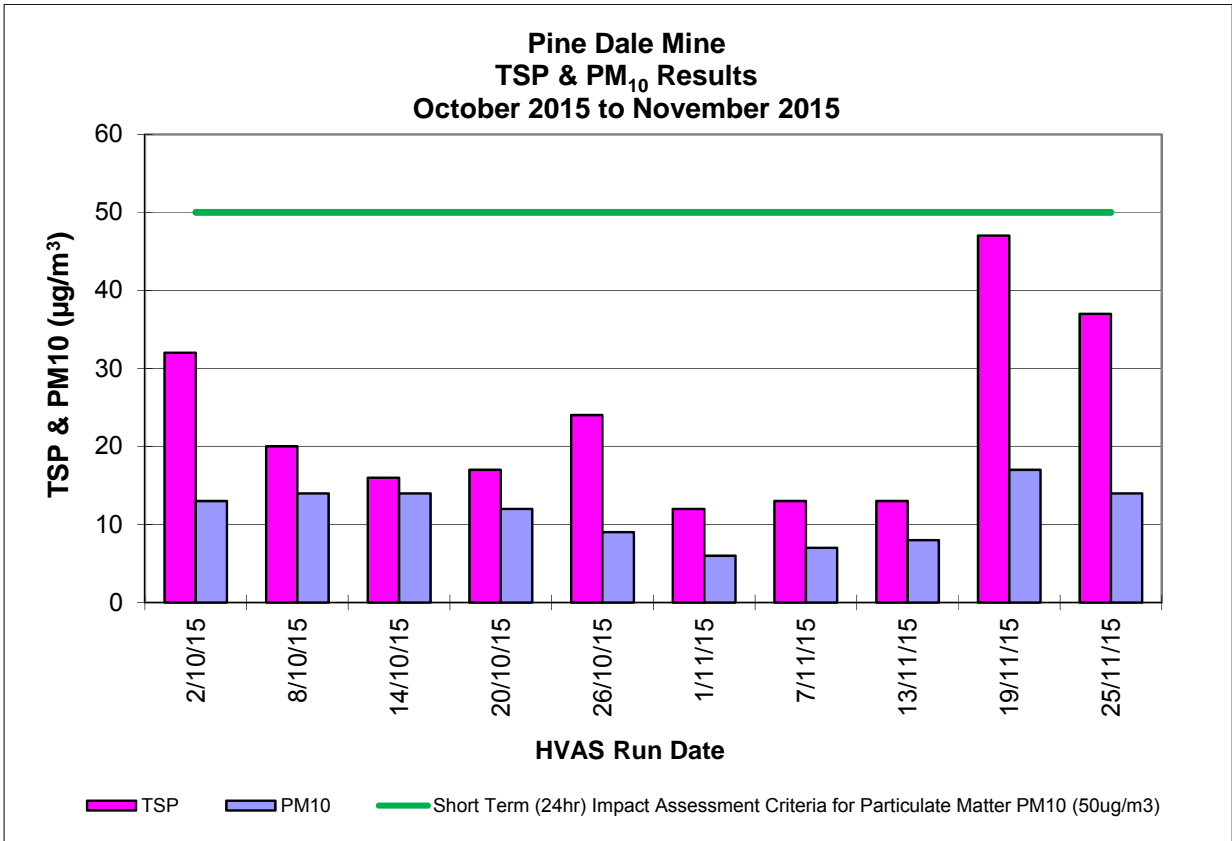
Depositional Dust and HVAS Graphs

**Pine Dale Mine  
Depositional Dust Gauge Comparative Results  
October 2015 to November 2015**



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



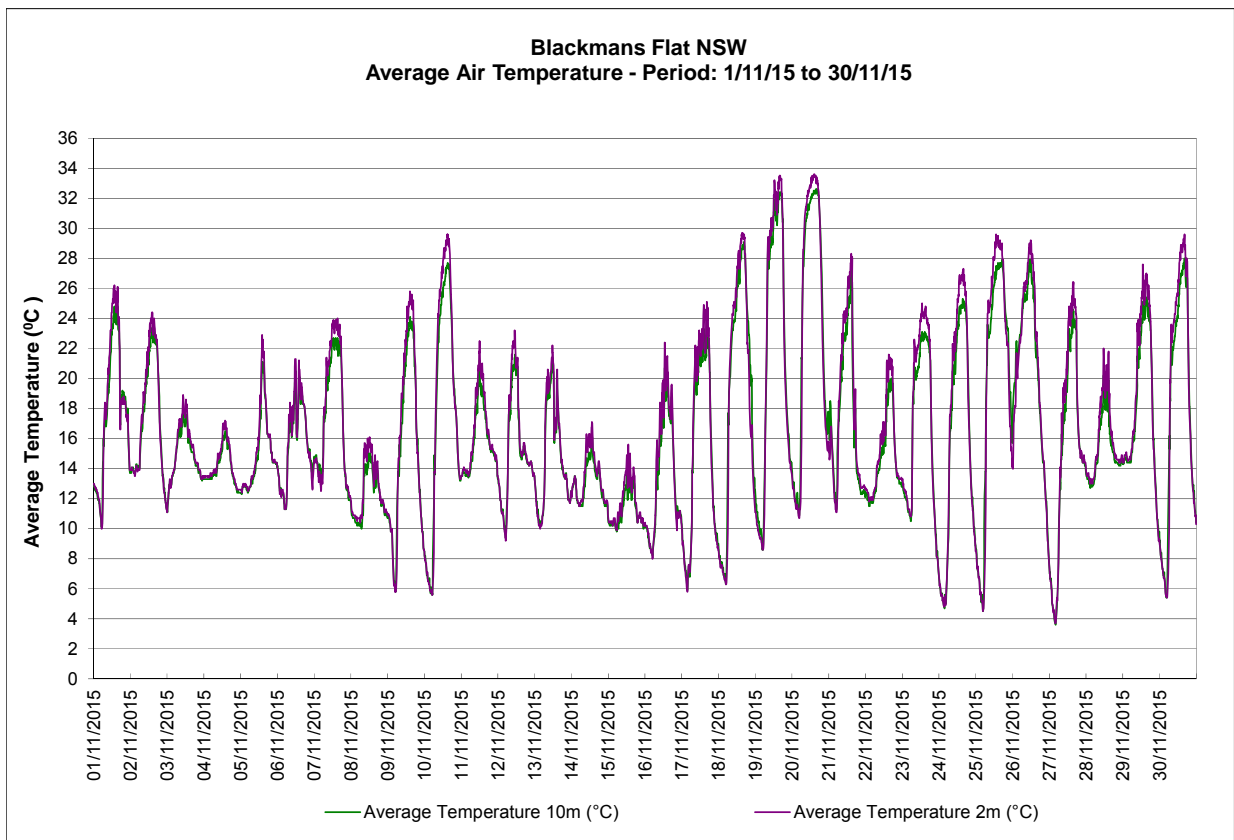
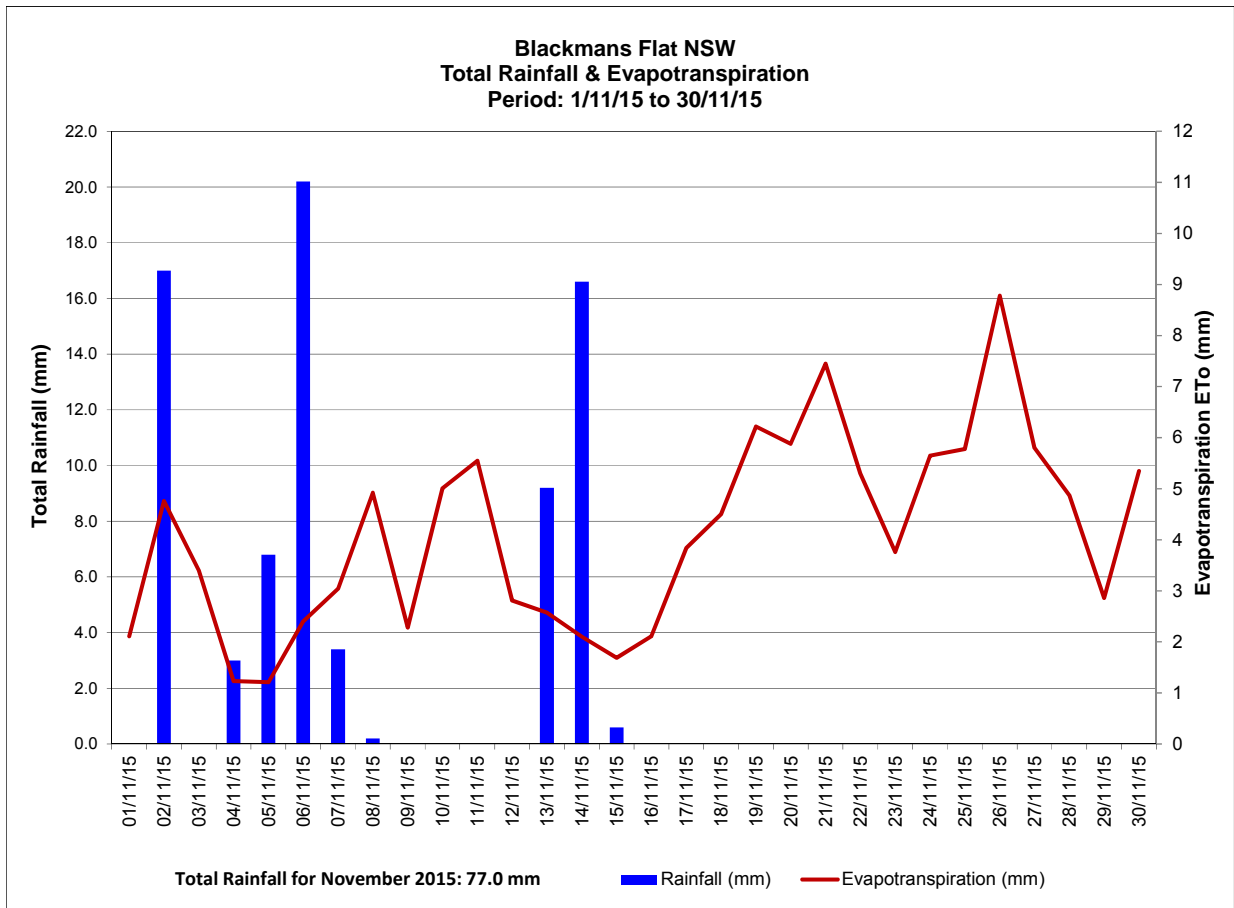




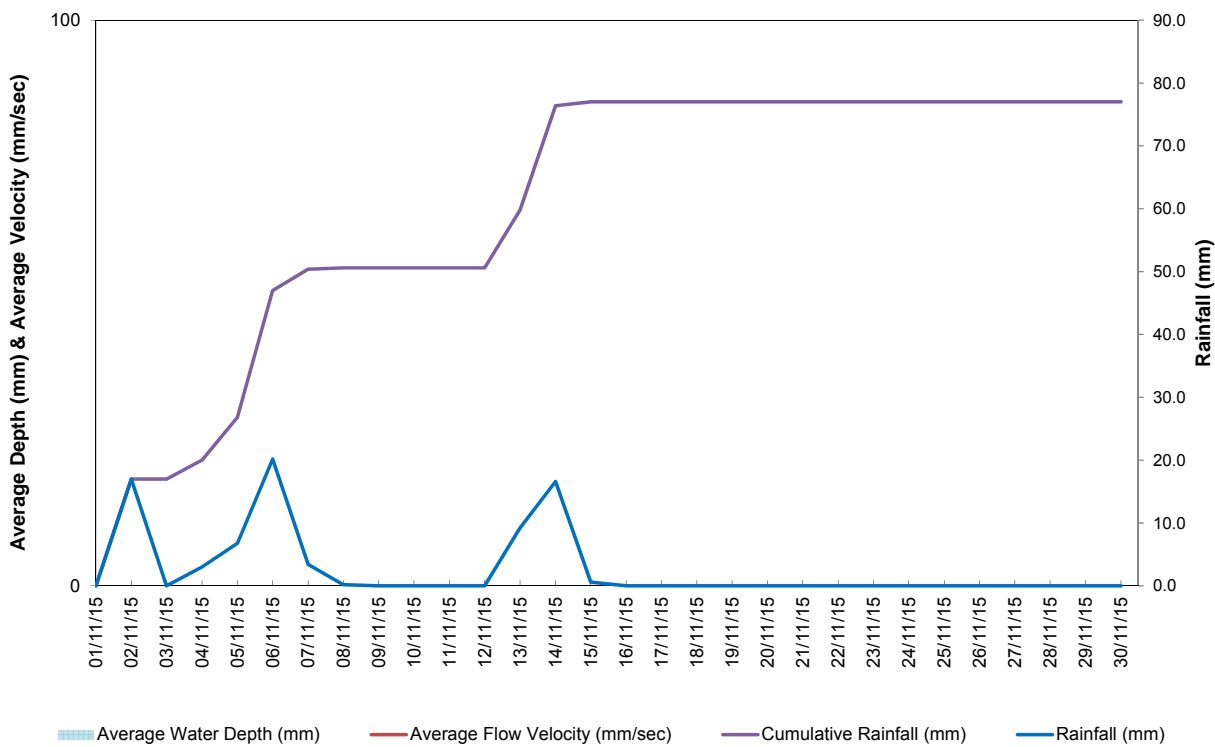
# Appendix 3

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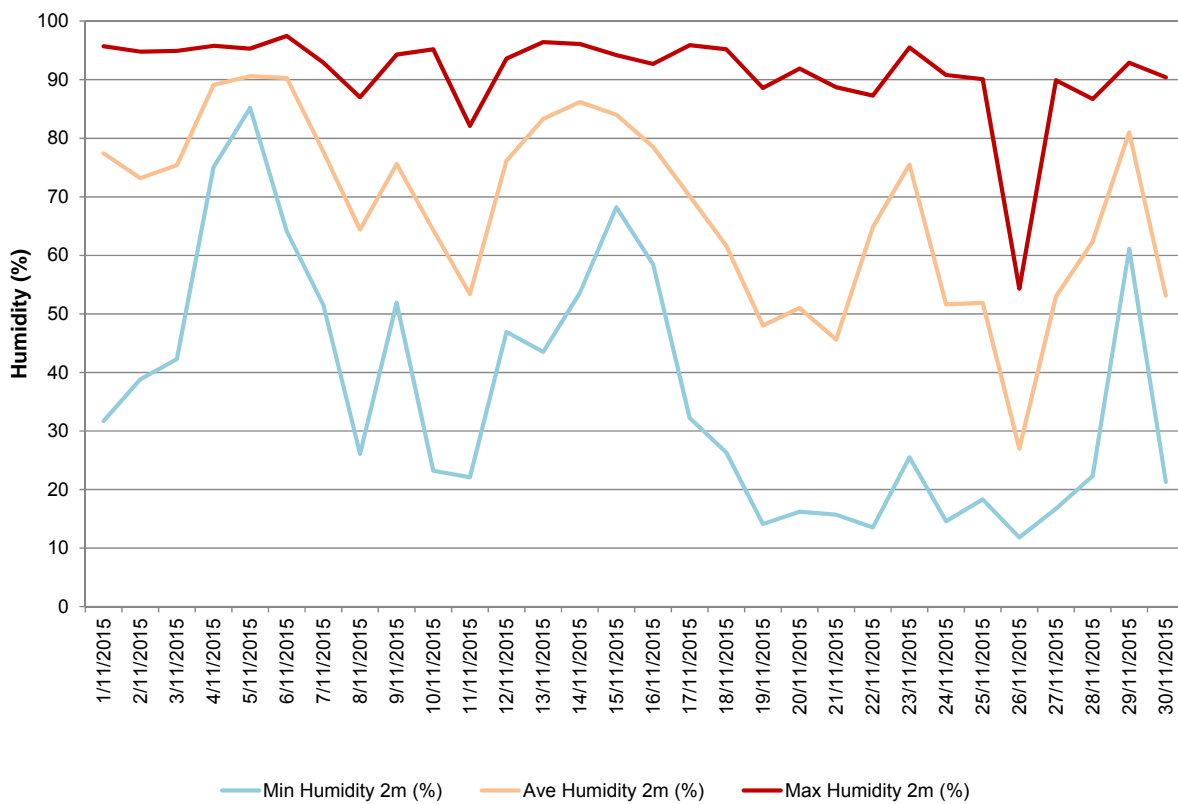
Meteorological Data

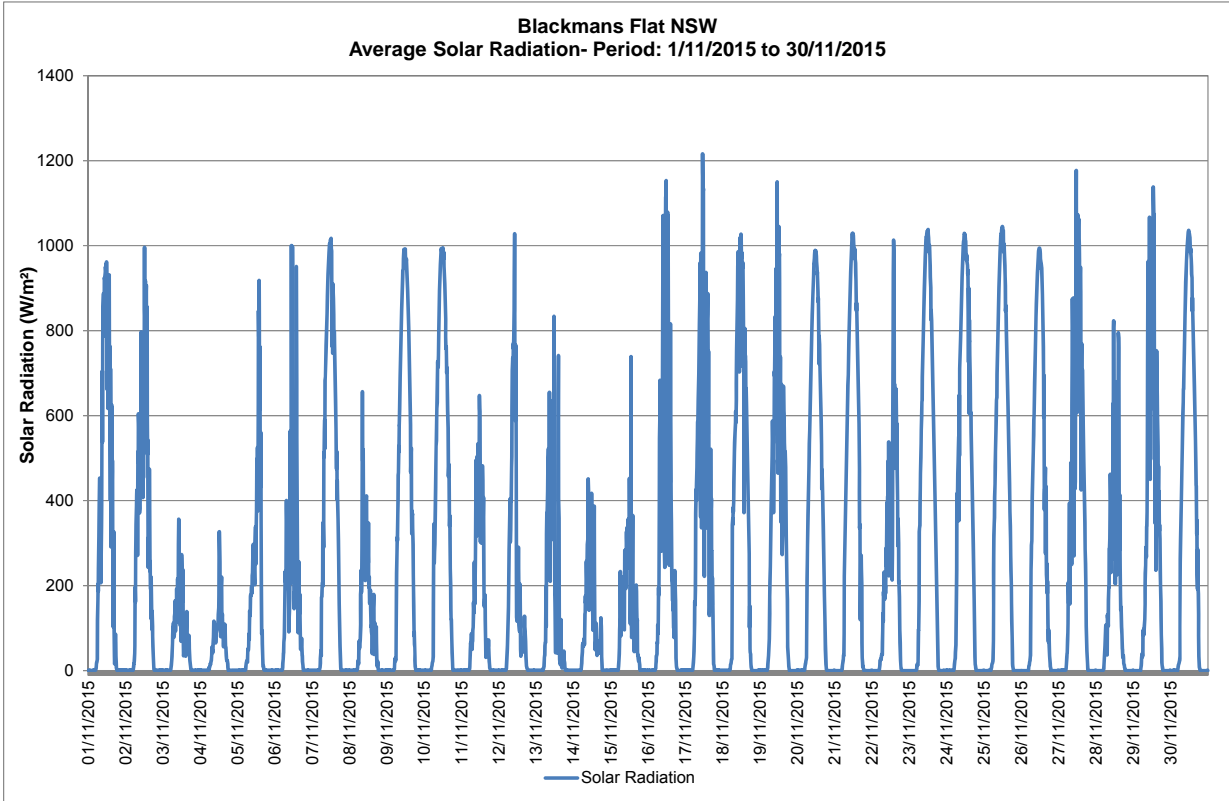
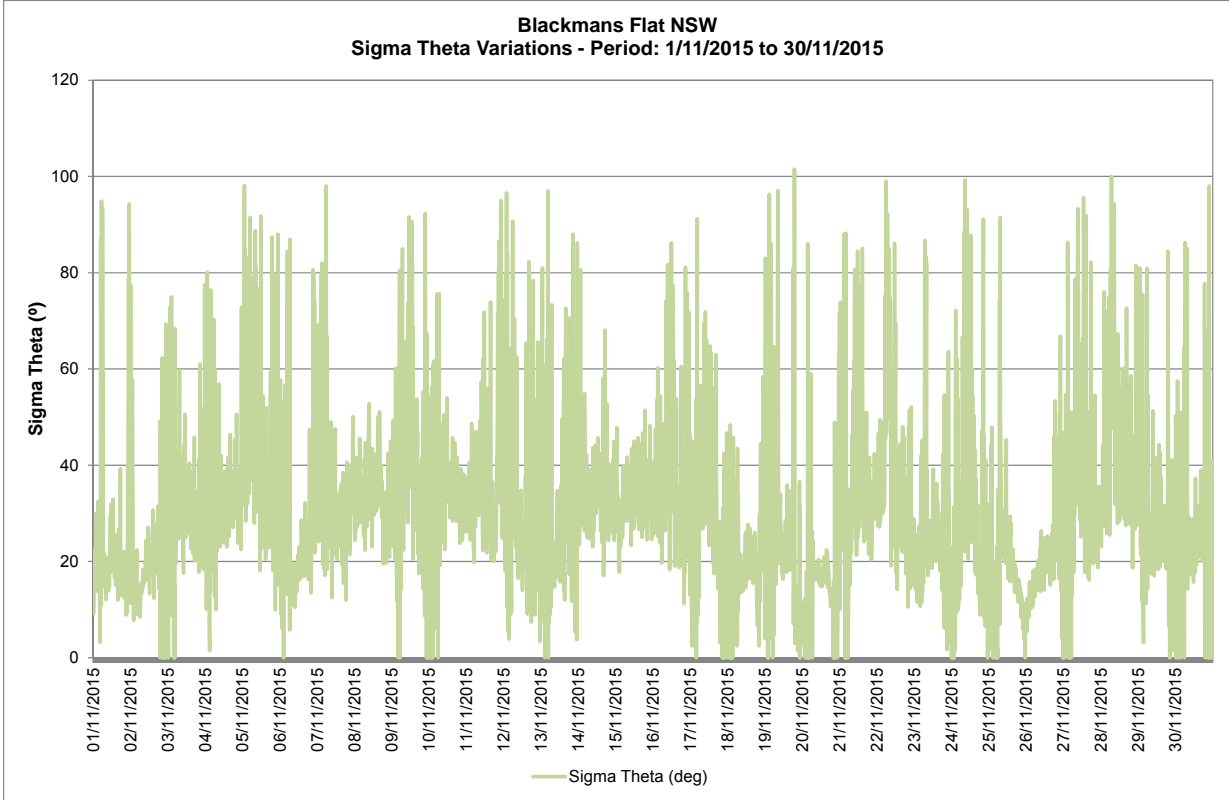


**Neubecks Creek - Blackmans Flat NSW**  
**Average Depth & Velocity vs. Rainfall- Period: 1/11/2015 to 30//2015**



**Blackmans Flat NSW**  
**Daily Humidity Variations - Period: 1/11/2015 to 30/11/2015**

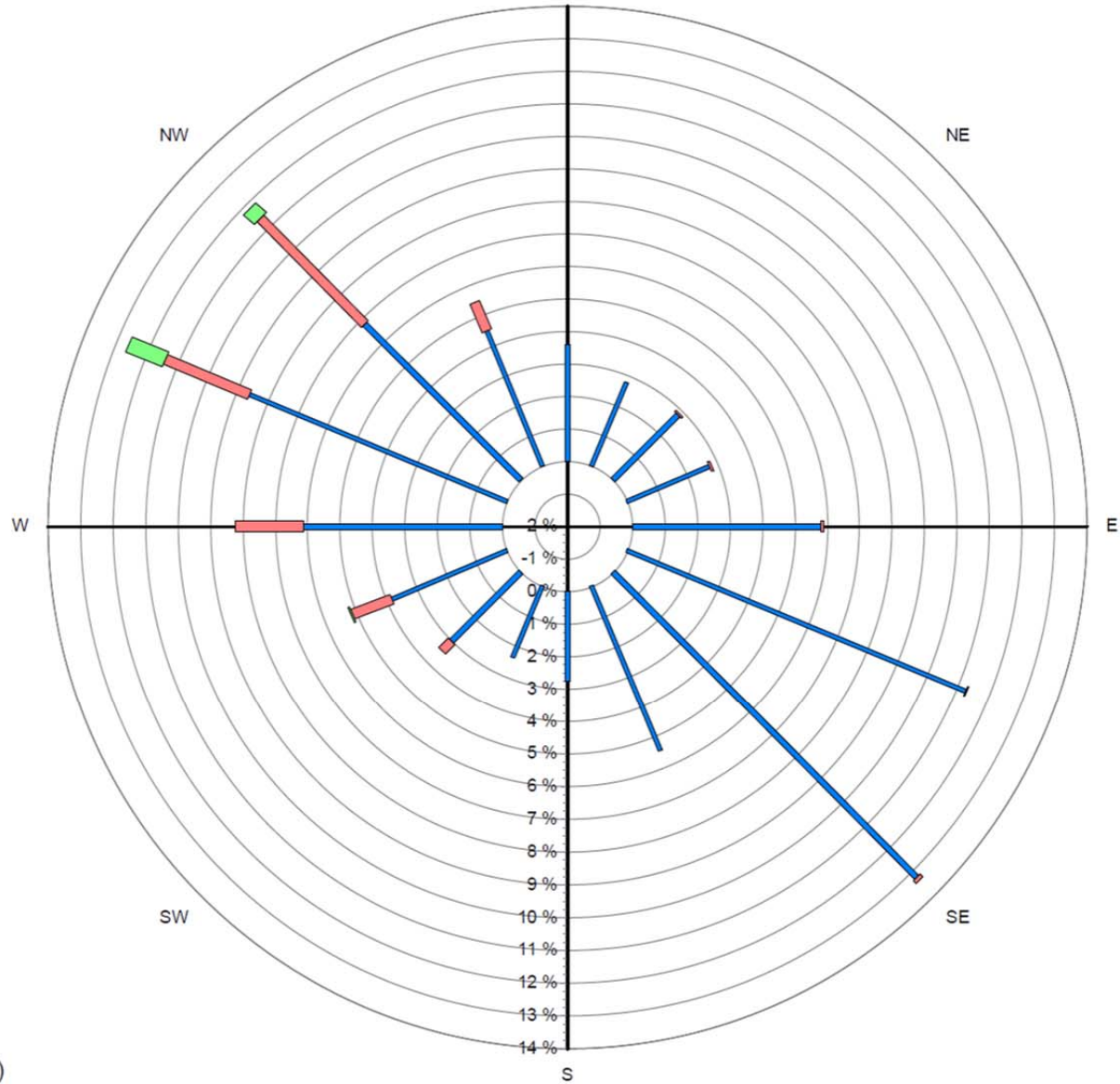
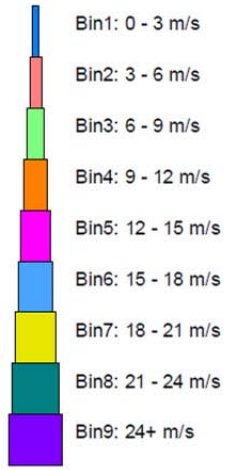




# Blackmans Flat Windrose

1/11/2015 to 30/11/2015

N



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