SURFACE WATER, DEPOSITIONAL DUST, HVAS AND METEOROLOGICAL MONITORING

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-830/0

August 2013

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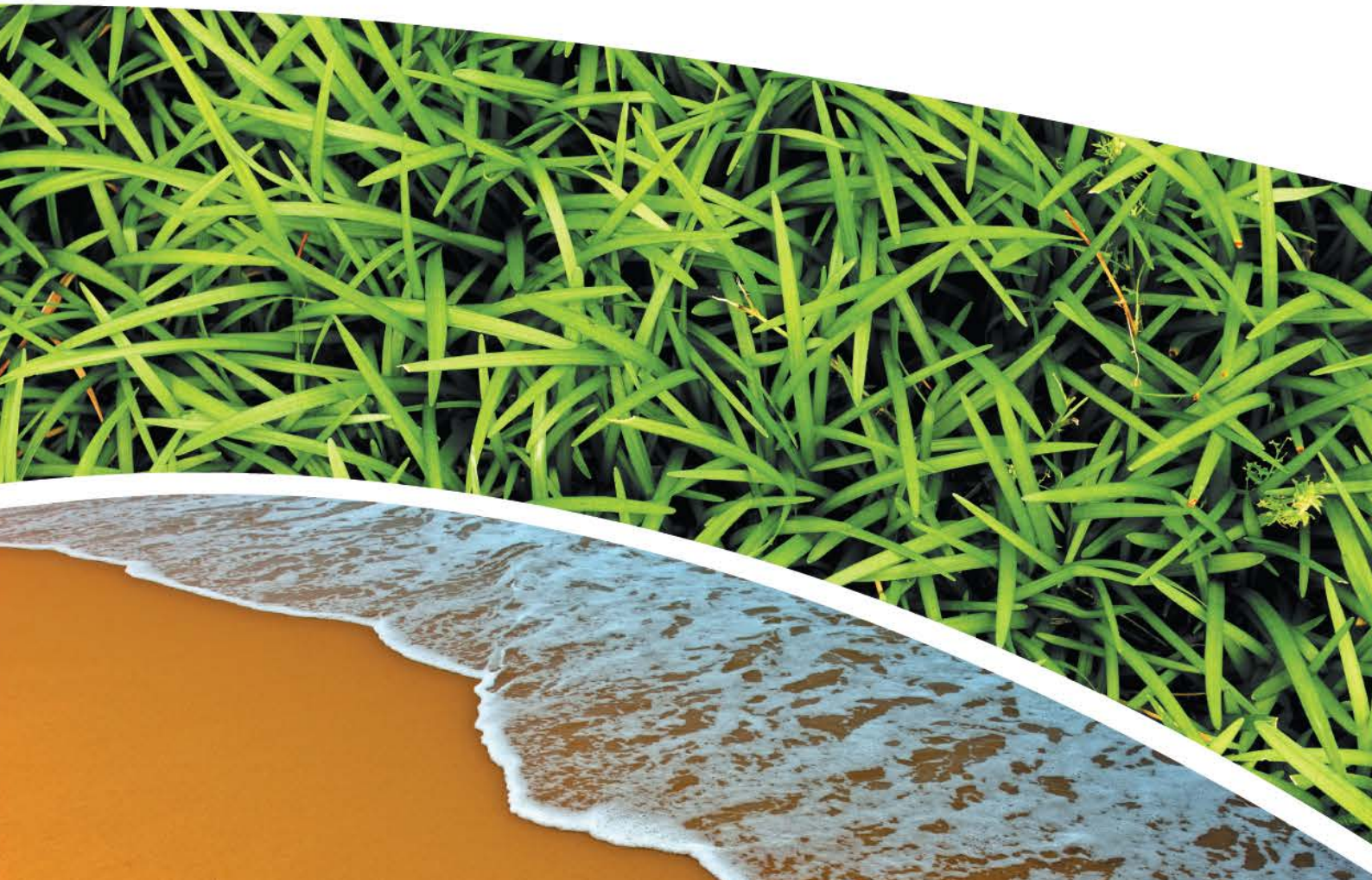

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RCA LE ref 6880-830/0

16 September 2013

Pine Dale Mine
PO Box 202
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Attention: Mr Graham Goodwin

REPORT COMPILED FOR
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE
DETAILING SURFACE WATER, DEPOSITIONAL DUST
HVAS AND METEOROLOGICAL MONITORING
AUGUST 2013

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1 GENERAL COMMENTS

Job Number: 6880.
Date Samples Received: During the month of August 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	$\mu g/m^3$	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
Dissolved Metals	EG020F	mg/L	ALS	NATA Analysis

2.1 EPA SURFACE WATER MONITORING

Routine quarterly surface water monitoring was undertaken during the month of August 2013 at three surface water sites, EPA points 2, 3 and 14. Water quality analysis results are shown in **Table 2**. No samples were obtained from Points 4, 5 and 13 as there was no discharge occurring at these locations.

Table 2 *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	-	08136880015	08136880010	08136880016
Date Sampled	-	26/08/2013	26/08/2013	26/08/2013
Time Sampled	-	15:40	17:00	13:36
Temperature	°C	18.0	16.0	19.0
pH	pH	7.2	6.9	7.9
Conductivity	µS/cm	1152	1681	1141
Sulfate	mg/L	457	758	86
Dissolved Iron	mg/L	<0.05	0.98	<0.05
Total Suspended Solids	mg/L	2	12	5
Turbidity	NTU	0.1	2.7	4.1

3 AIR QUALITY MONITORING RESULTS

3.1 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**;

PM_{10} Suspended Particulate Matter results are shown in **Table 4**.

Table 3 *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
01-Aug-13	16	08136880036	8703026	05-Aug-13	10:35	Client	24.00
07-Aug-13	2	08136880038	8703028	09-Aug-13	13:15	Client	24.00
13-Aug-13	15	08136880040	8703030	14-Aug-13	14:10	Client	24.00
19-Aug-13	11	08136880042	8703032	21-Aug-13	13:10	Client	24.00
25-Aug-13	17	08136880044	8703034	26-Aug-13	13:25	Client	24.00
31-Aug-13	29	08136880046	8724967	02-Sep-13	10:15	Client	24.00

Table 4 *Suspended Particulate Matter PM_{10} ($\mu g/m^3$ 0^oC 101.3 kPa)*

RUN DATE	PM_{10} ($\mu g/m^3$)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
01-Aug-13	5	08136880037	8703027	05-Aug-13	10:35	Client	24.00
07-Aug-13	ND	08136880039	8703029	09-Aug-13	13:15	Client	24.00
13-Aug-13	4	08136880041	8703031	14-Aug-13	14:10	Client	24.00
19-Aug-13	4	08136880043	8703033	21-Aug-13	13:10	Client	24.00
25-Aug-13	9	08136880045	8724966	26-Aug-13	13:25	Client	24.00
31-Aug-13	12	08136880047	8724968	02-Sep-13	10:15	Client	24.00

Notes: ND – No Data available due to filter damage.

3.1.1 Allowable TSP Limits

The EPA Annual Mean TSP allowable limit is 90µg/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 2012 to August 2013) for the TSP unit is 24.4µg/m^3, which is well below the allowable limit of 90µg/m^3.

3.1.2 Allowable PM_{10} Limits

The EPA 24h Maximum PM_{10} allowable limit is 50µg/m^3. The EPA Annual Mean PM_{10} allowable limit is 30µg/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 11.2µg/m^3, which is below the allowable limit of 30µg/m^3. The 24 hour maximum allowable limit of 50µg/m^3 was not exceeded on any run day during the August 2013 monitoring period.

3.1.3 Comments

HVAS monitoring locations are shown in **Appendix 1**.

Graphical HVAS results presentations are shown in **Appendix 2**.

3.2 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 August 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)
08136880026	D1	25/07/2013	26/08/2013	32	N	0.4	0.2	0.2
08136880027	D2	25/07/2013	26/08/2013	32	I	0.2	0.1	0.1
08136880028	D3	25/07/2013	26/08/2013	32	I	0.6	0.3	0.3
08136880029	D4	25/07/2013	26/08/2013	32	I	0.2	0.1	0.1
08136880030	D5	25/07/2013	26/08/2013	32	I	0.3	0.1	0.2
08136880031	D6	25/07/2013	26/08/2013	32	B	2.1	0.6	1.5

3.2.1 Glossary of Terms Used in Notes

B	Bird Droppings	N	No foreign matter
I	Insects (e.g. Ants, spiders)		

3.2.2 Allowable Depositional Dust Limits

The EPA Long Term (Annual Average) Dust Limit is $4g/m^2$ 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 $1.1g/m^2$ per month, which is below the allowable Annual Average Long Term Limit of $4g/m^2$ per month.

Depositional Dust monitoring locations are shown in **Appendix 1**. Graphical Depositional Dust results are shown in **Appendix 2**.

4 BLASTING RESULTS

Blasting results for the month of August 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)
15/08/2013	NT	NT	109.9	1.45	113.3	1.19
16/08/2013	NT	NT	109.5	1.28	109.4	1.37
2012- 2013 Year to Date Information						
Minimum	96.9	0.38	78.3	0.08	87.2	0.10
Average	96.9	0.38	104.7	0.99	106.01	1.08
Maximum	96.9	0.38	112.6	2.39	113.7	2.85
% > 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.

4.1.1 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 September 2012 to August 2013.

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

5 NOISE MONITORING RESULTS

Routine quarterly noise monitoring was not required to be undertaken this month. Quarterly noise monitoring is next scheduled to be undertaken during the October 2013 period.

6 OPERATIONAL ACTIVITIES

Pine Dale Mine production rates in August 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, 18.2 mm total, which predominantly fell on the 8th, 13th and 17th of August. Production material targets have largely been achieved this month, with coal tonnage slightly above target, whilst overburden was above forecast. In total 159,000 tonnes of overburden were excavated and 25,600 tonnes of coal delivered to Mt Piper Power Station.

7 SUMMARY

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

Quarterly surface waters sampling were sampled this month, with all required sites sampled.

Rolling annual averages from both the TSP and PM_{10} High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM_{10} criterion of 90µg/m^3 and 30µg/m^3 respectively. There were zero exceedances of the PM_{10} short term impact assessment criteria of 50µg/m^3 over twenty-four hours during August 2013.

Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m^2.month based upon a rolling average of the past 12 months.

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

Quarterly noise monitoring was not conducted this month, and is scheduled to be conducted in October 2013.

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Please contact the undersigned if you have any queries.

Yours sincerely

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

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Senior Environmental Scientist/Hygienist
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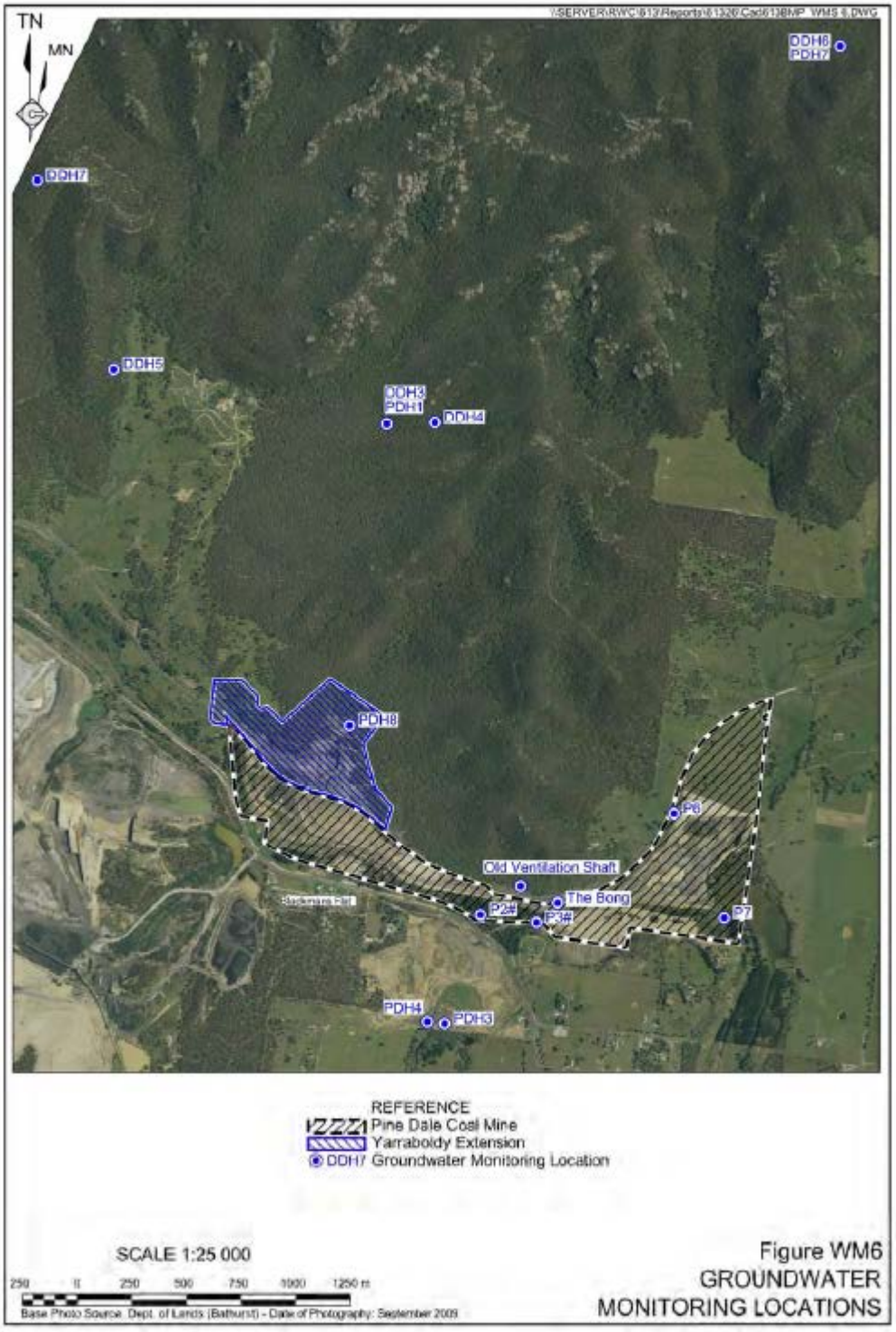
RCA Laboratories – Environmental

Appendix 1

Surface Water Groundwater and Air Quality Monitoring Locations


TN
MN
\\SERVER\RWC\613\Reports\6132B\Cad\613BMP_WM 5.DWG
CR U/S
EPA 2
LG D/S
EPA 4
NC Bridge
Blackmans Flat
BL U/S
EPA 13
NC D/S
CR D/S
EPA 14
REFERENCE
Pine Dale Coal Mine
Yarraboldy Extension
EPA 14 Surface Water Monitoring Location
SCALE 1:25 000
250 0 250 500 750 1000 1250 m
Base Photo Source: Dept. of Lands (Bathurst) - Date of Photography: September 2009
Figure WM5
SURFACE WATER
MONITORING LOCATIONS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TN
MN
DDH6
PDH7
DDH7
DDH5
DDH3
PDH1
DDH4
PDH8
P6
Old Ventilation Shaft
The Bong
P2#
P3#
P7
PDH4
PDH3
REFERENCE
Pine Dale Coal Mine
Yarraboldy Extension
DDH7 Groundwater Monitoring Location
SCALE 1:25 000
250 0 250 500 750 1000 1250 m
Base Photo Source: Dept. of Lands (Bathurst) - Date of Photography: September 2009
Figure WM6
GROUNDWATER
MONITORING LOCATIONS

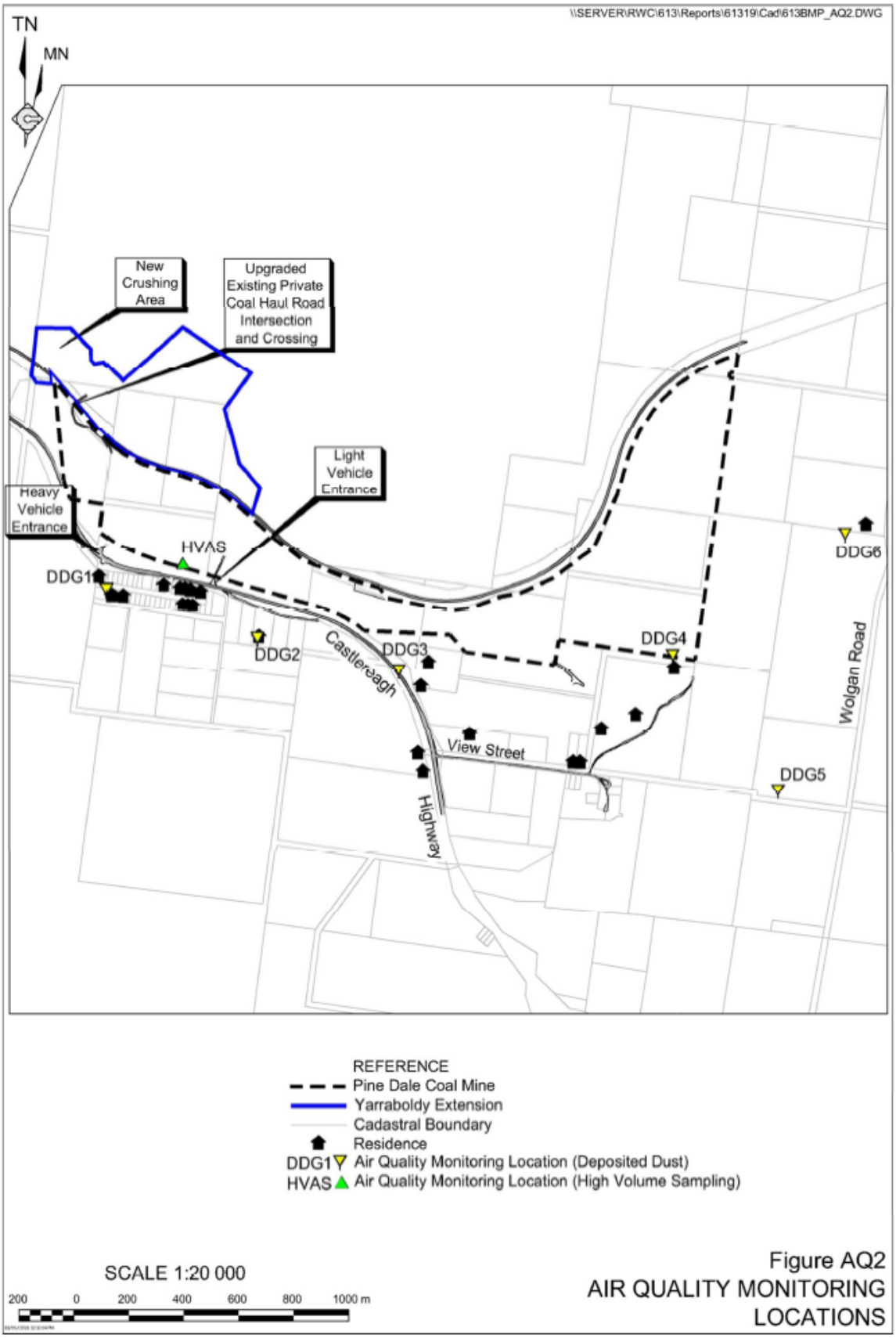
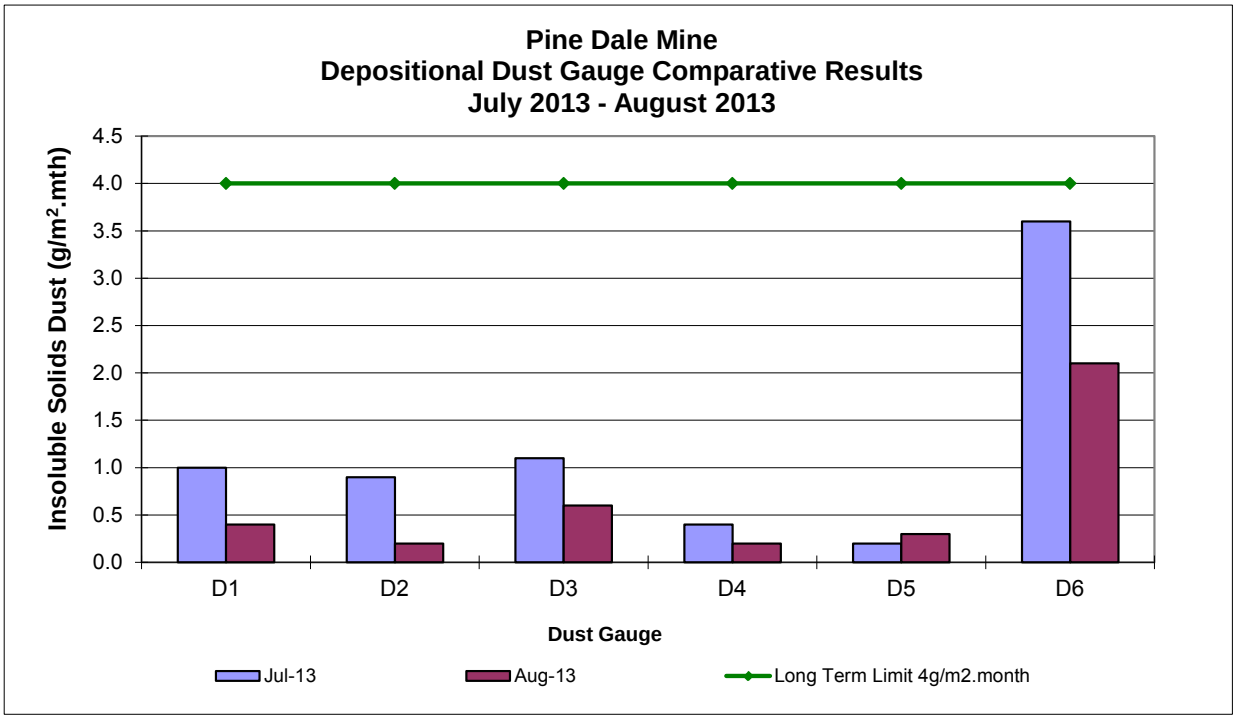
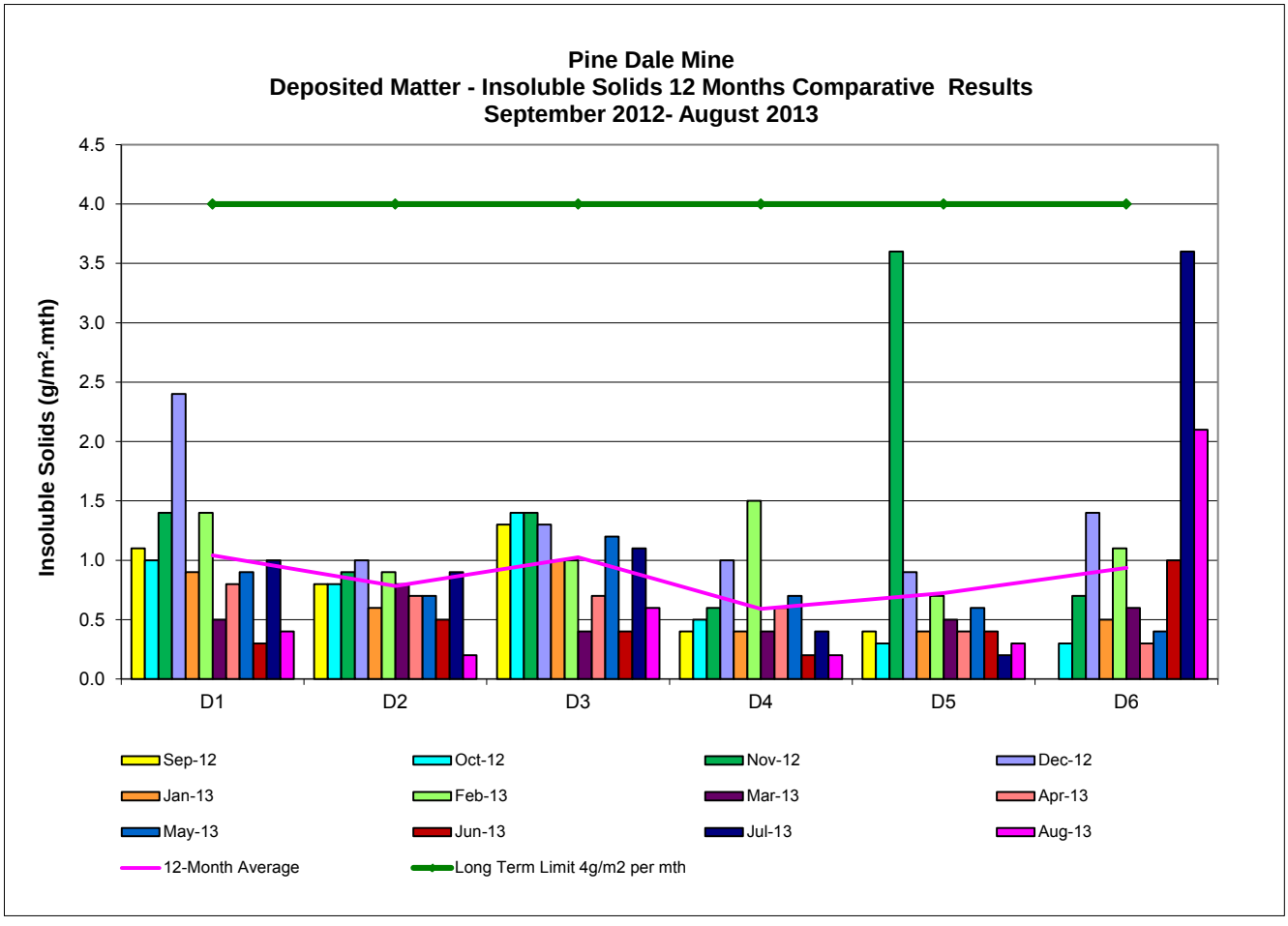


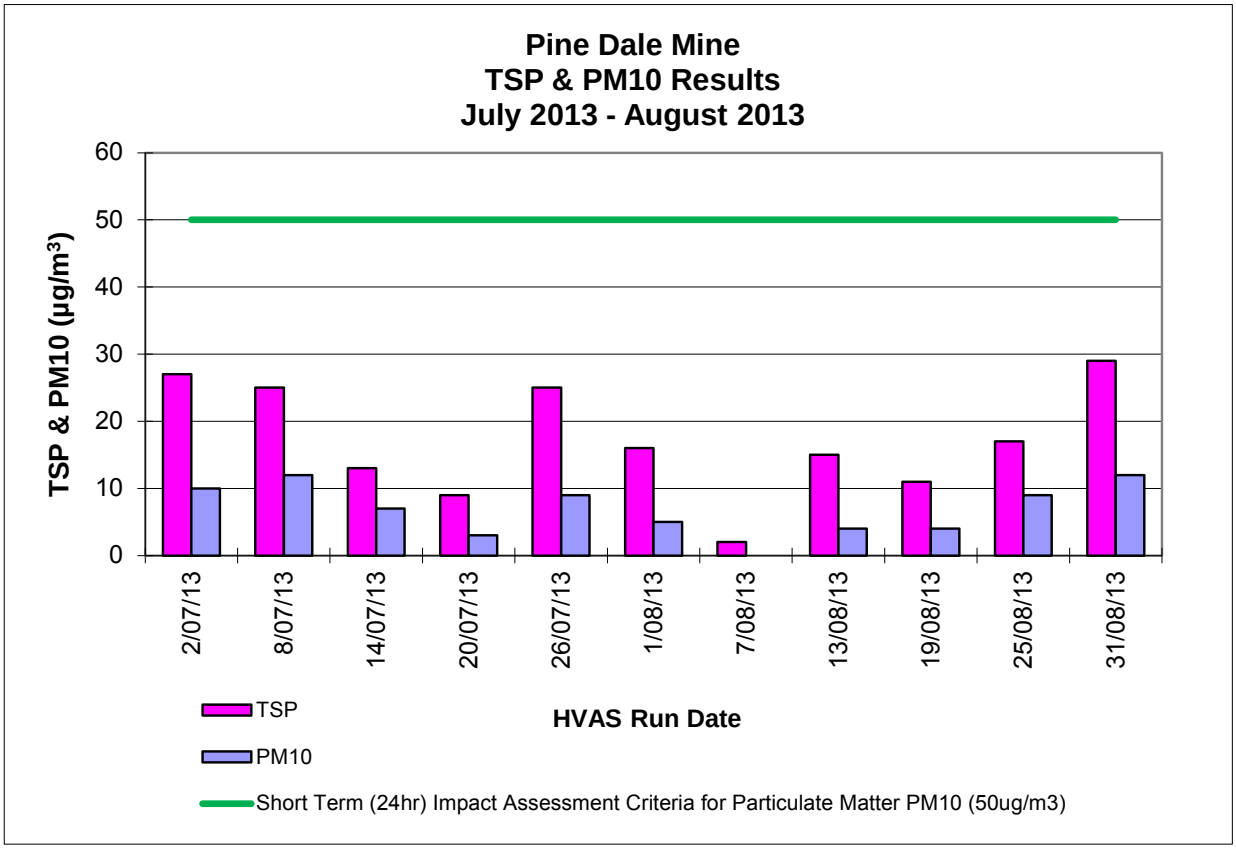
Figure AQ2
AIR QUALITY MONITORING LOCATIONS

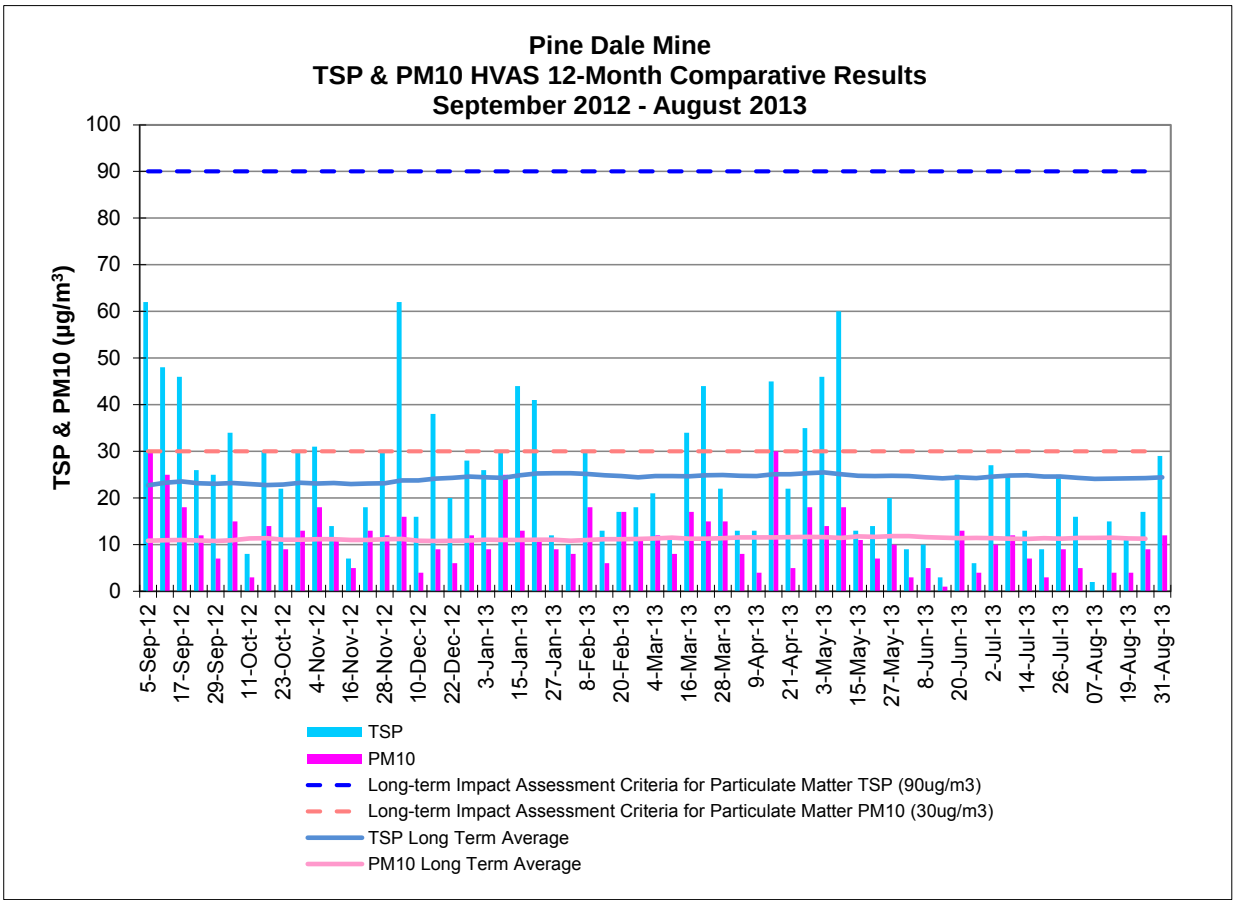
Appendix 2

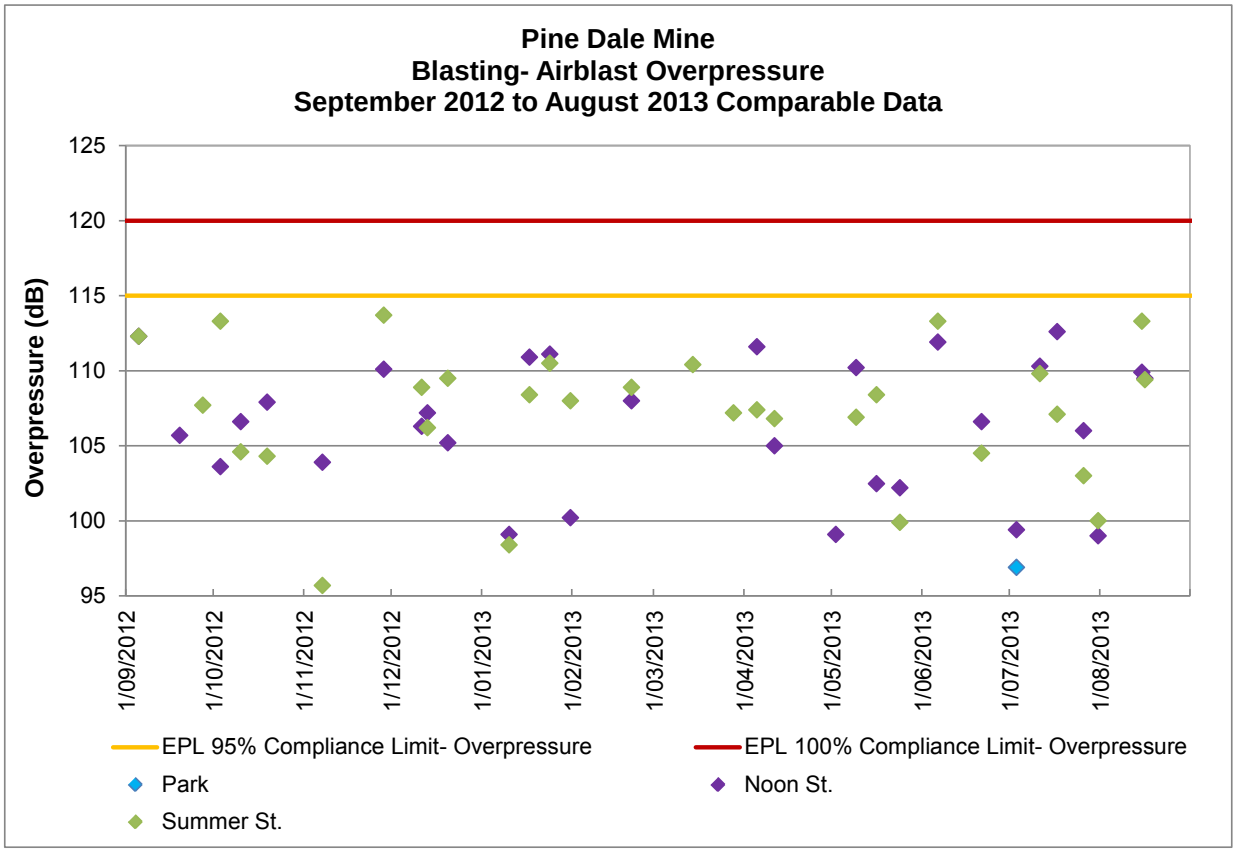
Depositional Dust, HVAS and Blast Result Graphs

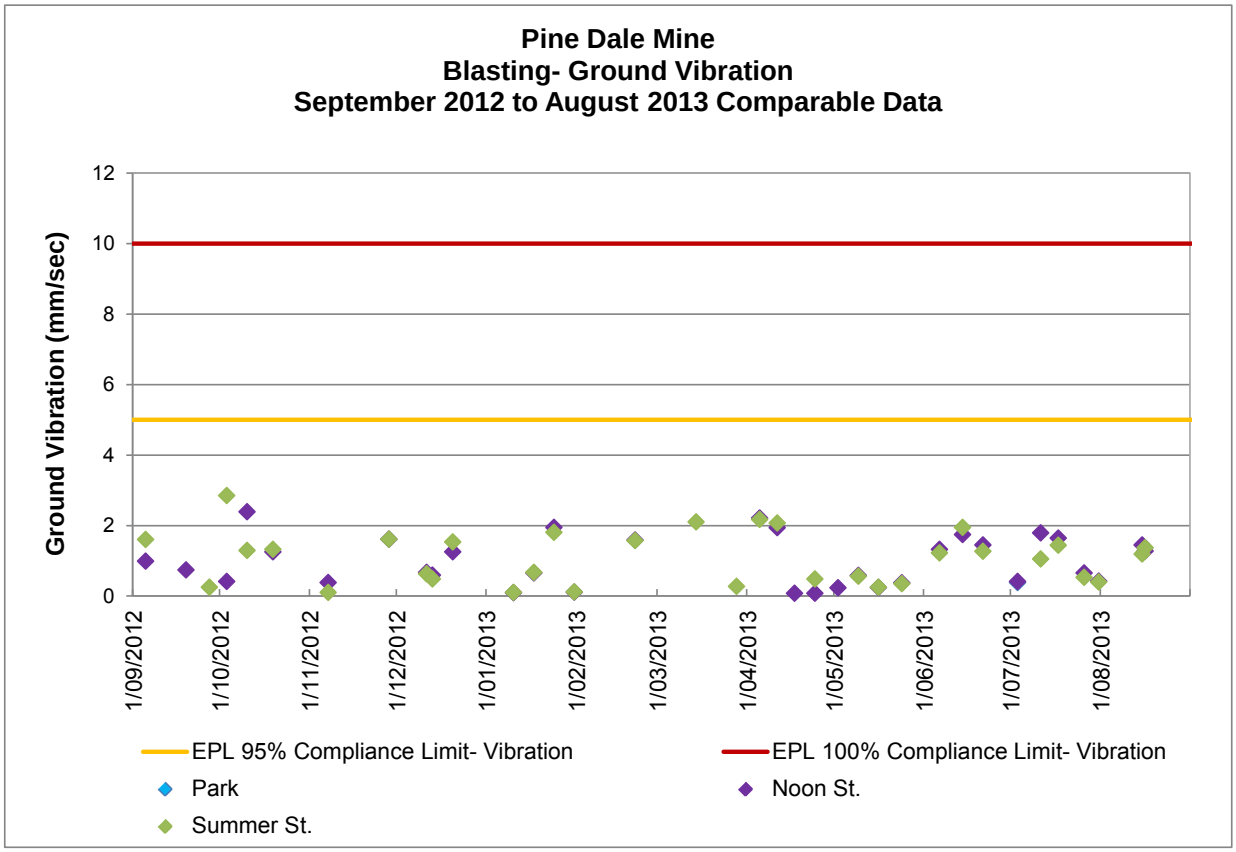

Pine Dale Mine
Depositional Dust Gauge Comparative Results
July 2013 - August 2013
Insoluble Solids Dust (g/m².mth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D2
D3
D4
D5
D6
Dust Gauge
Jul-13
Aug-13
Long Term Limit 4g/m2.month


Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
September 2012- August 2013
Insoluble Solids (g/m².mth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D2
D3
D4
D5
D6
Sep-12
Oct-12
Nov-12
Dec-12
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
12-Month Average
Long Term Limit 4g/m2 per mth


Pine Dale Mine
TSP & PM10 Results
July 2013 - August 2013
TSP & PM10 (µg/m³)
60
50
40
30
20
10
0
2/07/13
8/07/13
14/07/13
20/07/13
26/07/13
1/08/13
7/08/13
13/08/13
19/08/13
25/08/13
31/08/13
HVAS Run Date
TSP
PM10
Short Term (24hr) Impact Assessment Criteria for Particulate Matter PM10 (50ug/m3)

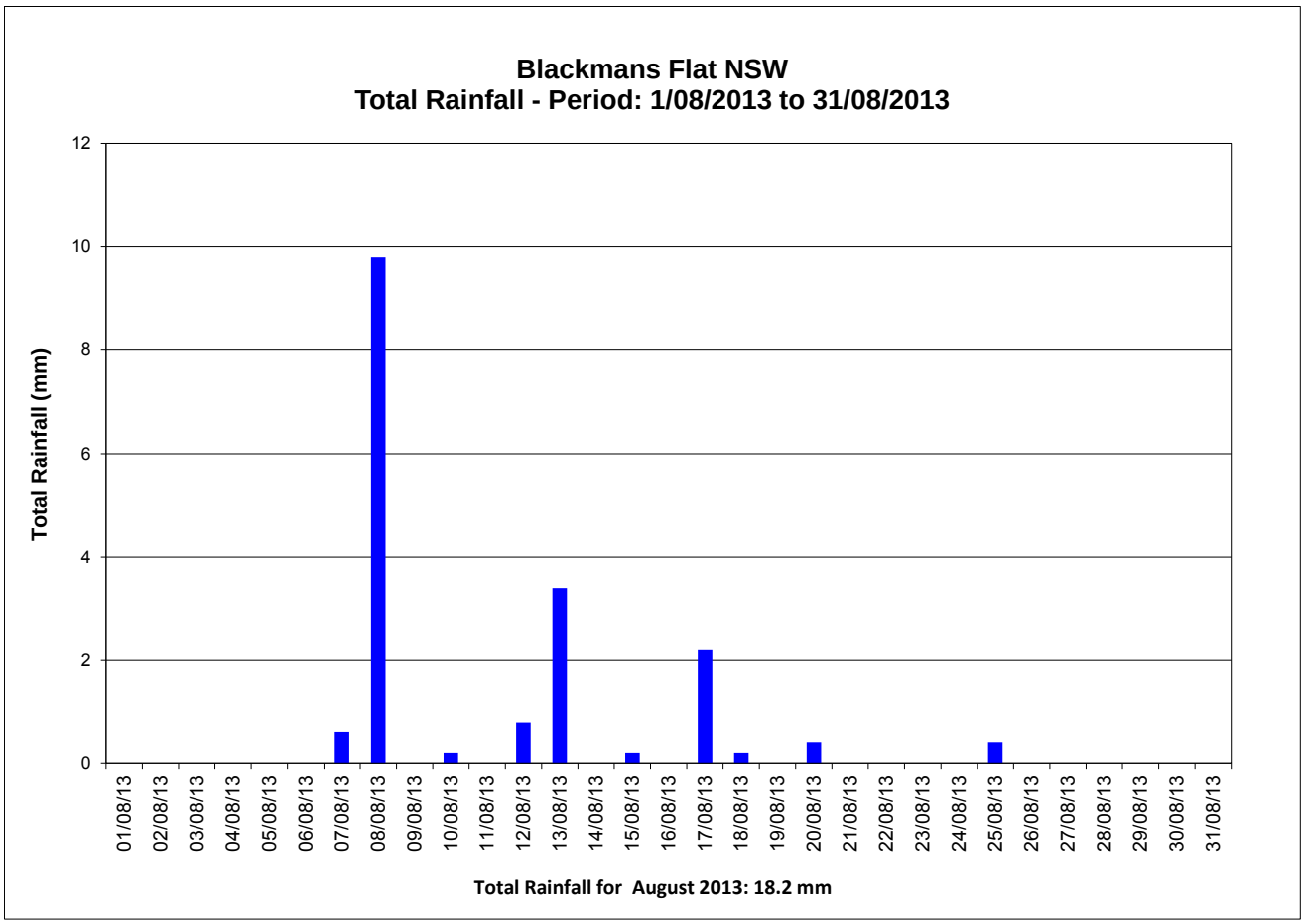

Pine Dale Mine
TSP & PM10 HVAS 12-Month Comparative Results
September 2012 - August 2013
TSP & PM10 (µg/m³)
100
90
80
70
60
50
40
30
20
10
0
5-Sep-12
17-Sep-12
29-Sep-12
11-Oct-12
23-Oct-12
4-Nov-12
16-Nov-12
28-Nov-12
10-Dec-12
22-Dec-12
3-Jan-13
15-Jan-13
27-Jan-13
8-Feb-13
20-Feb-13
4-Mar-13
16-Mar-13
28-Mar-13
9-Apr-13
21-Apr-13
3-May-13
15-May-13
27-May-13
8-Jun-13
20-Jun-13
2-Jul-13
14-Jul-13
26-Jul-13
07-Aug-13
19-Aug-13
31-Aug-13
TSP
PM10
Long-term Impact Assessment Criteria for Particulate Matter TSP (90ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter PM10 (30ug/m3)
TSP Long Term Average
PM10 Long Term Average

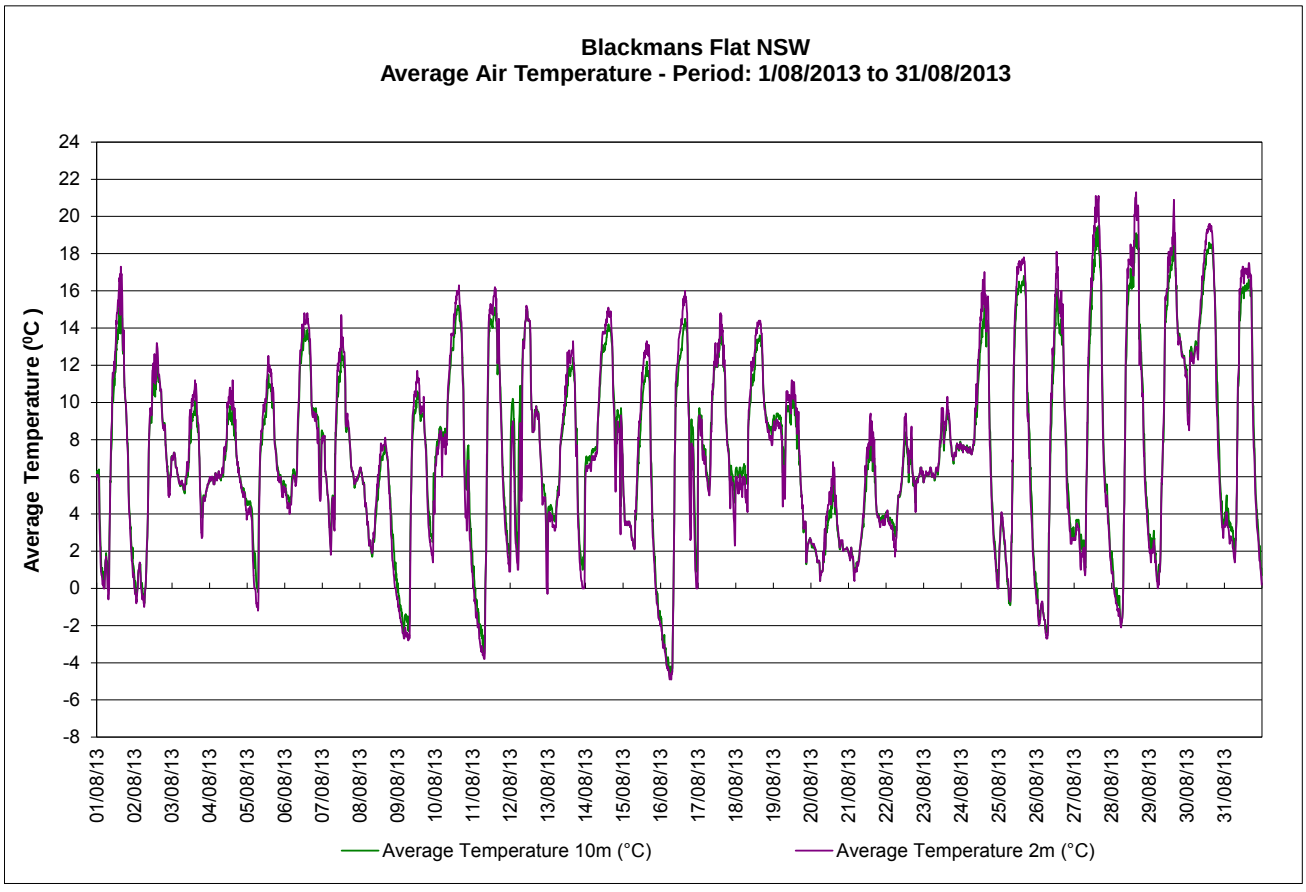

Pine Dale Mine
Blasting- Airblast Overpressure
September 2012 to August 2013 Comparable Data
Overpressure (dB)
125
120
115
110
105
100
95
1/09/2012
1/10/2012
1/11/2012
1/12/2012
1/01/2013
1/02/2013
1/03/2013
1/04/2013
1/05/2013
1/06/2013
1/07/2013
1/08/2013
EPL 95% Compliance Limit- Overpressure
EPL 100% Compliance Limit- Overpressure
Park
Noon St.
Summer St.


Pine Dale Mine
Blasting- Ground Vibration
September 2012 to August 2013 Comparable Data
Ground Vibration (mm/sec)
12
10
8
6
4
2
0
1/09/2012
1/10/2012
1/11/2012
1/12/2012
1/01/2013
1/02/2013
1/03/2013
1/04/2013
1/05/2013
1/06/2013
1/07/2013
1/08/2013
EPL 95% Compliance Limit- Vibration
EPL 100% Compliance Limit- Vibration
Park
Noon St.
Summer St.

Appendix 3

Meteorological Data


Blackmans Flat NSW
Total Rainfall - Period: 1/08/2013 to 31/08/2013
Total Rainfall (mm)
0
2
4
6
8
10
12
01/08/13
02/08/13
03/08/13
04/08/13
05/08/13
06/08/13
07/08/13
08/08/13
09/08/13
10/08/13
11/08/13
12/08/13
13/08/13
14/08/13
15/08/13
16/08/13
17/08/13
18/08/13
19/08/13
20/08/13
21/08/13
22/08/13
23/08/13
24/08/13
25/08/13
26/08/13
27/08/13
28/08/13
29/08/13
30/08/13
31/08/13
Total Rainfall for August 2013: 18.2 mm


Blackmans Flat NSW
Average Air Temperature - Period: 1/08/2013 to 31/08/2013
Average Temperature (ºC)
-8
-6
-4
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
01/08/13
02/08/13
03/08/13
04/08/13
05/08/13
06/08/13
07/08/13
08/08/13
09/08/13
10/08/13
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15/08/13
16/08/13
17/08/13
18/08/13
19/08/13
20/08/13
21/08/13
22/08/13
23/08/13
24/08/13
25/08/13
26/08/13
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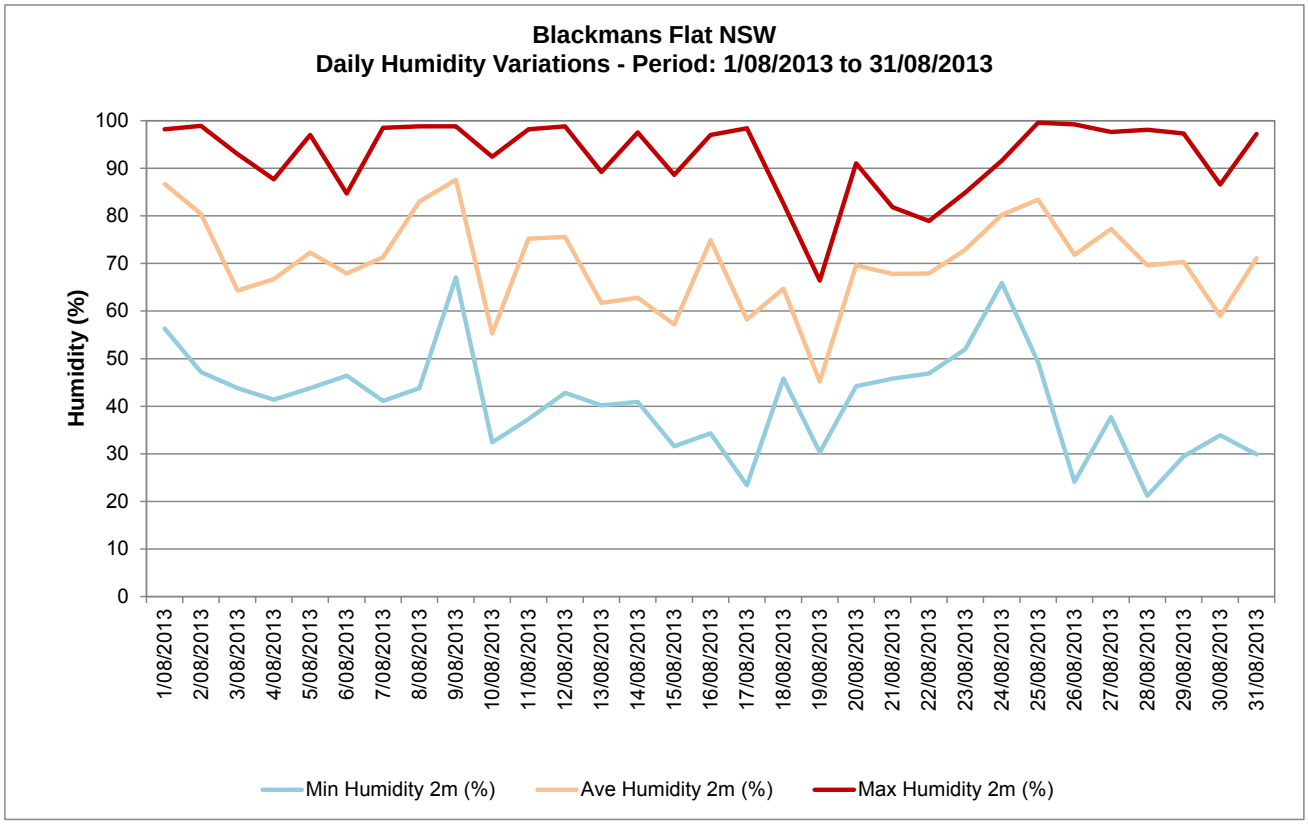
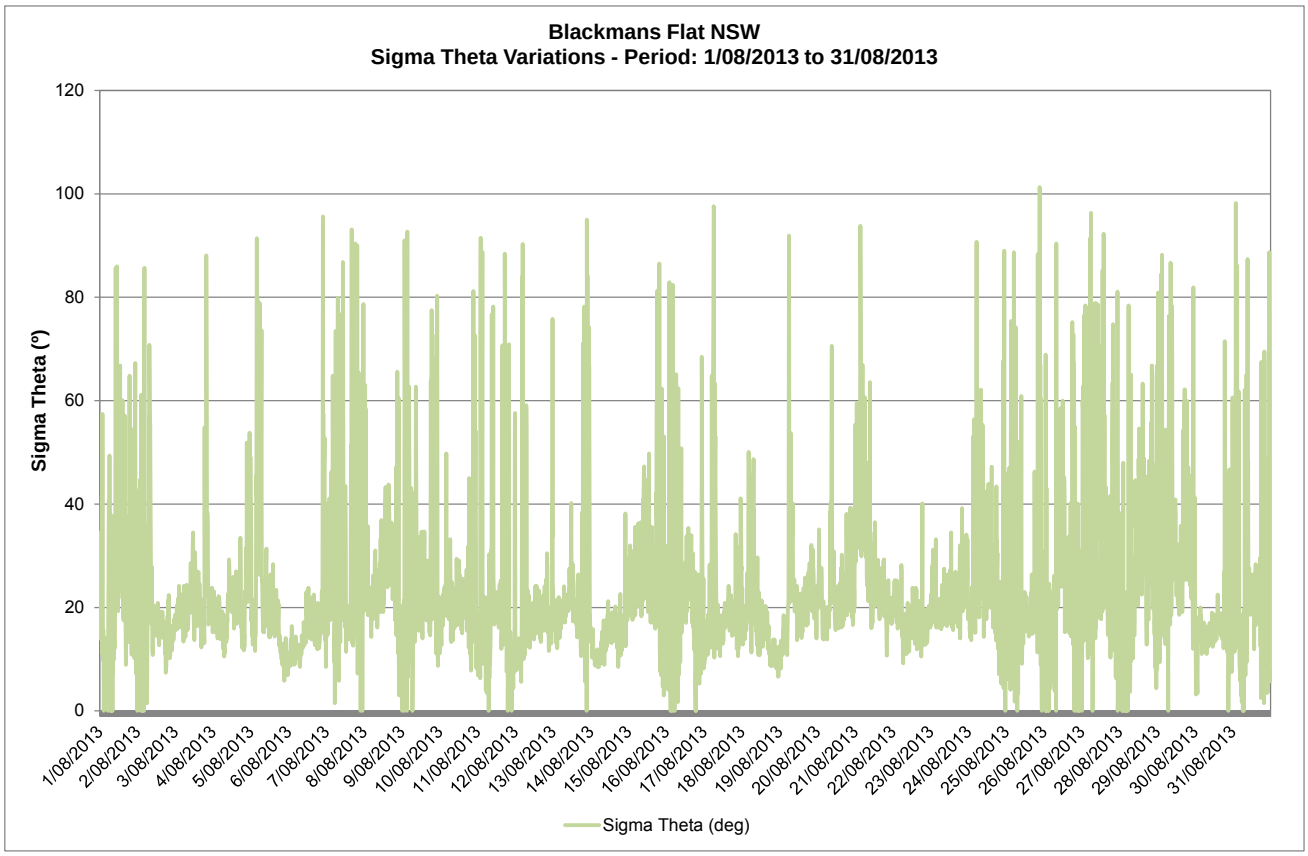
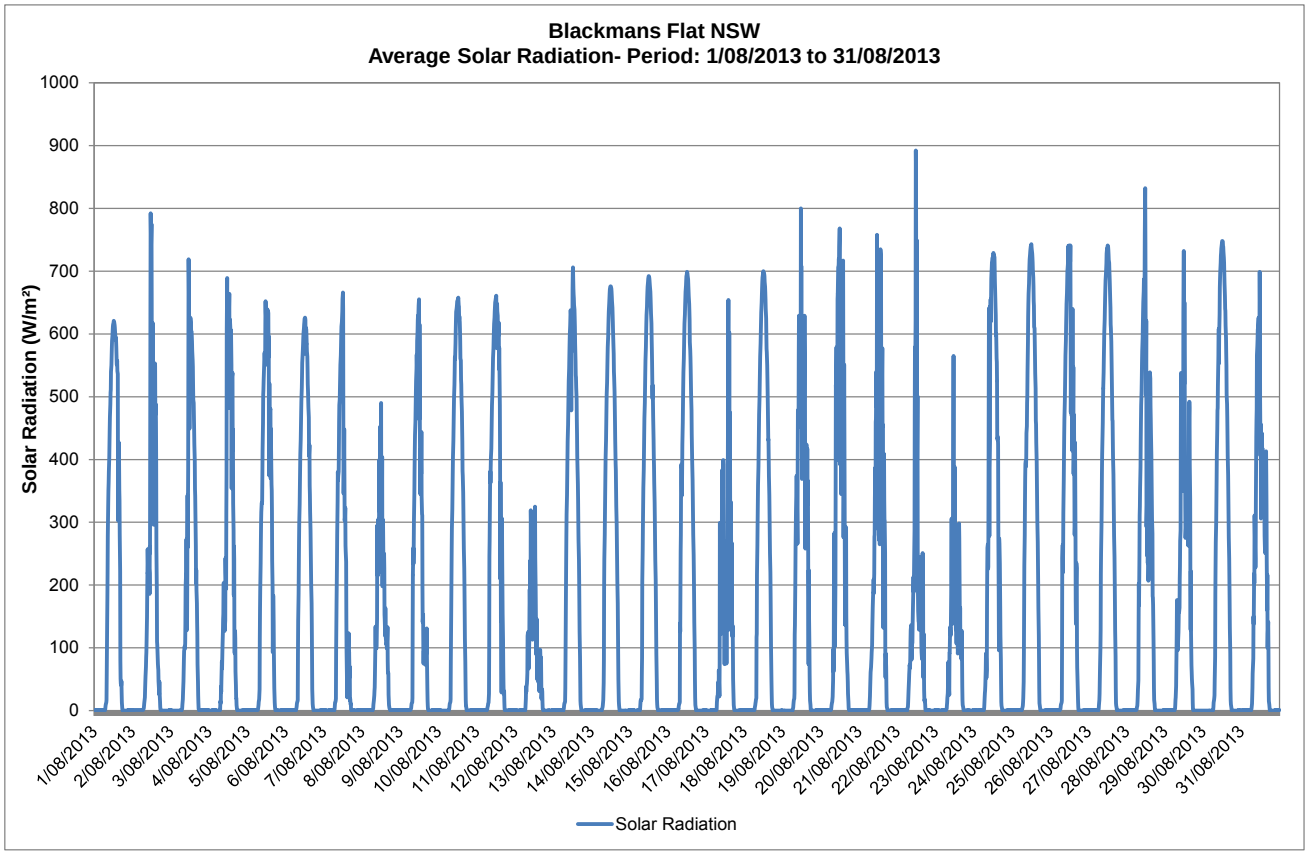
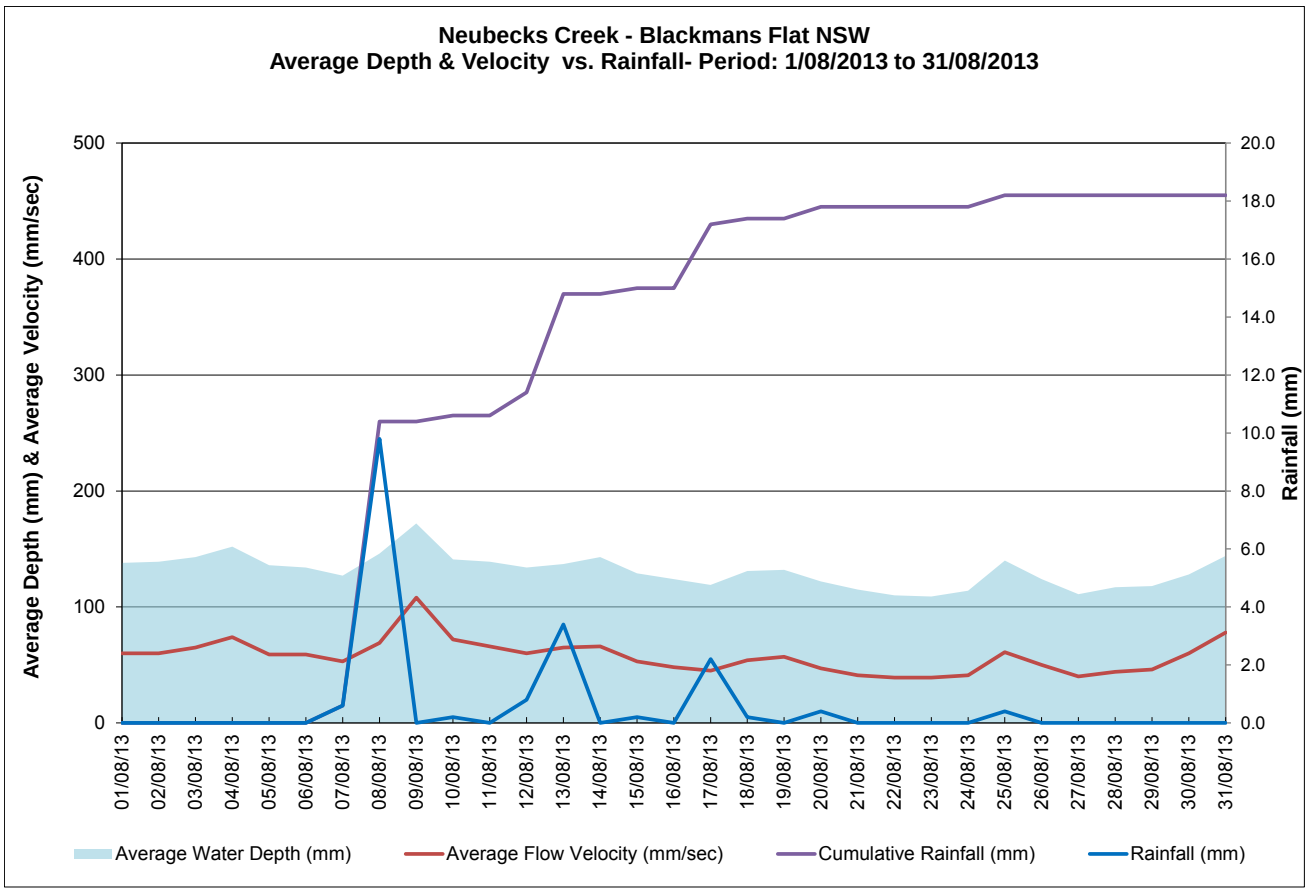
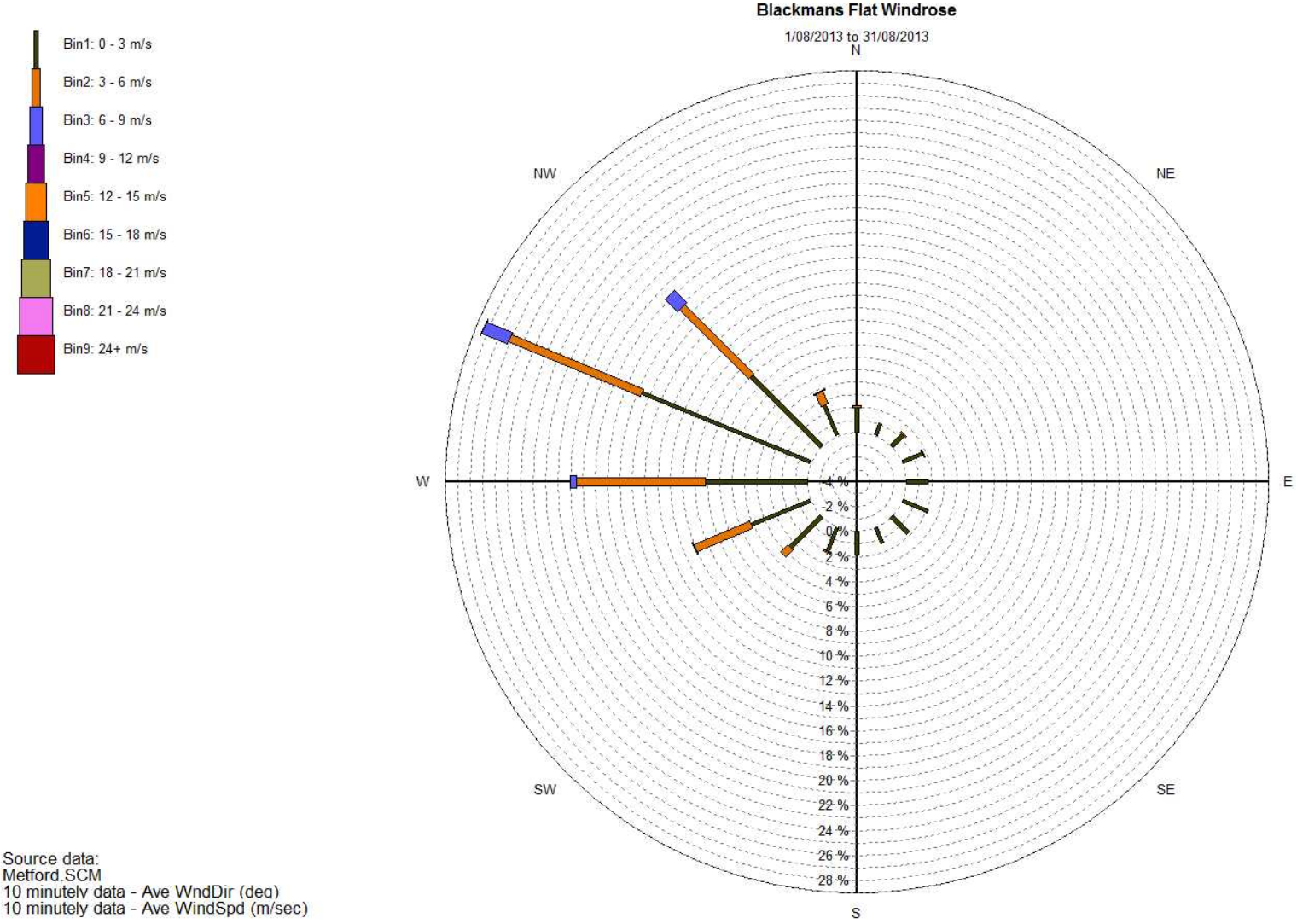
28/08/13
29/08/13
30/08/13
31/08/13
Average Temperature 10m (°C)
Average Temperature 2m (°C)


Blackmans Flat NSW
Daily Humidity Variations - Period: 1/08/2013 to 31/08/2013
Humidity (%)
100
90
80
70
60
50
40
30
20
10
0
1/08/2013
2/08/2013
3/08/2013
4/08/2013
5/08/2013
6/08/2013
7/08/2013
8/08/2013
9/08/2013
10/08/2013
11/08/2013
12/08/2013
13/08/2013
14/08/2013
15/08/2013
16/08/2013
17/08/2013
18/08/2013
19/08/2013
20/08/2013
21/08/2013
22/08/2013
23/08/2013
24/08/2013
25/08/2013
26/08/2013
27/08/2013
28/08/2013
29/08/2013
30/08/2013
31/08/2013
Min Humidity 2m (%)
Ave Humidity 2m (%)
Max Humidity 2m (%)


Blackmans Flat NSW
Sigma Theta Variations - Period: 1/08/2013 to 31/08/2013
Sigma Theta (°)
120
100
80
60
40
20
0
1/08/2013
2/08/2013
3/08/2013
4/08/2013
5/08/2013
6/08/2013
7/08/2013
8/08/2013
9/08/2013
10/08/2013
11/08/2013
12/08/2013
13/08/2013
14/08/2013
15/08/2013
16/08/2013
17/08/2013
18/08/2013
19/08/2013
20/08/2013
21/08/2013
22/08/2013
23/08/2013
24/08/2013
25/08/2013
26/08/2013
27/08/2013
28/08/2013
29/08/2013
30/08/2013
31/08/2013
Sigma Theta (deg)


Blackmans Flat NSW
Average Solar Radiation- Period: 1/08/2013 to 31/08/2013
Solar Radiation (W/m²)
1000
900
800
700
600
500
400
300
200
100
0
1/08/2013
2/08/2013
3/08/2013
4/08/2013
5/08/2013
6/08/2013
7/08/2013
8/08/2013
9/08/2013
10/08/2013
11/08/2013
12/08/2013
13/08/2013
14/08/2013
15/08/2013
16/08/2013
17/08/2013
18/08/2013
19/08/2013
20/08/2013
21/08/2013
22/08/2013
23/08/2013
24/08/2013
25/08/2013
26/08/2013
27/08/2013
28/08/2013
29/08/2013
30/08/2013
31/08/2013
Solar Radiation


Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/08/2013 to 31/08/2013
Average Depth (mm) & Average Velocity (mm/sec)
Rainfall (mm)
500
400
300
200
100
0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
01/08/13
02/08/13
03/08/13
04/08/13
05/08/13
06/08/13
07/08/13
08/08/13
09/08/13
10/08/13
11/08/13
12/08/13
13/08/13
14/08/13
15/08/13
16/08/13
17/08/13
18/08/13
19/08/13
20/08/13
21/08/13
22/08/13
23/08/13
24/08/13
25/08/13
26/08/13
27/08/13
28/08/13
29/08/13
30/08/13
31/08/13
Average Water Depth (mm)
Average Flow Velocity (mm/sec)
Cumulative Rainfall (mm)
Rainfall (mm)



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