

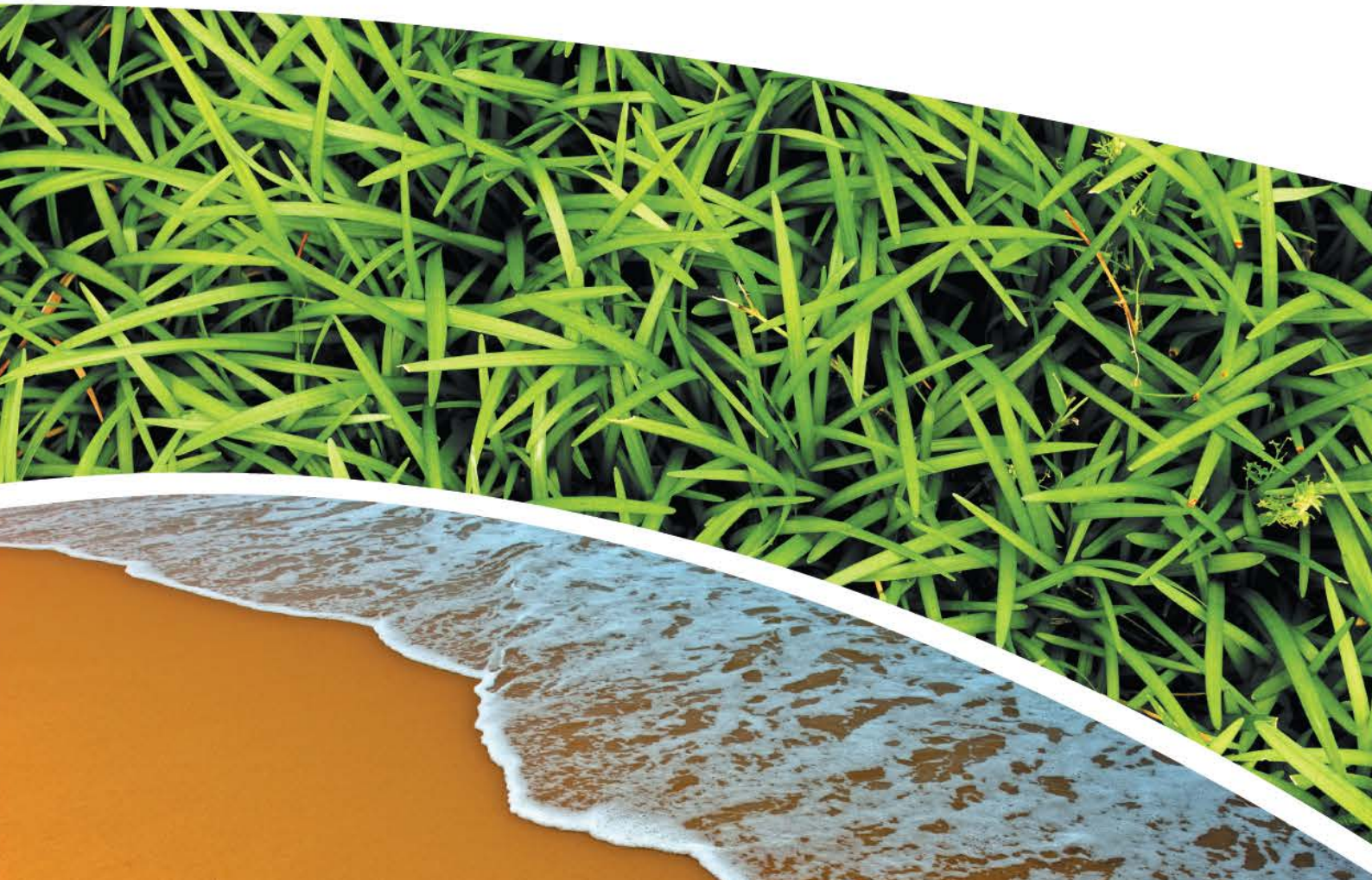
**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-835/0

October 2013



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RCA LE ref 6880-835/0



13 November 2013

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
OCTOBER 2013**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of October 2013.

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	Non-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

*Note that turbidity sampling and analysis is conducted to NATA approved method ENV-LAB037, however as the meter is not owned by RCA Laboratories-Environmental the test cannot be considered NATA accredited.

3 WATER MONITORING RESULTS

3.1 GROUNDWATER

A total of 2 on-site groundwater samples were collected during the month of October 2013. 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	-	10136880014	10136880015
Date Sampled	-	30/10/2013	30/10/2013
Time Sampled	-	13:55	15:05
Depth to Water from Surface*	m	26.10	6.65
Water Level (AHD)	m	890.85	887.75
Temperature	°C	17.0	15.0
pH	pH	6.53	7.05
Conductivity	µS/cm	1112	787
Turbidity	NTU	21	
Dissolved Oxygen	mg/L	7.1	
TSS	mg/L	28	
Oil & Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	49	
Total Alkalinity (CaCO ₃)	mg/L	49	
Sulfate (as SO ₄)	mg/L	520	
Chloride	mg/L	25	
Calcium	mg/L	115	
Magnesium	mg/L	54	
Sodium	mg/L	38	
Potassium	mg/L	22	
Cobalt (dissolved)	mg/L	0.094	
Manganese (dissolved)	mg/L	3.6	
Nickel (dissolved)	mg/L	0.126	
Zinc (dissolved)	mg/L	0.17	
Iron (dissolved)	mg/L	25.0	

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 waters were not scheduled to be monitored this month. Quarterly surface water monitoring is next scheduled to be undertaken in November 2013.

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 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-Oct-13	26	10136880034	8725986	09-Oct-13	10:03	Client	24.00
12-Oct-13	32	10136880036	8725988	15-Oct-13	13:25	Client	84.41
18-Oct-13	105	10136880038	8725990	21-Oct-13	13:30	Client	24.05
24-Oct-13	24	10136880040	8725916	28-Oct-13	9:55	Client	24.00
30-Oct-13	21	10136880042	8725917	31-Oct-13	10:15	K Tripp	24.00
06-Oct-13	26	10136880034	8725986	09-Oct-13	10:03	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-Oct-13	8	10136880035	8725987	09-Oct-13	10:03	Client	24.04
12-Oct-13	20	10136880037	8725989	15-Oct-13	13:25	Client	48.00
18-Oct-13	85	10136880039	8725991	21-Oct-13	13:30	Client	24.00
24-Oct-13	7	10136880041	8725992	28-Oct-13	9:55	Client	24.00
30-Oct-13	11	10136880043	8725918	31-Oct-13	10:23	K Tripp	24.00
06-Oct-13	8	10136880035	8725987	09-Oct-13	10:03	Client	24.04

* It should be noted on the 12 October 2013 both HVAS units ran for greater than the quality assurance period of 24 hours \pm 1 hour as stipulated in applicable Australian Standards 3850.9.3 and 3850.9.6 due to a programming error.

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 November 2012 to October 2013) for the TSP unit is $25.6\mu\text{g}/\text{m}^3$, which is well below the allowable limit of $90\mu\text{g}/\text{m}^3$. The high TSP concentration recorded on 18 October 2013 is most likely attributed to the "State Mine Fire" and other bushfires observed within the Lithgow and Blue Mountains region.

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 $12.2\mu\text{g}/\text{m}^3$, 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 exceeded on the 18 October 2013 with a concentration of $85\mu\text{g}/\text{m}^3$ recorded at the unit. It is considered that this result, which is highly elevated when compared to historical data and results recorded during the remainder October, is the result of the severe bushfires that were observed in the Lithgow and Blue Mountains region this month.

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 5**. The depositional dust exposure period for October (35 and 36 days) is outside of the typical exposure period of 30 ± 2 days nominated in AS/NZS 3580.10.1:2003 due to the occurrence of bushfires within the area which impacted the health and safety risk of undertaking dust monitoring. However, as results are based on a 30-day month, the additional exposure has been factored into the equation during calculation allowing the results for October to be considered accurate and reliable.

Table 5 *Depositional Dust Monitoring - Deposited Matter October 2013*

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)
10136880024	D1	25/09/2013	30/10/2013	35*	IT	0.9	0.5	0.4
10136880025	D2	25/09/2013	30/10/2013	35*	I	0.8	0.5	0.3
10136880026	D3	25/09/2013	30/10/2013	35*	I	0.9	0.6	0.3
10136880027	D4	25/09/2013	30/10/2013	35*	I	0.6	0.4	0.2
10136880028	D5	25/09/2013	31/10/2013	36*	B	NR**	NR**	NR**
10136880029	D6	25/09/2013	31/10/2013	36*	I	0.5	0.3	0.2

*Please note that insoluble solids, ash residue and combustible matter are calculated based on a 30 day month as per Australian Standard 3580.10.1. Exposure days are taken into consideration as a variable when conducting this calculation and producing results in g/m².month.

**Sample has been rejected due to excessive bird droppings, with an ash residue: insoluble solids ratio less than 50%

4.2.1 Glossary of Terms Used in Notes

B	Bird Droppings	I	Insects (eg, Ants, spiders)
IT	Insects (e.g. Ants, Spiders) and Tree Litter		

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 1.1g/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

Blasting results for the month of October are shown in **Table 6**.

Table 6 *Blasting Results- Airblast Overpressure (dB) and Ground Vibration (mm/sec)*

Date	Park		Noon St.		Summer St.	
	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)
11/10/2013	NT	NT	94.6	0.10	NT	NT
18/10/2013	NT	NT	103.4	0.08	NT	NT
2012- 2013 Year to Date Information						
Minimum	96.9	0.38	78.3	0.08	87.2	0.10
Average	96.9	0.38	104.4	0.87	106.1	1.05
Maximum	96.9	0.38	113.5	2.21	113.7	2.17
% > EPL 95% Compliance Criteria	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% > EPL 100% Compliance Criteria	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Notes: NT - No Trigger. Blast monitoring unit was not triggered during the blast.

5.1.1 Allowable Blasting Limits

Conditions of EPL 4911 state that in relation to airblast overpressure levels a result of greater than 115dB must not be observed at any noise sensitive location for more than 5% of the total number of blasts over each annual reporting period. All blasts within the annual reporting period (100% of blasts) are not to exceed the compliance criteria of 120dB. Ground vibration peak velocity levels must not exceed 5mm/sec for 95% of blasts, whilst an intensity of 10mm/sec must not be exceeded by any blast during the reporting period. The reporting period runs as a rolling 12-month average from November 2012 to October 2013.

During October 2013, there were nil exceedances of the EPL conditions for both overpressure and vibration levels. In terms of the rolling annual average, no blasts have exceeded the 100% compliance conditions of 120dB and 10mm/sec for overpressure and vibration respectively. The overpressure and vibration criteria of 115dB and 5mm/sec, respectively, have not been exceeded for more than 5% of the blasts during the reporting period.

Graphical presentation of the blasting results from overpressure and vibration are shown in **Appendix 2**.

6 NOISE MONITORING RESULTS

Routine quarterly noise monitoring was undertaken during this reporting period on 30 and 31 October 2013. The quarterly noise surveys consist of three 15-minute attended noise assessments between the hours of 7:00am and 6:00pm at six locations as determined by the site's *Noise Management Plan* and EPL No.4911, whilst in accordance with Project Approval 10_0041, schedule 3-1.

Quarterly noise monitoring results for the month of October is presented in **Table 7**. Noise monitoring results indicate the noise contribution from Pine Dale Mine was within the allowable noise limits nominated in EPL No. 4911.

Noise monitoring locations are provided in **Appendix 1**, with locations situated at each of the deposition dust gauge monitoring sites.

Table 7 *Attended Noise Monitoring Results- October 2013*

Location	Date and Time	Daytime Noise Level recorded dB (LAeq 15 minute)	PDM Noise Contribution dB (LAeq 15 minute)	Daytime Noise Limit dB (LAeq 15 minute)
NM1 (EPL Ref No. 33)	30/10/2013 10:52	43.1	30.0	42
	30/10/2013 11:07	41.9	29.5	
	30/10/2013 11:22	43.8	32.0	
NM2 (EPL Ref No. 14)	30/10/2013 11:52	47.3	33.3	42
	30/10/2013 12:07	48.8	38.9	
	30/10/2013 12:22	47.6	39.8	
NM3 (EPL Ref No. 10)	30/10/2013 13:30	43.5	39.0	42
	30/10/2013 13:45	43.0	33.2	
	30/10/2013 14:00	45.2	36.1	
NM4 (EPL Ref No. 5)	30/10/2013 14:38	37.8	19.5	35
	30/10/2013 14:53	37.4	19.6	
	30/10/2013 15:08	37.3	25.1	
NM5 (EPL Ref No. 4)	31/10/2013 10:55	41.8	NIL	35
	31/10/2013 11:10	39.1	18.5	
	31/10/2013 11:25	36.7	NIL	
NM6 (EPL Ref No. 2)	31/10/2013 11:46	38.3	27.2	35
	31/10/2013 12:01	37.9	29.3	
	31/10/2013 12:16	38.8	33.5	

7 OPERATIONAL ACTIVITIES

Pine Dale Mine production rates in October 2013 were good, with no major issues recorded. There were 22 production days available with no weekend work undertaken. Overall, two blasts were shot throughout the month.

Relatively low rainfall was observed throughout the month, 15.0mm in total, of which the majority fell on the 23rd and 31st October. Production material targets have largely been achieved this month, with coal tonnage above target. Waste production was slightly below target this month, with approximately 120,000 tonnes of overburden excavated. Delivery of coal to Mt Piper was above budget with a total of 26,600 tonnes of coal delivered to Mt Piper Power Station.

8 SUMMARY

During the month of October 2013 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Quarterly surface waters were not scheduled to be sampled this month. Surface water Quality monitoring is next scheduled to be undertaken in November 2013.

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. There was one exceedence of the PM₁₀ short term impact assessment criteria of 50µg/m³ over twenty-four hours this month, with a result of 85µg/m³ measured on the 18th October 2013. This elevated concentration of particulate matter was attributed to severe bushfires occurring in the Lithgow and Blue Mountains region.

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.

During October the blasting requirements documented in the Pine Dale Mine EPL were not exceeded. During the previous twelve-month reporting period, there have been zero non-conformance's based upon the 95% or 100% limits for either overpressure or vibration levels.

Quarterly noise monitoring was conducted this month, with results showing the noise contribution from Pine Dale Mine was below the daytime noise impact assessment criteria as specified in the site's EPL and Noise Management Plan (NMP) across all six monitoring locations.

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Please contact the undersigned if you have any queries.

Yours sincerely



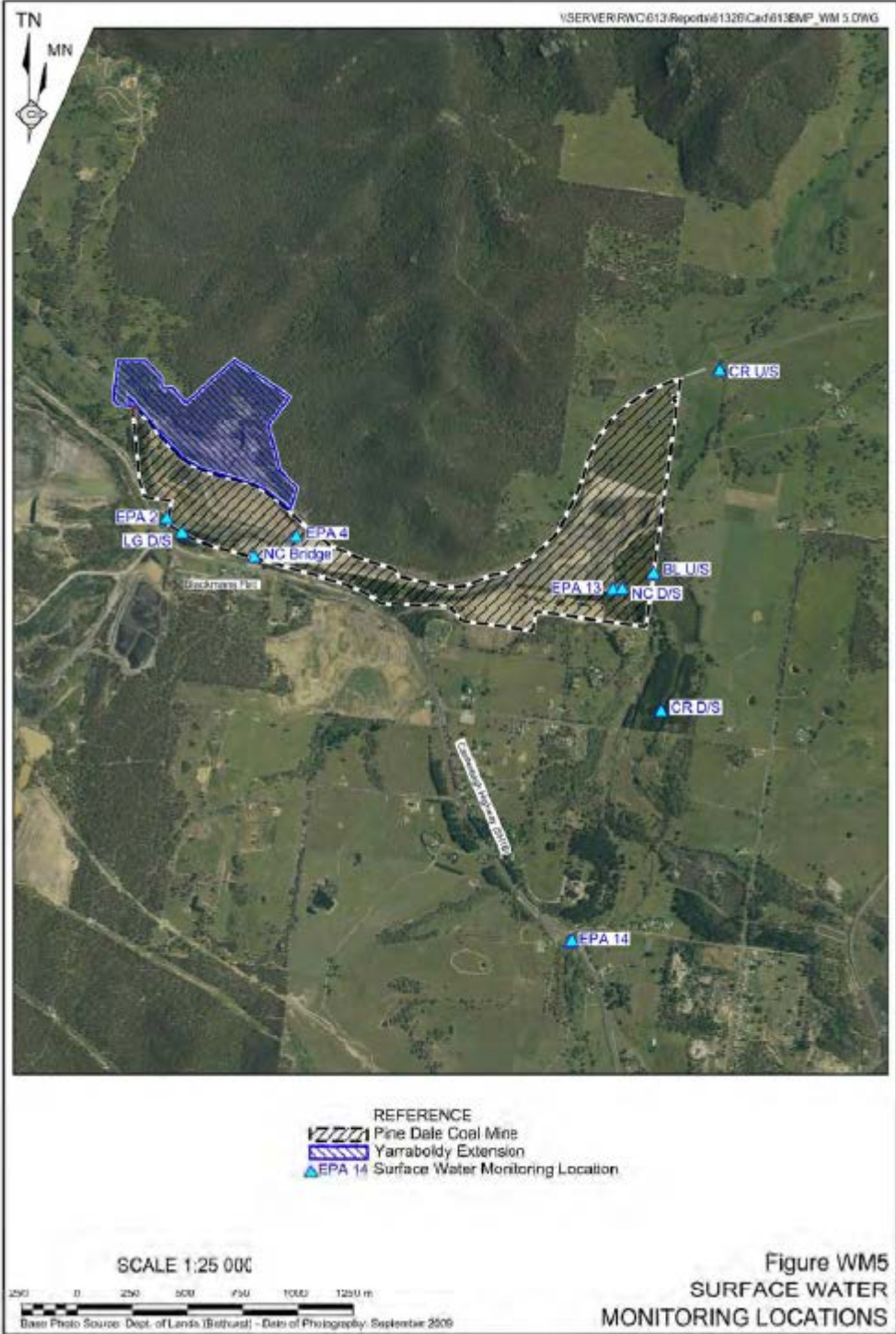
Katy Shaw
Environmental Scientist
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



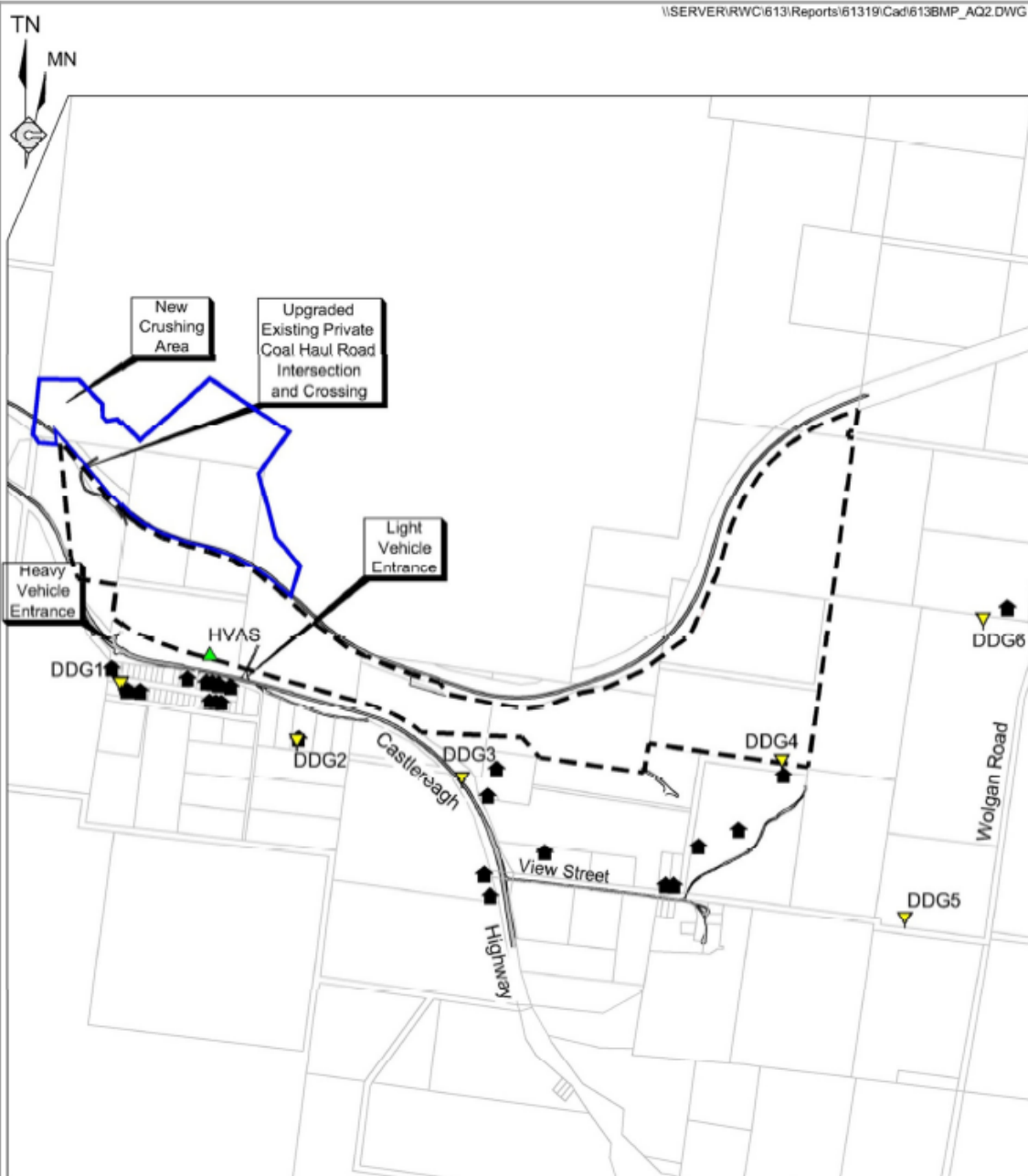
Karen Tripp
Senior Environmental Scientist/Hygienist
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental

Appendix 1

Surface Water Groundwater and Air Quality Monitoring Locations







- REFERENCE
- Pine Dale Coal Mine
 - Yarraboldy Extension
 - Cadastral Boundary
 - Residence
 - DDG1 ▾ Air Quality Monitoring Location (Deposited Dust)
 - HVAS ▲ Air Quality Monitoring Location (High Volume Sampling)

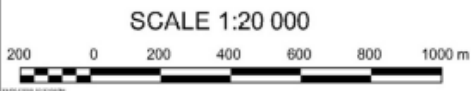
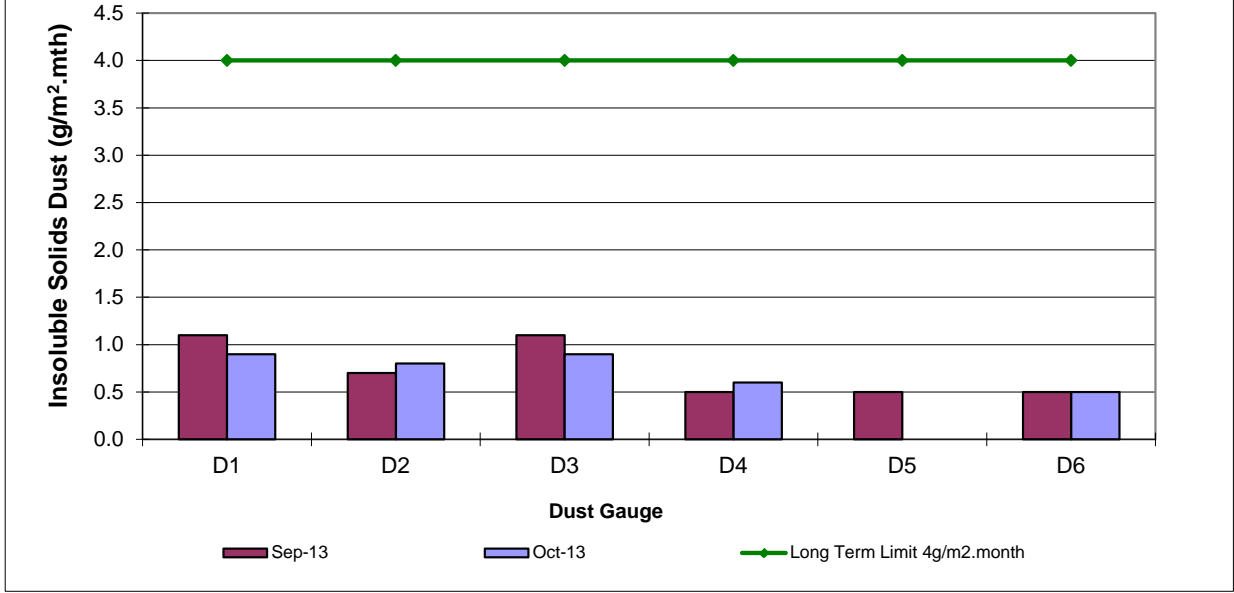


Figure AQ2
AIR QUALITY MONITORING
LOCATIONS

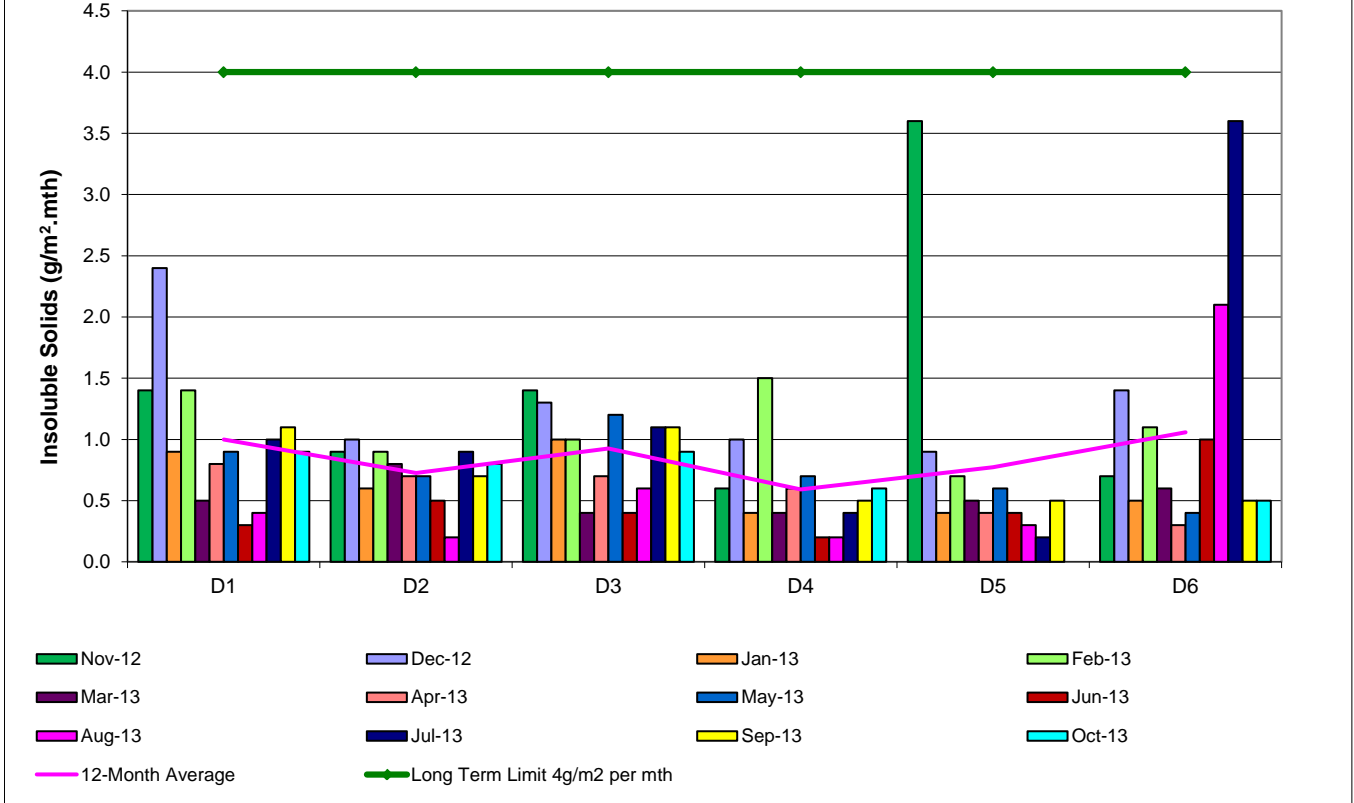
Appendix 2

Depositional Dust, HVAS and Blast Result Graphs

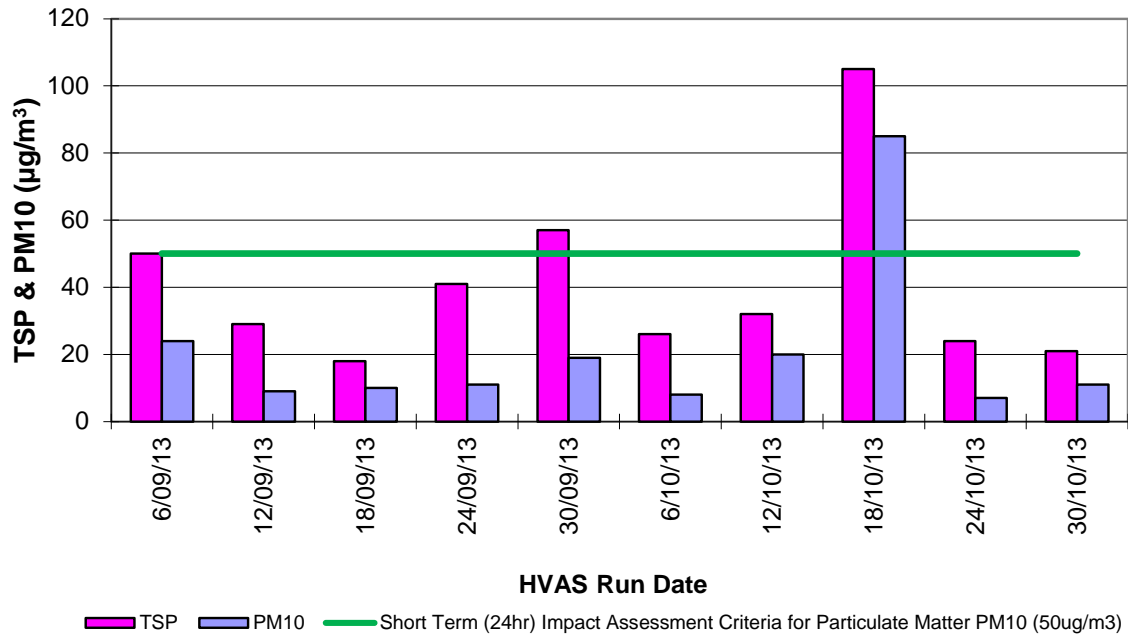
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
September 2013 - October 2013**



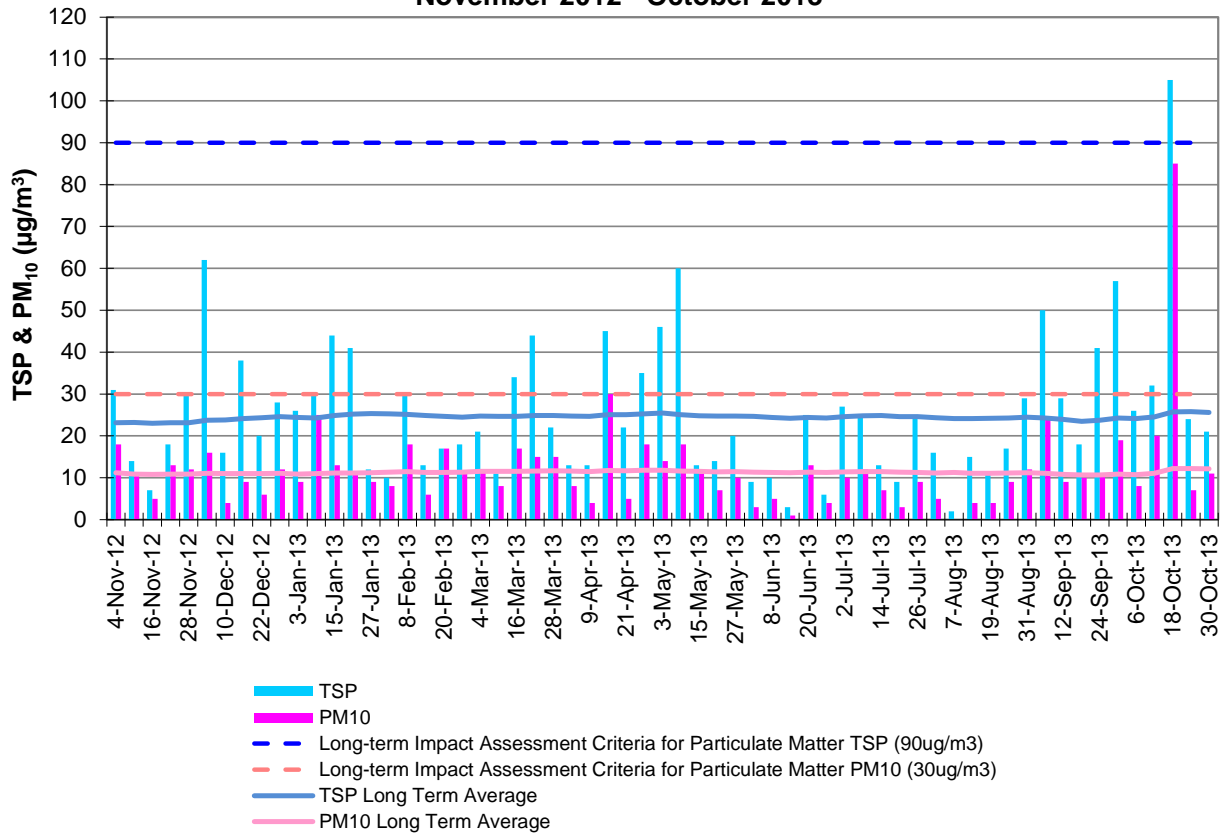
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
November 2012- October 2013**



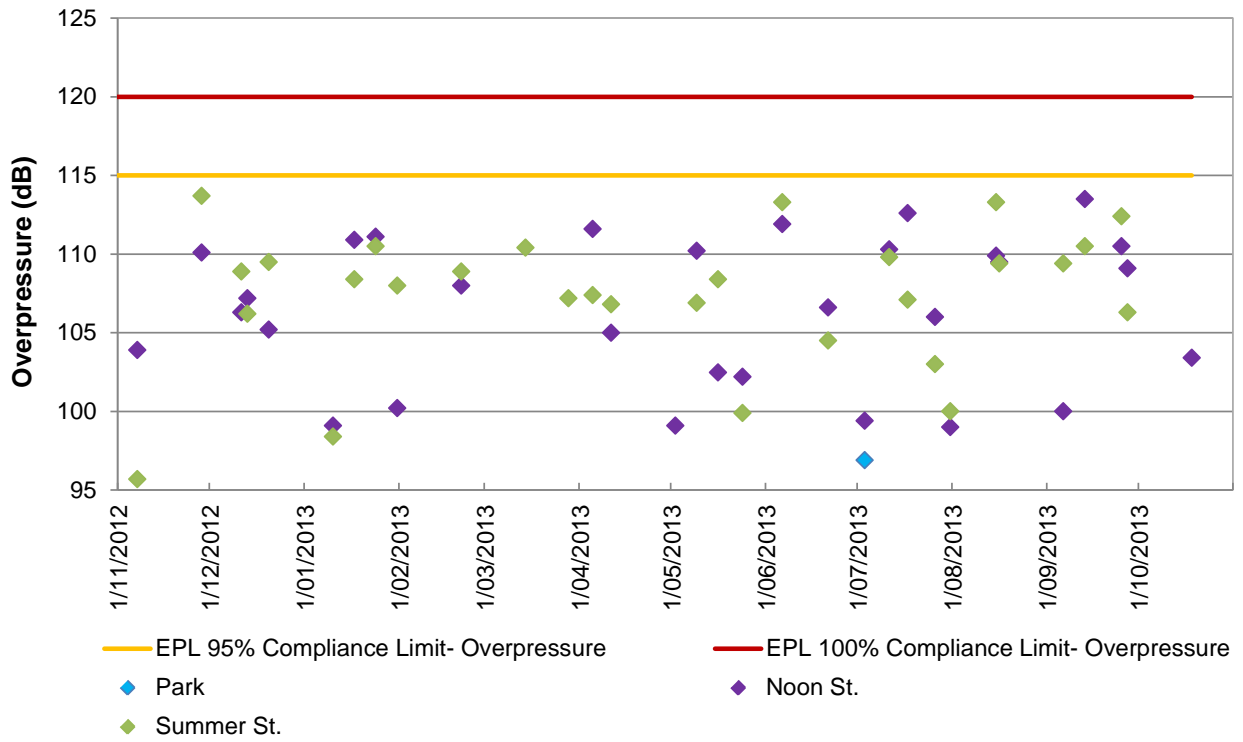
**Pine Dale Mine
TSP & PM₁₀ Results
September 2013 - October 2013**



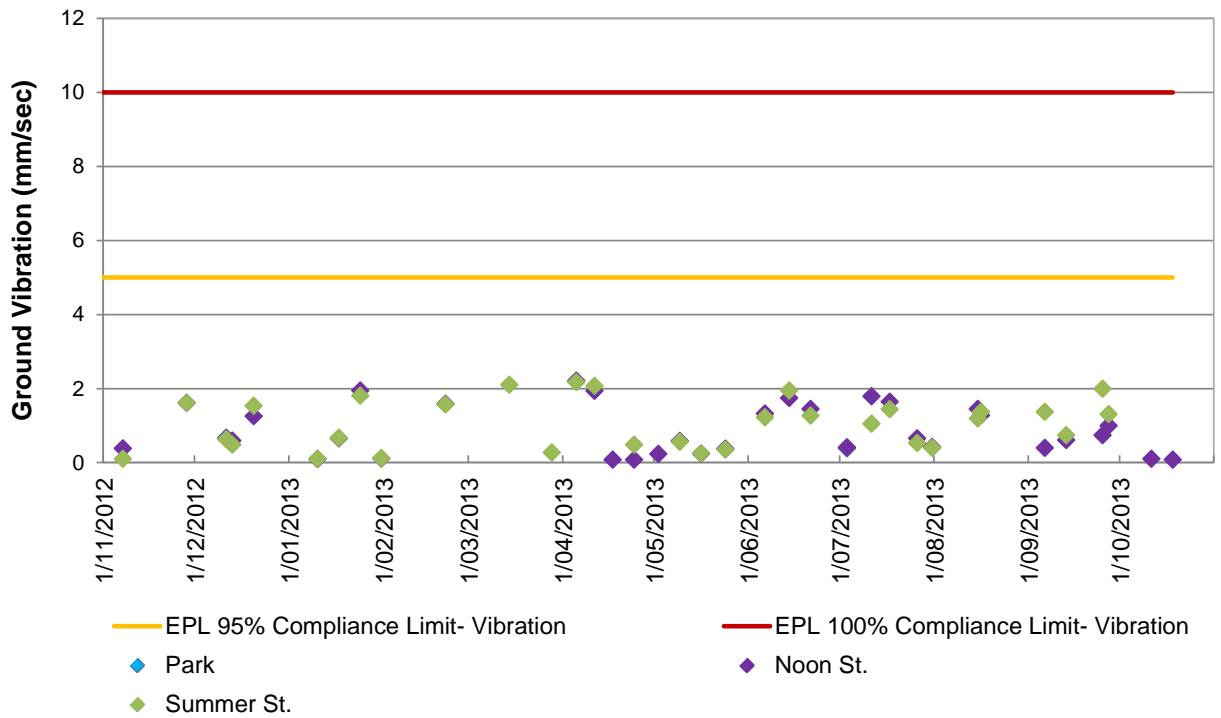
**Pine Dale Mine
TSP & PM₁₀ HVAS 12-Month Comparative Results
November 2012 - October 2013**



**Pine Dale Mine
Blasting- Airblast Overpressure
November 2012 to October 2013 Comparable Data**



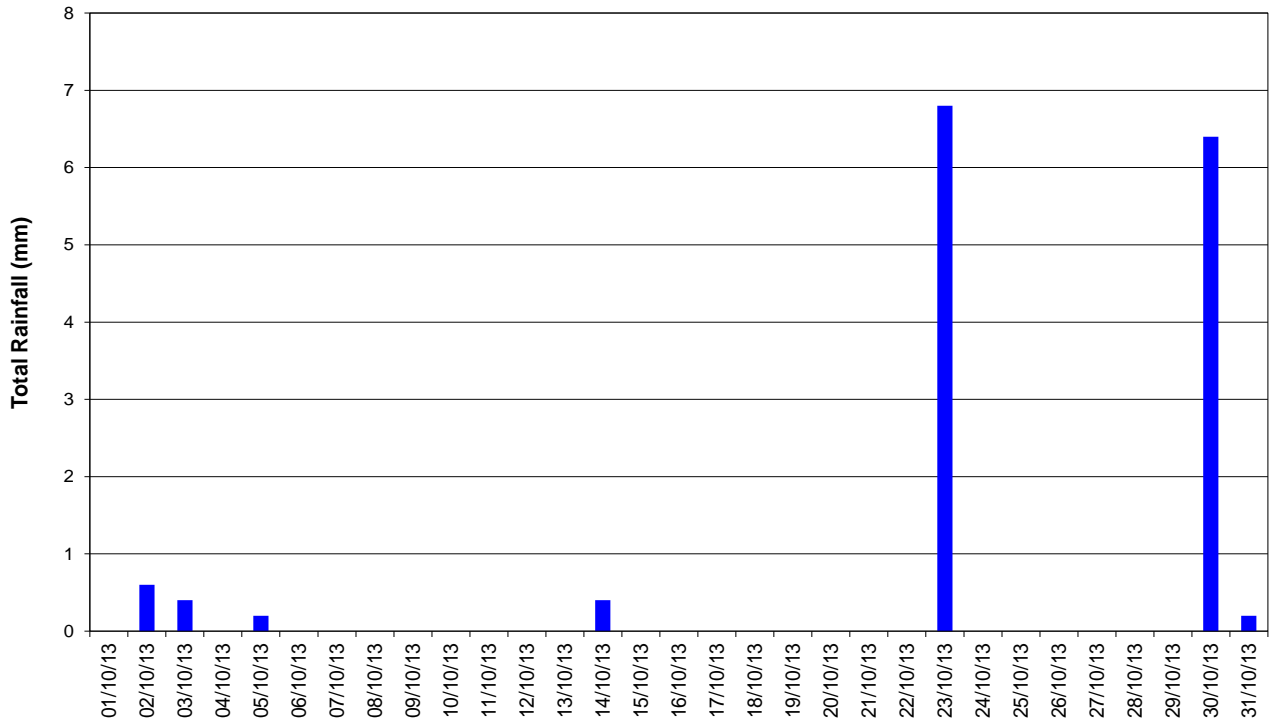
**Pine Dale Mine
Blasting- Ground Vibration
November 2012 to October 2013 Comparable Data**



Appendix 3

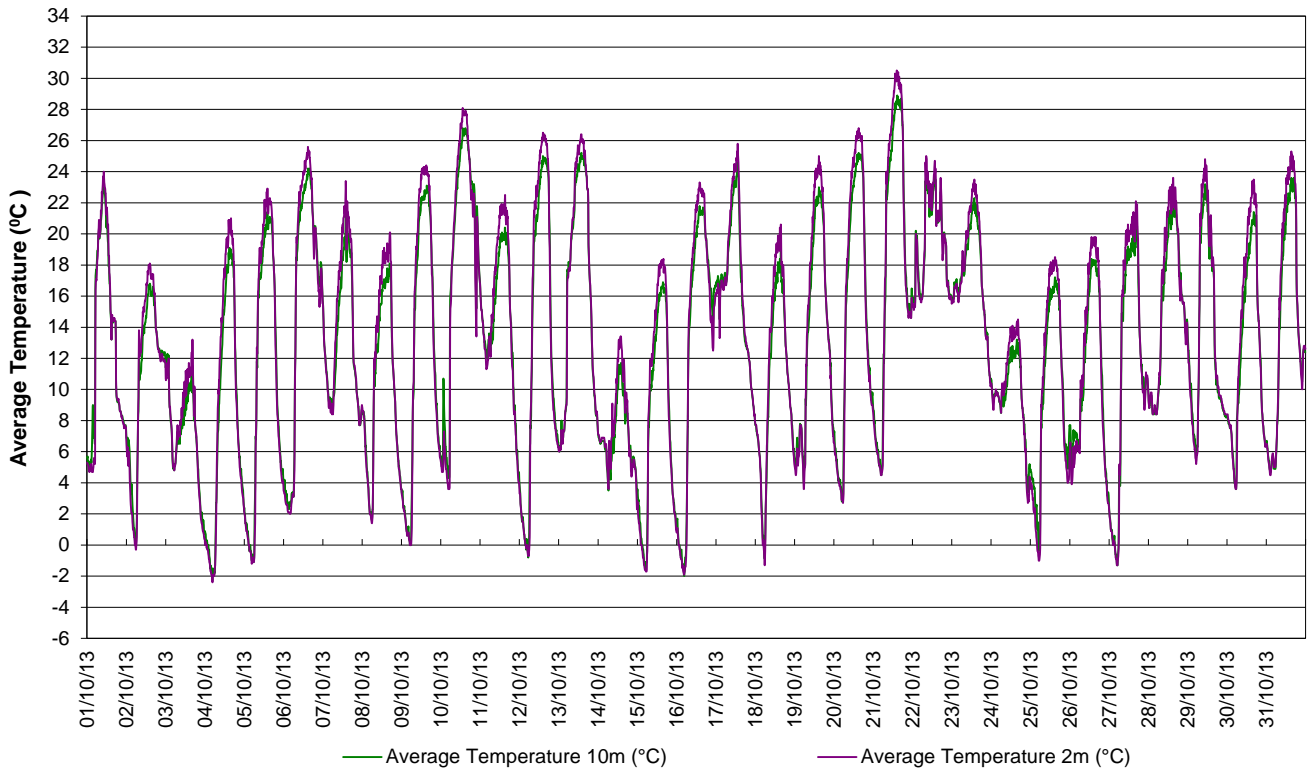
Meteorological Data

Blackmans Flat NSW
Total Rainfall - Period: 1/10/2013 to 31/10/2013

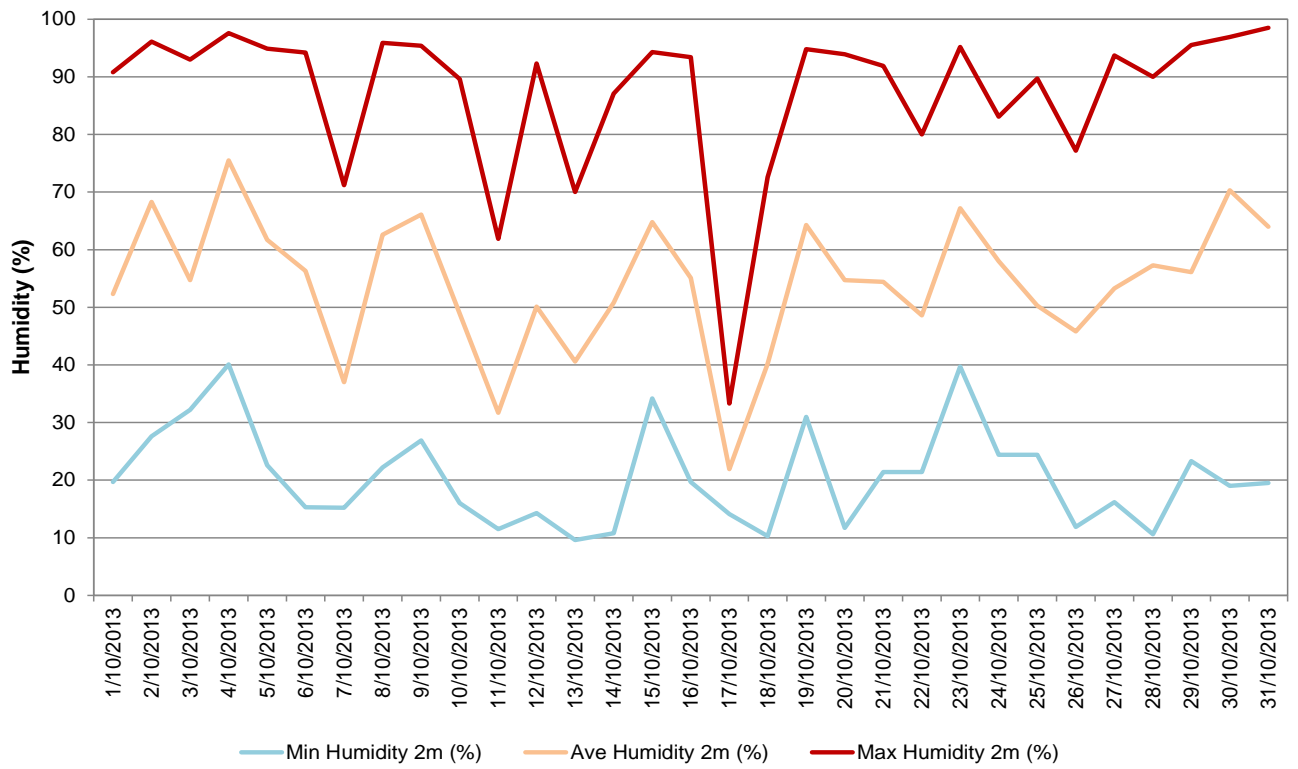


Total Rainfall for October 2013: 15.0 mm

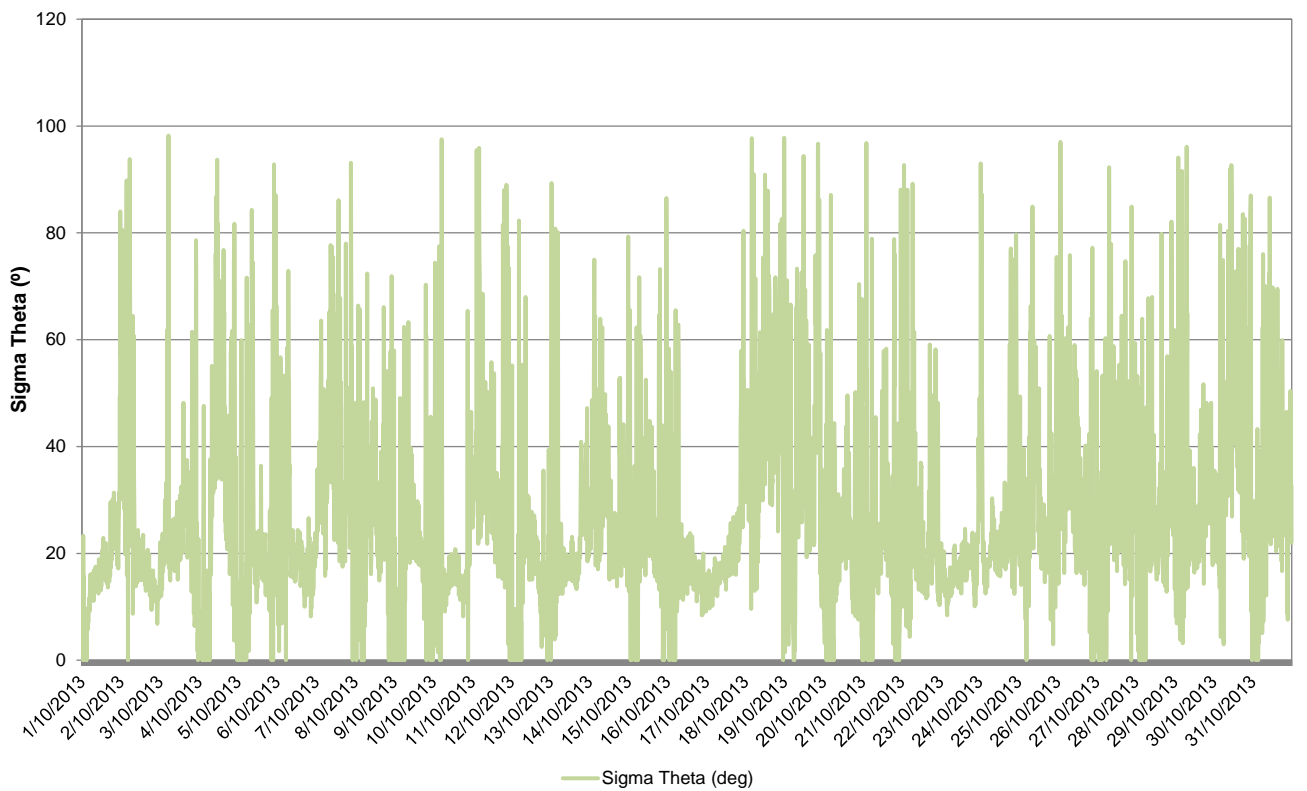
Blackmans Flat NSW
Average Air Temperature - Period: 1/10/2013 to 31/10/2013

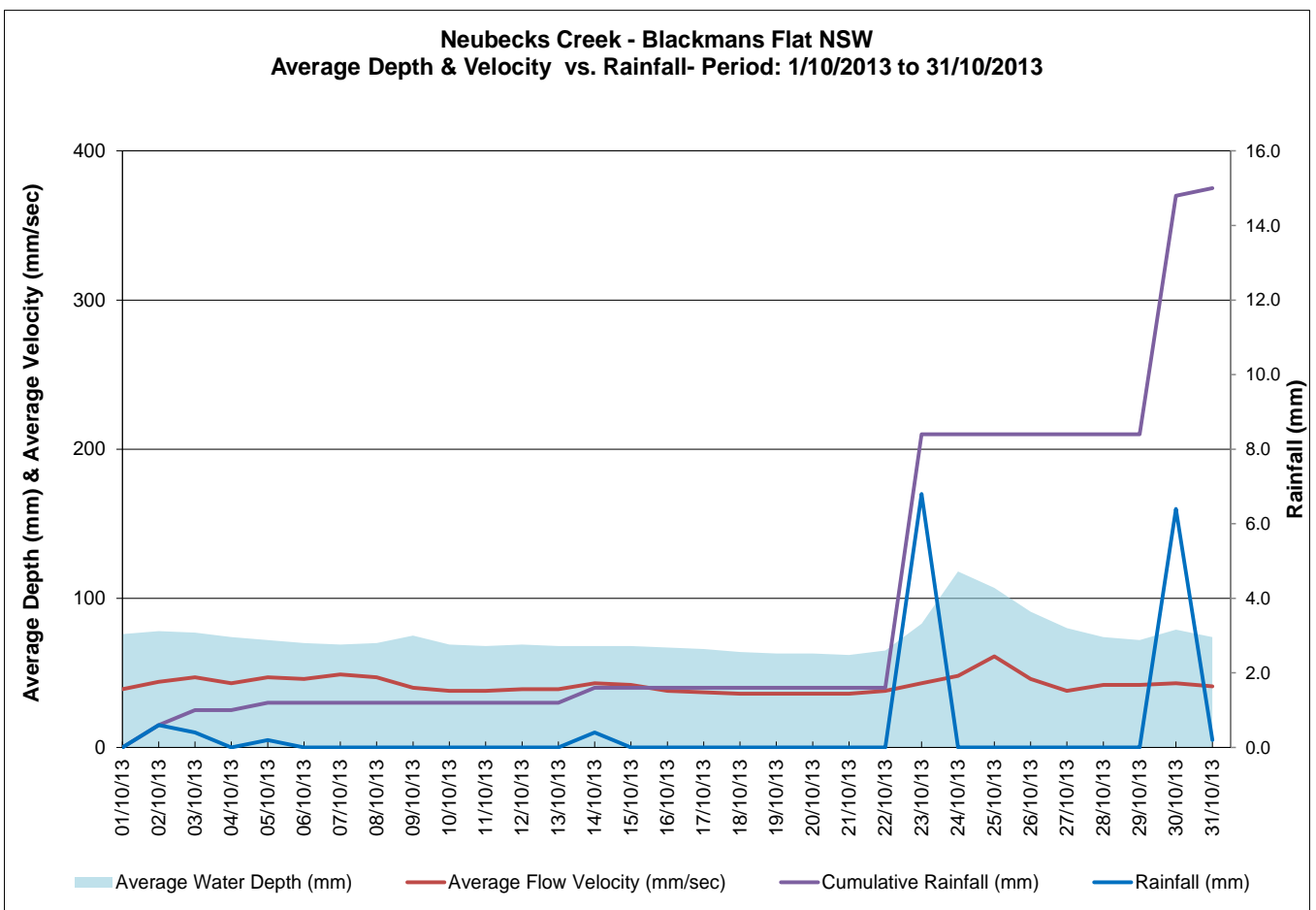
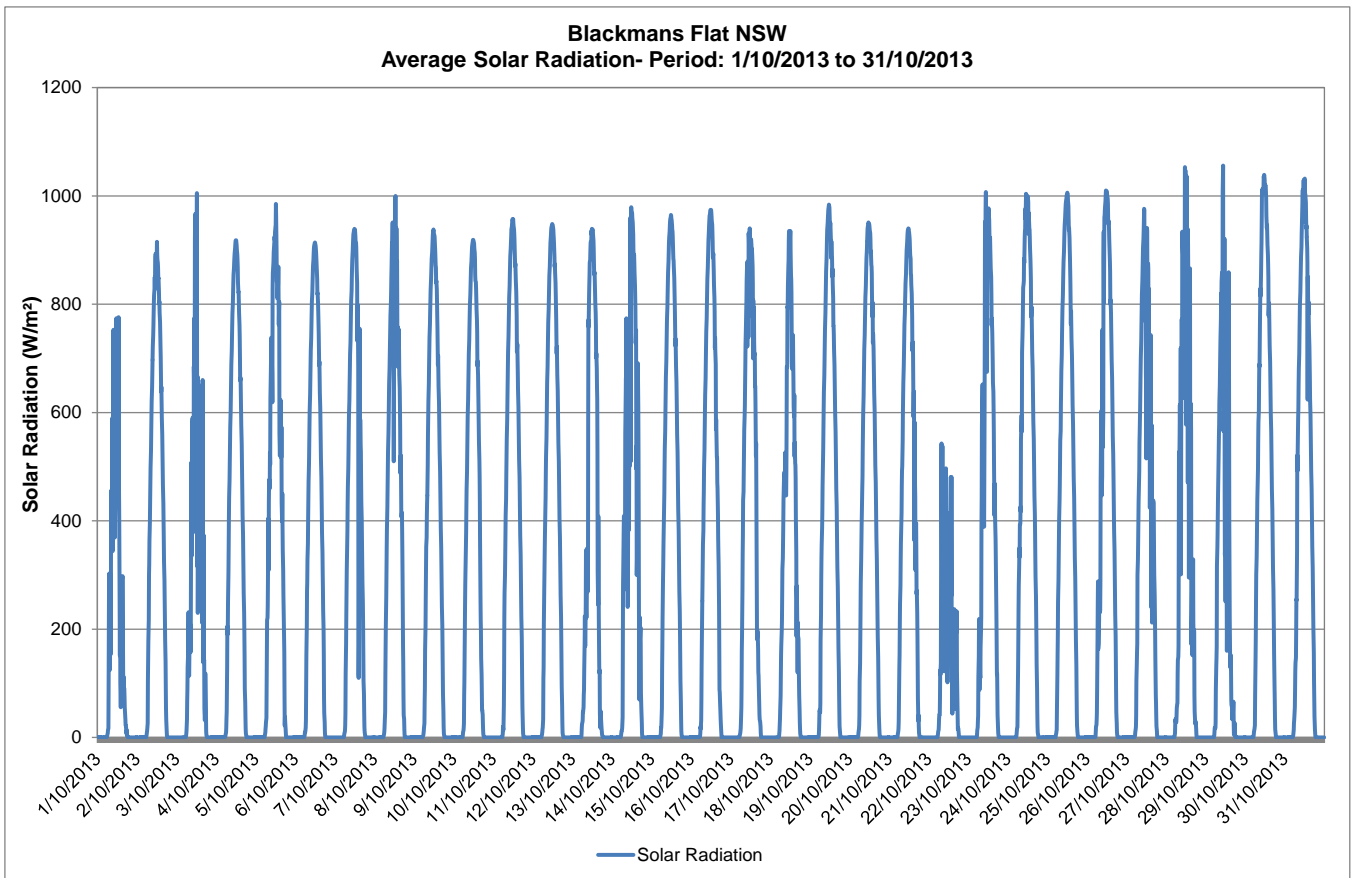


Blackmans Flat NSW
Daily Humidity Variations - Period: 1/10/2013 to 31/10/2013



Blackmans Flat NSW
Sigma Theta Variations - Period: 1/10/2013 to 31/10/2013





Blackman's Flat Windrose

1/10/2013 to 31/10/2013

