



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

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-811/0

December 2012



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18 February 2013

Pine Dale Mine
PO Box 202
WALLERAWANG NSW 2845

Attention: Mr Hilton Goldfinch

**REPORT COMPILED FOR
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE
DETAILING GROUND WATER, DEPOSITIONAL DUST
HVAS AND METEOROLOGICAL MONITORING
DECEMBER 2012**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of December 2012.

Samples received were sampled by RCA Laboratories – Environmental staff.

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 Dissolved Solids	ENV-LAB020	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 ANALYSIS RESULTS

3.1 GROUNDWATER

A total of 5 on-site groundwater samples were collected during the month of December 2012. No sample was collected from groundwater monitoring location P4 as the bore did not contain sufficient water to sample.

Water quality analysis results are shown in **Table 2**.

Table 2 *Groundwater Analysis Results*

ANALYSIS	UNITS	P2	P3	P6	P7	P7a
Sample Number		12126880019	12126880020	12126880010	12126880021	12126880022
Date Sampled	-	20/12/2012	20/12/2012	---	20/12/2012	20/12/2012
Time Sampled	-	17:06	16:55	15:40	16:13	16:18
Standing Water Level	m	5.55	6.10	27.04	8.35	6.29
Standpipe Height	m	0.95	0.66	0.95	1.00	0.90
Relative Standing Water Level*	m	4.60	5.44	26.09	7.35	5.39
pH	pH unit	5.3	4.6	20.0	18.0	17.0
Conductivity	µS/cm	442	729	6.9	6.6	6.4
Bicarbonate Alkalinity	mg/L	<1	<1	67	218	226
Total Alkalinity	mg/L	<1	<1	67	218	226
Sulphate	mg/L	176	322	430	91	44
Chloride	mg/L	15	19	19	61	113
Calcium	mg/L	24	53	104	42	50
Magnesium	mg/L	16	36	46	45	46
Sodium	mg/L	22	32	30	42	43
Potassium	mg/L	5	8	19	8	9
Iron	mg/L	8.1	4.12	24.6	<0.05	2.72

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

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 February 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
04-Dec-12	62	12126880046	8580236	07-Dec-12	1:10	Client	24.00
10-Dec-12	16	12126880048	8580234	12-Dec-12	1:30	Client	24.00
16-Dec-12	38	12126880050	8580232	19-Dec-12	1:20	Client	24.00
22-Dec-12	20	12126880052	8580230	27-Dec-12	9:35	Client	24.00
28-Dec-12	28	12126880054	8698444	02-Jan-13	9:05	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
04-Dec-12	16	12126880047	8580237	07-Dec-12	1:10	Client	24.00
10-Dec-12	4	12126880049	8580235	12-Dec-12	1:30	Client	24.00
16-Dec-12	9	12126880051	8580233	19-Dec-12	1:20	Client	24.00
22-Dec-12	6	12126880053	8580231	27-Dec-12	9:35	Client	24.00
28-Dec-12	12	12126880055	8698445	02-Jan-13	9:05	Client	24.00

4.1.1 Allowable TSP Limits

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 January 2012 to December 2012) for the TSP unit is $24.6\mu\text{g}/\text{m}^3$, which is well below the allowable limit of $90\mu\text{g}/\text{m}^3$.

4.1.2 Allowable PM₁₀ Limits

The EPA 24h Maximum PM₁₀ allowable limit is 50µg/m³. The EPA Annual Mean PM₁₀ allowable limit is 30µg/m³. All PM₁₀ HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* for the PM₁₀ unit is 11.1µg/m³, which is below the allowable limit of 30µg/m³. The 24 hour maximum allowable limit of 50µg/m³ was not exceeded on any run day during the December 2012 monitoring period.

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**.

Table 5 *Depositional Dust Monitoring - Deposited Matter December 2012*

SAMPLE NO	DEPOSIT GAUGE	DATE SAMPLE STARTED	DATE SAMPLE COMPLETED	NO OF DAYS	NOTES	INSOLUBLE SOLIDS (g/m ² /month)	ASH (g/m ² /month)	COMBUSTIBLE MATTER (g/m ² /month)
12126880033	D1	23/11/2012	21/12/2012	28	IT	2.4	1.6	0.8
12126880034	D2	23/11/2012	21/12/2012	28	I	1.0	0.6	0.4
12126880035	D3	23/11/2012	21/12/2012	28	I	1.3	0.9	0.4
12126880036	D4	23/11/2012	21/12/2012	28	I	1.0	0.5	0.5
12126880037	D5	23/11/2012	21/12/2012	28	I	0.9	0.6	0.3
12126880038	D6	23/11/2012	21/12/2012	28	I	1.4	0.7	0.7

4.2.1 Glossary of Terms Used in Notes

- I Insects (eg, ants, spiders)
- IT Insects (eg, 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 1.0g/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**.

4.3 BLASTING

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

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

Date	<i>Park</i>		<i>Noon St.</i>		<i>Summer St.</i>	
	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)
6/12/2012	NT	NT	NT	NT	NT	NT
11/12/2012	NT	NT	106.3	0.67	108.9	0.63
13/12/2012	NT	NT	107.2	0.59	106.2	0.48
20/12/2012	NT	NT	105.2	1.25	109.5	1.53
2012 Year to Date Information						
Minimum	103.9	0.32	103.6	0.33	95.70	0.10
Average	109.1	2.1	109.5	1.3	109.6	1.6
Maximum	114.6	3.95	114.4	2.69	116.30	4.58
% > EPL 95% Compliance Criteria	0%	0%	0%	0%	3%	0%
% > EPL 100% Compliance Criteria	0%	0%	0%	0%	0%	0%

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

4.3.1 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. Pine Dale Mine's reporting period runs from 1 January 2012- 31 December 2012.

During December 2012, there were nil exceedances of the EPL conditions for both overpressure and vibration levels. For the year-to-date, there have been zero blasts which have exceeded the 100% compliance conditions of 120dB and 10mm/sec for overpressure and vibration respectively. Overpressure and vibration criteria of 115dB and 5mm/sec, respectively, have not been exceeded for more than 5% of the blasts during the 2012 reporting period.

Graphical blasting results from overpressure and vibration are presented in **Appendix 2**.

5 SUMMARY

During the month of December 2012 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Quarterly surface waters were not scheduled to be sampled this month. Water Quality monitoring is next scheduled to be undertaken in February 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 were zero exceedances of the PM₁₀ short term impact assessment criteria of 50µg/m³ over twenty-four hours during December 2012.

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 December there were nil exceedances of the blasting requirements as outlined in Pine Dale Mine's EPL. During the 2012 reporting period, there was no non-compliance based upon the 95% or 100% limits for either overpressure or vibration levels.

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Please contact the undersigned if you have any queries.

Yours sincerely



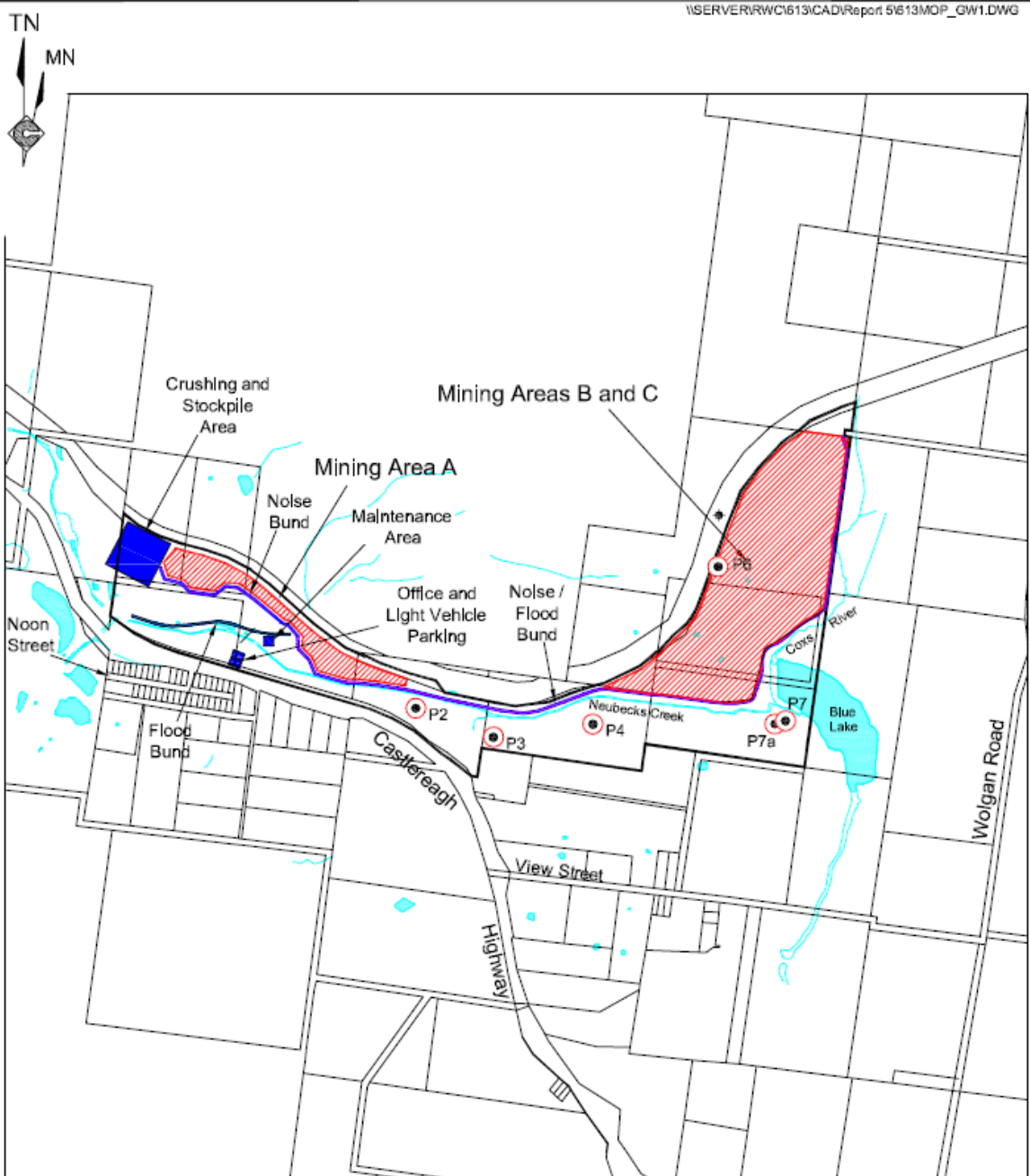
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



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

Appendix 1

Groundwater and Air Quality Monitoring Locations



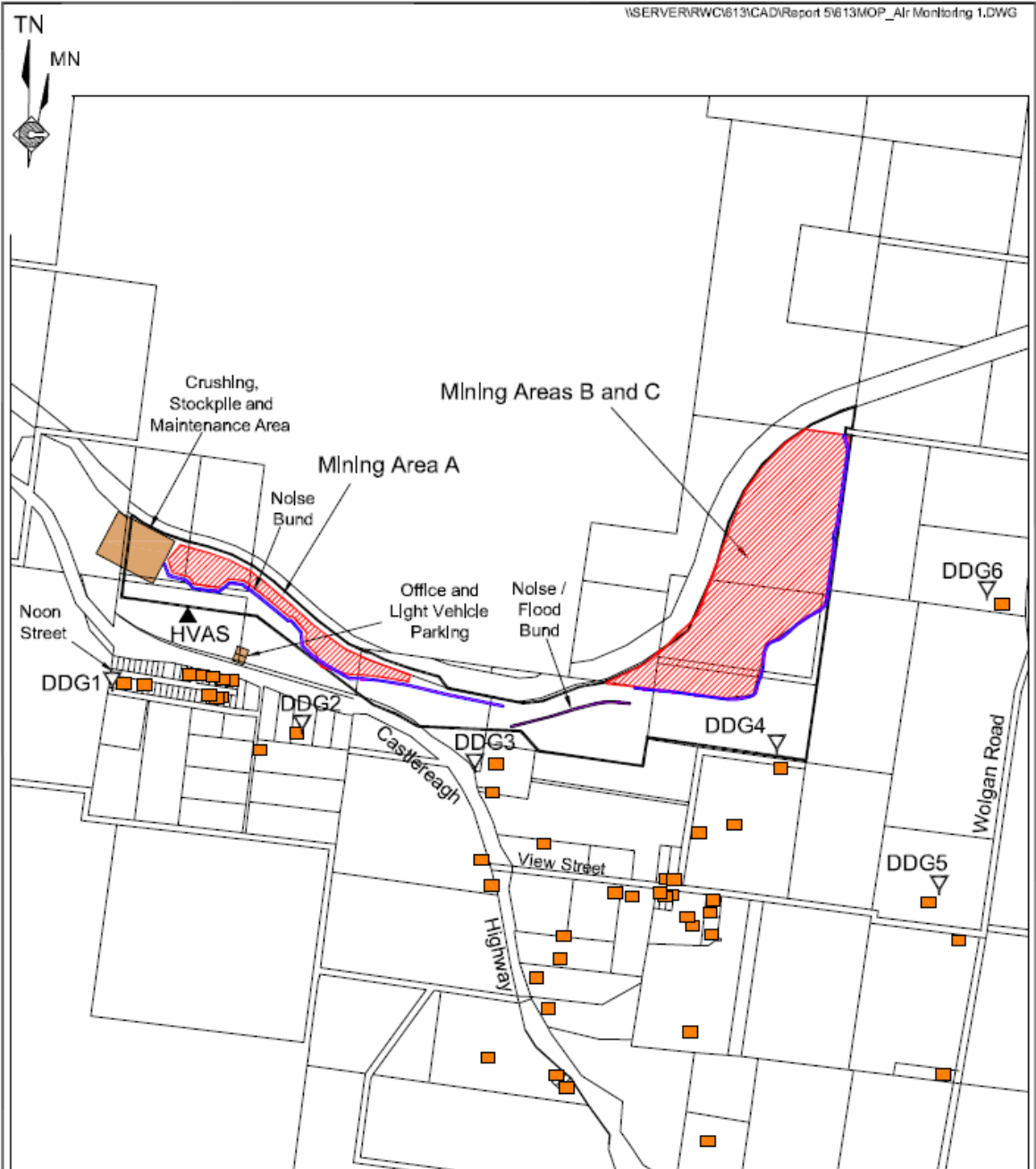
REFERENCE
 — Mine Site Boundary (ML_XYZ)
 ● P4 Groundwater Monitoring Location

SCALE 1:20 000



Figure GW1
GROUNDWATER MONITORING LOCATIONS





REFERENCE
 — Mine Lease Boundary (ML1578)
 ■ Residence
 DDG1 ▽ Air Quality Monitoring Location (Deposited Dust)
 HVAS ▲ Air Quality Monitoring Location (High Volume Sampling)

SCALE 1:20 000

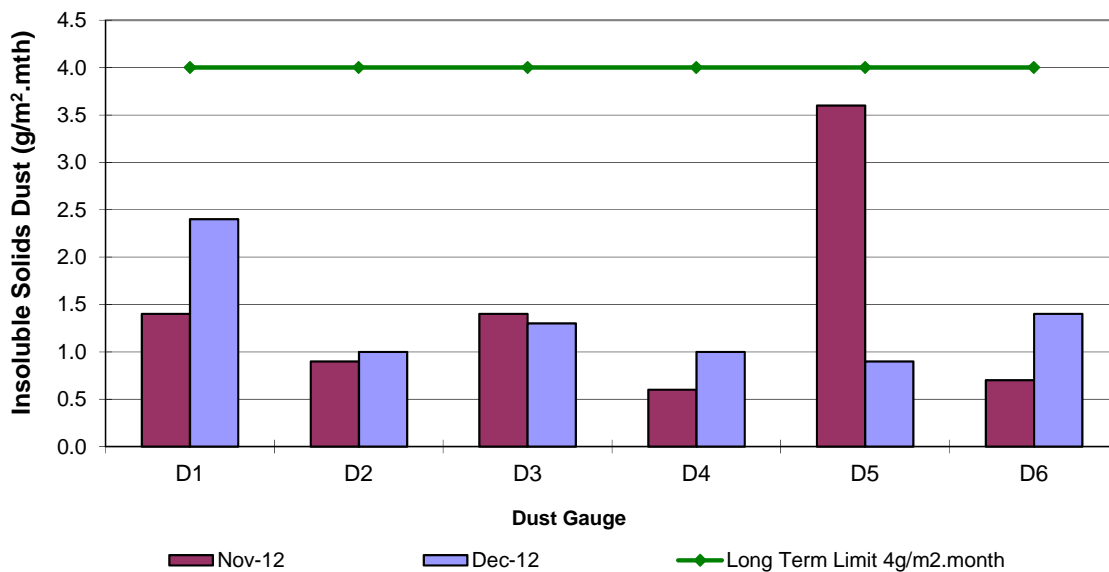


Figure AQ1
AIR QUALITY MONITORING LOCATIONS

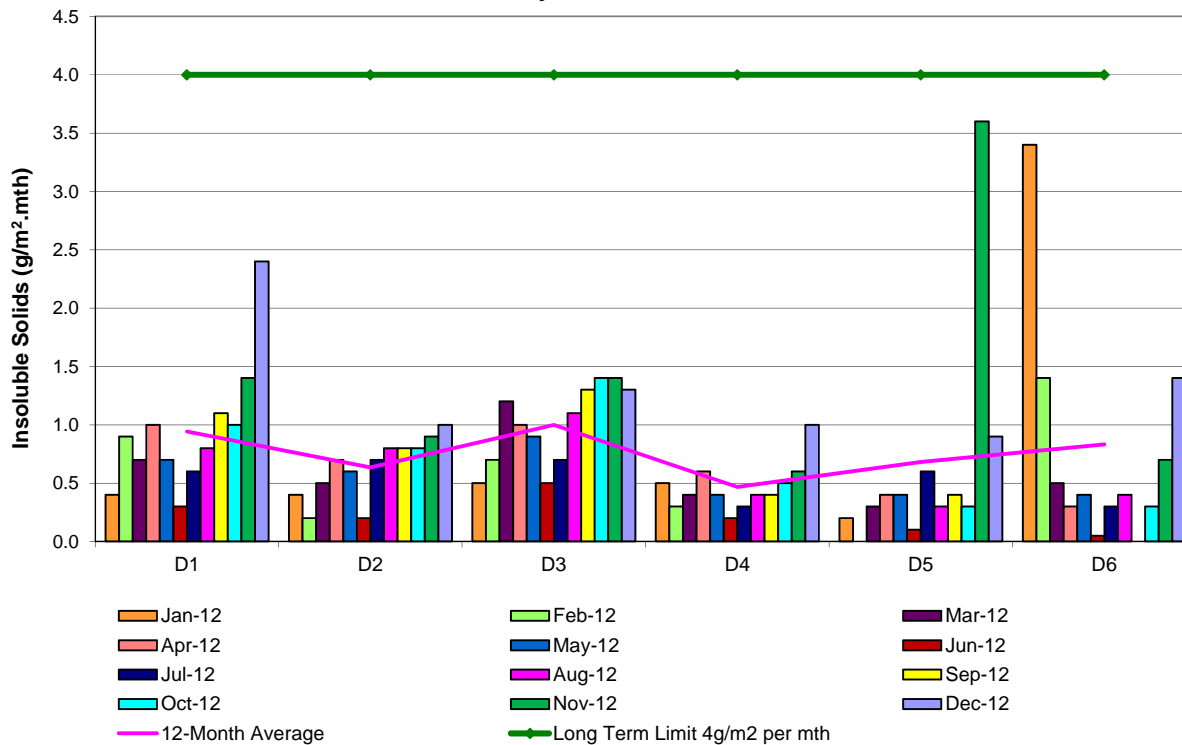
Appendix 2

Depositional Dust, HVAS and Blast Result Graphs

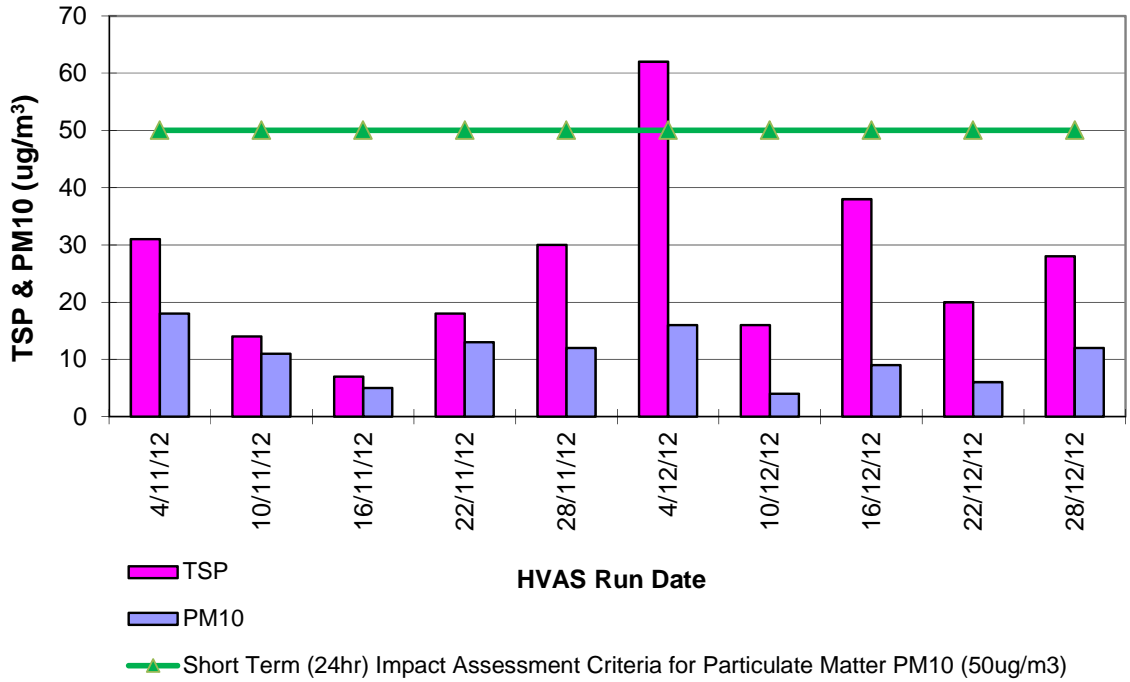
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
November 2012- December 2012**



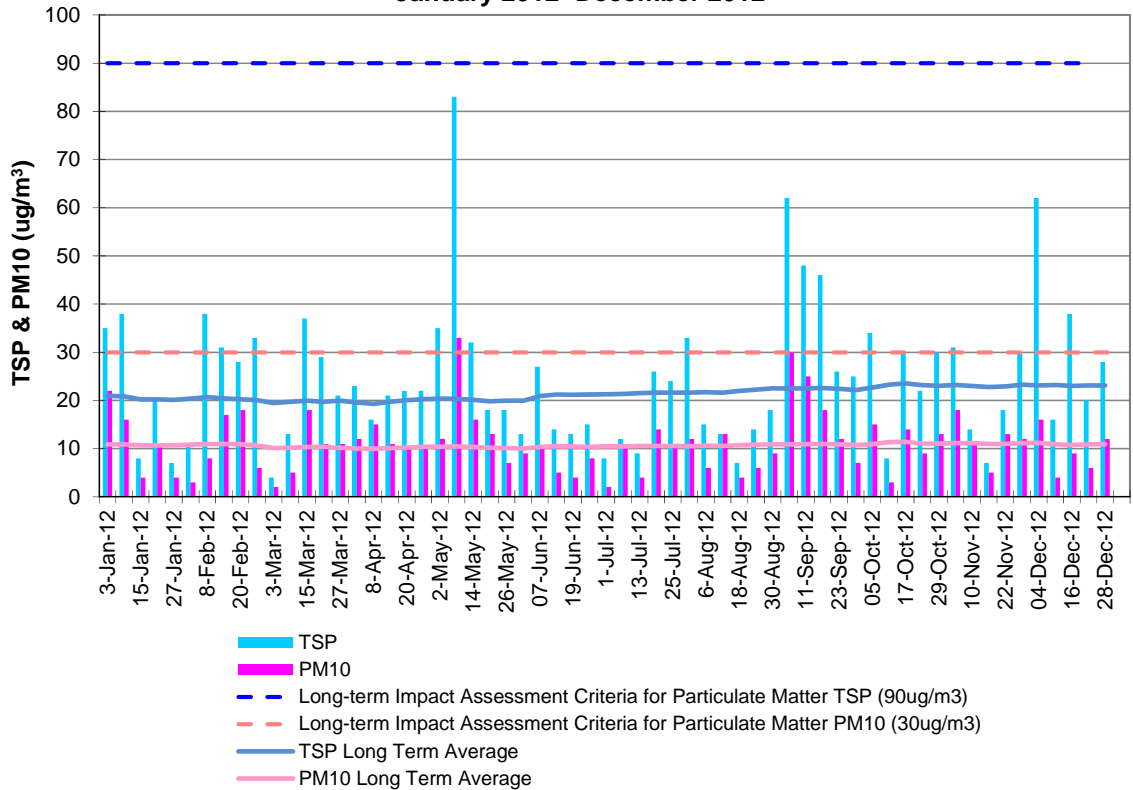
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
January 2012- December 2012**



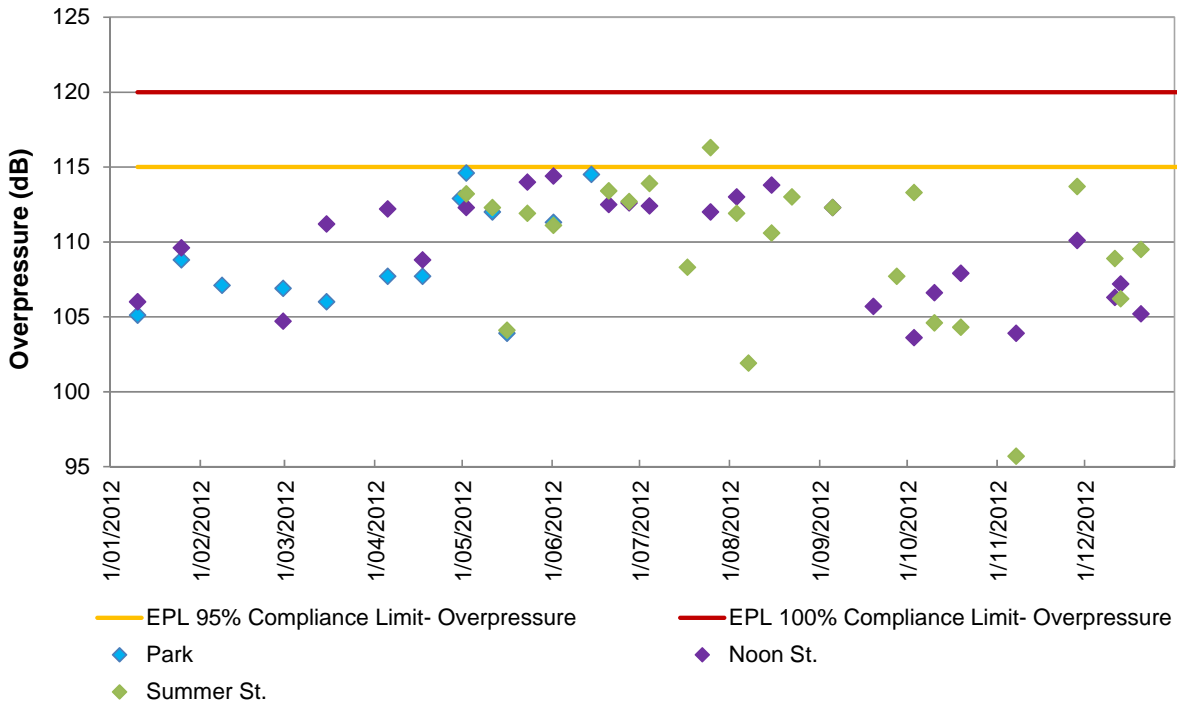
**Pine Dale Mine
TSP & PM10 Results
November 2012 - December 2012**



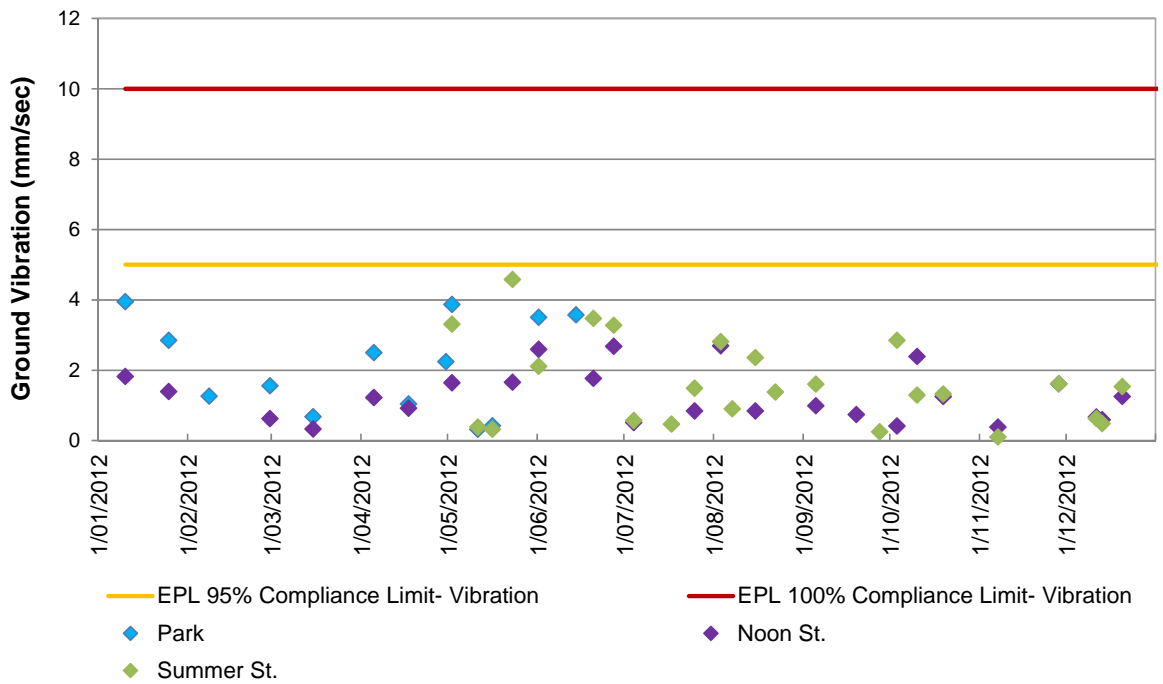
**Pine Dale Mine
TSP & PM10 HVAS 12-Month Comparative Results
January 2012- December 2012**



**Pine Dale Mine
Blasting- Airblast Overpressure
Jan- Dec 2012 Comparable Data**



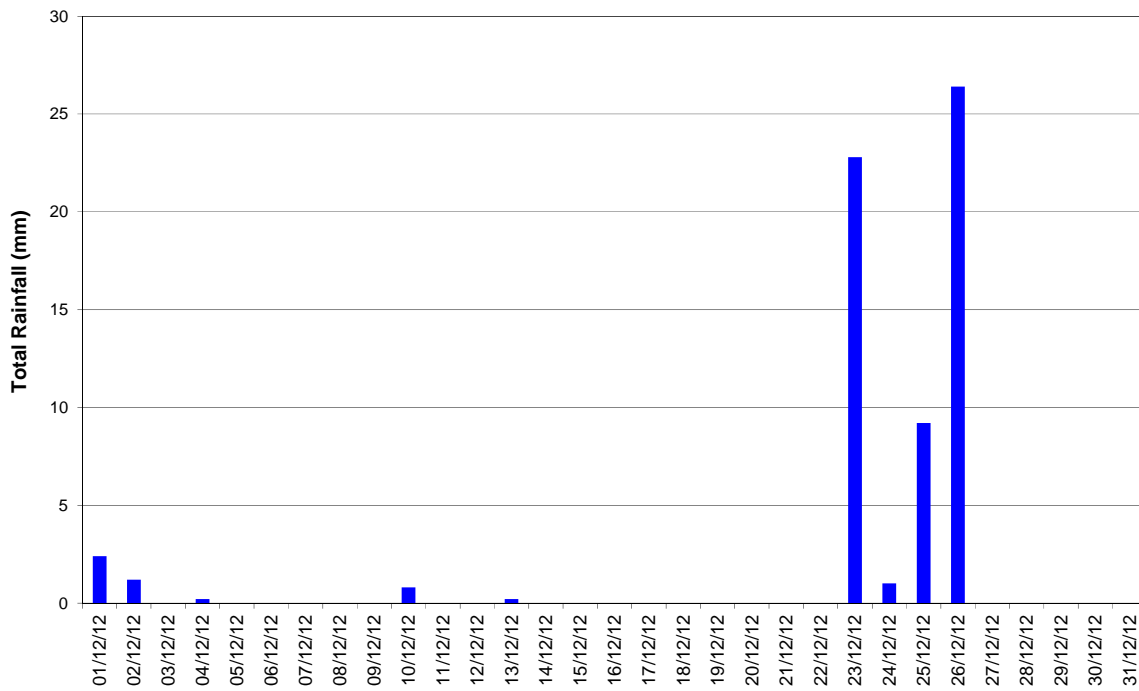
**Pine Dale Mine
Blasting- Ground Vibration
Jan- Dec 2012 Comparable Data**



Appendix 3

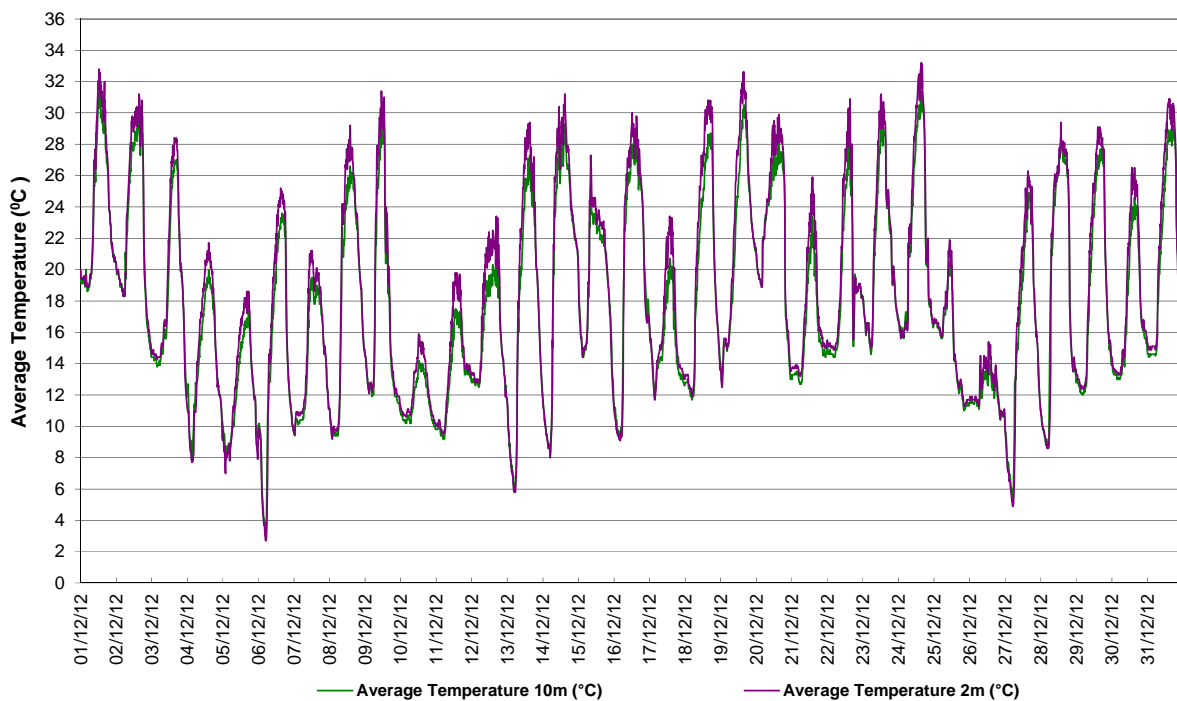
Meteorological Data

Blackmans Flat NSW
Total Rainfall - Period: 1/12/2012 to 31/12/2012



Total Rainfall for December 2012: 63.4 mm

Blackmans Flat NSW
Average Air Temperature - Period: 1/12/2012 to 31/12/2012



Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/12/2012 to 31/12/2012

