Appendix 2

Monthly Dust and Meteorological Reports

This appendices is presented on the CD included on the inside front cover of this report.

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Donaldson Monitoring
Dust and Meteorological Data
Monthly Report

June 2008

Prepared for
Donaldson Coal

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1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during June 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**. **Table 1** lists the monitors used and pollutants measured at these locations.

Table 1. Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during June 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for June 2008

Date	Beresfield PM_{10} (µg/m³)	Blackhill PM_{10} (µg/m³)	Blackhill TSP (µg/m³)
4/06/2008	11	8	11
10/06/2007	12	15	54
16/06/2008	13	8	14
22/06/2008	10	7	12
28/06/2008	22	9	18
Annual average	**20**	**12**	**25**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in June 2008 was 22 µg/m³, measured on the 28th at the Beresfield site. On no occasion did the measured PM_{10} concentrations exceed the 50 µg/m³ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 µg/m³ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to June 2008 was 25 µg/m³.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 20 µg/m³ and 12 µg/m³ respectively for the 12 months to June 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 µg/m³.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. The flow to the DustTrak was obstructed on the 26th of June causing significant loss of data for the month of June, following the pervious obstruction being rectified on the 13th of June. Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 µg/m³. The maximum 24-hour average PM_{10} concentration was recorded on the 19th of June at 18.9 µg/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in **Figure 4**. The DustTrak monitoring for the Weakleys Drive site is available from the 13th to the 15th of June 2008. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 µg/m³. The maximum 24-hour average PM_{10} concentration was 2 µg/m³, recorded on the 14th of June.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for June 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for June 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3. Dust deposition monitoring for the 12-month period to June 2008

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
Jun-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
Annual Average	1.6	0.6	1.4	0.9	0.8	0.9	0.7	1.4	0.6	0.7	0.9

*Data supplied by Metford Laboratories. # Insects/bird droppings reported. * Invalid (excess bird droppings).*

The highest dust deposition measurement in June 2008 was 0.8 g/m²/month at DG10, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in June 2008 are shown in **Figure 6** and a windrose is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maximums and minimums all appeared to be sensible for this site during May. Total rainfall for the month was 105.4 mm.

A windrose (see **Figure 7**) created from the available 10-minute average wind data shows that winds were predominantly from the west and the westnorthwest quadrants. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 41.1% of the time. This is quite a high percentage but is similar to the value for June 2007.

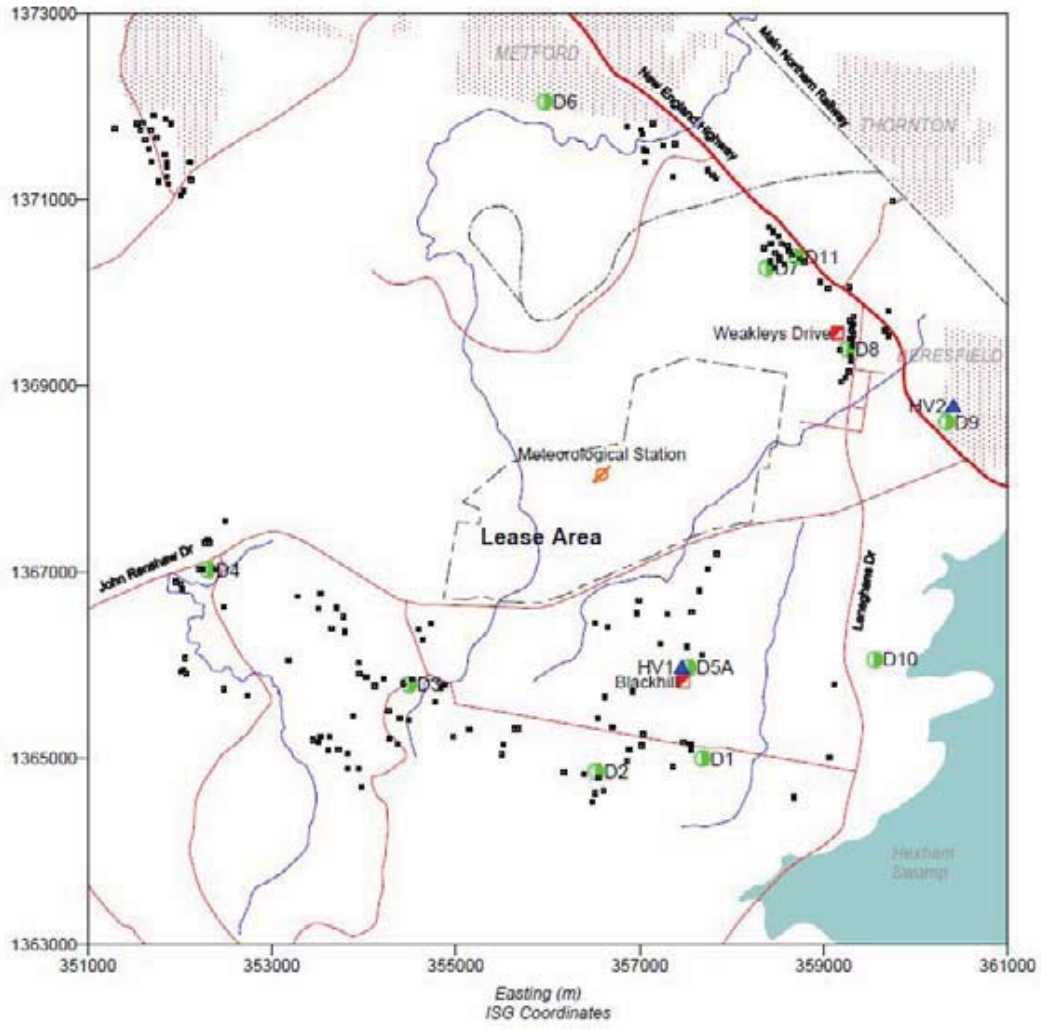
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m^2/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4[r]	0.4[r]	0.8[r]	0.4[r]	0.4[r]	0.8[r]	1.1[r]	1.7[r]	1.2	1.1[r]	1.1[r]
May-08	1.1	2.4[r]	0.9	1.4	0.9	0.9	0.7	2.7	1[r]	1.1	1.3[r]
June-08	0.2	0.4[r]	0.1	0.5	0.1[r]	0.1	0.3	0.5[r]	0.1	0.8	0.2

FIGURES



Location of Project Area

FIGURE 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to June 2008

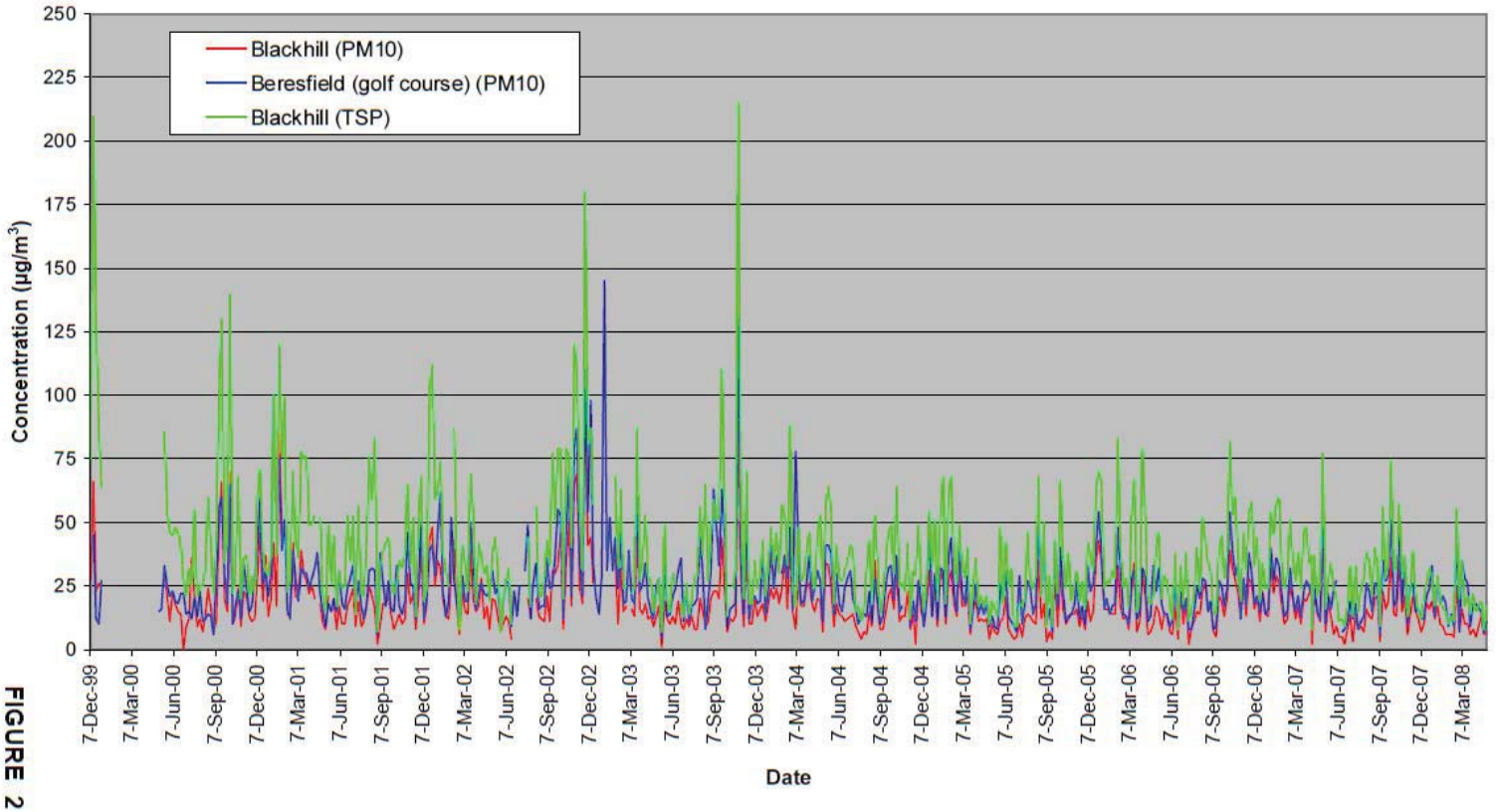


FIGURE 2

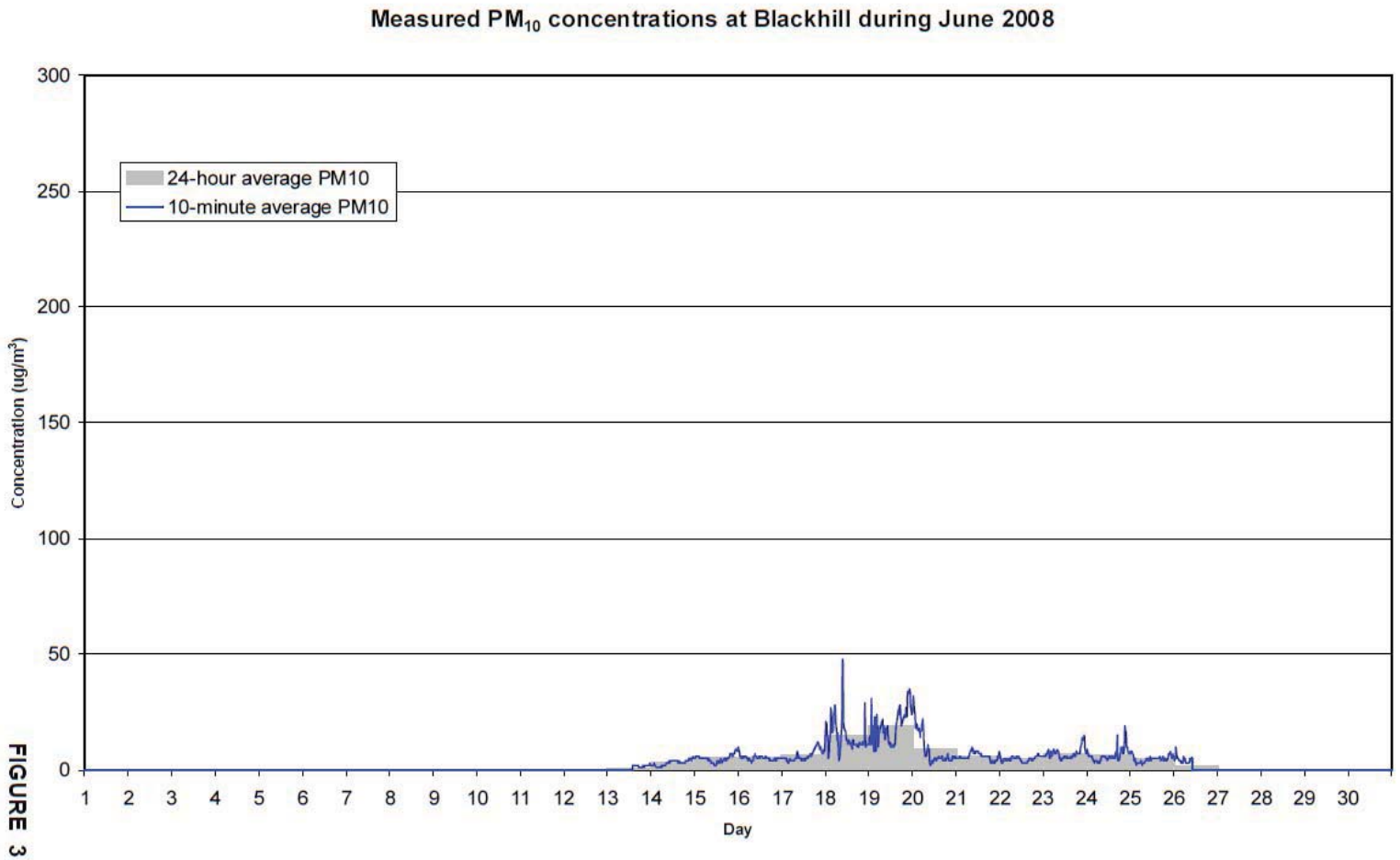

Measured PM10 concentrations at Blackhill during June 2008
24-hour average PM10
10-minute average PM10
Concentration (ug/m3)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

FIGURE 3

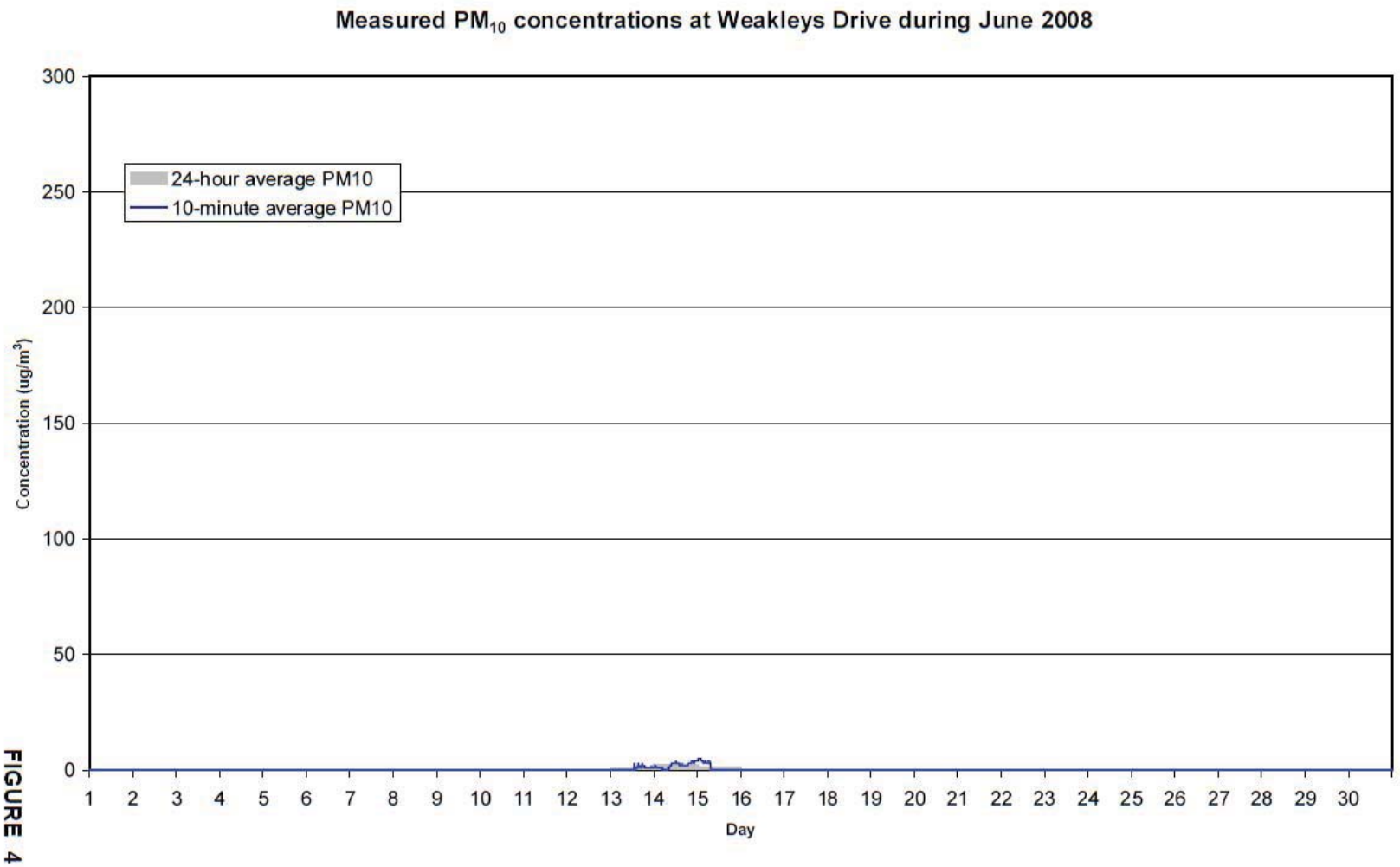
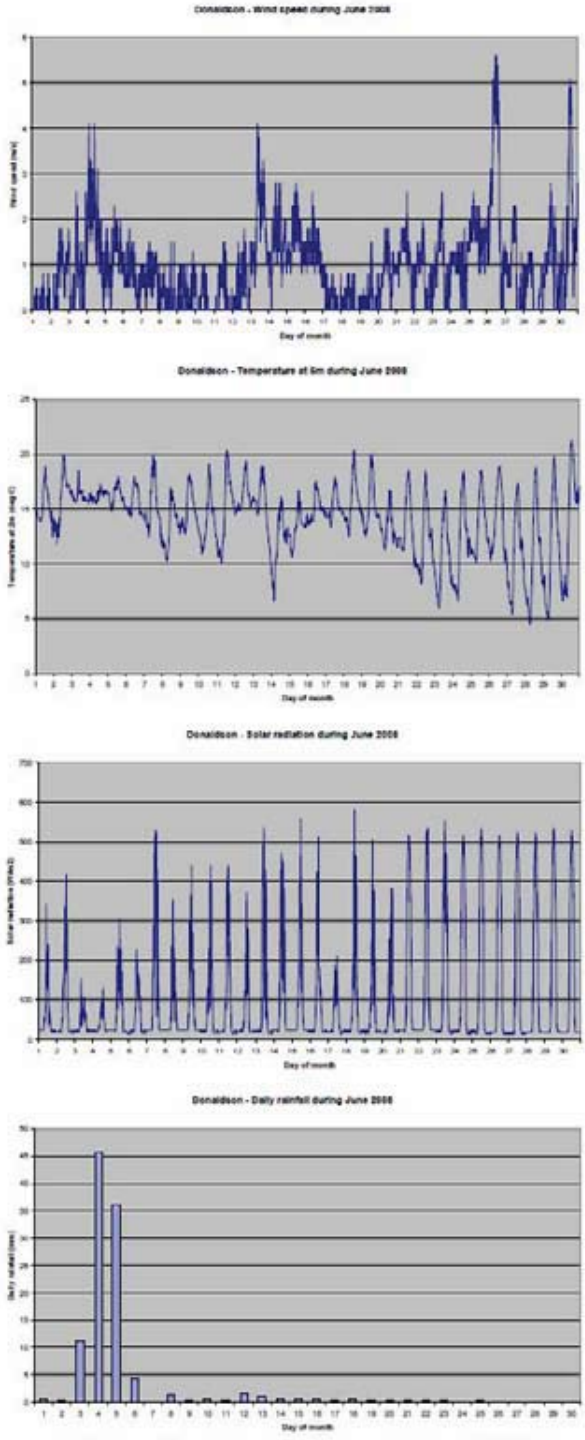

Measured PM10 concentrations at Weakleys Drive during June 2008
24-hour average PM10
10-minute average PM10
Concentration (ug/m3)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

FIGURE 4

[No Grimm monitoring was scheduled for this month]

FIGURE 5



Meteorological conditions – June 2008

FIGURE 6

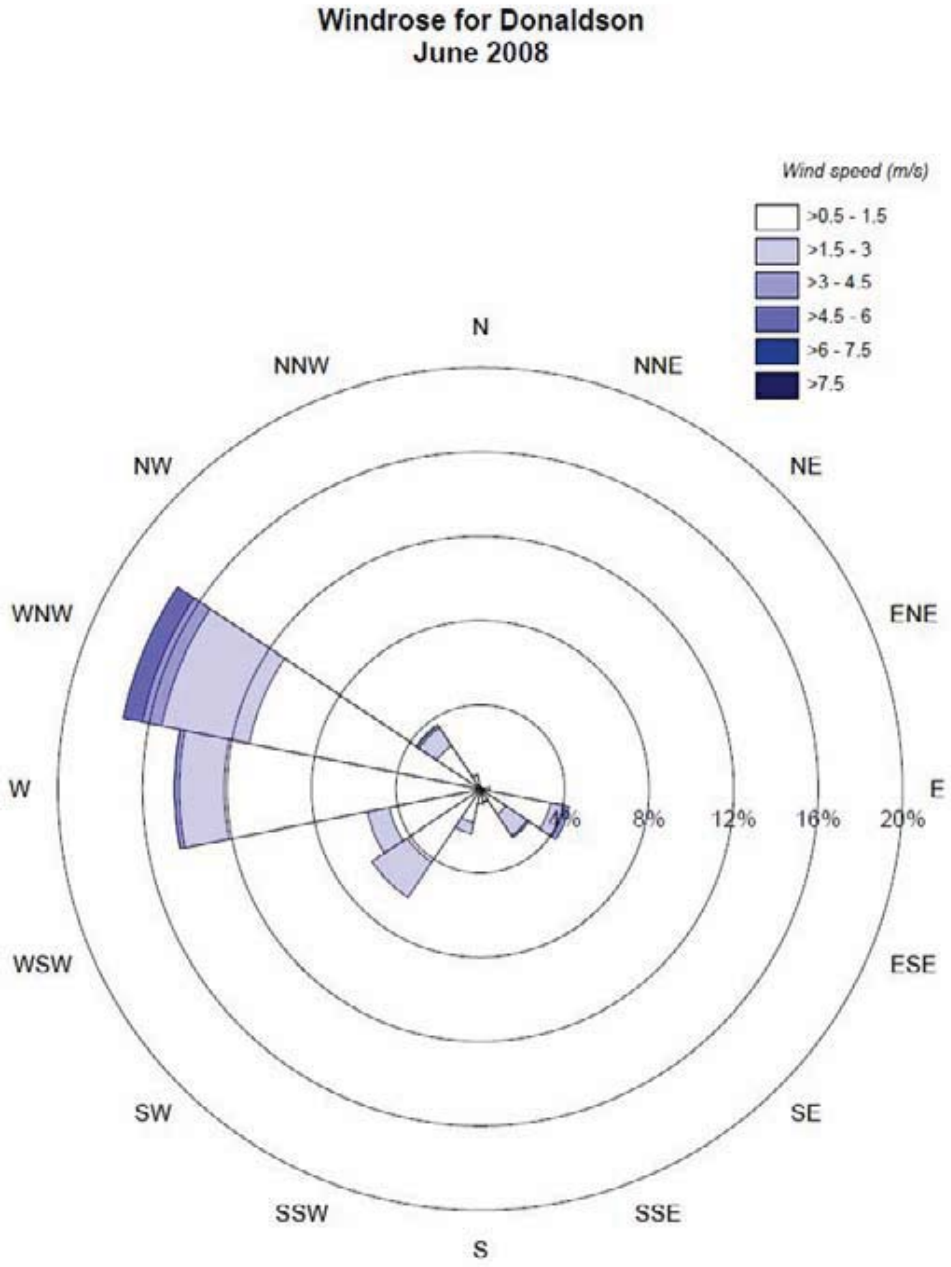

Windrose for Donaldson
June 2008
Wind speed (m/s)
>0.5 - 1.5
>1.5 - 3
>3 - 4.5
>4.5 - 6
>6 - 7.5
>7.5
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
4%
8%
12%
16%
20%
Calms = 41.1%

FIGURE 7

Donaldson Monitoring
Dust and Meteorological Data
Monthly Report

July 2008

Prepared for
Donaldson Coal

by
Holmes Air Sciences

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CONTENTS

LIST OF FIGURES

(All figures are at the end of the report)

LIST OF TABLES

1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during July 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**. **Table 1** lists the monitors used and pollutants measured at these locations.

Table 1. Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during July 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for July 2008

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
4/07/2008	10	24	28
10/07/2007	12	21	28
16/07/2008	10	18	16
22/07/2008	10	18	28
28/07/2008	1	4	3
Annual average	19	13	25

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in July 2008 was 24 $\mu g/m^3$, measured on the 4th at the Blackhill site. On no occasion did the measured PM_{10} concentrations exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to July 2008 was 25 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 19 $\mu g/m^3$ and 13 $\mu g/m^3$ respectively for the 12 months to July 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. Unfortunately due to a possible power failure to the DustTrak monitor only five days of PM_{10} data has been collected at this site. Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 7th of June at 12.5 $\mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in **Figure 4**. The DustTrak monitoring for the Weakleys Drive site is available from the 3rd to the 31st of July 2008. The available data show that 24-hour average PM_{10} concentration was above the NEPM goal of 50 µg/m^3 on one occasion. The maximum 24-hour average PM_{10} concentration was 87.7 µg/m^3, recorded on the 18th of June.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for July 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for July 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A.**

Table 3. Dust deposition monitoring for the 12-month period to July 2008

Month	Monthly dust deposition rate (g/m^2/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14 *	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2 *	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 *	0.4 *	0.8 *	0.4 *	0.4 *	0.8 *	1.1 *	1.7 *	1.2	1.1 *	1.1 *
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1 *	1.1	1.3 *
Jun-08	0.2	0.4 *	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2
Jul-08	0.4	0.7 *	1.3 *	0.6 *	0.8	0.9	0.8	1	0.7	0.5	1.1
Annual Average	1.6	0.6	1.4	0.9	0.9	0.9	0.7	1.4	0.7	0.7	1.0

*Data supplied by Metford Laboratories. * Insects/bird droppings reported. ^ Invalid (excess bird droppings).*

The highest dust deposition measurement in July 2008 was 1.1 g/m^2/month at DG11, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m^2/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in July 2008 are shown in **Figure 6** and a windrose is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during July. Total rainfall for the month was 17.4 mm.

A windrose (see **Figure 7**) created from the available 10-minute average wind data shows that winds were predominantly from the west. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 41.6% of the time. This is quite a high percentage but is similar to the value for July 2007.

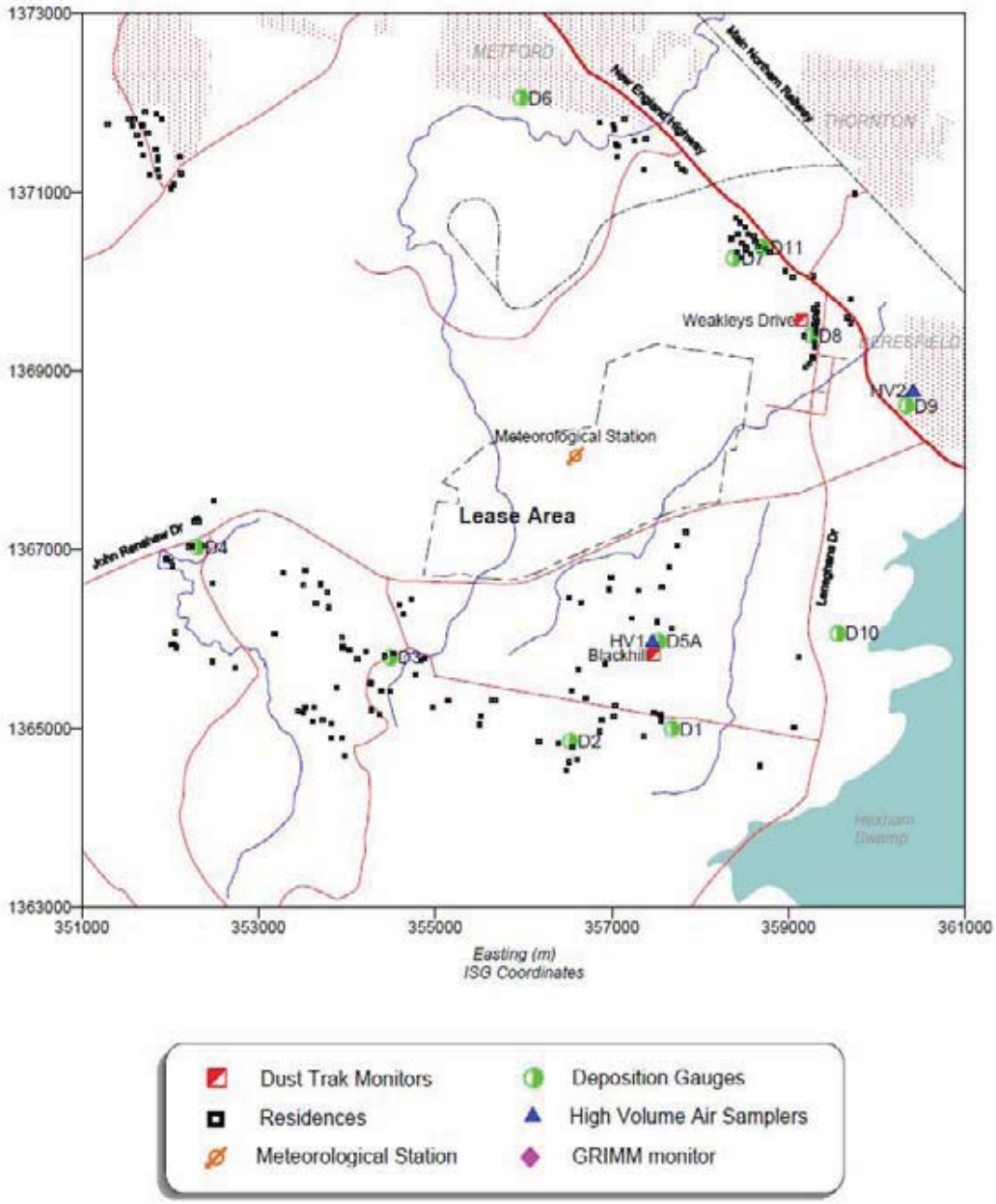
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m^2/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4[r]	0.4[r]	0.8[r]	0.4[r]	0.4[r]	0.8[r]	1.1[r]	1.7[r]	1.2	1.1[r]	1.1[r]
May-08	1.1	2.4[r]	0.9	1.4	0.9	0.9	0.7	2.7	1[r]	1.1	1.3[r]
June-08	0.2	0.4[r]	0.1	0.5	0.1[r]	0.1	0.3	0.5[r]	0.1	0.8	0.2
July-08	0.4	0.7[r]	1.3[r]	0.6	0.8[r]	0.9	0.8	1	0.7	0.5	1.1

FIGURES



Location of Project Area

FIGURE 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to July 2008

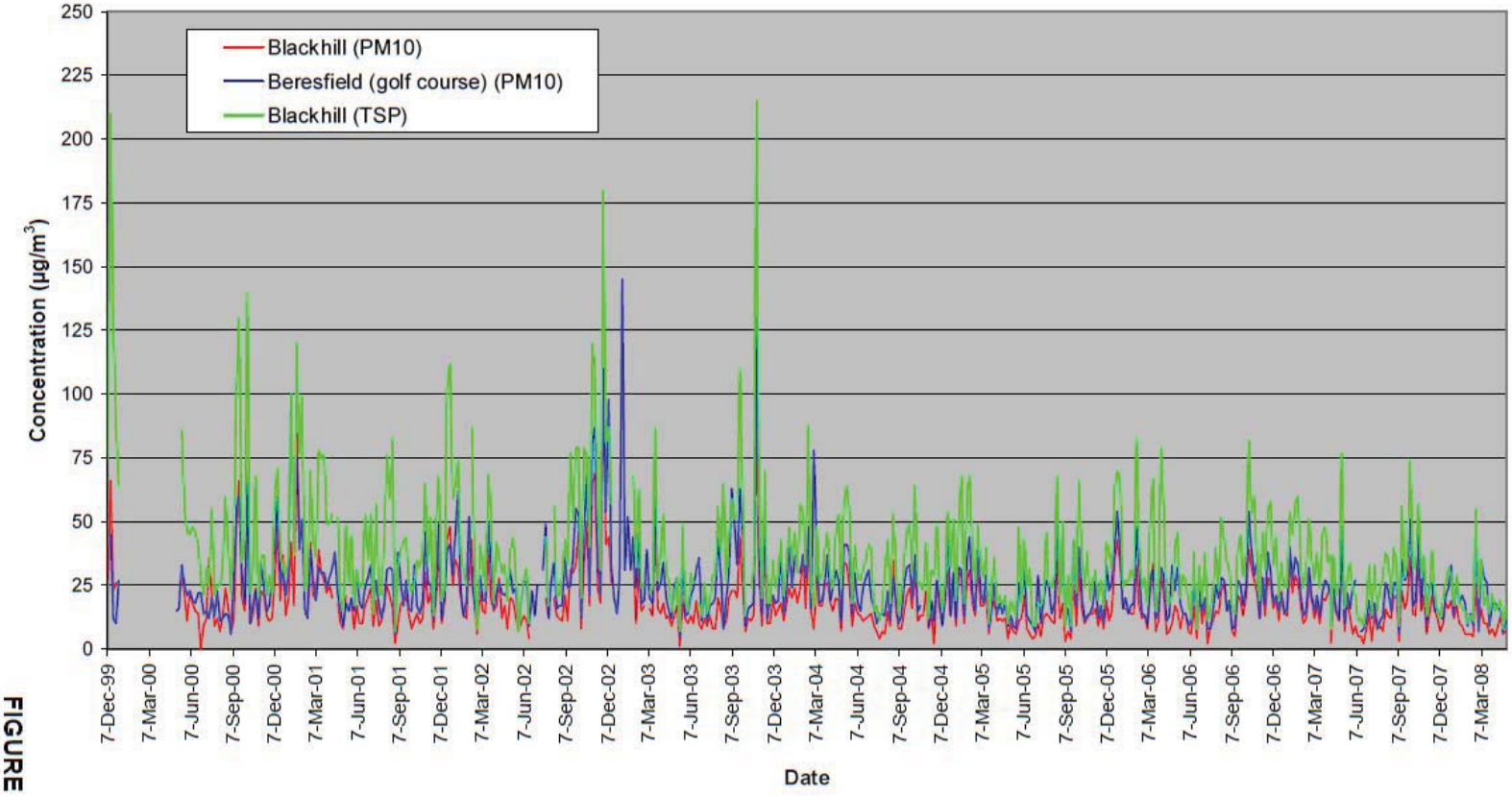


FIGURE 2

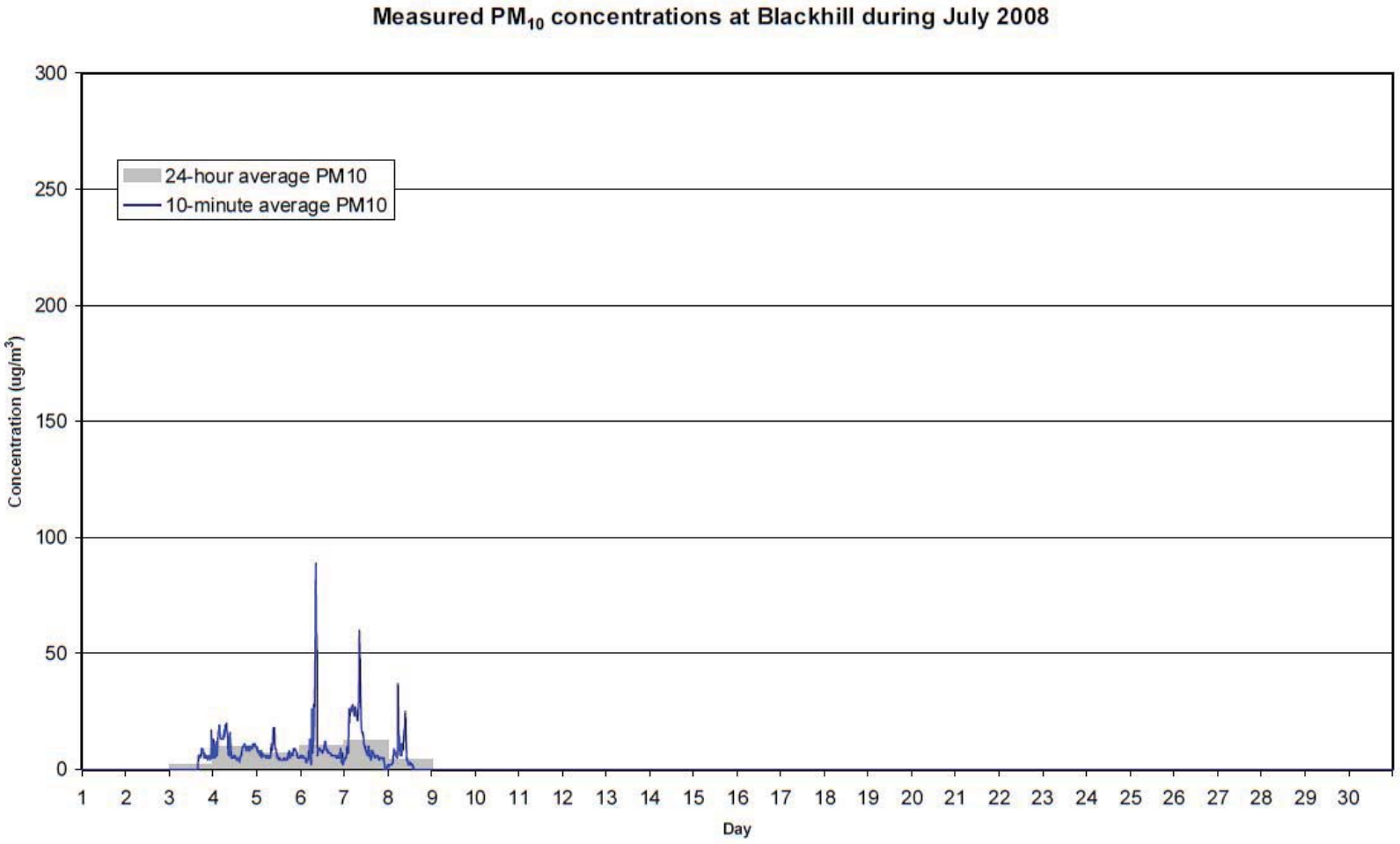

Measured PM10 concentrations at Blackhill during July 2008
24-hour average PM10
10-minute average PM10
Concentration (ug/m3)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

FIGURE 3

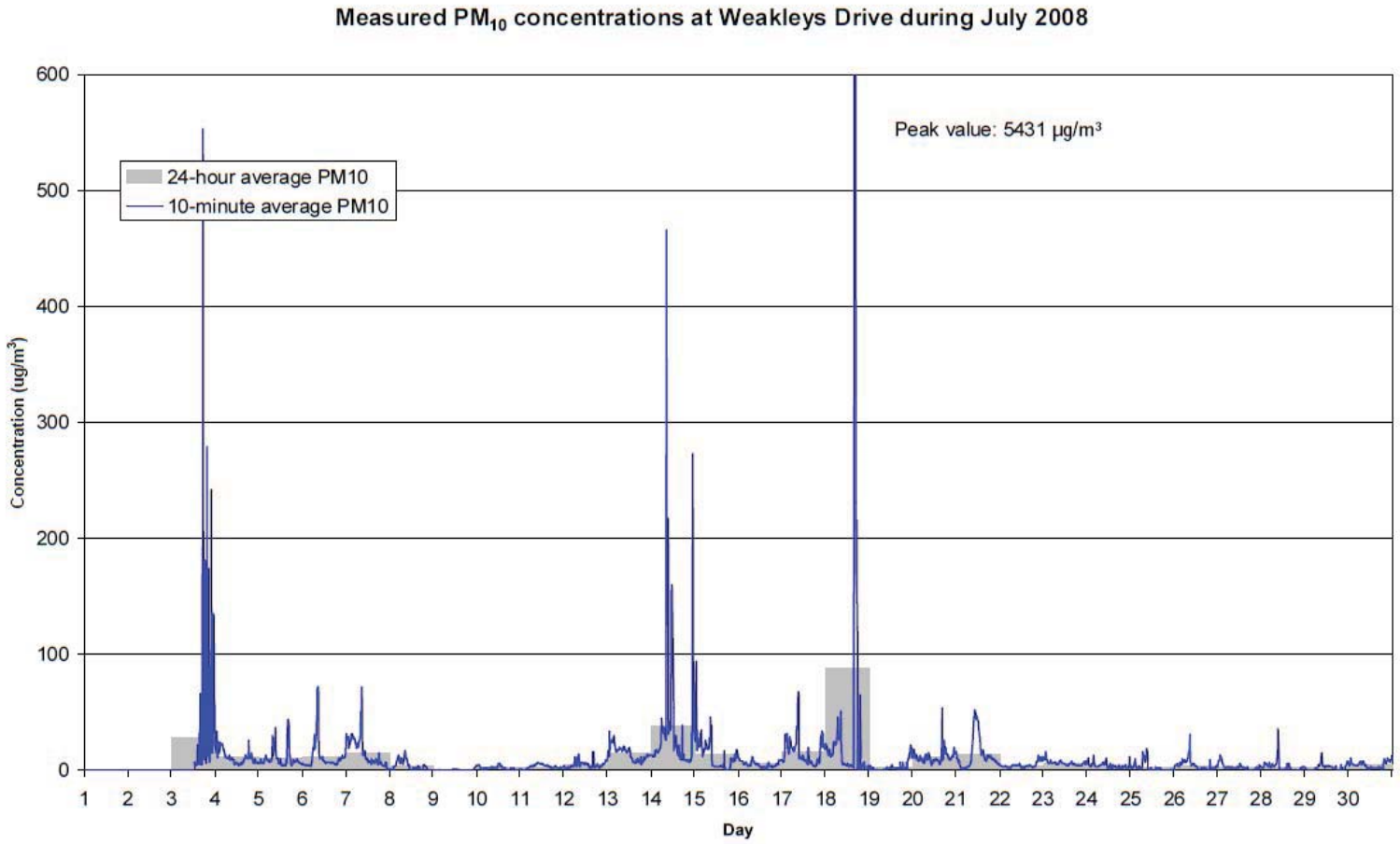
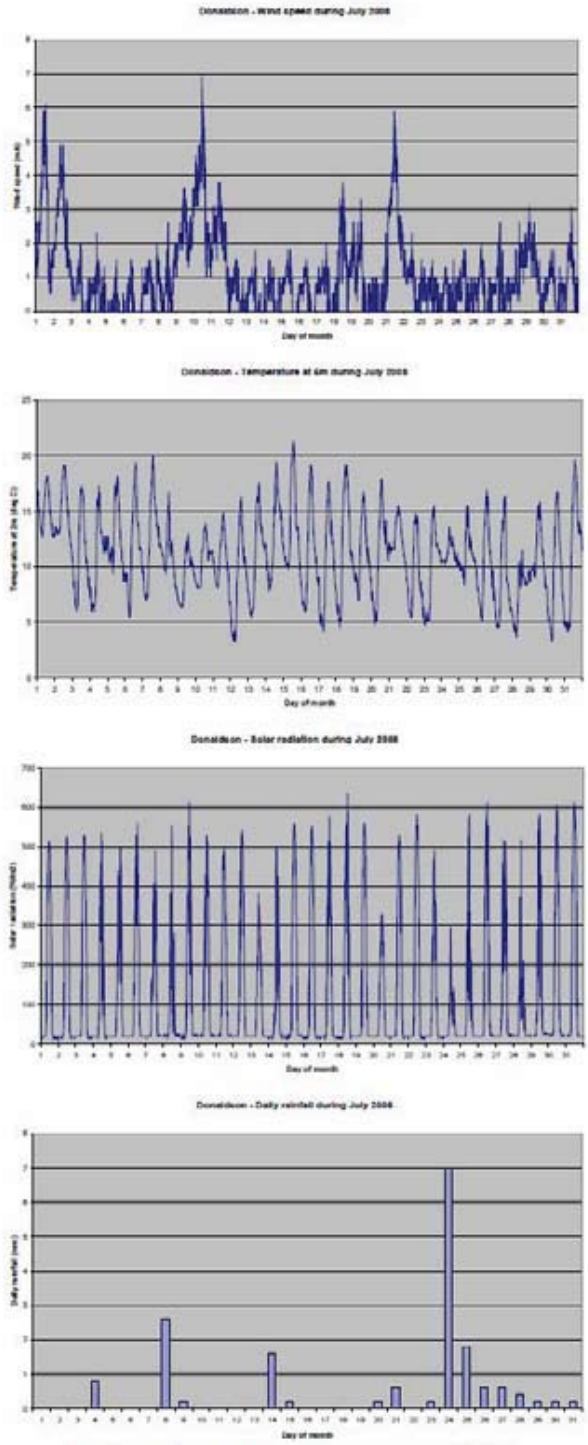

Measured PM10 concentrations at Weakleys Drive during July 2008
Peak value: 5431 µg/m³
24-hour average PM10
10-minute average PM10
Concentration (ug/m³)
Day
0
100
200
300
400
500
600
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

FIGURE 4

[No Grimm monitoring was scheduled for this month]

FIGURE 5



Meteorological conditions – July 2008

FIGURE 6

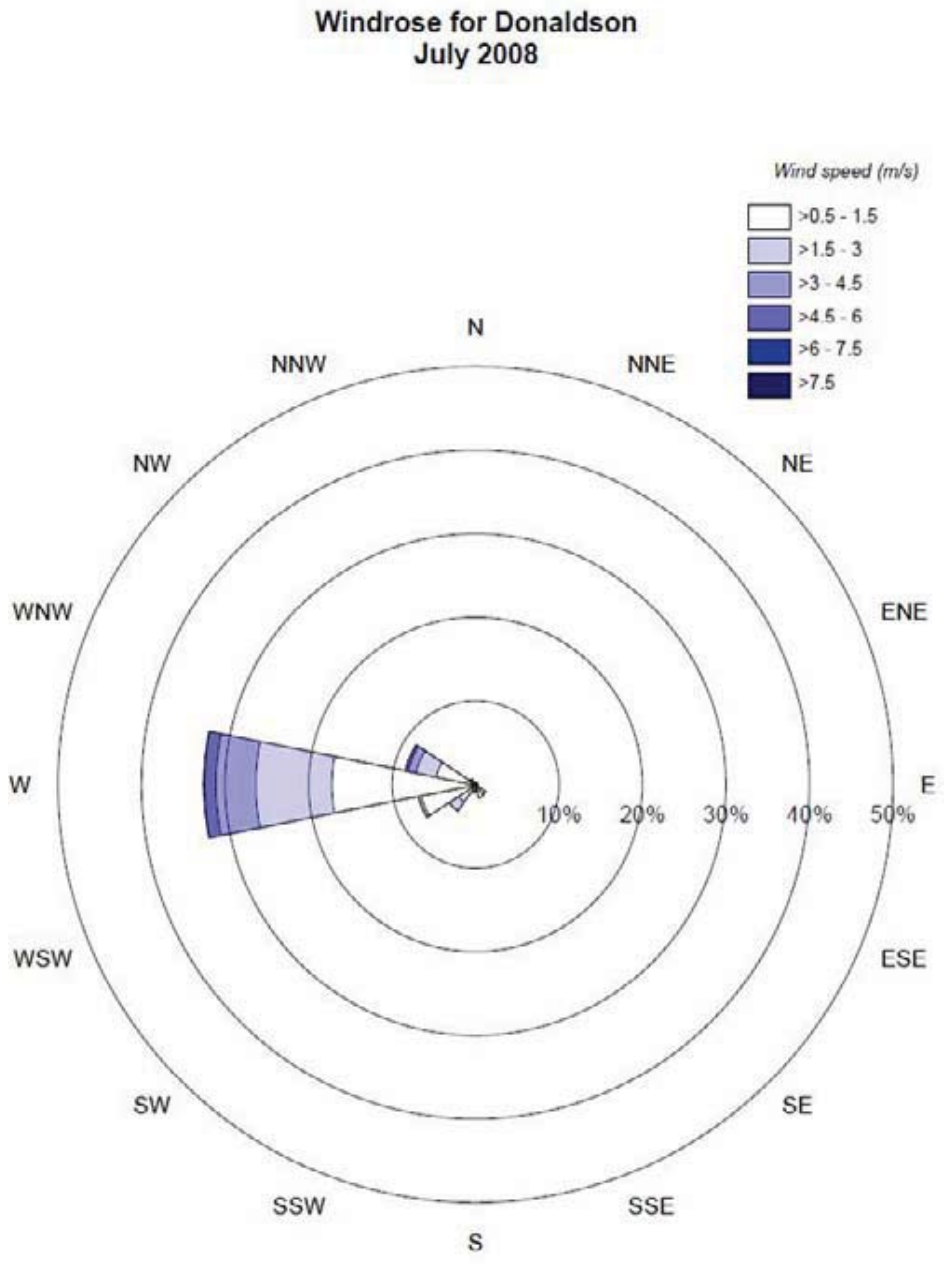

Windrose for Donaldson
July 2008
Wind speed (m/s)
>0.5 - 1.5
>1.5 - 3
>3 - 4.5
>4.5 - 6
>6 - 7.5
>7.5
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
20%
30%
40%
50%
Calms = 41.6%

FIGURE 7

Donaldson Monitoring Dust and Meteorological Data Monthly Report

August 2008

Prepared for
Donaldson Coal

by
Holmes Air Sciences

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CONTENTS

LIST OF FIGURES

(All figures are at the end of the report)

LIST OF TABLES

1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during August 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**. **Table 1** lists the monitors used and pollutants measured at these locations.

Table 1. Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during August 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for August 2008

Date	Beresfield PM_{10} (µg/m³)	Blackhill PM_{10} (µg/m³)	Blackhill TSP (µg/m³)
3/08/2008	11	11	20
9/08/2008	14	14	22
15/08/2008	28	28	52
21/08/2008	43	43	56
27/08/2008	25	25	34
Annual average	20	13	25

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in August 2008 was 43 µg/m³; measured on the 21st at both the Beresfield and Blackhill site. On no occasion did the measured PM_{10} concentrations exceed the 50 µg/m³ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 µg/m³ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to August 2008 was 25 µg/m³.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 20 µg/m³ and 13 µg/m³ respectively for the 12 months to August 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 µg/m³.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. During the month of August, the DustTrak monitor located at the Blackhill site experienced a power failure. The effect of this was that no data were recorded for the month of August. The DustTrak returned to normal functioning on the 8th of September 2008.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in **Figure 4**. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 31st of August 2008. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 µg/m^3. The maximum 24-hour average PM_{10} concentration was 32.6 µg/m^3, recorded on the 29th of August.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for August 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for August 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3. Dust deposition monitoring for the 12-month period to June 2008

Month	Monthly dust deposition rate (g/m^2/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14 *	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2 *	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 '	0.4 '	0.8 '	0.4 '	0.4 '	0.8 '	1.1 '	1.7 '	1.2	1.1 '	1.1 '
May-08	1.1	2.4 '	0.9	1.4	0.9	0.9	0.7	2.7	1 '	1.1	1.3 '
Jun-08	0.2	0.4 '	0.1	0.5	0.1 '	0.1	0.3	0.5 '	0.1	0.8	0.2
Jul-08	0.4	0.7'	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1'	0.5'	0.7'	0.6'	0.5	1.9'	0.8'	1'	1'	0.9'	1.4
Annual Average	**1.5**	**0.7**	**1.5**	**0.7**	**0.8**	**1.0**	**0.8**	**1.4**	**0.8**	**0.8**	**1.1**

*Data supplied by Metford Laboratories. ' Insects/bird droppings reported. * Invalid (excess bird droppings).*

The highest dust deposition measurement in August 2008 was 1.4 g/m^2/month at DG11, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m^2/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in August 2008 are shown in **Figure 6** and a windrose is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during August. Total rainfall for the month was 13.4 mm.

A windrose (see **Figure 7**) created from the available 10-minute average wind data shows that winds were predominantly from the west. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 31.8% of the time. This is quite a high percentage but is similar to the value for August 2007.

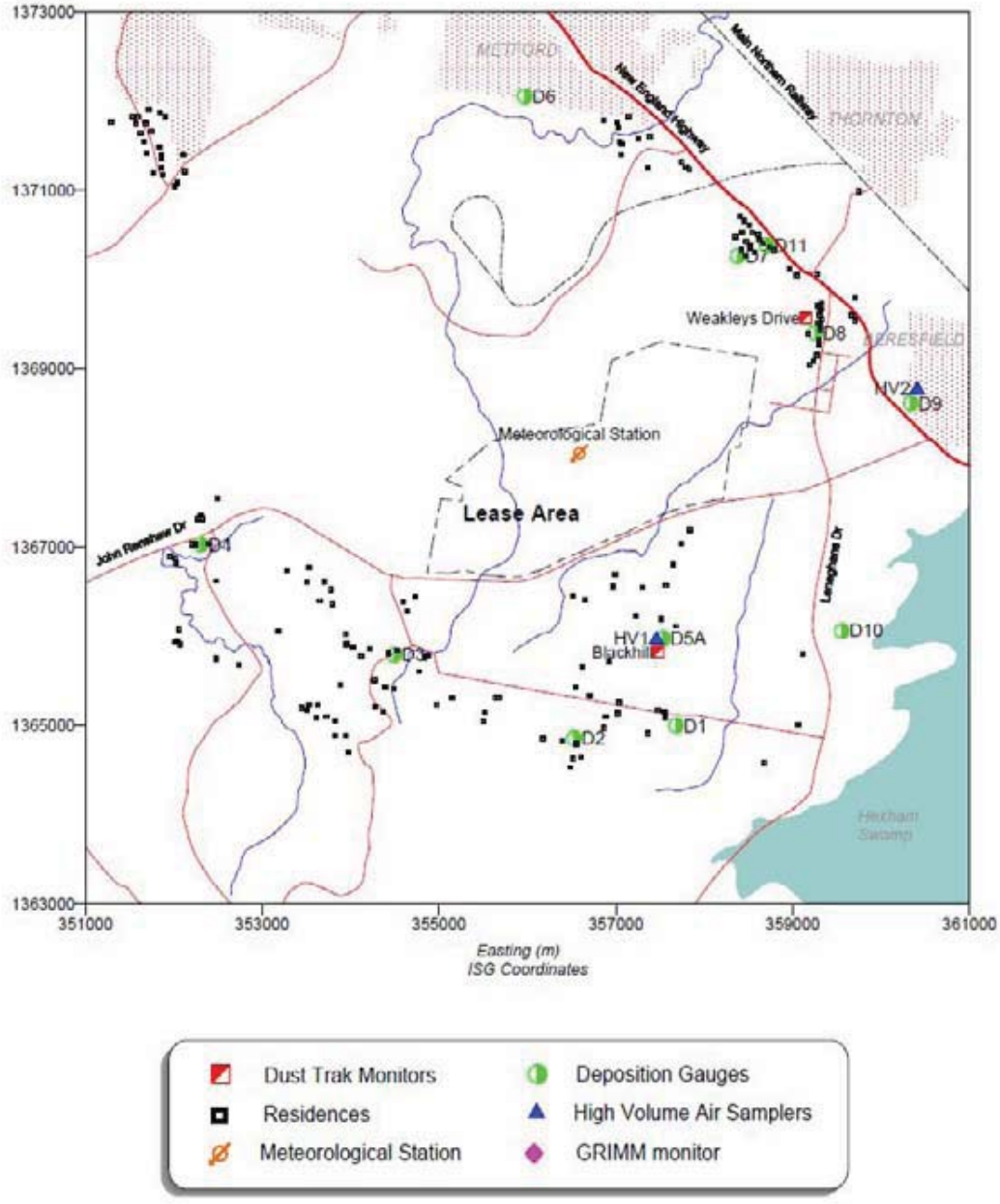
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4[#]	0.4[#]	0.8[#]	0.4[#]	0.4[#]	0.8[#]	1.1[#]	1.7[#]	1.2	1.1[#]	1.1[#]
May-08	1.1	2.4[#]	0.9	1.4	0.9	0.9	0.7	2.7	1[#]	1.1	1.3[#]
June-08	0.2	0.4[#]	0.1	0.5	0.1[#]	0.1	0.3	0.5[#]	0.1	0.8	0.2
July-08	0.4	0.7[#]	1.3[#]	0.6	0.8[#]	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1[#]	0.5[#]	0.7[#]	0.6[#]	0.5	1.9[#]	0.8[#]	1[#]	1[#]	0.9[#]	1.4

FIGURES



Location of Project Area

FIGURE 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to August 2008

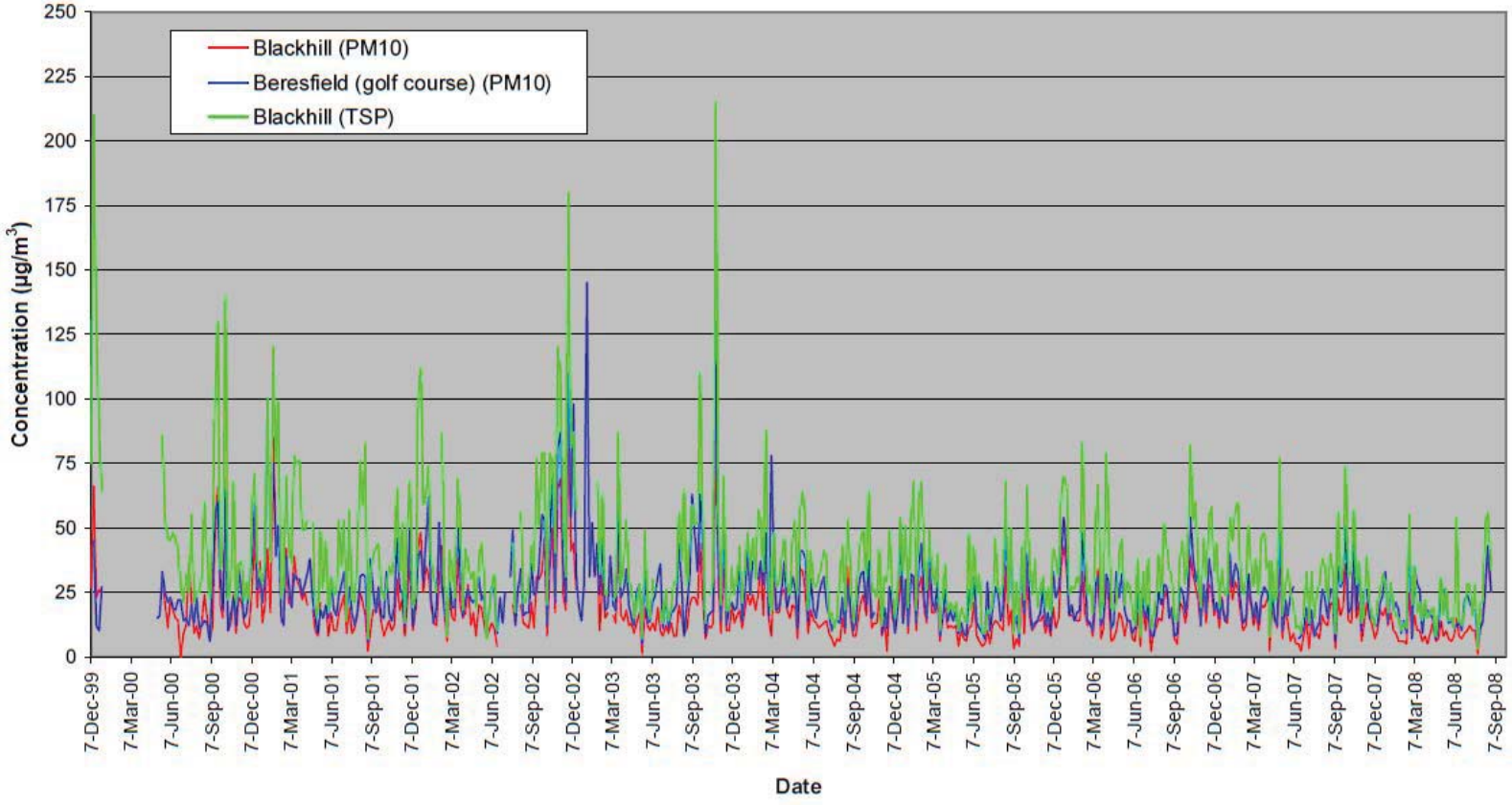


FIGURE 2

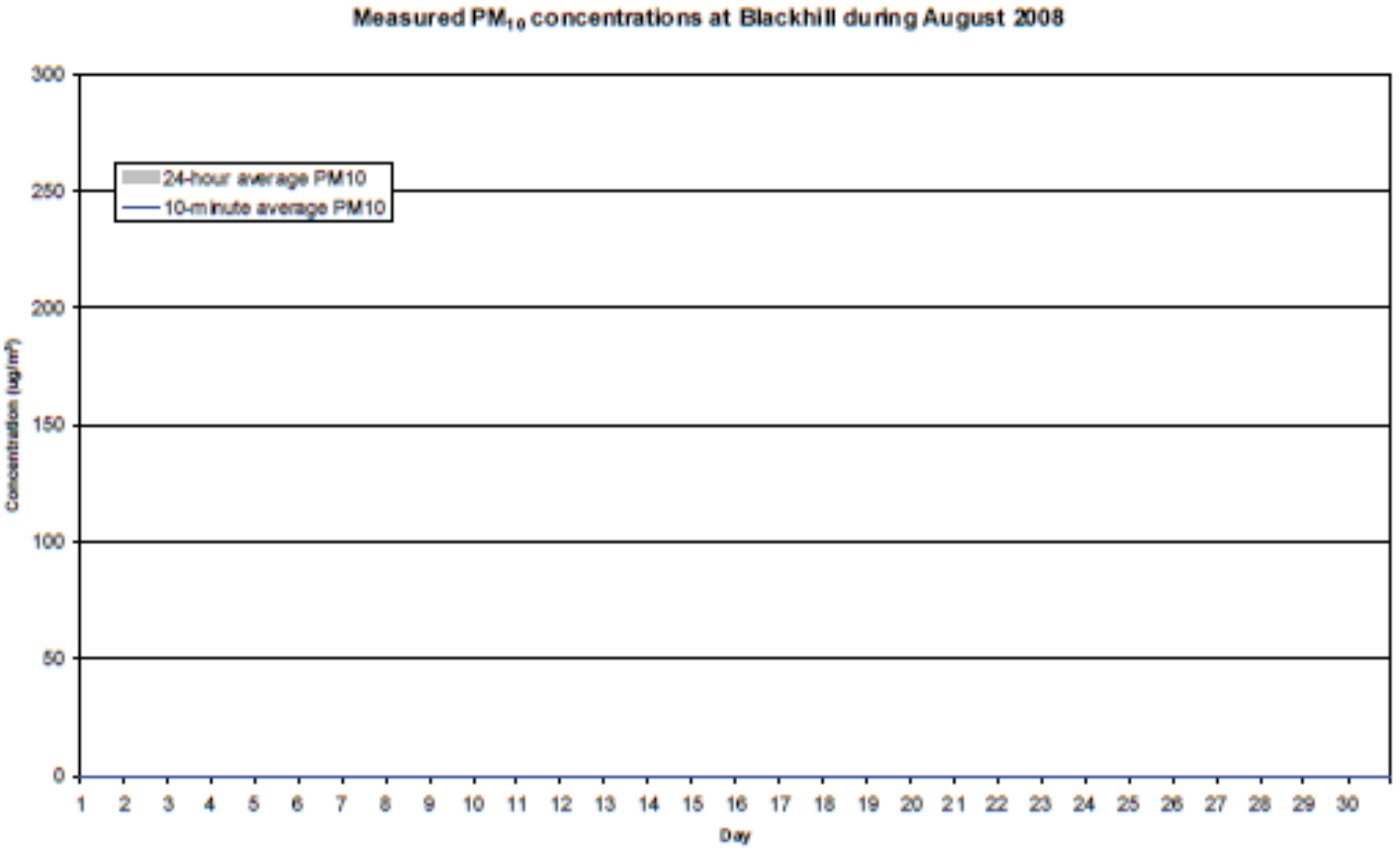

Measured PM10 concentrations at Blackhill during August 2008
24-hour average PM10
10-minute average PM10
Concentration (ug/m3)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

FIGURE 3

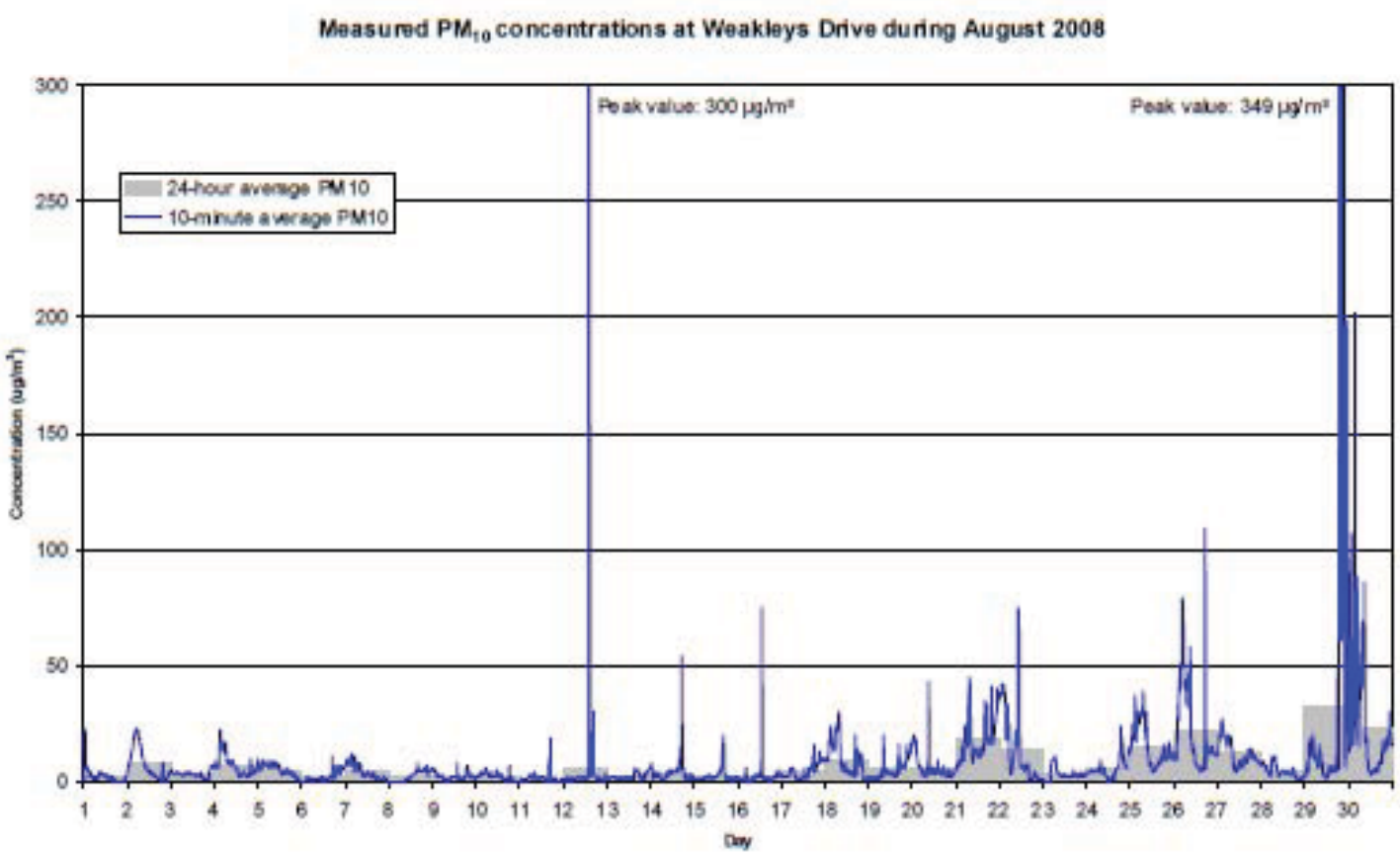
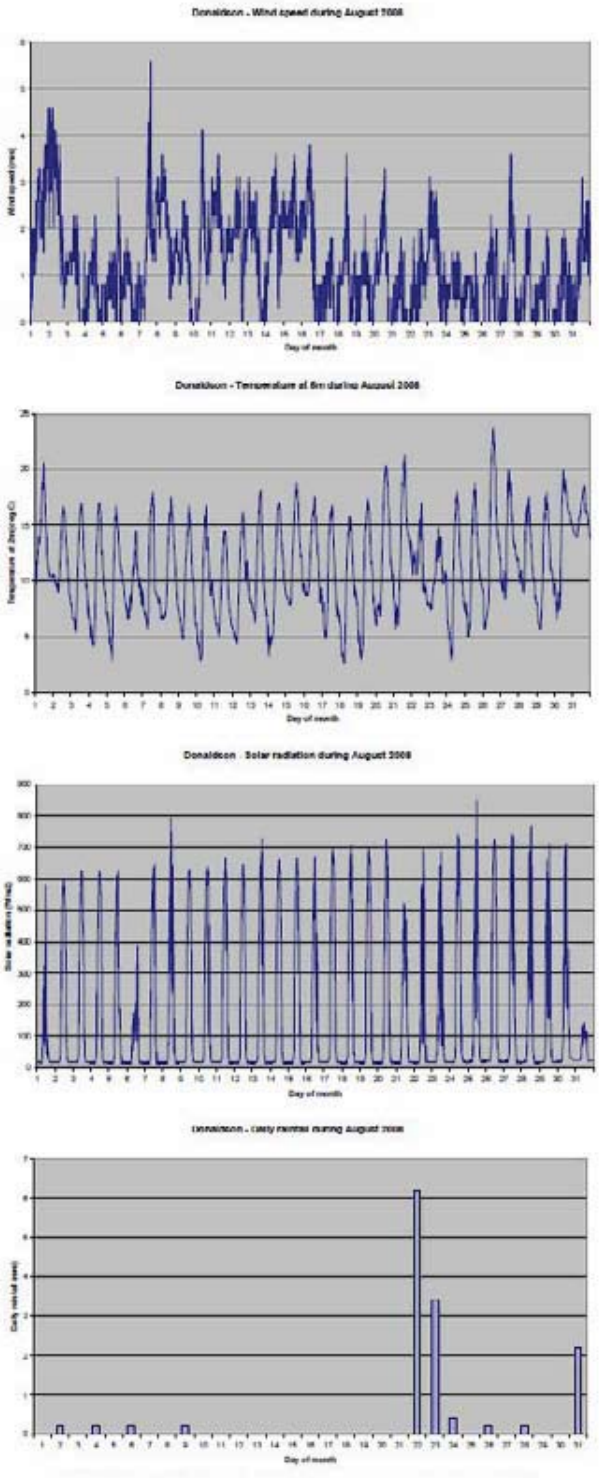

Measured PM10 concentrations at Weakleys Drive during August 2008
Peak value: 300 µg/m³
Peak value: 349 µg/m³
24-hour average PM10
10-minute average PM10
Concentration (ug/m³)
Day
0
50
100
150
200
250
300
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

FIGURE 4

[No Grimm monitoring was scheduled for this month]

FIGURE 5



Meteorological conditions – August 2008

FIGURE 6

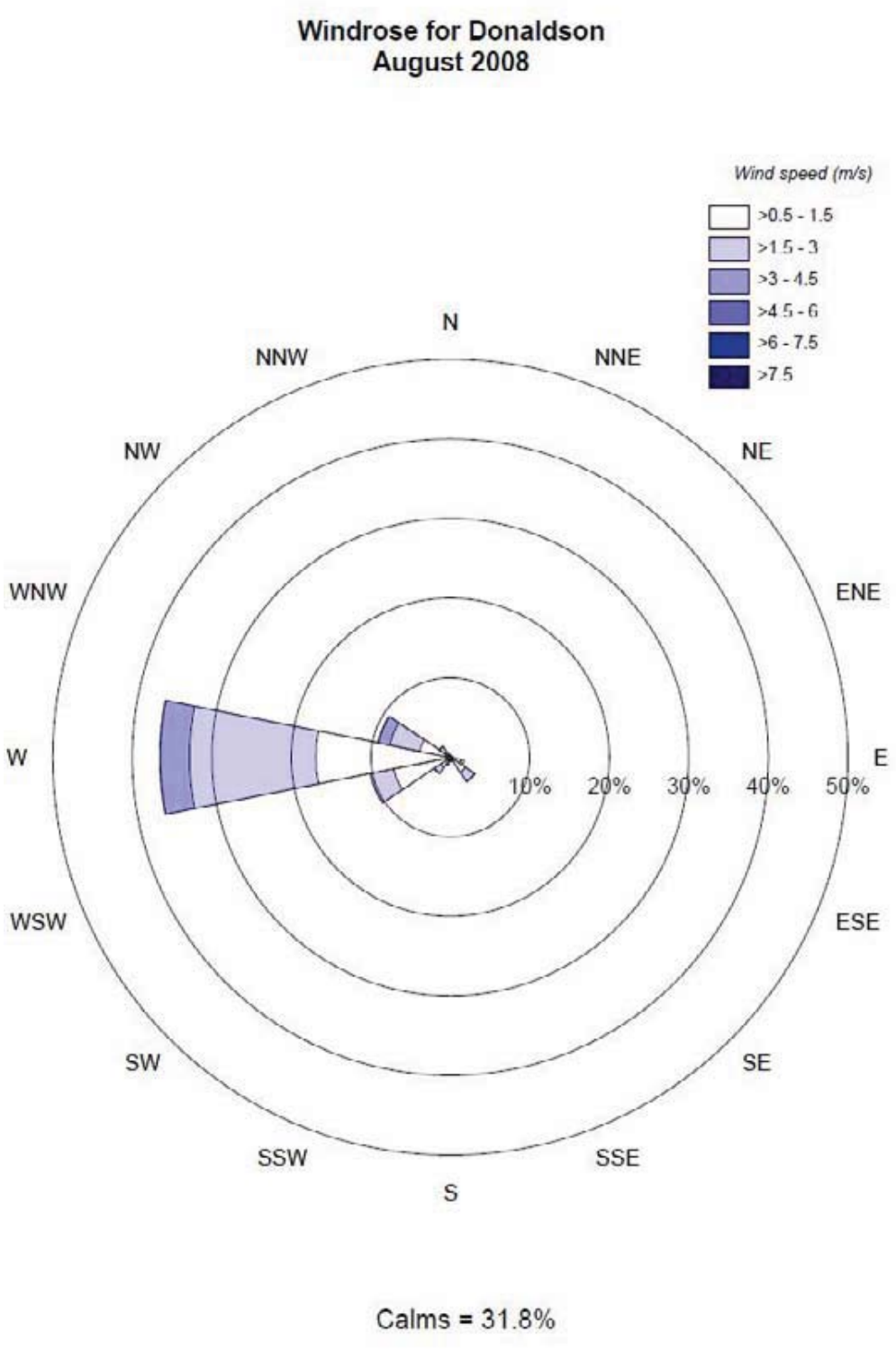

Windrose for Donaldson
August 2008
Wind speed (m/s)
>0.5 - 1.5
>1.5 - 3
>3 - 4.5
>4.5 - 6
>6 - 7.5
>7.5
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
20%
30%
40%
50%
Calms = 31.8%

FIGURE 7

Donaldson Monitoring
Dust and Meteorological Data
Monthly Report

September 2008

Prepared for
Donaldson Coal

by
Holmes Air Sciences

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LIST OF FIGURES

(All figures are at the end of the report)

LIST OF TABLES

1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during September 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**. **Table 1** lists the monitors used and pollutants measured at these locations.

Table 1. Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during September 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for September 2008

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
2/09/2008	18	12	22
8/09/2007	15	9	19
14/09/2008	19	16	34
20/09/2008	55	41	85
26/09/2008	29	21	47
Annual average	21	13	26

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in September 2008 was 55 $\mu g/m^3$, measured on the 20th at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to September 2008 was 26 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 21 $\mu g/m^3$ and 13 $\mu g/m^3$ respectively for the 12 months to September 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. The power to the DustTrak was unavailable until the 8th of September causing loss of data for the month of September, following the pervious month of August where significant loss of data was incurred. Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 19th of September at 27 $\mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in **Figure 4**. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 30th of September 2008. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 µg/m³. The maximum 24-hour average PM_{10} concentration was 31.6 µg/m³, recorded on the 20th of June.

3.3 Grimm Monitoring

Grimm monitoring was carried out between 18th and 26th of September 2008 and the data are presented in **Figure 5**. The measurements show that there was an exceedance of the 24-hour average NEPM goal of 50 µg/m³ during this period. It should be noted that the exceedance measured on the 20th of September is consistent with the HVAS measurement for this day at the Beresfield site; the Blackhill site recorded a measurement of 41 µg/m³. The average $PM_{2.5}$ fraction in the PM_{10} was calculated from the measurements as 0.3. This suggests that the PM_{10} is predominantly coarse particles and the measurement is consistent with windblown dust.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for September 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from May 2000 in provided in **Appendix A**.

Table 3. Dust deposition monitoring for the 12-month period to September 2008

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14+	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 '	0.4 '	0.8 '	0.4 '	0.4 '	0.8 '	1.1 '	1.7 '	1.2	1.1 '	1.1 '
May-08	1.1	2.4 '	0.9	1.4	0.9	0.9	0.7	2.7	1 '	1.1	1.3 '
Jun-08	0.2	0.4 '	0.1	0.5	0.1 '	0.1	0.3	0.5 '	0.1	0.8	0.2
Jul-08	0.4	0.7'	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1'	0.5'	0.7'	0.6'	0.5	1.9'	0.8'	1'	1'	0.9'	1.4
Sep-08	0.6'	1'	1.3'	0.7'	0.6'	0.9'	0.6	0.9	0.9'	0.9'	1.8'
Annual Average	1.5	0.8	1.4	0.7	0.8	1.0	0.7	1.4	0.7	0.8	1.1

Data supplied by Metford Laboratories. ' Insects/bird droppings reported. + Invalid (excess bird droppings).

The highest dust deposition measurement in August 2008 was 0.9 g/m²/month at DG8, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m^2/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in September 2008 are shown in **Figure 6** and a windrose is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during September. Total rainfall for the month was 27.2 mm.

A windrose (see **Figure 7**) created from the available 10-minute average wind data shows that the winds were predominantly from the west and west-north-west; changing direction to the south-east. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 41.2% of the time. This is quite a high percentage but is similar to the value for September 2007.

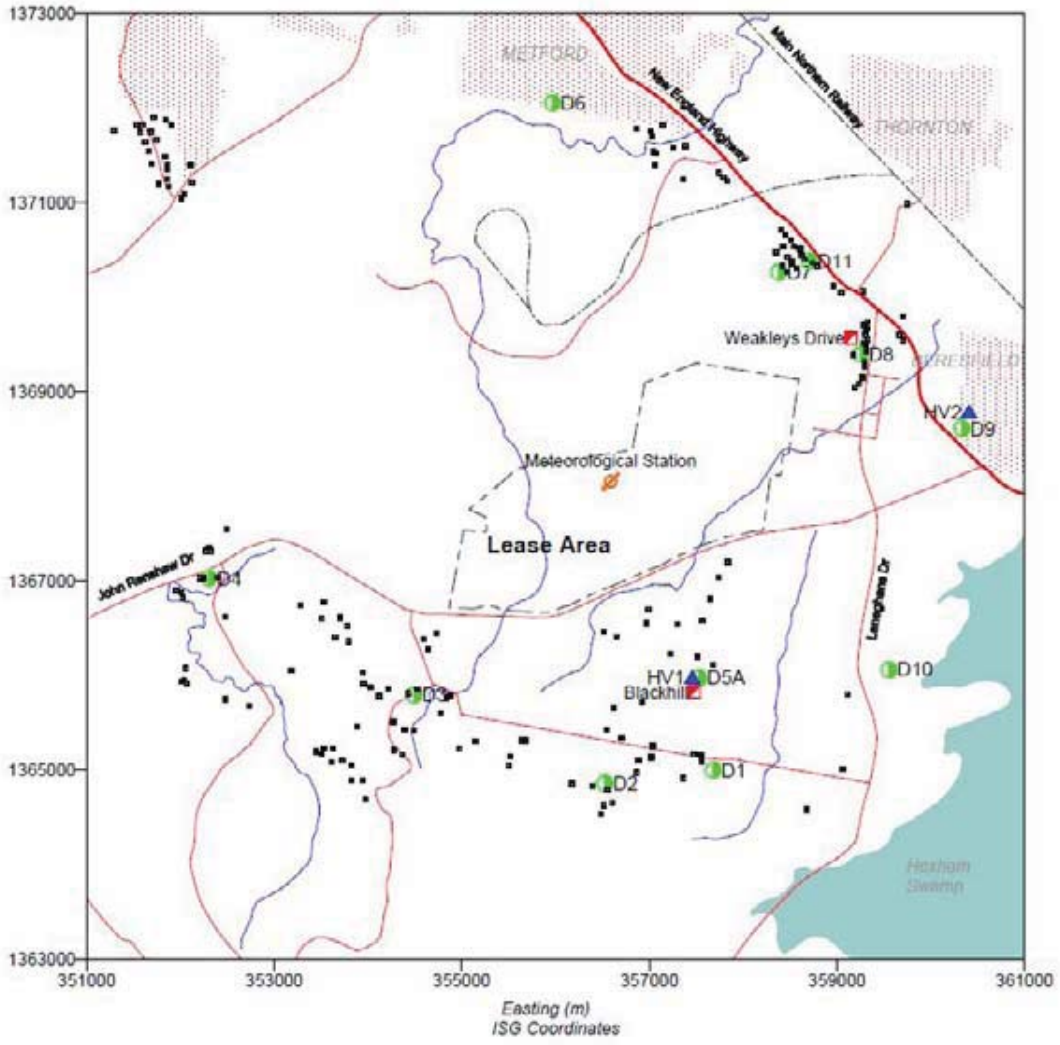
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4'	0.4'	0.8'	0.4'	0.4'	0.8'	1.1'	1.7'	1.2	1.1'	1.1'
May-08	1.1	2.4'	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3'
June-08	0.2	0.4'	0.1	0.5	0.1'	0.1	0.3	0.5'	0.1	0.8	0.2
July-08	0.4	0.7'	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1'	0.5'	0.7'	0.6'	0.5	1.9'	0.8'	1'	1'	0.9'	1.4
Sep-08	0.6'	1'	1.3'	0.7'	0.6'	0.9'	0.6	0.9	0.9'	0.9'	1.8'

FIGURES



Location of Project Area

FIGURE 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to September 2008

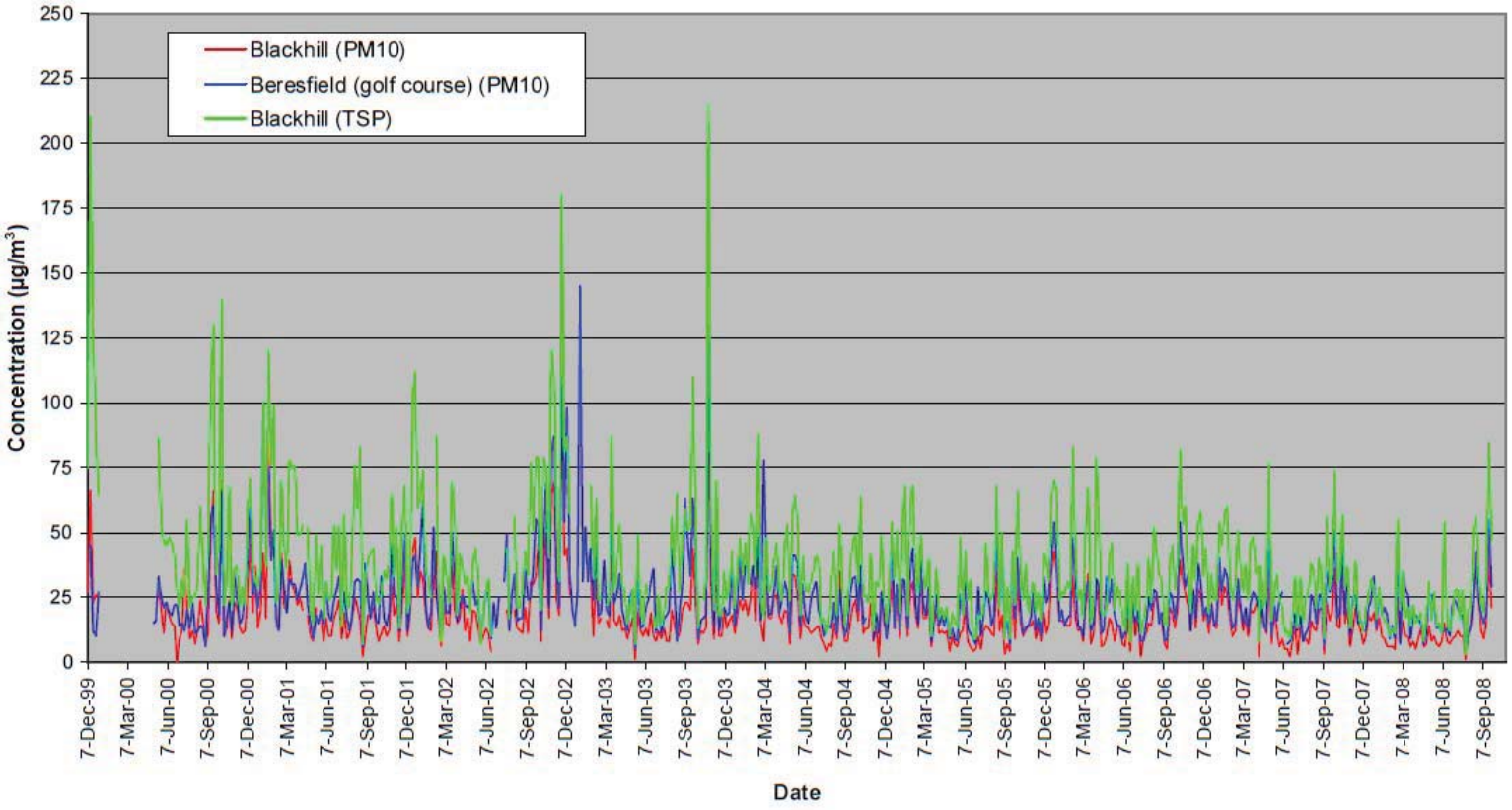


FIGURE 2

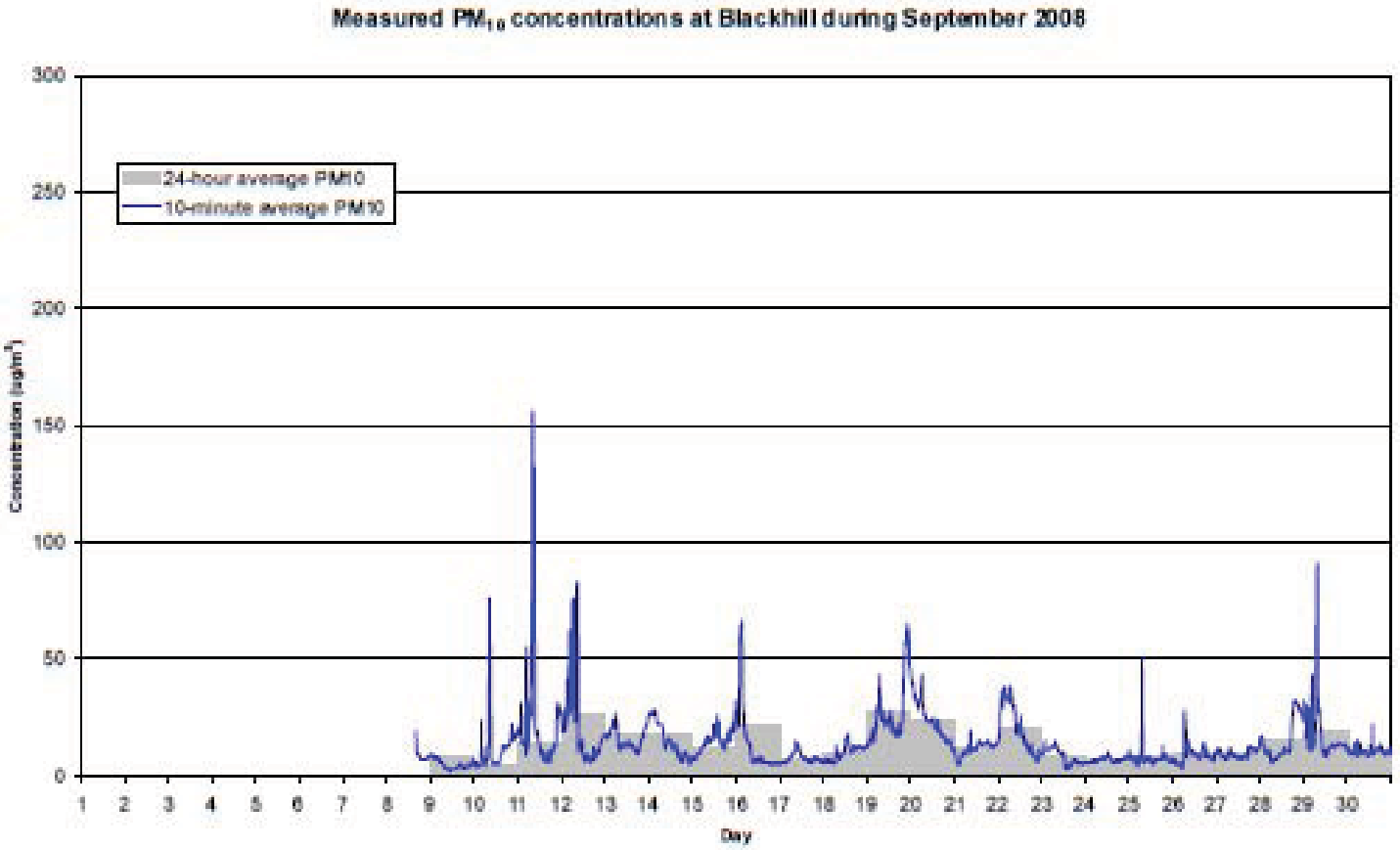

Measured PM10 concentrations at Blackhill during September 2008
24-hour average PM10
10-minute average PM10
Concentration (µg/m³)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

FIGURE 3

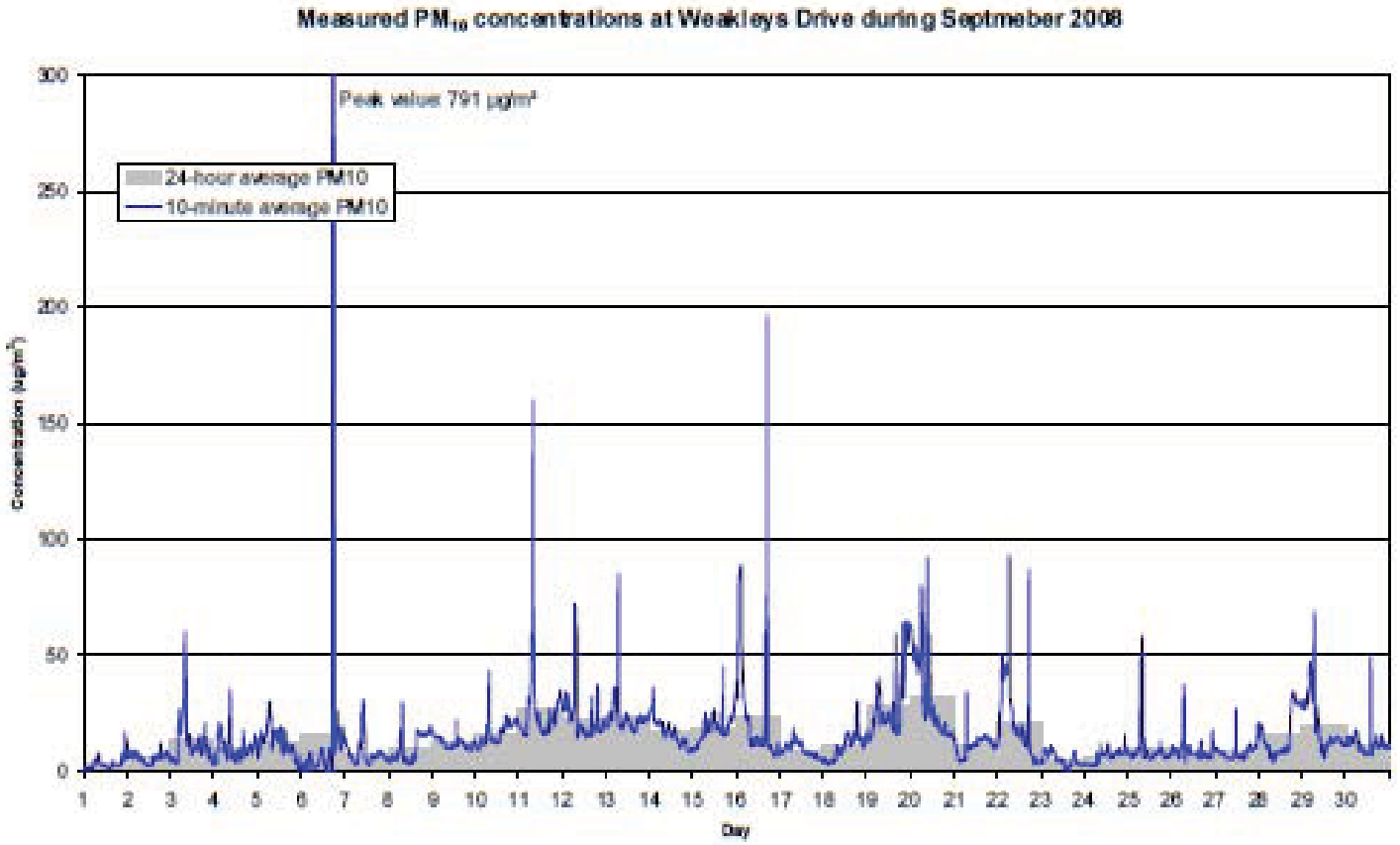

Measured PM10 concentrations at Weakleys Drive during Septmeber 2008
Peak value 791 µg/m³
24-hour average PM10
10-minute average PM10
Concentration (µg/m³)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

FIGURE 4

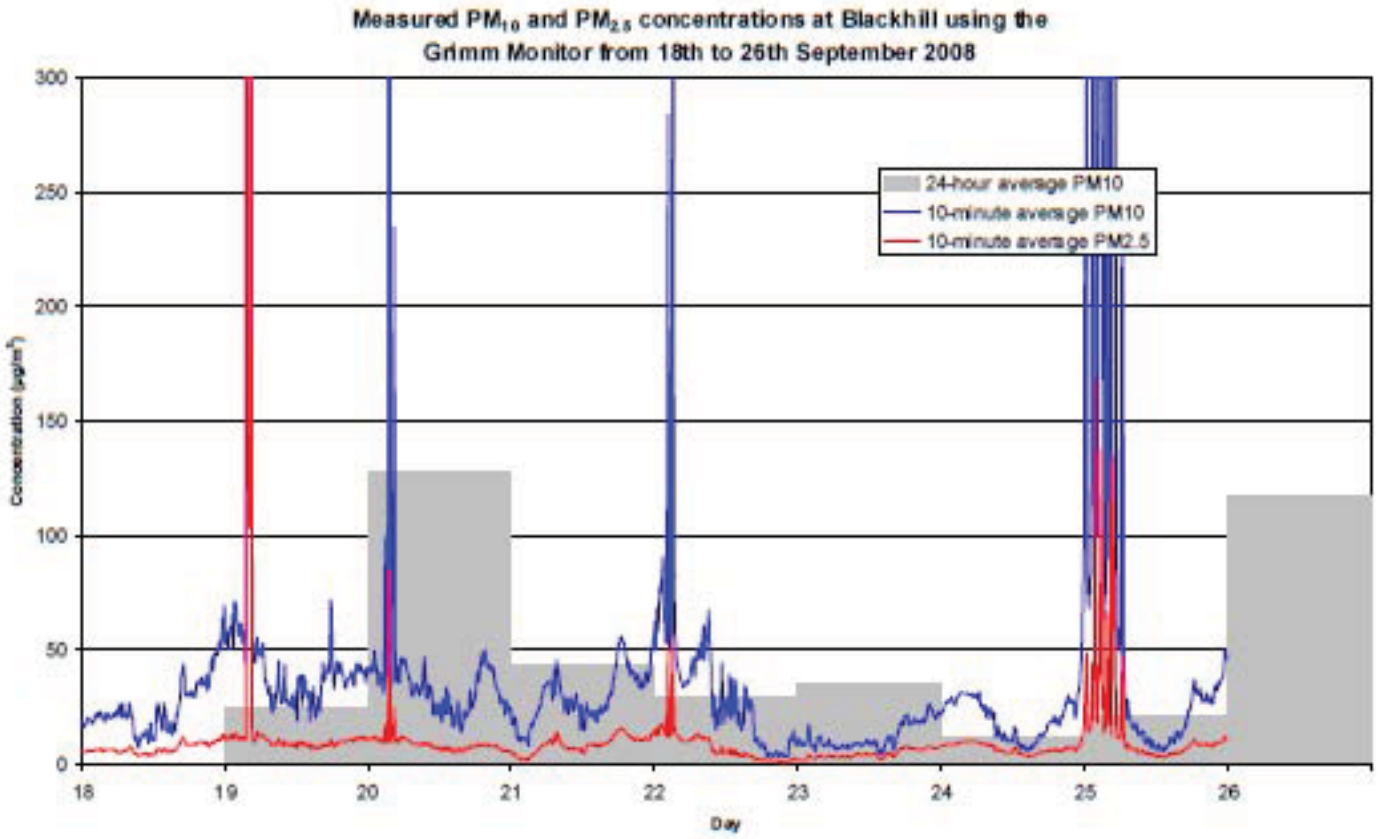

Measured PM10 and PM2.5 concentrations at Blackhill using the Grimm Monitor from 18th to 26th September 2008
24-hour average PM10
10-minute average PM10
10-minute average PM2.5
Concentration (µg/m³)
Day
0
50
100
150
200
250
300
18
19
20
21
22
23
24
25
26

FIGURE 5

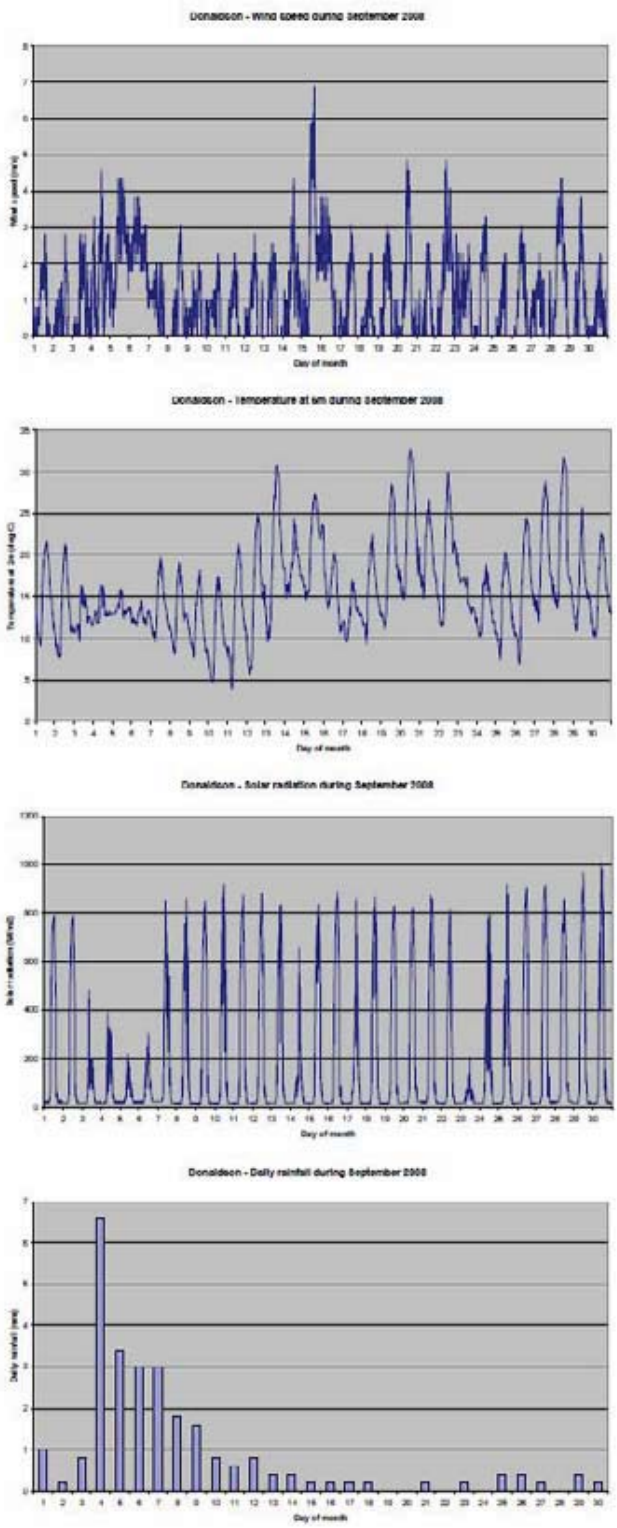
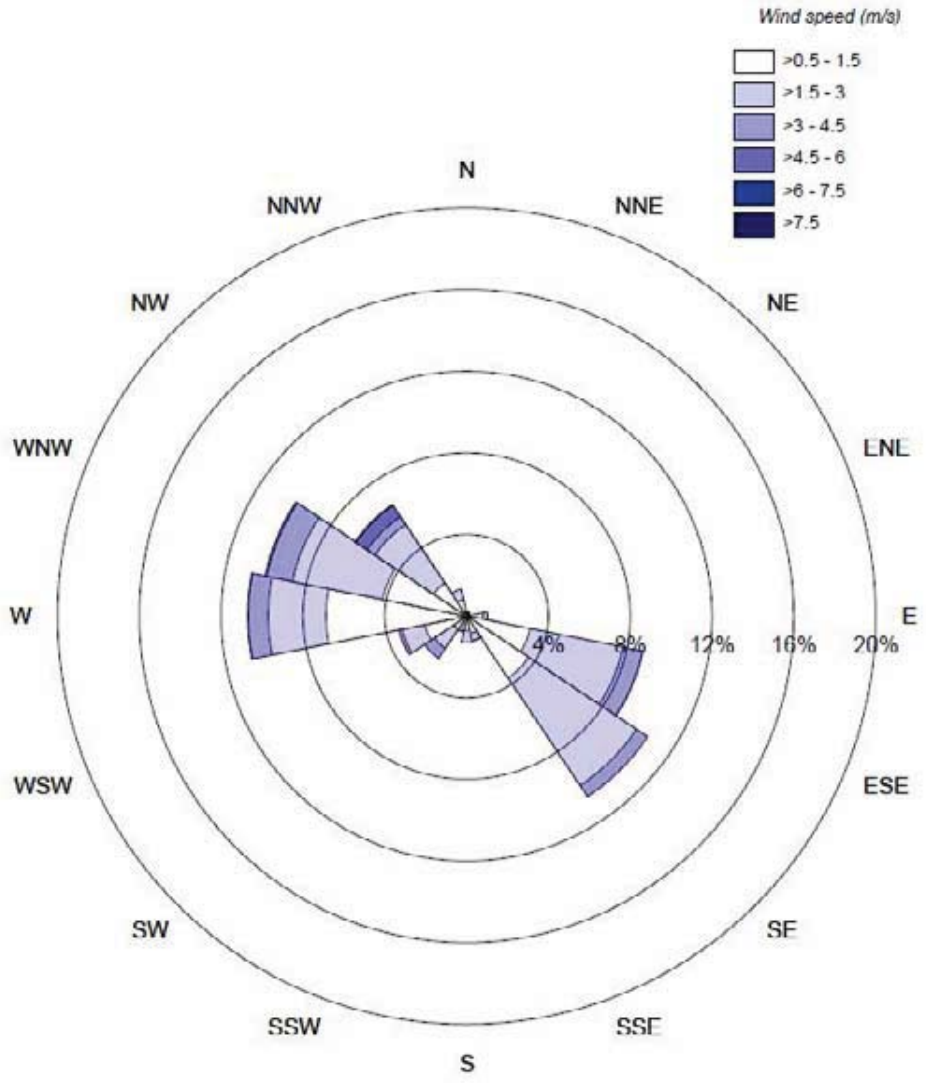

Donaldson - Wind speed during September 2008
Day of month
Donaldson - Temperature at 9m during September 2008
Day of month
Donaldson - Solar radiation during September 2008
Day of month
Donaldson - Daily rainfall during September 2008
Day of month

FIGURE 6

Meteorological conditions – September
Windrose for Donaldson
September 2008



2008

Calms = 41.2%

FIGURE 7

Donaldson Monitoring
Dust and Meteorological Data
Monthly Report

October 2008

Prepared for
Donaldson Coal

by
Holmes Air Sciences

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CONTENTS

LIST OF FIGURES

(All figures are at the end of the report)

LIST OF TABLES

1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during October 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**. **Table 1** lists the monitors used and pollutants measured at these locations.

Table 1. Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS HVAS DustTrak Grimm (1 week per quarter)	PM_{10} TSP PM_{10} PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during October 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for October 2008

Date	Beresfield PM_{10} (µg/m³)	Blackhill PM_{10} (µg/m³)	Blackhill TSP (µg/m³)
2/10/2008	55	36	88
8/10/2007	19	10	23
14/10/2008	21	16	25
20/10/2008	43	38	60
26/10/2008	21	19	29
Annual average	21	13	26

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in October 2008 was 55 µg/m³, measured on the 2nd at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 µg/m³ 24-hour NEPM goal. The cause of this event has not been determined and will be investigated.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 µg/m³ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to October 2008 was 26 µg/m³.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 21 µg/m³ and 13 µg/m³ respectively for the 12 months to October 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 µg/m³.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. The DustTrak monitoring for the Blackhill site is available from the 1st to the 29th of October. Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 µg/m³. The maximum 24-hour average PM_{10} concentration was recorded on the 13th of October at 38.44 µg/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in **Figure 4**. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 31st of October 2008. However the data from October 7th indicates that the instrument was not in working order over this period. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 µg/m^3. The maximum 24-hour average PM_{10} concentration was 25.1 µg/m^3, recorded on the 2nd of October.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for October 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for October 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3. Dust deposition monitoring for the 12-month period to October 2008

Month	Monthly dust deposition rate (g/m^2/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14+	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 *	0.4 *	0.8 *	0.4 *	0.4 *	0.8 *	1.1 *	1.7 *	1.2	1.1 *	1.1 *
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1 *	1.1	1.3 *
Jun-08	0.2	0.4 *	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2
Jul-08	0.4	0.7 *	1.3 *	0.6	0.8 *	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 *	0.5 *	0.7 *	0.6 *	0.5	1.9 *	0.8 *	1 *	1 *	0.9 *	1.4
Sep-08	0.6 *	1 *	1.3 *	0.7 *	0.6 *	0.9 *	0.6	0.9	0.9 *	0.9 *	1.8 *
Oct-08	1 *	0.5 *	1 *	1.3 *	1.3 *	1.2	1 *	1.4 *	0.8 *	1.6 *	1.8 *
Annual Average	1.2	0.8	1.4	0.7	0.8	1.0	0.7	1.3	0.7	0.8	1.1

*Data supplied by Metford Laboratories. * Insects/bird droppings reported. + Invalid (excess bird droppings).*

The highest dust deposition measurement in October 2008 was 1.8 g/m^2/month at DG11, the accompanying laboratory report showed that the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m^2/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in October 2008 are shown in **Figure 6** and a windrose is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during October. Total rainfall for the month was 8.4 mm.

A windrose (see **Figure 7**) created from the available 10-minute average wind data shows that winds were predominantly from the southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 45.3% of the time. This is quite a high percentage but is similar to the value for October 2007.

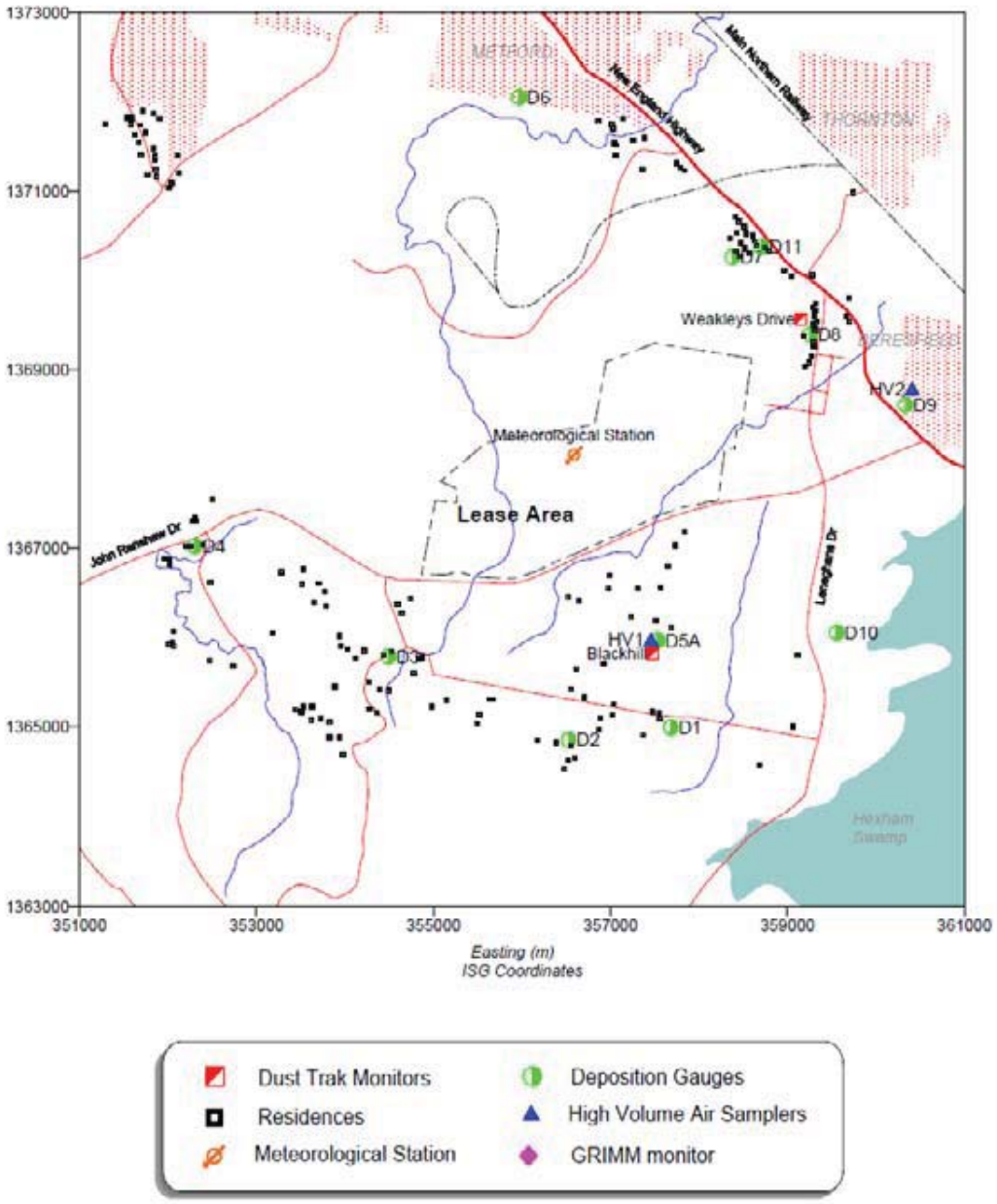
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4'	0.4'	0.8'	0.4'	0.4'	0.8'	1.1'	1.7'	1.2	1.1'	1.1'
May-08	1.1	2.4'	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3'
June-08	0.2	0.4'	0.1	0.5	0.1'	0.1	0.3	0.5'	0.1	0.8	0.2
July-08	0.4	0.7'	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8

FIGURES



Location of Project Area

Figure 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to October 2008

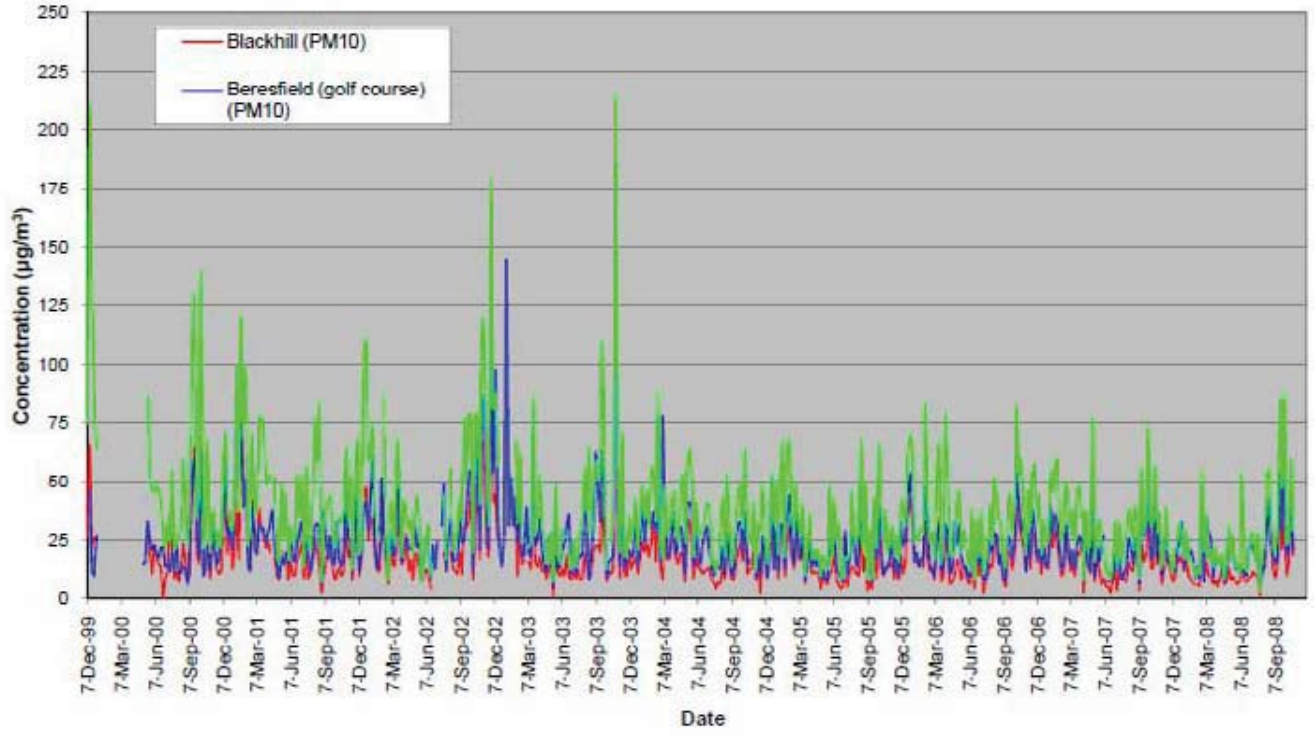


Figure 2

Measured PM_{10} concentrations at Blackhill during October 2008

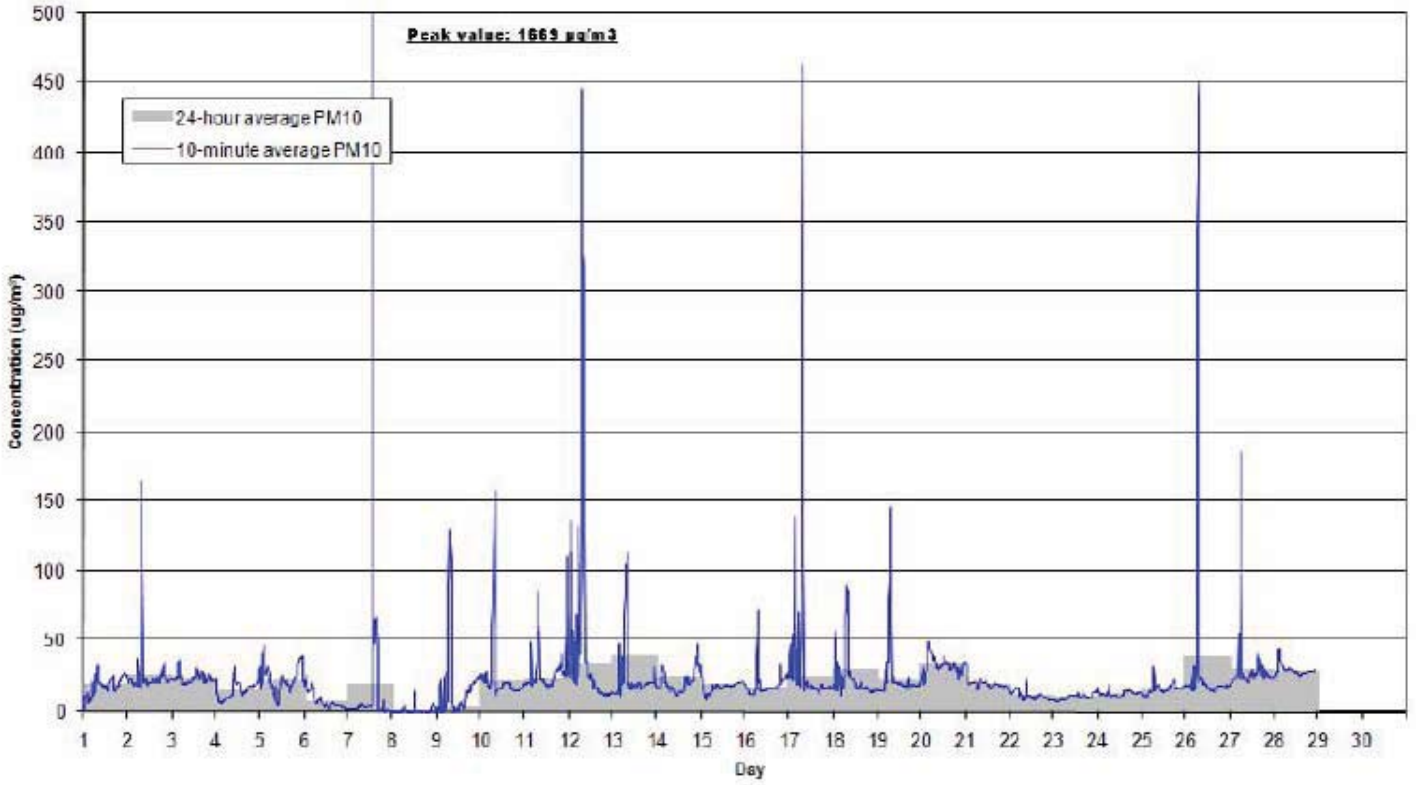


Figure 3

Measured PM_{10} concentrations at Weakleys Drive during October 2008

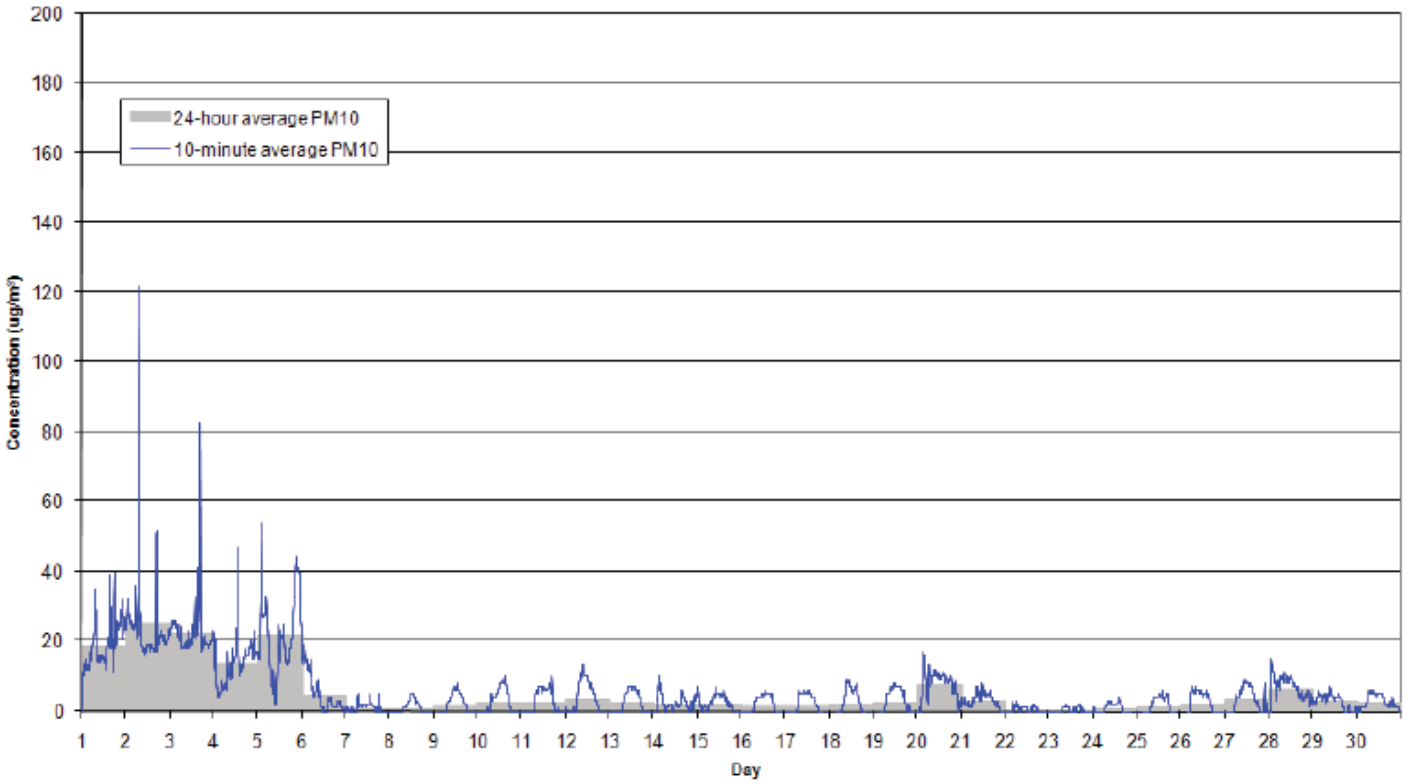
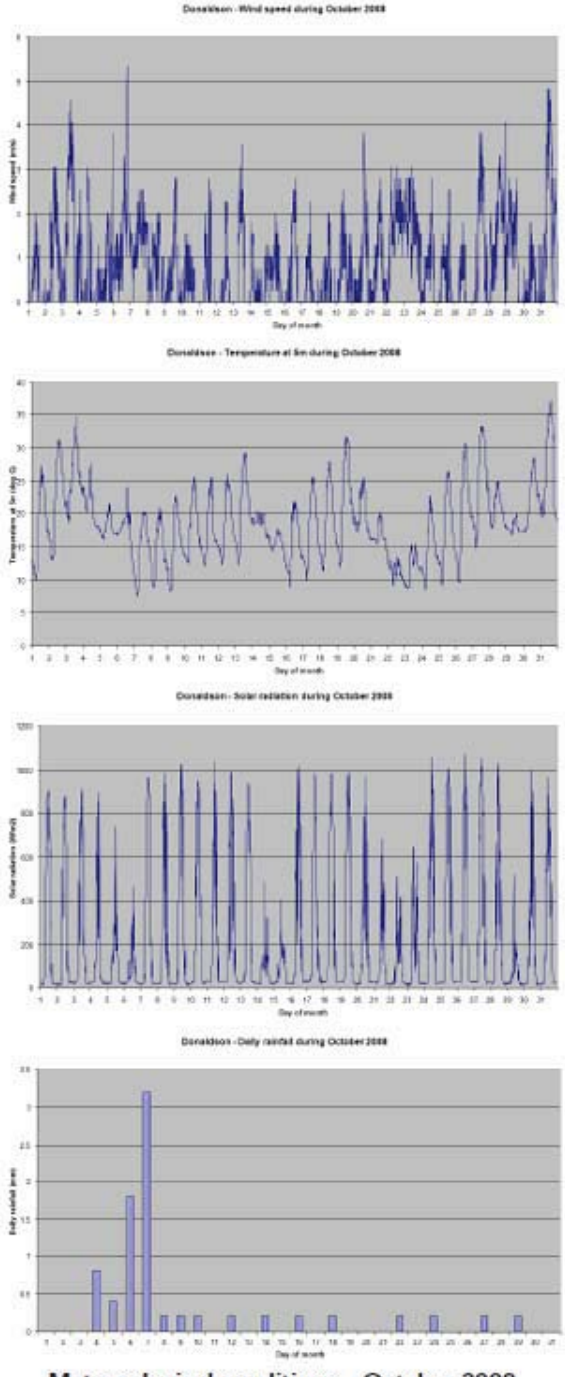


Figure 4

[No Grimm monitoring was scheduled for this month]

Figure 5



Meteorological conditions – October 2008

Figure 6

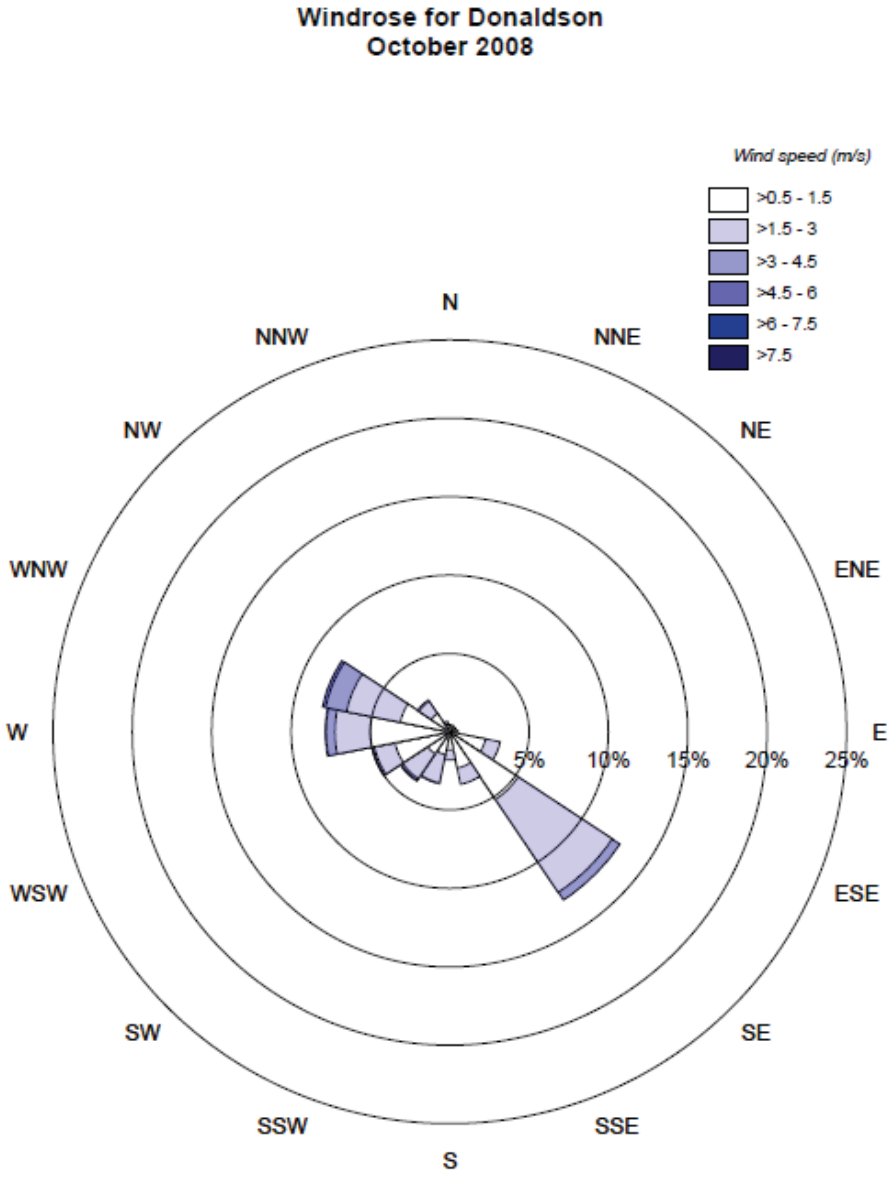

Windrose for Donaldson
October 2008
Wind speed (m/s)
>0.5 - 1.5
>1.5 - 3
>3 - 4.5
>4.5 - 6
>6 - 7.5
>7.5
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
5%
10%
15%
20%
25%
Calms = 45.3%

Figure 7

Donaldson Monitoring Dust and Meteorological Data Monthly Report

November 2008

Prepared for
Donaldson Coal

by
Holmes Air Sciences

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LIST OF FIGURES

(All figures are at the end of the report)

LIST OF TABLES

1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during November 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**. **Table 1** lists the monitors used and pollutants measured at these locations.

Table 1. Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS HVAS DustTrak Grimm (1 week per quarter)	PM_{10} TSP PM_{10} PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during November 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for November 2008

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
4/11/2008	22	15	45
7/11/2008	40	35	55
13/11/2008	69	13	20
19/11/2008	10	9	14
25/11/2008	24	17	36
Annual average	**22**	**14**	**26**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in November 2008 was 69 $\mu g/m^3$, measured on the 13th at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 $\mu g/m^3$ 24-hour NEPM goal. The cause of this event has not been determined and will be investigated.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to November 2008 was 26 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 22 $\mu g/m^3$ and 14 $\mu g/m^3$ respectively for the 12 months to Novmeber 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. The DustTrak monitoring for the Blackhill site is unavailable for the month of November due to a power failure on the 29th October. The problem has since been rectified.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in **Figure 4**. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 22nd of November 2008. However the data for the month of November indicates that the instrument was not in working order over this period. The reason for this was a malfunction with the DustTrak monitor which has been replaced.

The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 µg/m^3. The maximum 24-hour average PM_{10} concentration was 14.7 µg/m^3, recorded on the 21st of November.

3.3 Grimm Monitoring

Grimm monitoring was carried out between 26th of November and 2nd of December 2008, the data are presented in **Figure 5**. The measurements show that there were no exceedances of the 24-hour average NEPM goal of 50 µg/m^3 during this period.

The average $PM_{2.5}$ fraction in the PM_{10} was calculated from the measurements as 0.44. This suggests that the PM_{10} is predominantly coarse particles and the measurement is consistent with windblown dust.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for November 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3. Dust deposition monitoring for the 12-month period to November 2008

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 '	0.4 '	0.8 '	0.4 '	0.4 '	0.8 '	1.1 '	1.7 '	1.2	1.1 '	1.1 '
May-08	1.1	2.4 '	0.9	1.4	0.9	0.9	0.7	2.7	1 '	1.1	1.3 '
Jun-08	0.2	0.4 '	0.1	0.5	0.1 '	0.1	0.3	0.5 '	0.1	0.8	0.2
Jul-08	0.4	0.7 '	1.3 '	0.6	0.8 '	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 '	0.5 '	0.7 '	0.6 '	0.5	1.9 '	0.8 '	1 '	1 '	0.9 '	1.4
Sep-08	0.6 '	1 '	1.3 '	0.7 '	0.6 '	0.9 '	0.6	0.9	0.9 '	0.9 '	1.8 '
Oct-08	1 '	0.5 '	1 '	1.3 '	1.3 '	1.2	1 '	1.4 '	0.8 '	1.6 '	1.8 '
Nov-08	0.8'	1.4'	2.7'	2.5'	0.9'	1.2'	0.8'	2.4'	1.1'	1'	1.7'
Annual Average	1.2	1.2	1.6	0.8	0.8	1.0	0.6	1.4	0.7	0.9	1.1

*Data supplied by Metford Laboratories. ' Insects/bird droppings reported. * Invalid (excess bird droppings).*

The highest dust deposition measurement in November 2008 was 2.7 g/m^2/month at DG3; the accompanying laboratory report showed that the sample was contaminated with bird droppings. The contaminated readings determined to be invalid have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m^2/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in November 2008 are shown in **Figure 6** and a windrose is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during October. Total rainfall for the month was 73.3 mm.

A windrose (see **Figure 7**) created from the available 15-minute average wind data shows that winds were predominantly from the southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 46.8% of the time. This is quite a high percentage but is similar to the value for November 2007.

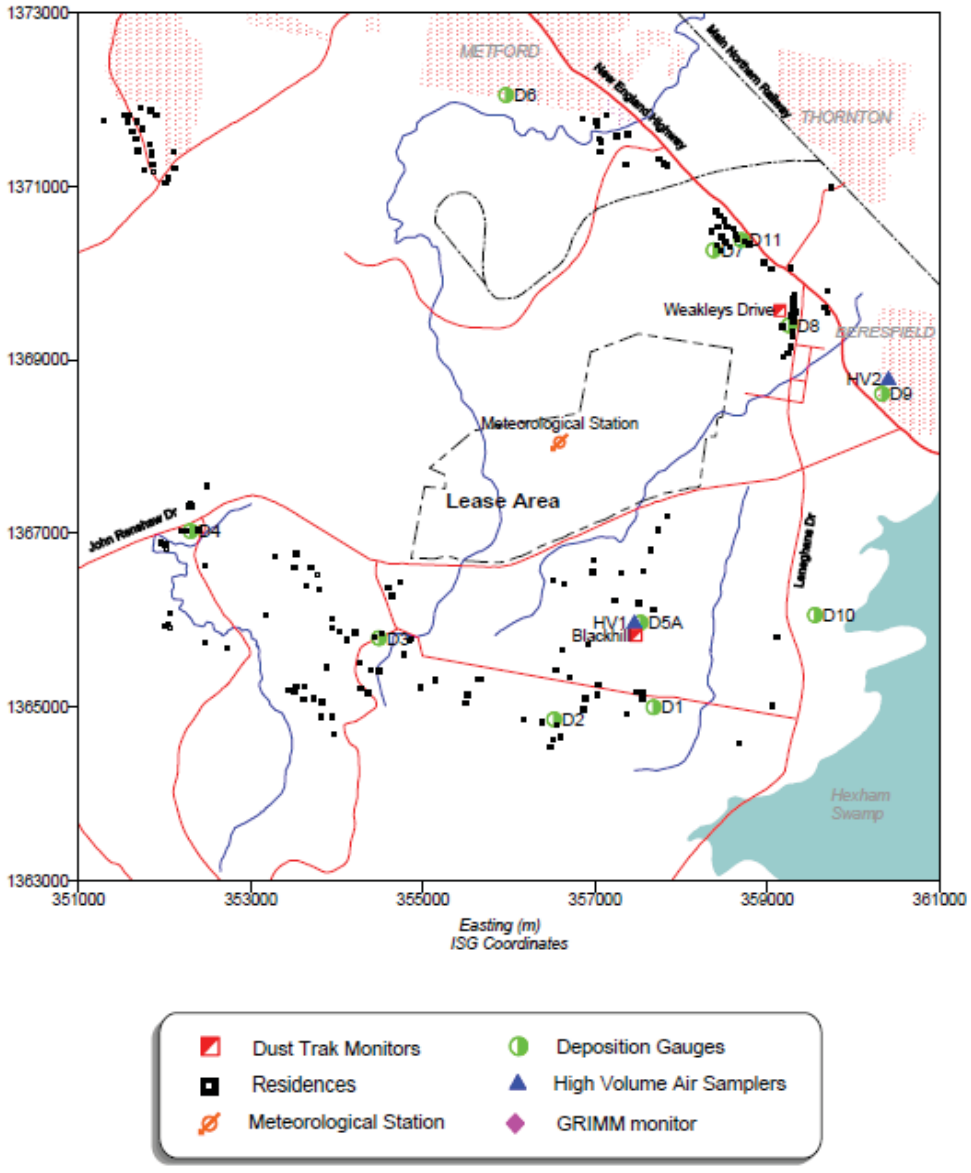
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m^2/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4[r]	0.4[r]	0.8[r]	0.4[r]	0.4[r]	0.8[r]	1.1[r]	1.7[r]	1.2	1.1[r]	1.1[r]
May-08	1.1	2.4[r]	0.9	1.4	0.9	0.9	0.7	2.7	1[r]	1.1	1.3[r]
June-08	0.2	0.4[r]	0.1	0.5	0.1[r]	0.1	0.3	0.5[r]	0.1	0.8	0.2
July-08	0.4	0.7[r]	1.3[r]	0.6	0.8[r]	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7

FIGURES



Location of Project Area

Figure 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to November 2008

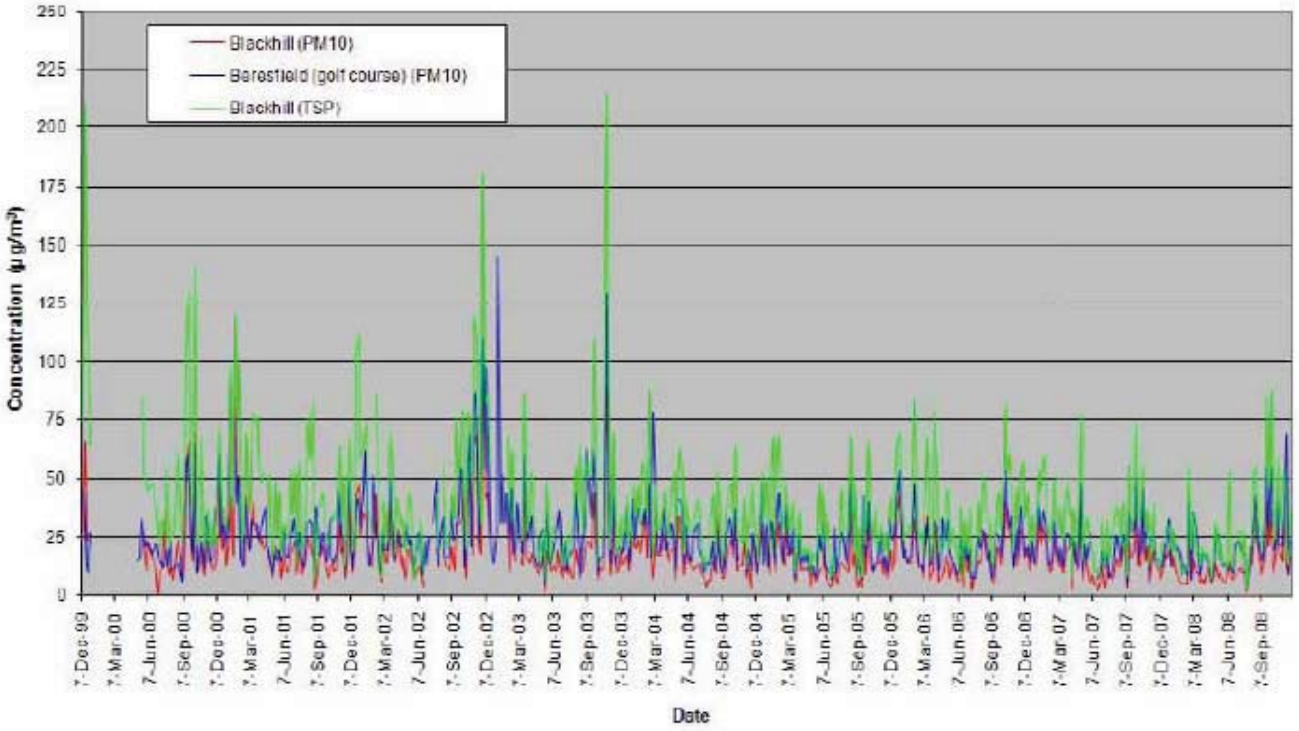


Figure 2

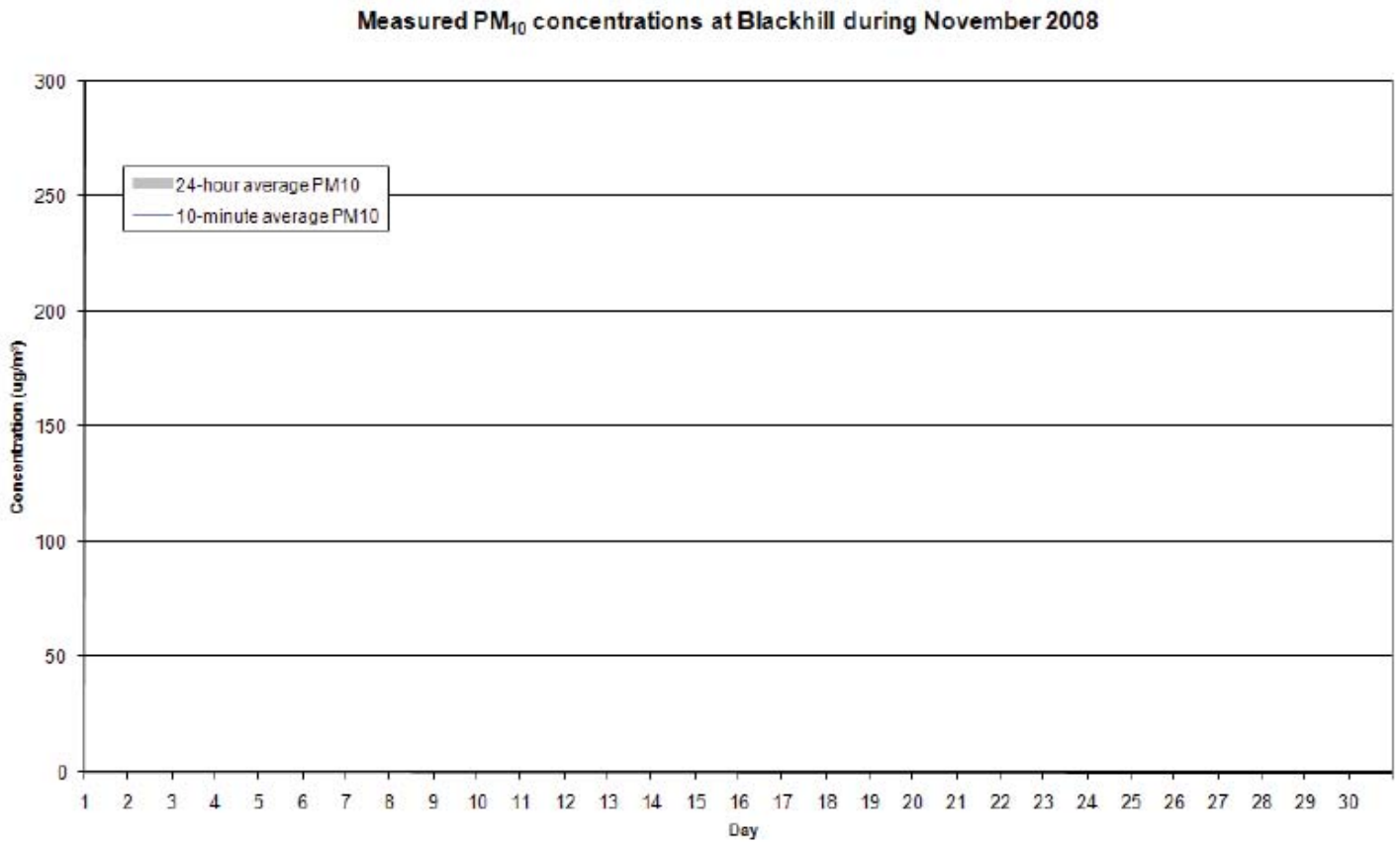

Measured PM10 concentrations at Blackhill during November 2008
24-hour average PM10
10-minute average PM10
Concentration (ug/m³)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

Figure 3

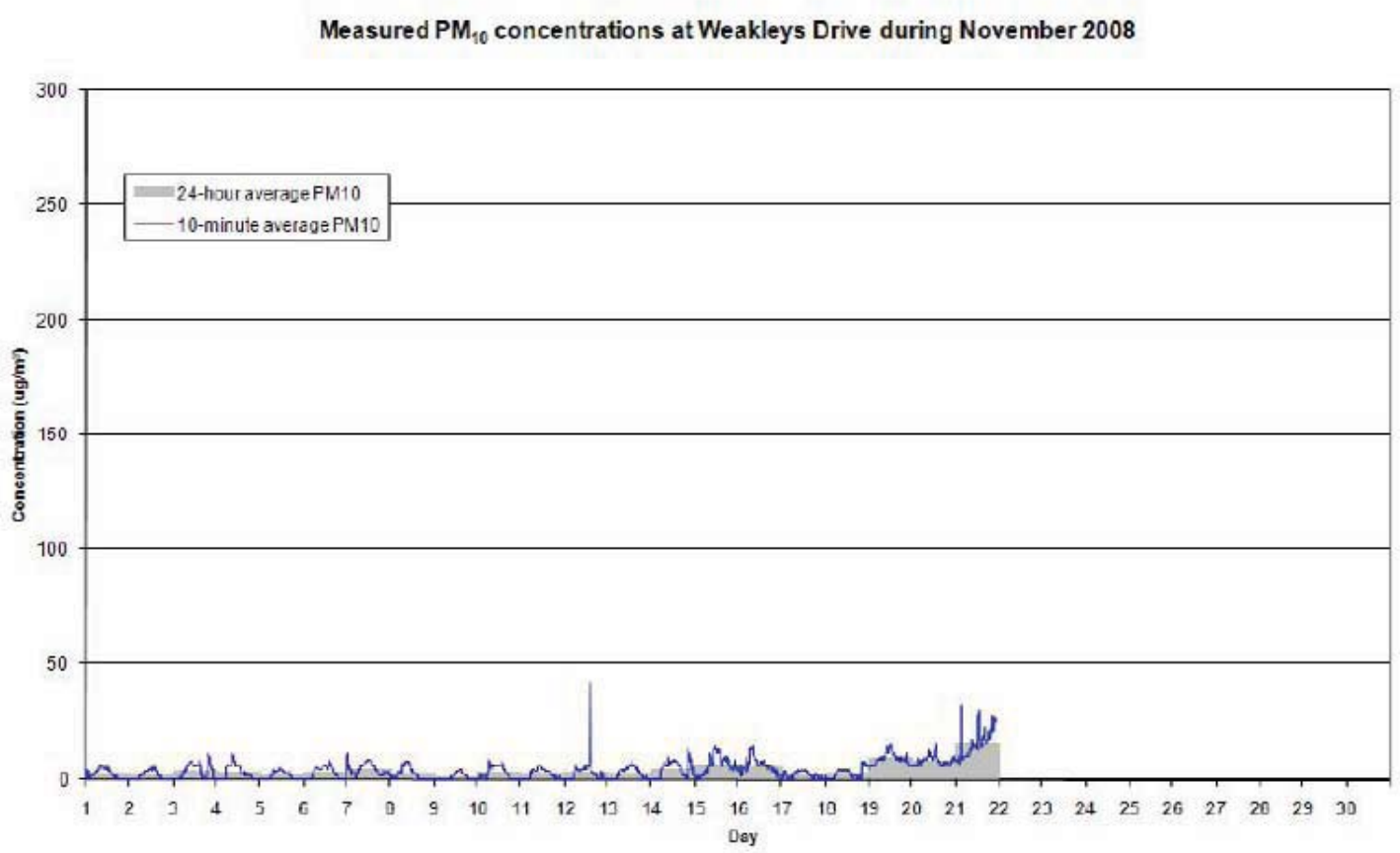

Measured PM10 concentrations at Weakleys Drive during November 2008
24-hour average PM10
10-minute average PM10
Concentration (ug/m³)
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day

Figure 4

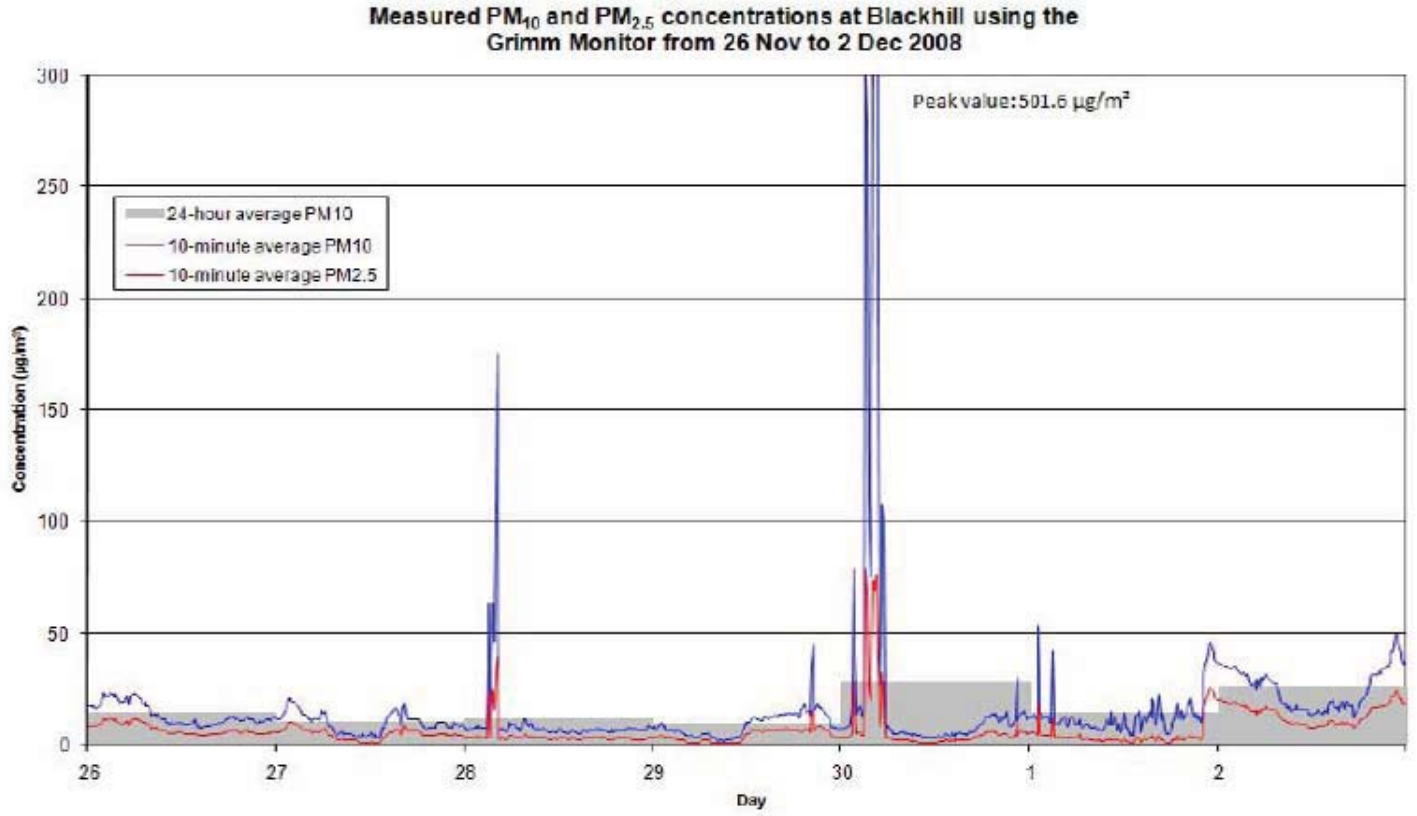
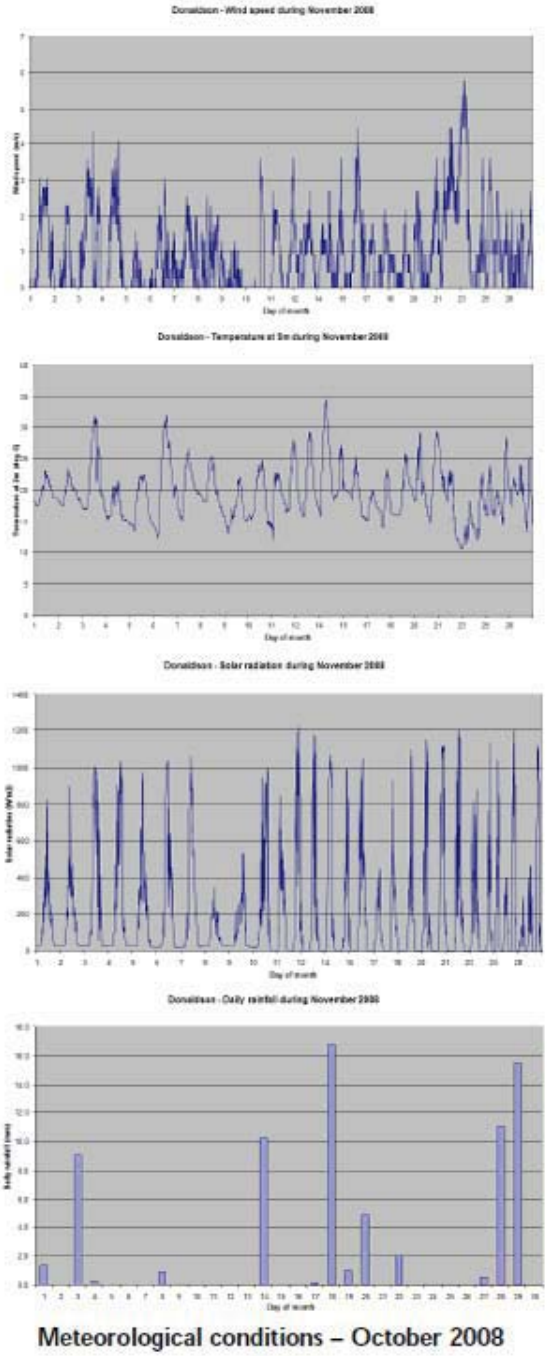

Measured PM10 and PM2.5 concentrations at Blackhill using the Grimm Monitor from 26 Nov to 2 Dec 2008
Peak value:501.6 µg/m³
24-hour average PM10
10-minute average PM10
10-minute average PM2.5
Concentration (µg/m³)
300
250
200
150
100
50
0
26
27
28
29
30
1
2
Day

Figure 5



Meteorological conditions – October 2008

Figure 6

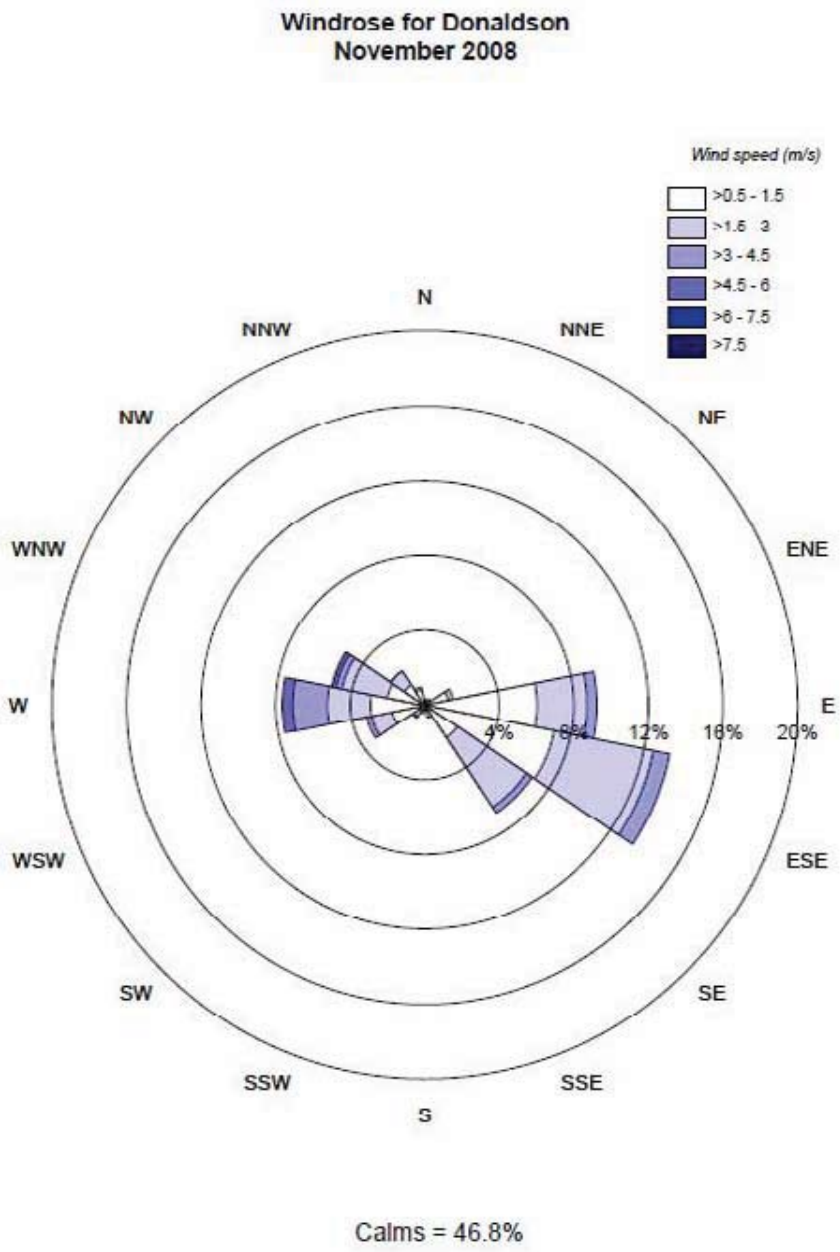

Windrose for Donaldson
November 2008
Wind speed (m/s)
>0.5 - 1.5
>1.5 3
>3 - 4.5
>4.5 - 6
>6 - 7.5
>7.5
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
4%
8%
12%
16%
20%
Calms = 46.8%

Figure 7

DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA DECEMBER 2008 REPORT

Donaldson Coal

Job No: 2815

02 March 2009

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA DECEMBER 2008 REPORT**
JOB NUMBER:	**2815**
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during December 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during November 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for December 2008

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
1/12/2008	27	34	65
7/12/2007	25	17	36
13/12/2008	23	15	37
19/12/2008	27	19	33
25/12/2008	19	13	28
31/12/2008	59	42	95
Annual average	**23**	**15**	**29**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in December 2008 was 59 $\mu g/m^3$, measured on the 31st at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 $\mu g/m^3$ 24-hour NEPM goal. The cause of this event has not been determined and will be investigated. The correlartion of TSP and pm_{10} at Blackhill are also relatively high on that day.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to December 2008 was 29 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 23 $\mu g/m^3$ and 15 $\mu g/m^3$ respectively for the 12 months to December 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. The DustTrak monitoring for the Blackhill site is available from the 7th to the 19th of December. Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50µg/m³. The maximum 24-hour average PM_{10} concentration was recorded on the 18th of December at 15.8 µg/m³.

A power failure at the Blackhill monitoring site on the 19th December caused a loss of data for the rest of the month. The problem has since been rectified.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 7th to the 9th of December 2008. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 µg/m³. The maximum 24-hour average PM_{10} concentration was 11.3µg/m³, recorded on the 8th of December.

The loss of data for the month of December was caused by water flooding the DustTrak monitor. The monitor has since been replaced.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for December.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for December 2008 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to December 2008

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14⁺	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2⁺	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 #	0.4 #	0.8 #	0.4 #	0.4 #	0.8 #	1.1 #	1.7 #	1.2	1.1 #	1.1 #
May-08	1.1	2.4 #	0.9	1.4	0.9	0.9	0.7	2.7	1 #	1.1	1.3 #
Jun-08	0.2	0.4 #	0.1	0.5	0.1 #	0.1	0.3	0.5 #	0.1	0.8	0.2
Jul-08	0.4	0.7 #	1.3 #	0.6	0.8 #	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 #	0.5 #	0.7 #	0.6 #	0.5	1.9 #	0.8 #	1 #	1 #	0.9 #	1.4
Sep-08	0.6 #	1 #	1.3 #	0.7 #	0.6 #	0.9 #	0.6	0.9	0.9 #	0.9 #	1.8 #
Oct-08	1 #	0.5 #	1 #	1.3 #	1.3 #	1.2	1 #	1.4 #	0.8 #	1.6 #	1.8 #
Nov-08	0.8 #	1.4 #	2.7 #	2.5	0.9 #	1.2 #	0.8 #	2.4 #	1.1 #	1 #	1.7 #
Dec-08	0.4 #	0.4 #	0.6 #	0.5 #	0.3 #	1.1 #	0.6 #	15⁺	0.9 #	0.7 #	1.2 #
Annual Average	**1.1**	**1.1**	**1.3**	**0.8**	**0.8**	**1.0**	**0.7**	**1.4**	**0.8**	**0.8**	**1.1**

Data supplied by Metford Laboratories. # Insects/bird droppings reported. ⁺Invalid (excess bird droppings).

The highest dust deposition measurement in December 2008 was 1.2 g/m²/month at DG11; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in December 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during December. Total rainfall for the month was 62.6 mm.

A windrose (see Figure 7) created from the available 15-minute average wind data shows that winds were predominantly from the southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 34% of the time. This is quite a high percentage but is similar to the value for December 2007.

APPENDIX A

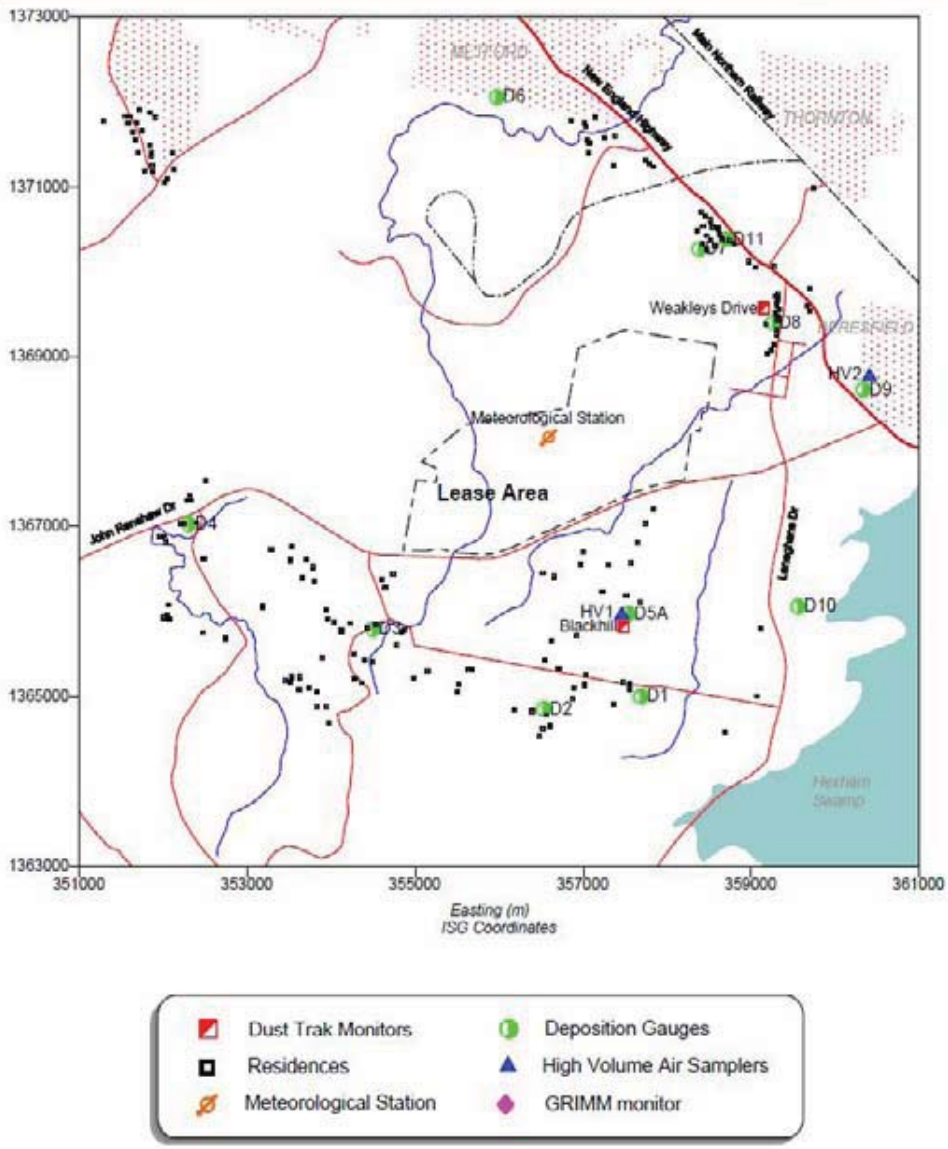
ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#

May-08	1.1	2.4[#]	0.9	1.4	0.9	0.9	0.7	2.7	1[#]	1.1	1.3[#]
June-08	0.2	0.4[#]	0.1	0.5	0.1[#]	0.1	0.3	0.5[#]	0.1	0.8	0.2
July-08	0.4	0.7[#]	1.3[#]	0.6	0.8[#]	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2

FIGURES



Location of Project Area

Figure 1: Project Location

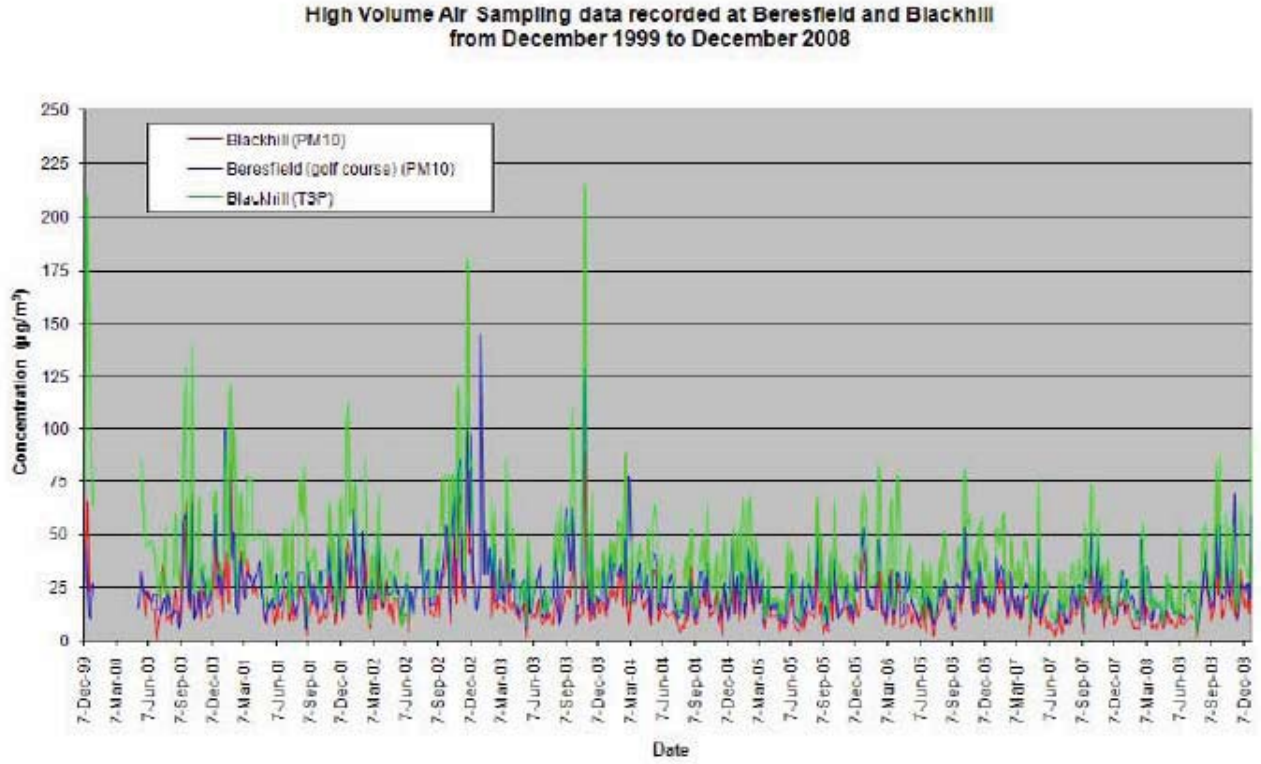


Figure 2: High Volume Air Sampling data

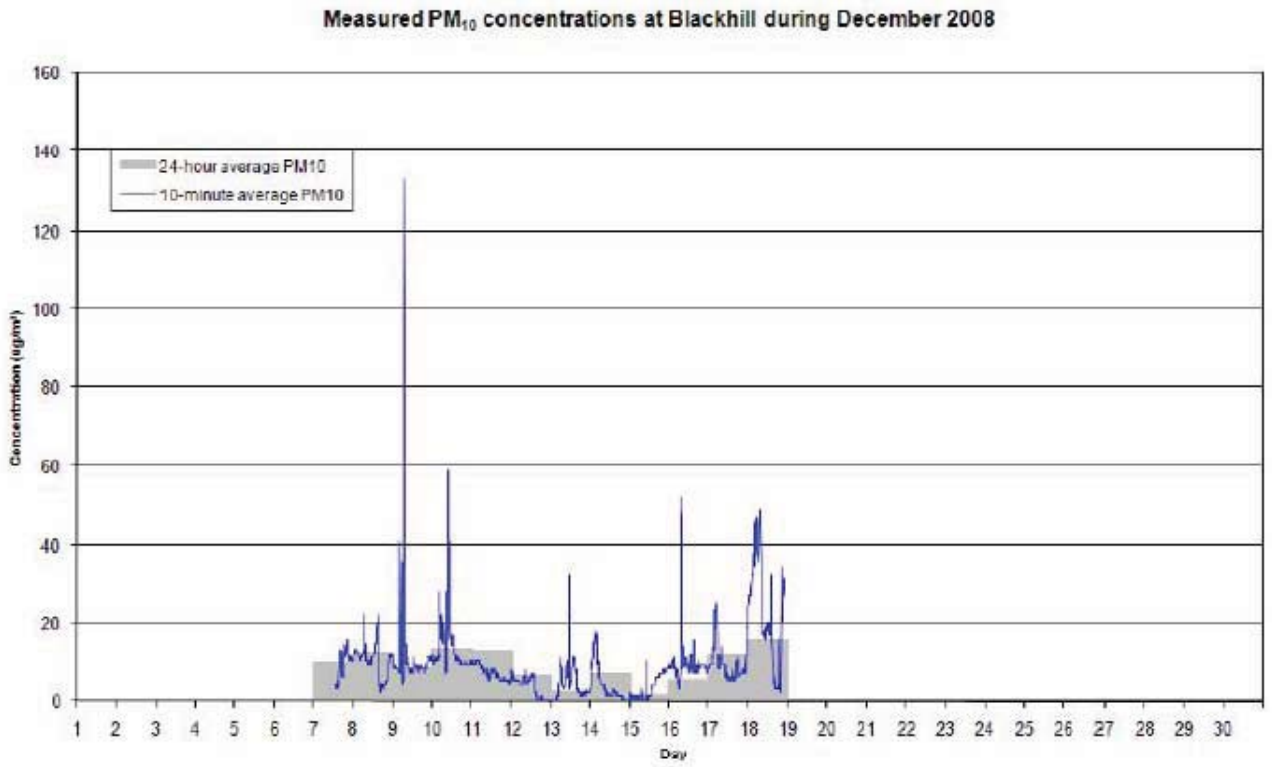


Figure 3: DustTrak sampling data, Blakchill site

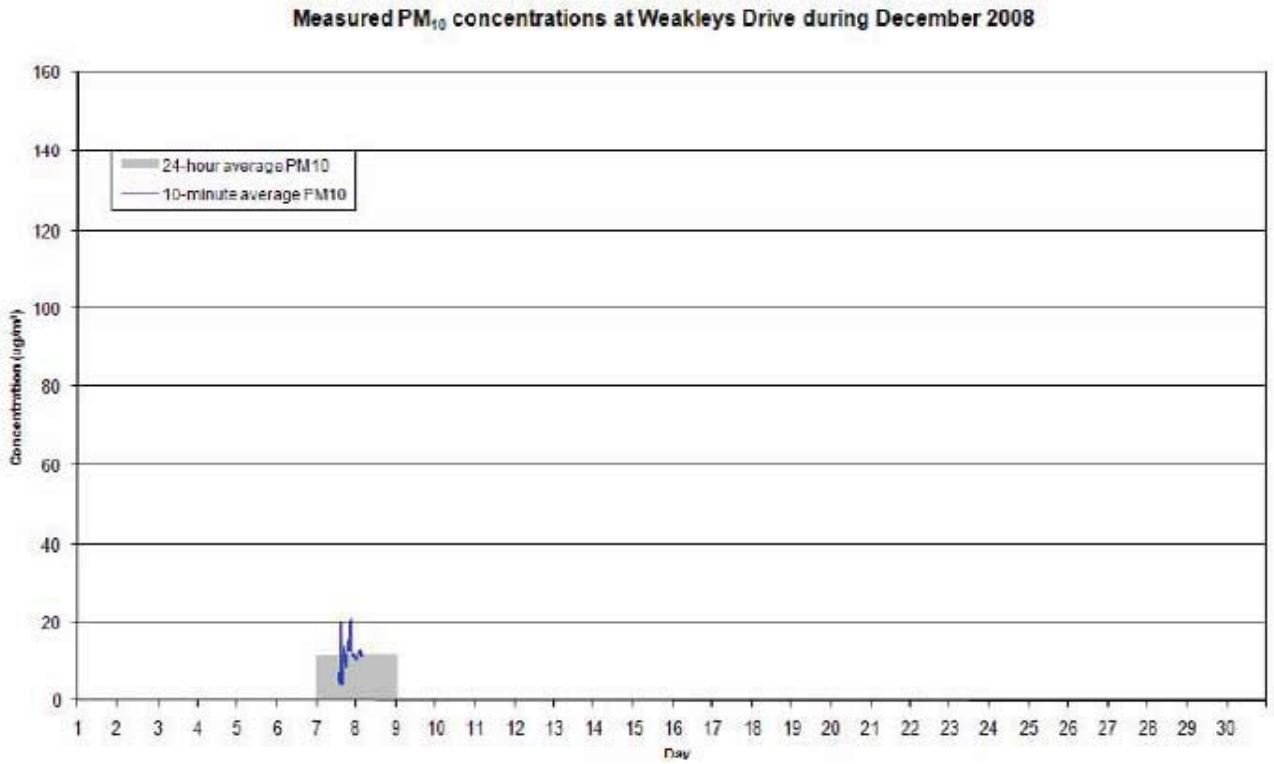


Figure 4: DustTrak sampling data, Weakleys Drive site

[No Grimm monitoring was scheduled for this month]

Figure 5: Grimm monitoring data

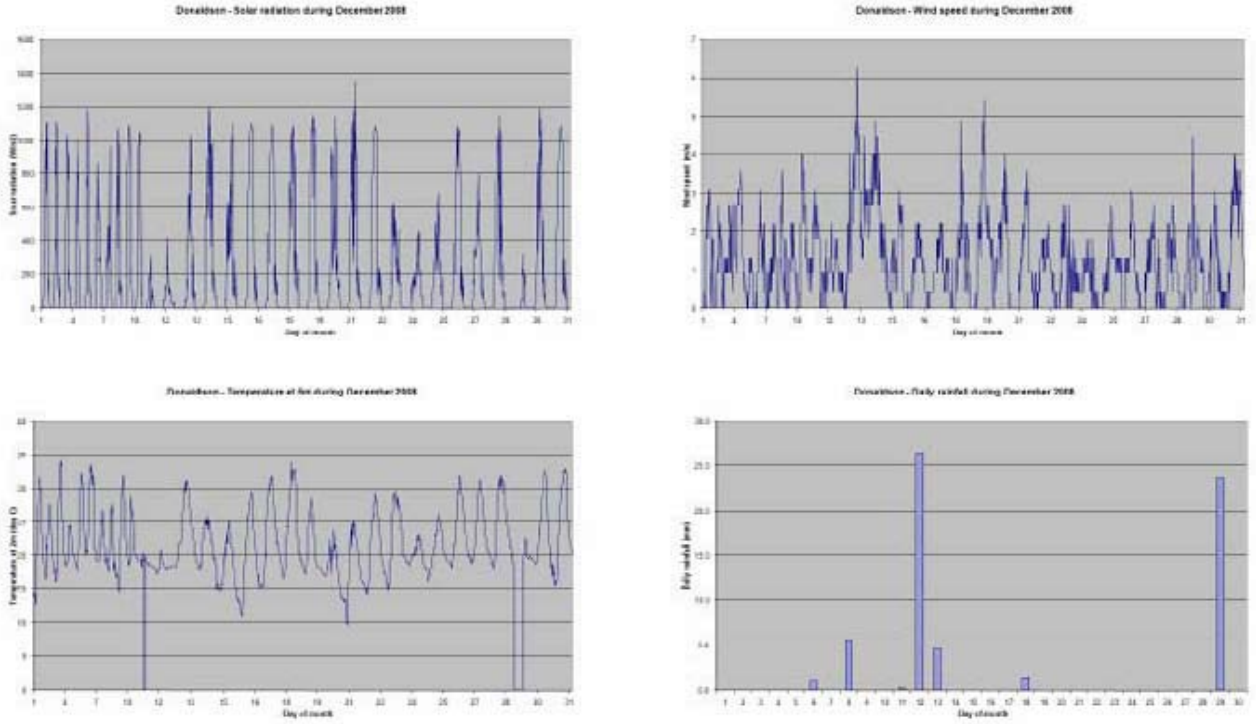


Figure 6: Meteorological conditions

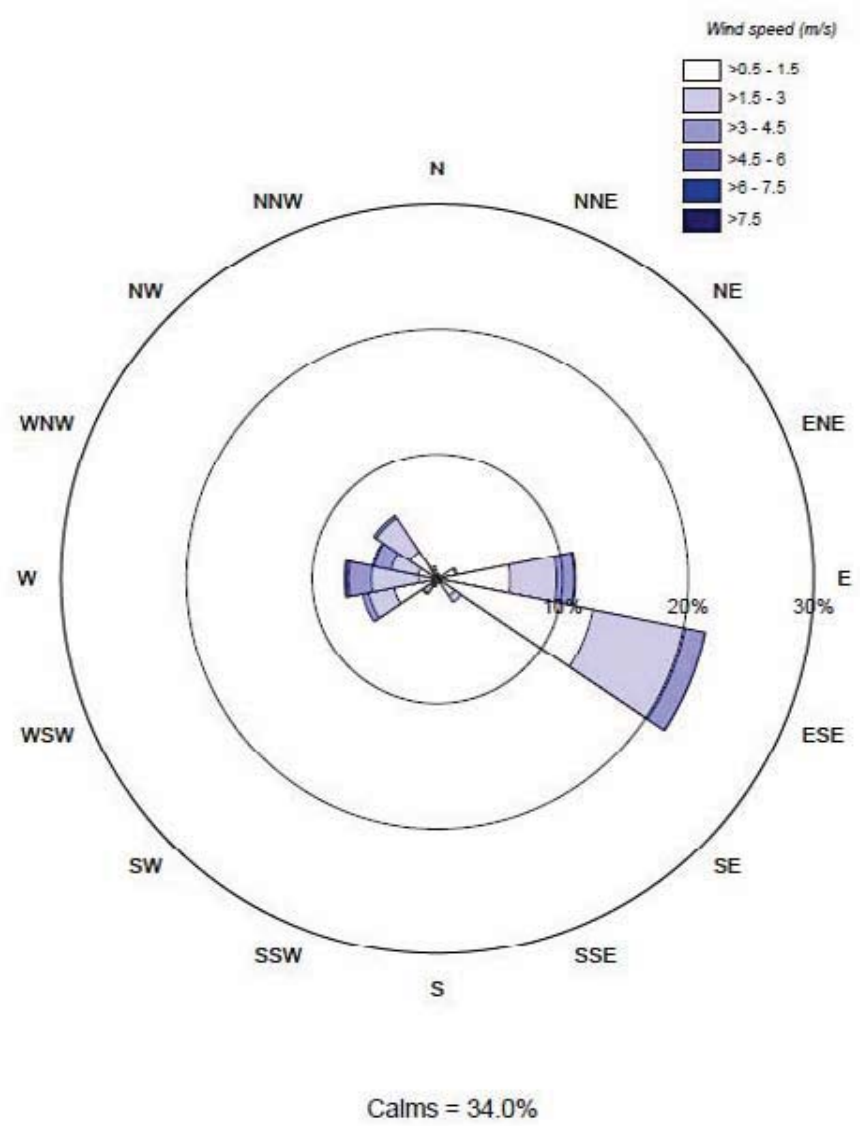


Figure 7: Windrose

DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA JANUARY 2009 REPORT

Donaldson Coal

Job No: 2815

24 March 2009

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA JANUARY 2009 REPORT**
JOB NUMBER:	**2815**
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during January 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during January 2009 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for January 2009

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
6/1/2009	65	34	67
12/1/2009	27	13	32
18/1/2009	22	13	28
24/1/2009	45	26	54
30/1/2009	30	15	30
Annual average	**24**	**15**	**31**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in January 2009 was 65 $\mu g/m^3$, measured on the 6th at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 $\mu g/m^3$ 24-hour NEPM goal. The cause of this event has not been determined and will be investigated. The measured concentration of TSP and PM_{10} at Blackhill are also relatively high on that day.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to January 2009 was 31 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 24 $\mu g/m^3$ and 15 $\mu g/m^3$ respectively for the 12 months to January 2009. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. No valid data were collected for the month of January.

A power failure at the Blackhill monitoring site is suspected as the main cause for no data being recorded.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. No valid data were collected for the month of January 2009.

The loss of data was caused by a malfunctioning DustTrak monitor. The monitor has since been replaced.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for January.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for January 2009 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to January 2009

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 #	0.4 #	0.8 #	0.4 #	0.4 #	0.8 #	1.1 #	1.7 #	1.2	1.1 #	1.1 #
May-08	1.1	2.4 #	0.9	1.4	0.9	0.9	0.7	2.7	1 #	1.1	1.3 #
Jun-08	0.2	0.4 #	0.1	0.5	0.1 #	0.1	0.3	0.5 #	0.1	0.8	0.2
Jul-08	0.4	0.7 #	1.3 #	0.6	0.8 #	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 #	0.5 #	0.7 #	0.6 #	0.5	1.9 #	0.8 #	1 #	1 #	0.9 #	1.4
Sep-08	0.6 #	1 #	1.3 #	0.7 #	0.6 #	0.9 #	0.6	0.9	0.9 #	0.9 #	1.8 #
Oct-08	1 #	0.5 #	1 #	1.3 #	1.3 #	1.2	1 #	1.4 #	0.8 #	1.6 #	1.8 #
Nov-08	0.8 #	1.4 #	2.7 #	2.5	0.9 #	1.2 #	0.8 #	2.4 #	1.1 #	1 #	1.7 #
Dec-08	0.4 #	0.4 #	0.6 #	0.5 #	0.3 #	1.1 #	0.6 #	15+	0.9 #	0.7 #	1.2 #
Jan-09	1.1 #	3 #	1.6 #	0.8 #	0.9 #	1.4 #	0.7 #	1.5 #	0.9 #	0.9 #	5 +
Annual Average	**1.0**	**1.3**	**1.1**	**0.8**	**0.8**	**1.1**	**0.7**	**1.4**	**0.8**	**0.9**	**1.2**

Data supplied by Metford Laboratories. # Insects/bird droppings reported. +Invalid (excess bird droppings / animals present).

The highest dust deposition measurement in January 2009 was 1.6 g/m²/month at DG3; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in January 2009 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during January. Total rainfall for the month was 11.3 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 30.6% of the time. This is quite a high percentage but is similar to the value for January 2008.

APPENDIX A

ALL DUST DEPOSITION DATA

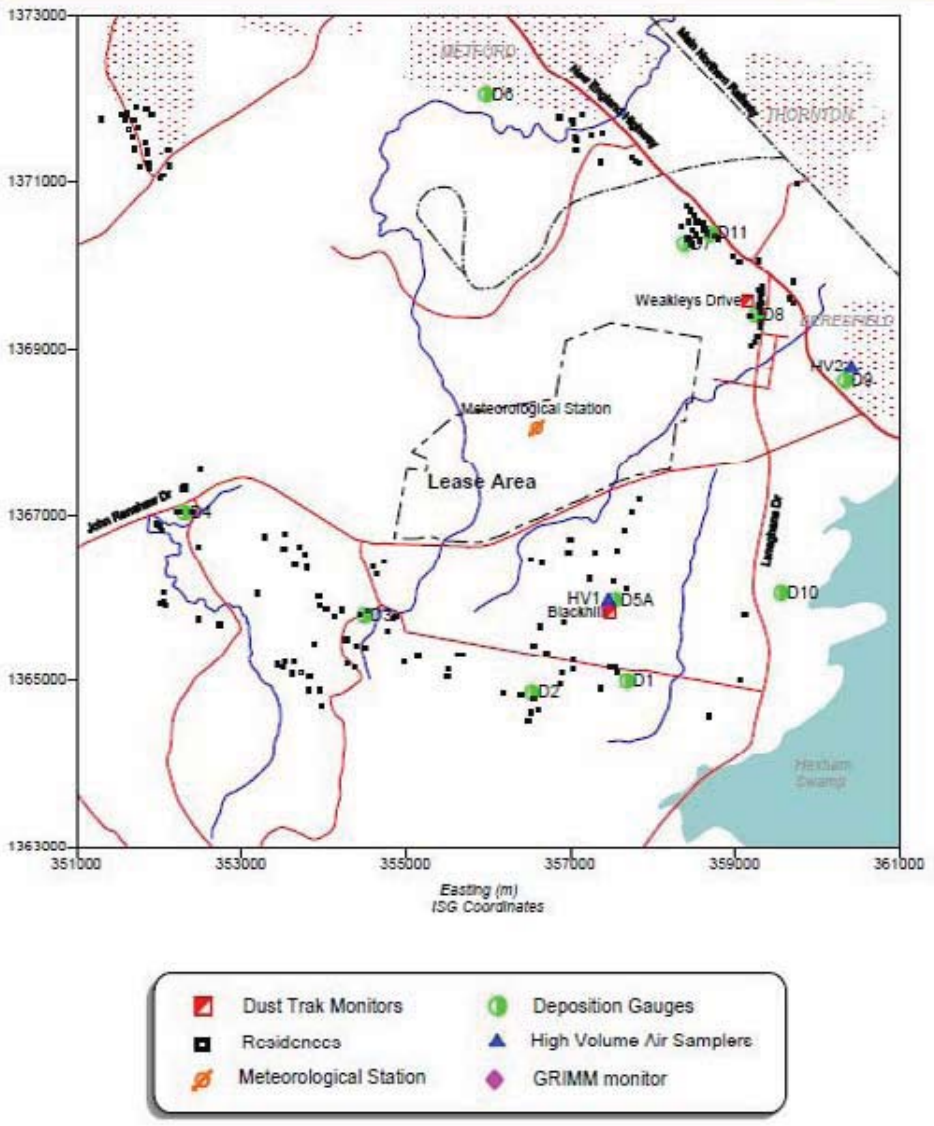
Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#

May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5#

 # - sample contaminated

FIGURES



Location of Project Area

Figure 1: Project Location

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to January 2009

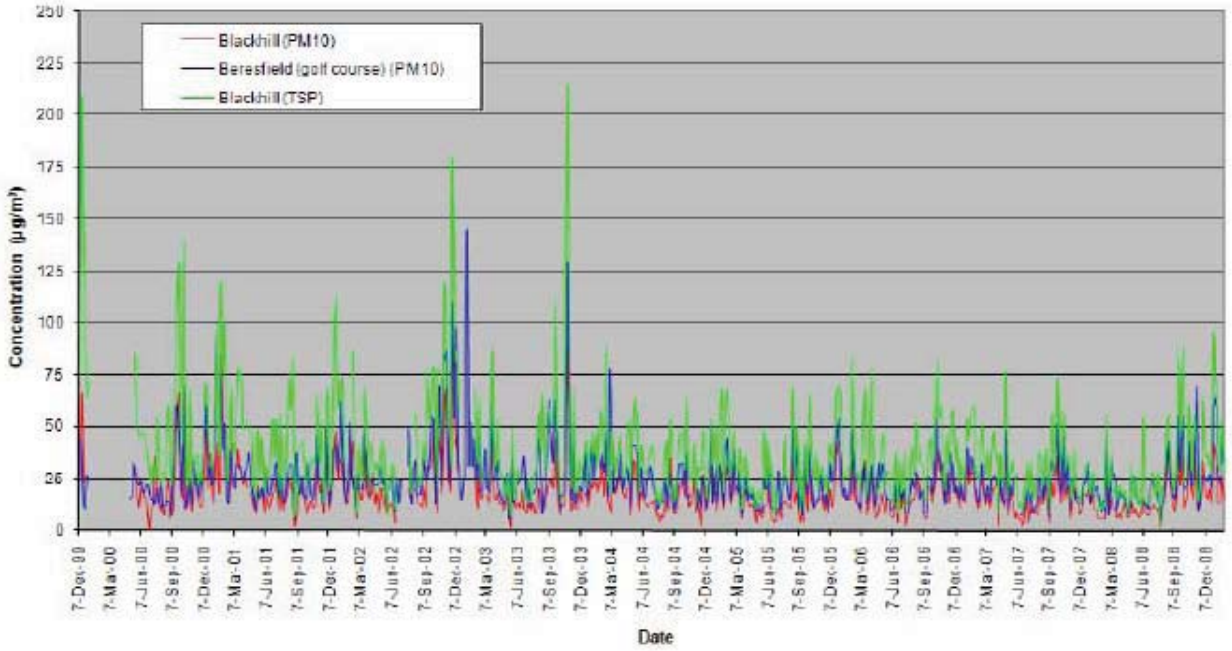


Figure 2: High Volume Air Sampling data

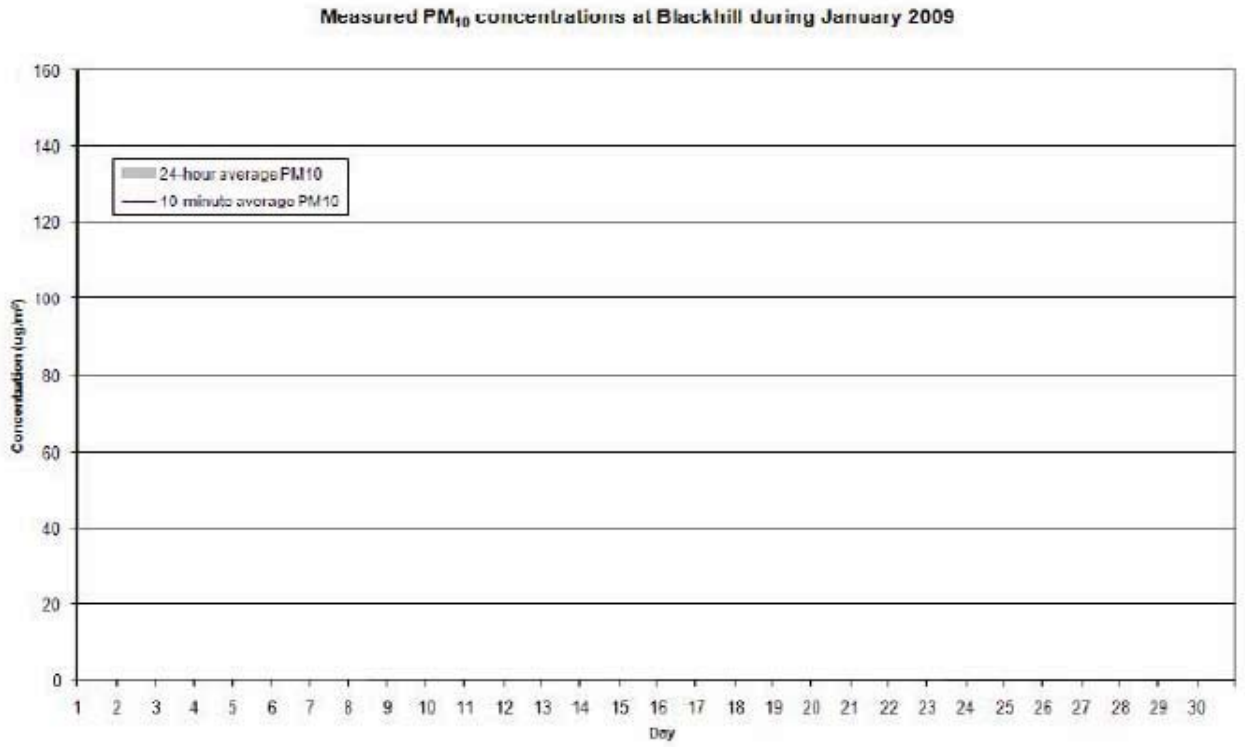


Figure 3: DustTrak sampling data, Blakchill site

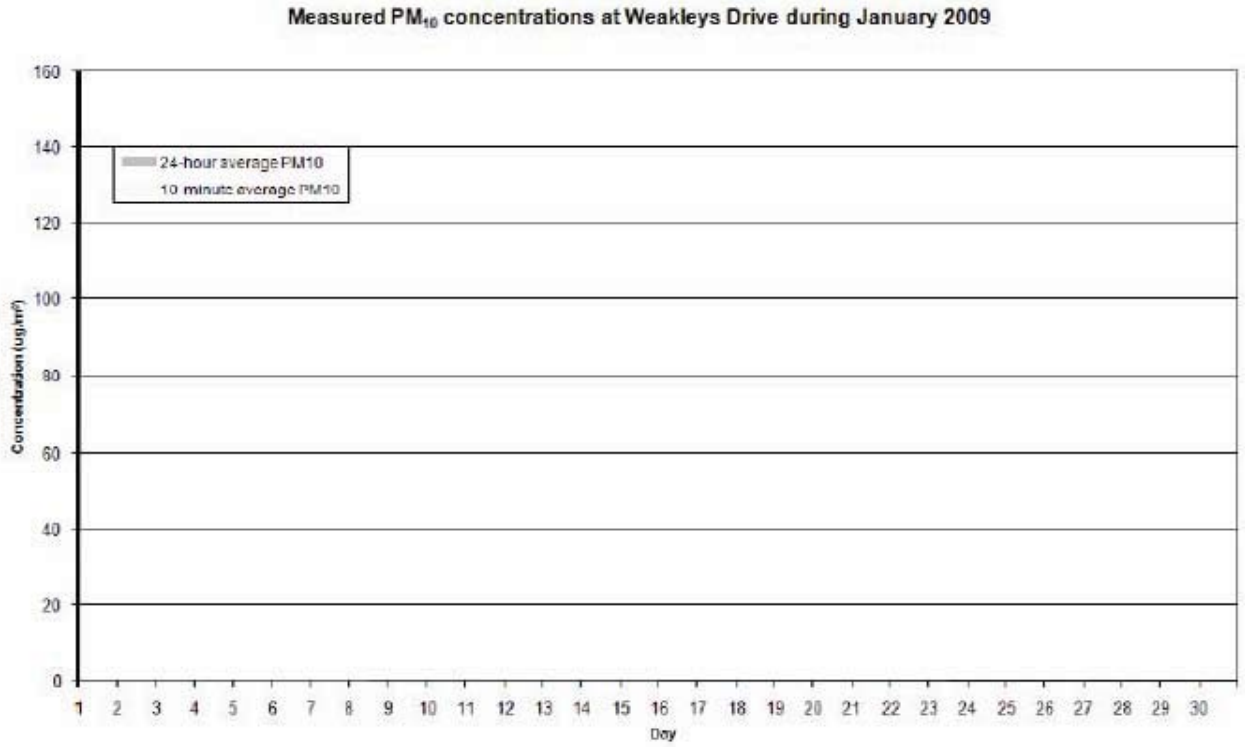


Figure 4: DustTrak sampling data, Weakleys Drive site

[No Grimm monitoring was scheduled for this month]

Figure 5: Grimm monitoring data

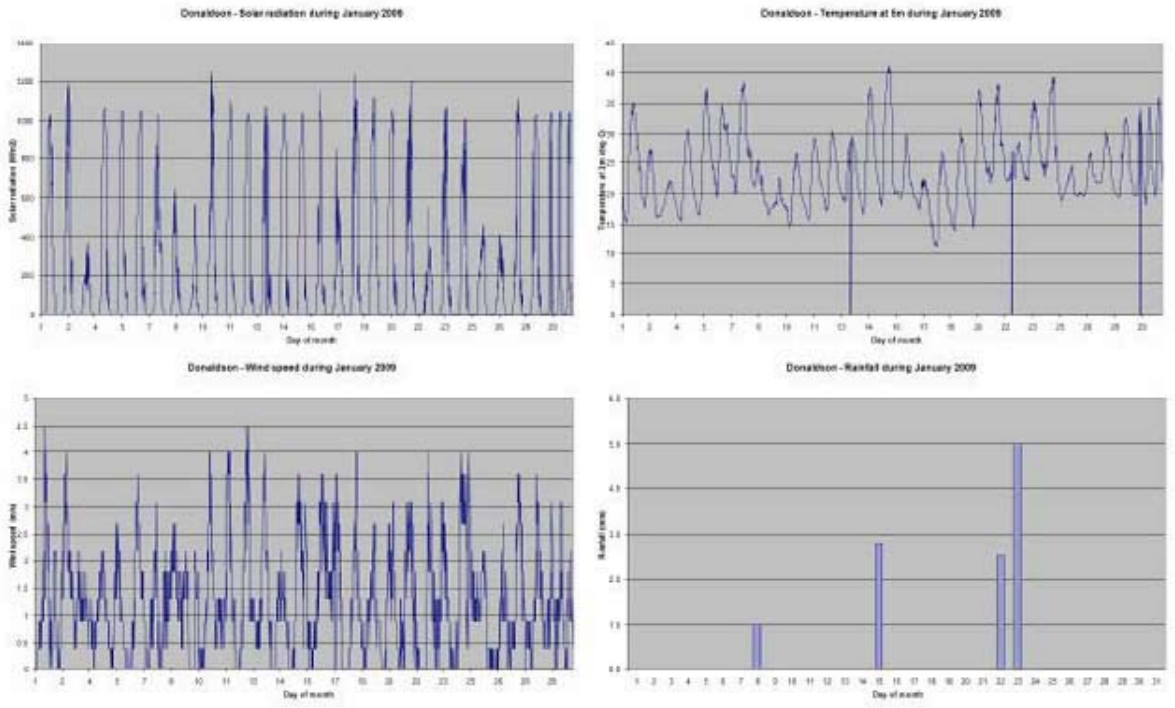


Figure 6: Meteorological conditions

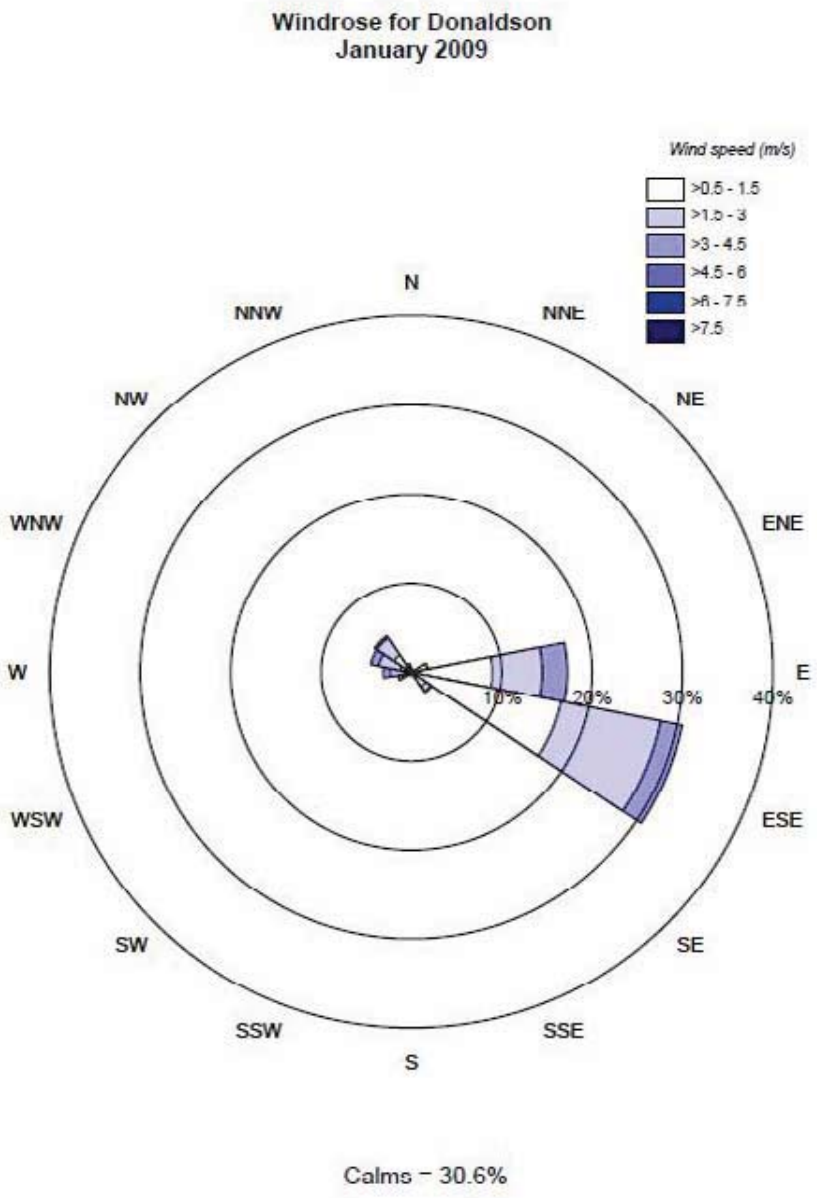


Figure 7: Windrose

DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA FEBRUARY 2009 REPORT

Donaldson Coal

Job No: 2815

24 March 2009

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA FEBRUARY 2009 REPORT**
JOB NUMBER:	**2815**
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during February 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during February 2009 are summarised in **Table 2.** A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for February 2009

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
5/02/2009	33	21	39
11/02/2009	25	26	30
17/02/2009	38	11	24
23/02/2009	18	18	35
Annual average	**25**	**16**	**32**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in February 2009 was 38 $\mu g/m^3$, measured on the 17th at the Beresfield site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to February 2009 was 32 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 25 $\mu g/m^3$ and 16 $\mu g/m^3$ respectively for the 12 months to February 2009. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. No data were collected for the month of February.

A power failure at the Blackhill monitoring site caused a loss of data for the rest of the month. The problem has since been rectified.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 26th to the 28th of February 2009. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was 25 $\mu g/m^3$, recorded on the 28th of February.

The lack of data for the month of February was caused by water flooding the DustTrak monitor. The monitor was replaced on the 26th of February.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for February.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for February 2009 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A.**

Table 3: Dust deposition monitoring for the 12-month period to February 2009

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Mar-08	4.5	0.6	9.2[+]	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 [#]	0.4 [#]	0.8 [#]	0.4 [#]	0.4 [#]	0.8 [#]	1.1 [#]	1.7 [#]	1.2	1.1 [#]	1.1 [#]
May-08	1.1	2.4 [#]	0.9	1.4	0.9	0.9	0.7	2.7	1 [#]	1.1	1.3 [#]
Jun-08	0.2	0.4 [#]	0.1	0.5	0.1 [#]	0.1	0.3	0.5 [#]	0.1	0.8	0.2
Jul-08	0.4	0.7 [#]	1.3 [#]	0.6	0.8 [#]	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 [#]	0.5 [#]	0.7 [#]	0.6 [#]	0.5	1.9 [#]	0.8 [#]	1 [#]	1 [#]	0.9 [#]	1.4
Sep-08	0.6 [#]	1 [#]	1.3 [#]	0.7 [#]	0.6 [#]	0.9 [#]	0.6	0.9	0.9 [#]	0.9 [#]	1.8 [#]
Oct-08	1 [#]	0.5 [#]	1 [#]	1.3 [#]	1.3 [#]	1.2	1 [#]	1.4 [#]	0.8 [#]	1.6 [#]	1.8 [#]
Nov-08	0.8 [#]	1.4 [#]	2.7 [#]	2.5	0.9 [#]	1.2 [#]	0.8 [#]	2.4 [#]	1.1 [#]	1 [#]	1.7 [#]
Dec-08	0.4 [#]	0.4 [#]	0.6 [#]	0.5 [#]	0.3 [#]	1.1 [#]	0.6 [#]	15*	0.9 [#]	0.7 [#]	1.2 [#]
Jan-09	1.1 [#]	3 [#]	1.6 [#]	0.8 [#]	0.9 [#]	1.4 [#]	0.7 [#]	1.5 [#]	0.9 [#]	0.9 [#]	5 [+]
Feb-09	0.4 [#]	4.4 [#]	1.5 [#]	1.1 [#]	0.9	1.6 [#]	0.8	1.2	1.4	2.5 [#]	1.2
Annual Average	**1.0**	**1.7**	**1.1**	**0.9**	**0.9**	**1.2**	**0.7**	**1.4**	**0.9**	**1.1**	**1.2**

Data supplied by Metford Laboratories. [#] Insects/bird droppings reported. [+]Invalid (excess bird droppings).

The highest dust deposition measurement in February 2009 was 4.4 g/m²/month at DG2; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in February 2009 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during February. Total rainfall for the month was 340.7 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 25.1% of the time. This is quite a low percentage and is less than the value for February 2008.

APPENDIX A

ALL DUST DEPOSITION DATA

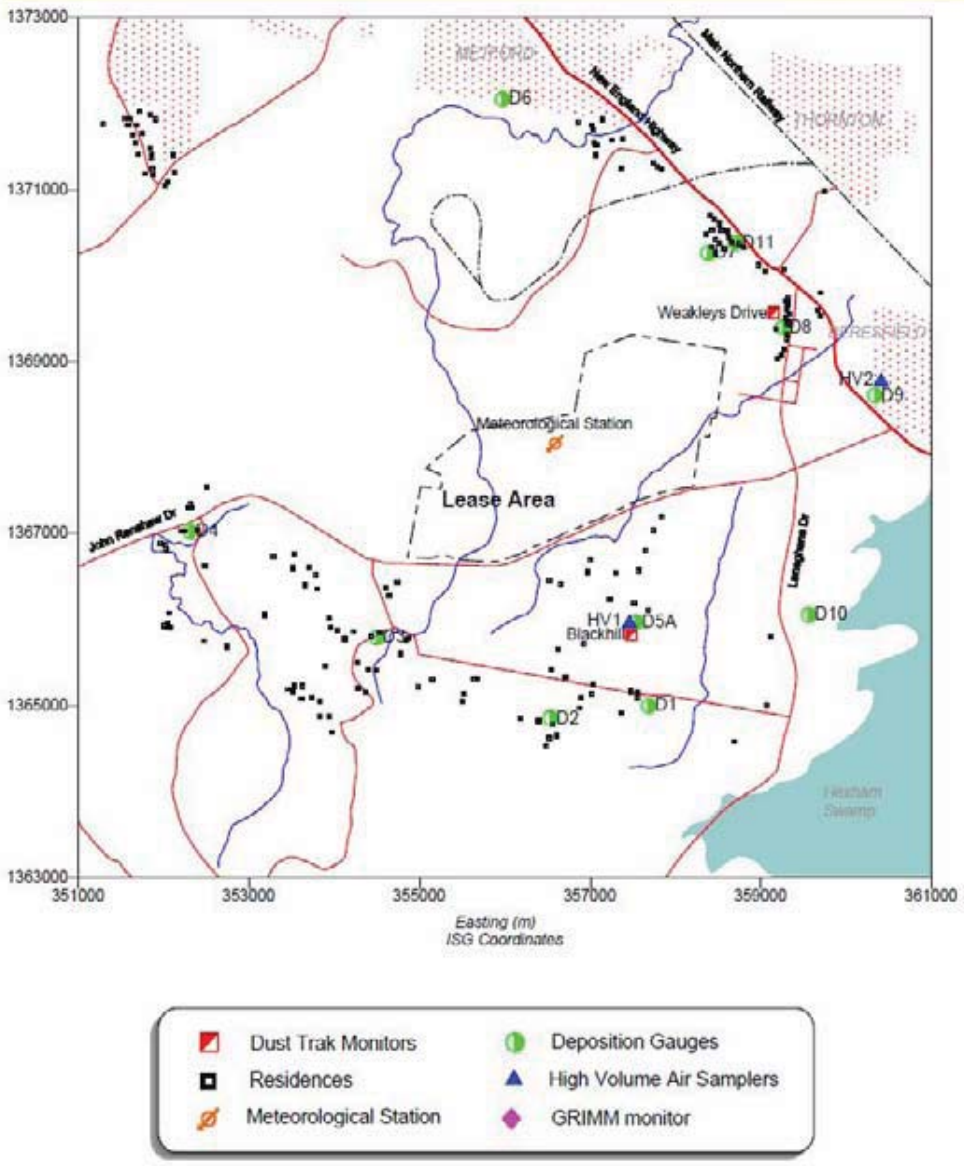
Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#

May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5#
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2

 # - sample contaminated

FIGURES



Location of Project Area

Figure 1: Project Location

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to February 2009

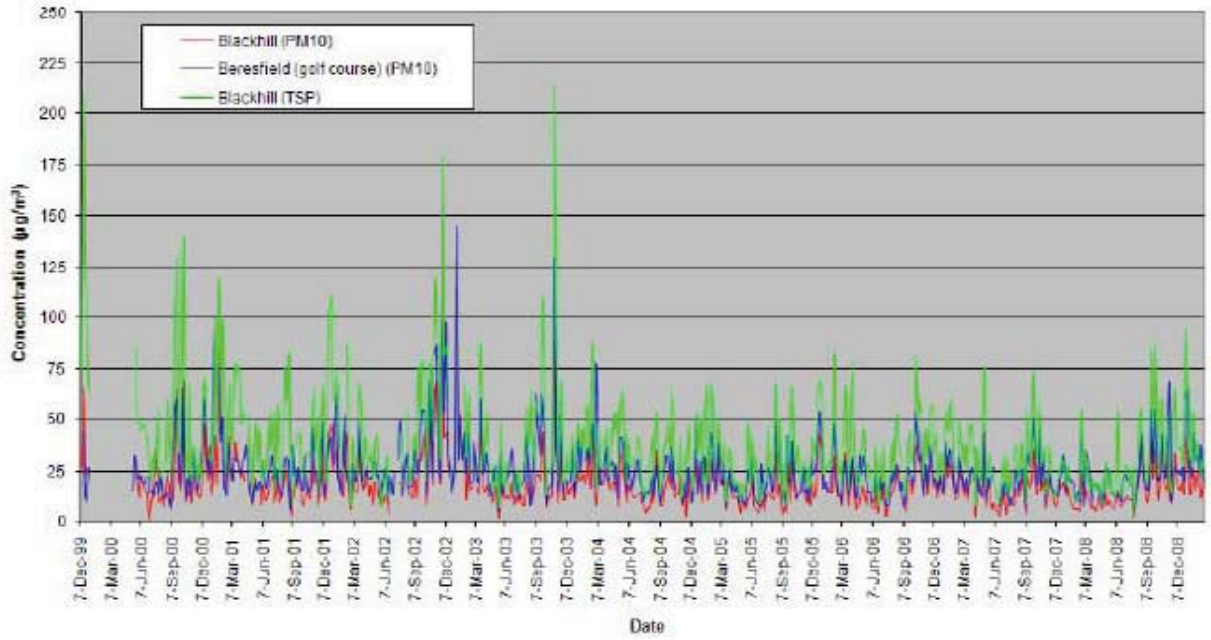


Figure 2: High Volume Air Sampling data

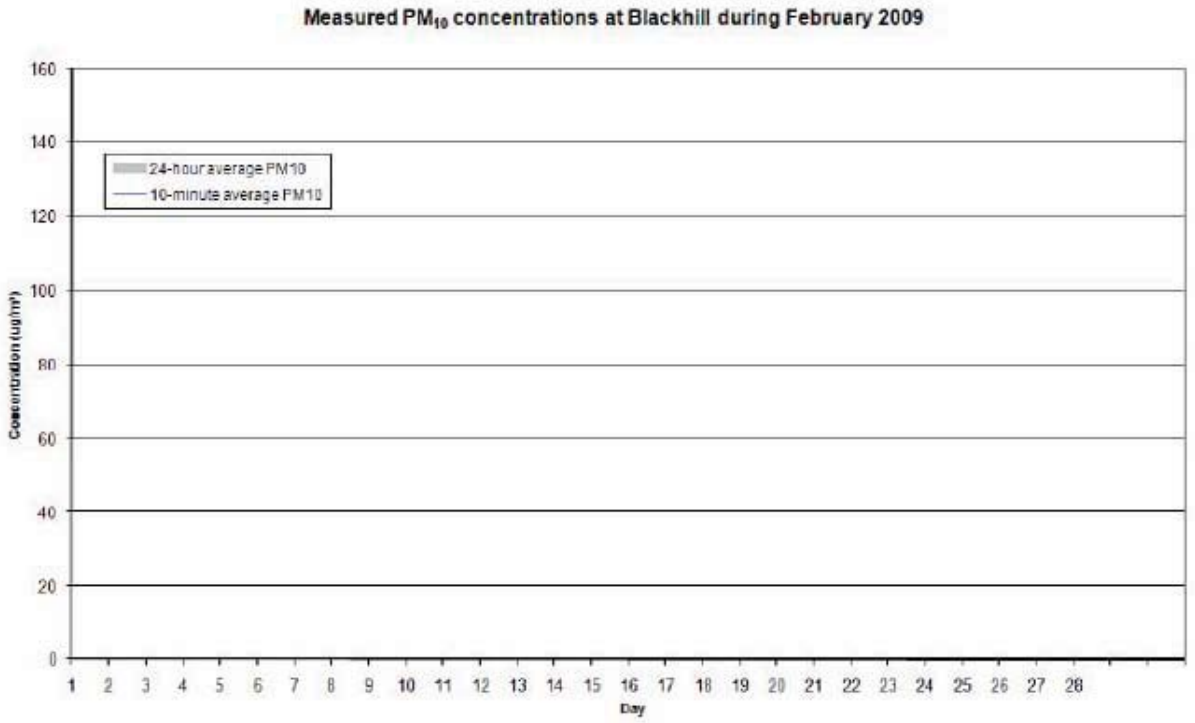


Figure 3: DustTrak sampling data, Blakchill site

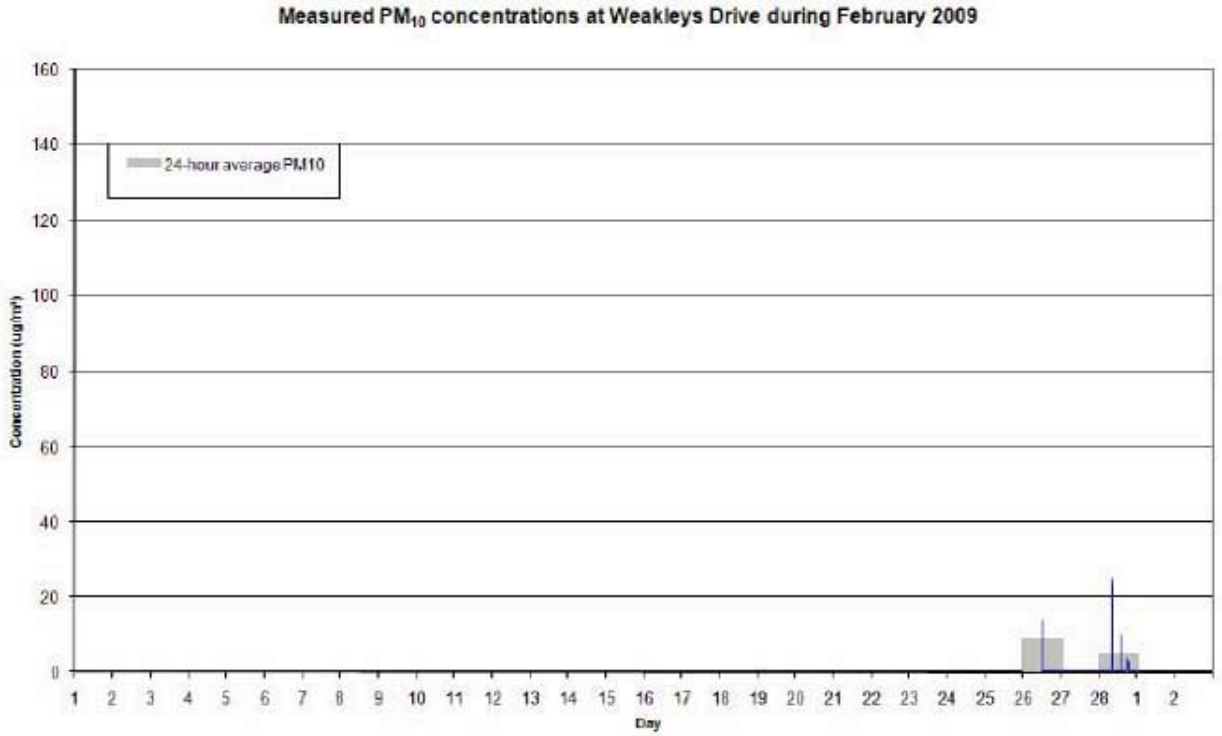


Figure 4: DustTrak sampling data, Weakleys Drive site

[No Grimm monitoring was scheduled for this month]

Figure 5: Grimm monitoring data

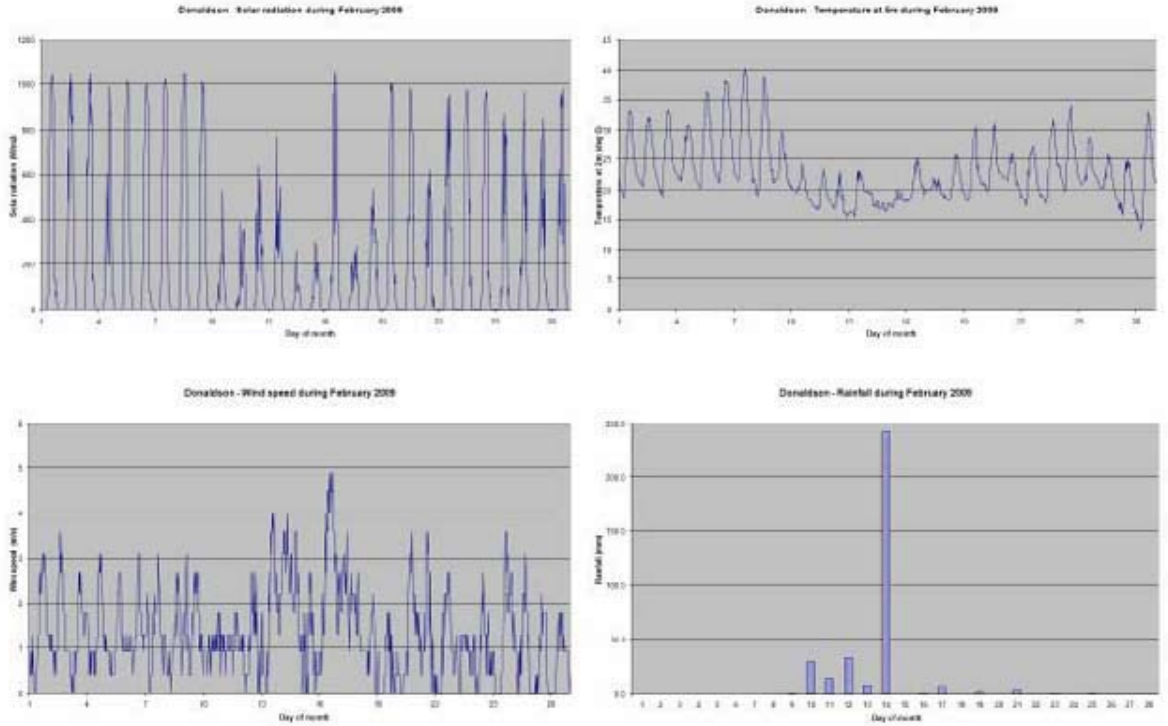
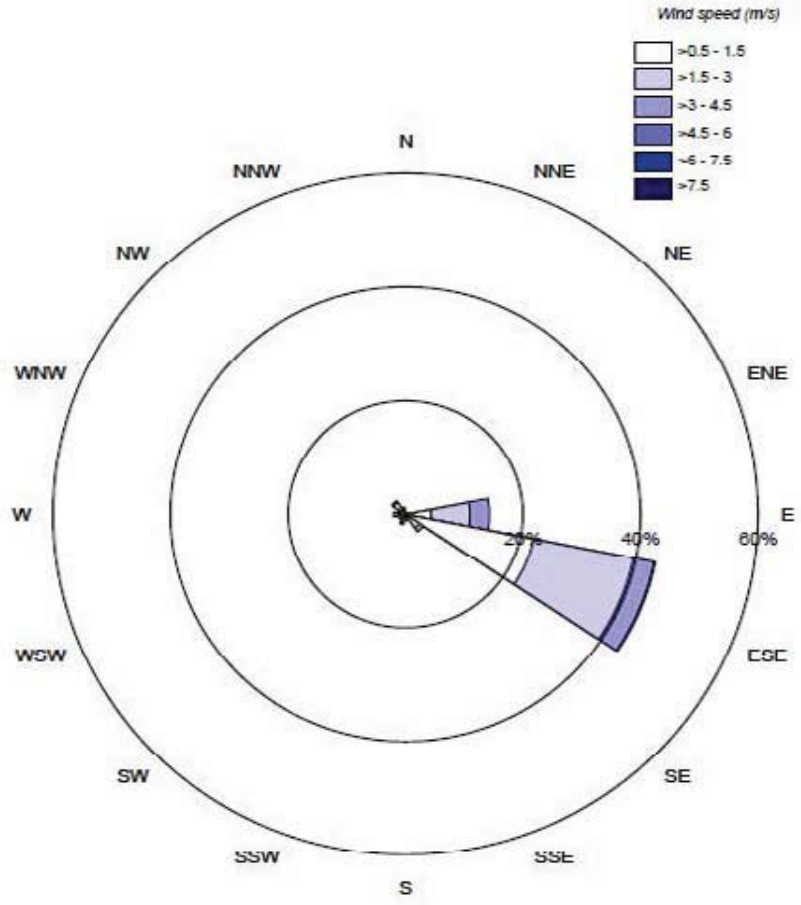


Figure G: Meteorological conditions



Calms = 25.1%

Figure 7: Windrose

DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA MARCH 2009 REPORT

Donaldson Coal

Job No: 2815

April 2009

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA MARCH 2009 REPORT**
JOB NUMBER:	**2815**
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during March 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- temperature
- solar radiation
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during March 2009 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for March 2009

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
1/03/2009	22	14	33
7/03/2009	34	26	47
13/03/2009	23	14	31
19/03/2009	24	20	37
25/03/2009	26	21	40
31/03/2009	20	18	30
Annual average	**25**	**17**	**33**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in March 2009 was 34 $\mu g/m^3$, measured on the 7th at the Beresfield site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to March 2009 was 33 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 25 $\mu g/m^3$ and 17 $\mu g/m^3$ respectively for the 12 months to March 2009. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. During the month of March, the DustTrak monitor located at the Blackhill site experienced a power failure. The problem was rectified and the DustTrak returned to normal functioning on the 17th of March 2009. The DustTrak monitoring for the Blackhill site is available from the 17th to the 31st of March 2009.

Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 27th of March at 29 $\mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 31st of March 2009. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was 23 $\mu g/m^3$, recorded on the 31st of March.

3.3 Grimm Monitoring

Grimm monitoring was carried out between 22nd and 30th of March 2009 and the data are presented in Figure 5. The measurements show that there were a number of exceedances of the 24-hour average NEPM goal of 50 $\mu g/m^3$ during this period. Exceedances occurred on the 22nd, 23rd, 26th and 29th of March 2009. These measurements are not reflected in the HVAS monitors as no measurement occurred during these days.

Both DustTrak monitors were operational during this period and recorded a similar trend measured by the Grimm although measured values were low. The trend shows spikes in the measurements occurring during morning periods. Instruments which measure dust using optical techniques are prone to be affected by high moisture content in the air. The observed spikes are most likely due to this effect, resulting in falsely high measurements which in turn affect the result for the 24-hour average.

The average $PM_{2.5}$ fraction in the PM_{10} was calculated from the measurements as 0.3. This suggests that the PM_{10} is predominantly coarse particles and the measurement is consistent with windblown dust.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for March 2009 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to March 2009

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
April-08	0.4 #	0.4 #	0.8 #	0.4 #	0.4 #	0.8 #	1.1 #	1.7 #	1.2	1.1 #	1.1 #
May-08	1.1	2.4 #	0.9	1.4	0.9	0.9	0.7	2.7	1 #	1.1	1.3 #
Jun-08	0.2	0.4 #	0.1	0.5	0.1 #	0.1	0.3	0.5 #	0.1	0.8	0.2
Jul-08	0.4	0.7 #	1.3 #	0.6	0.8 #	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 #	0.5 #	0.7 #	0.6 #	0.5	1.9 #	0.8 #	1 #	1 #	0.9 #	1.4
Sep-08	0.6 #	1 #	1.3 #	0.7 #	0.6 #	0.9 #	0.6	0.9	0.9 #	0.9 #	1.8 #
Oct-08	1 #	0.5 #	1 #	1.3 #	1.3 #	1.2	1 #	1.4 #	0.8 #	1.6 #	1.8 #
Nov-08	0.8 #	1.4 #	2.7 #	2.5	0.9 #	1.2 #	0.8 #	2.4 #	1.1 #	1 #	1.7 #
Dec-08	0.4 #	0.4 #	0.6 #	0.5 #	0.3 #	1.1 #	0.6 #	15+	0.9 #	0.7 #	1.2 #
Jan-09	1.1 #	3 #	1.6 #	0.8 #	0.9 #	1.4 #	0.7 #	1.5 #	0.9 #	0.9 #	5 +
Feb-09	0.4 #	4.4 #	1.5 #	1.1 #	0.9	1.6 #	0.8	1.2	1.4	2.5 #	1.2
Mar-09	2.8 #	5.8 #	2.7 #	2.4 #	1.9 #	2.1 #	2.5 #	2.4 #	2.3 #	5.7 #	2.7 #
Annual Average	**0.9**	**2.1**	**1.3**	**1.1**	**0.8**	**1.2**	**0.9**	**1.5**	**1.0**	**1.5**	**1.4**

Data supplied by Metford Laboratories. # Insects/bird droppings reported. +Invalid (excess bird droppings).

The highest dust deposition measurement in March 2009 was 5.8 g/m²/month at DG2; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates for the gauges in the network were low and significantly below the amount goal of 4 g/m²/month, indicating good air quality with respect to dust deposition.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in March 2009 are shown in Figure 6 and a windrose is shown in Figure 7

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during March. Total rainfall for the month was 136.5 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 42.3% of the time. This is quite a low percentage and is less than the value for March 2008.

APPENDIX A

ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1

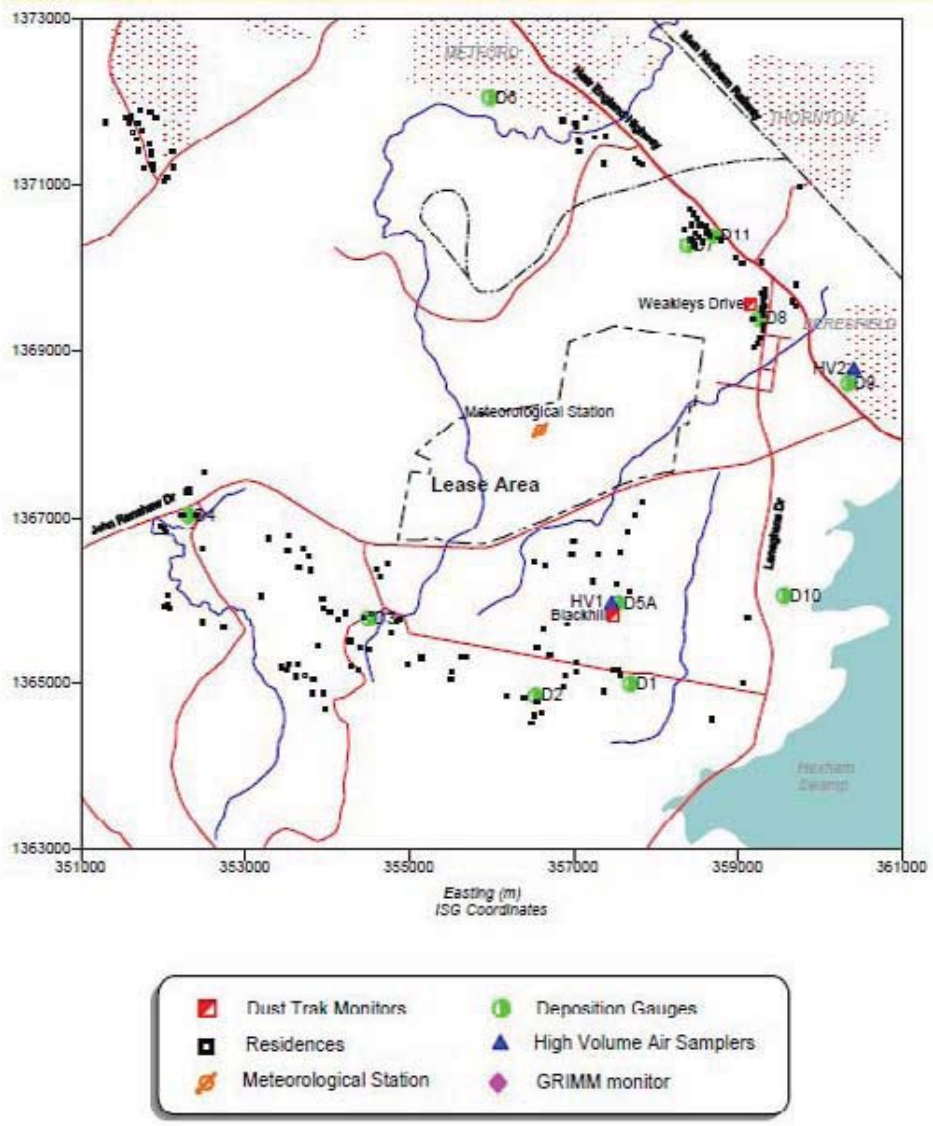
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2[1]	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#

May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7

 # - sample contaminated

+ - sample invalid

FIGURES



Location of Project Area

Figure 1: Project Location

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to March 2009

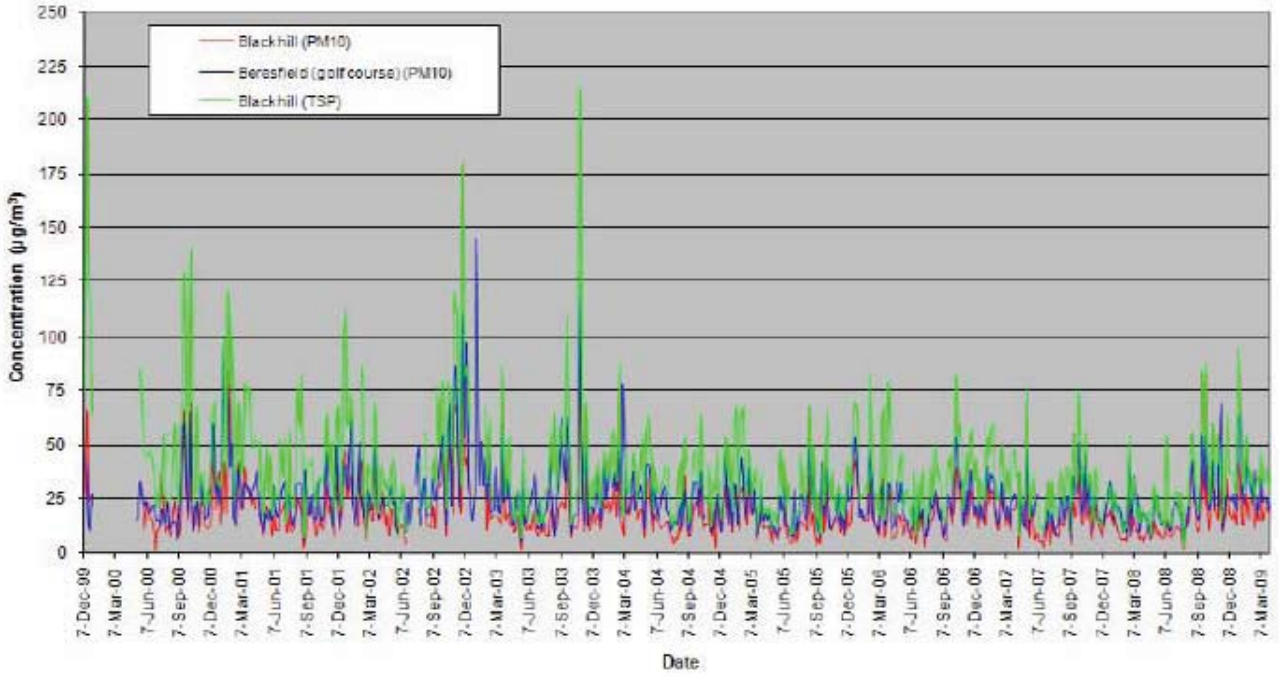


Figure 2: High Volume Air Sampling data

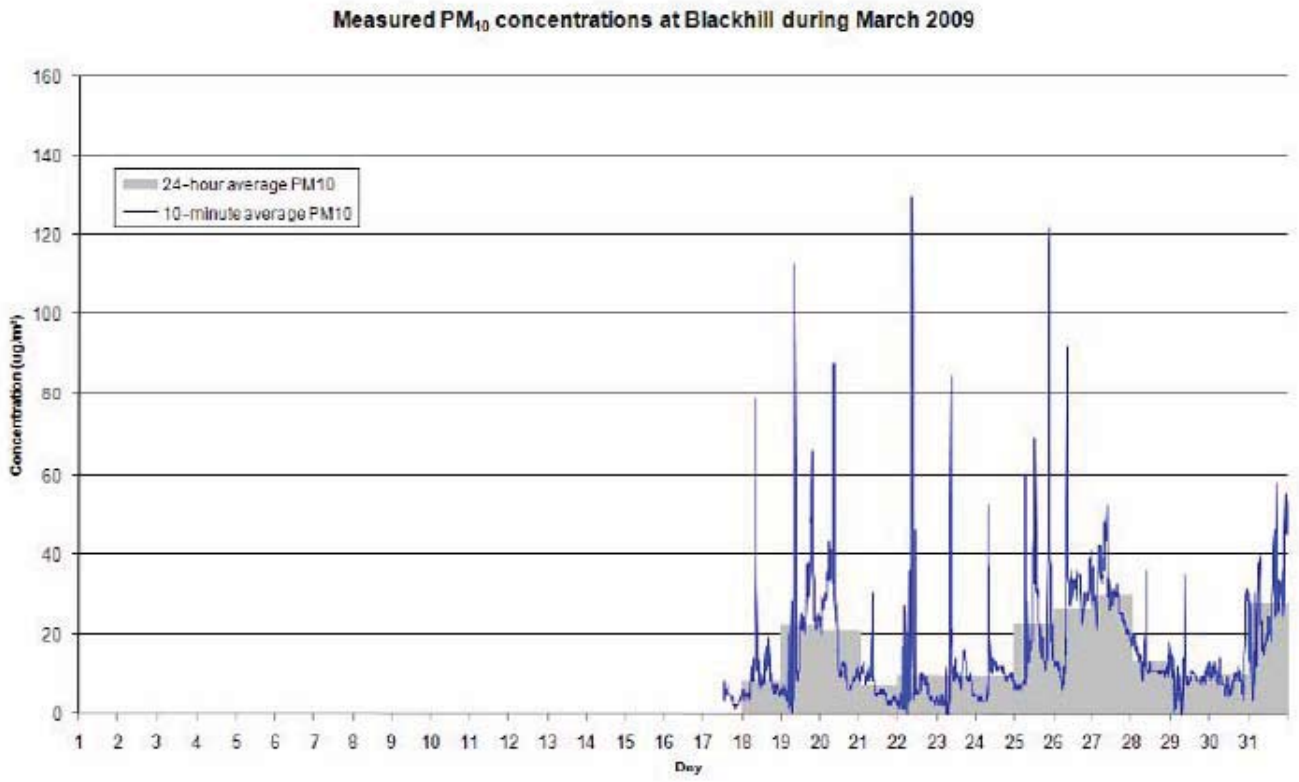


Figure 3: DustTrak sampling data, Blakchill site

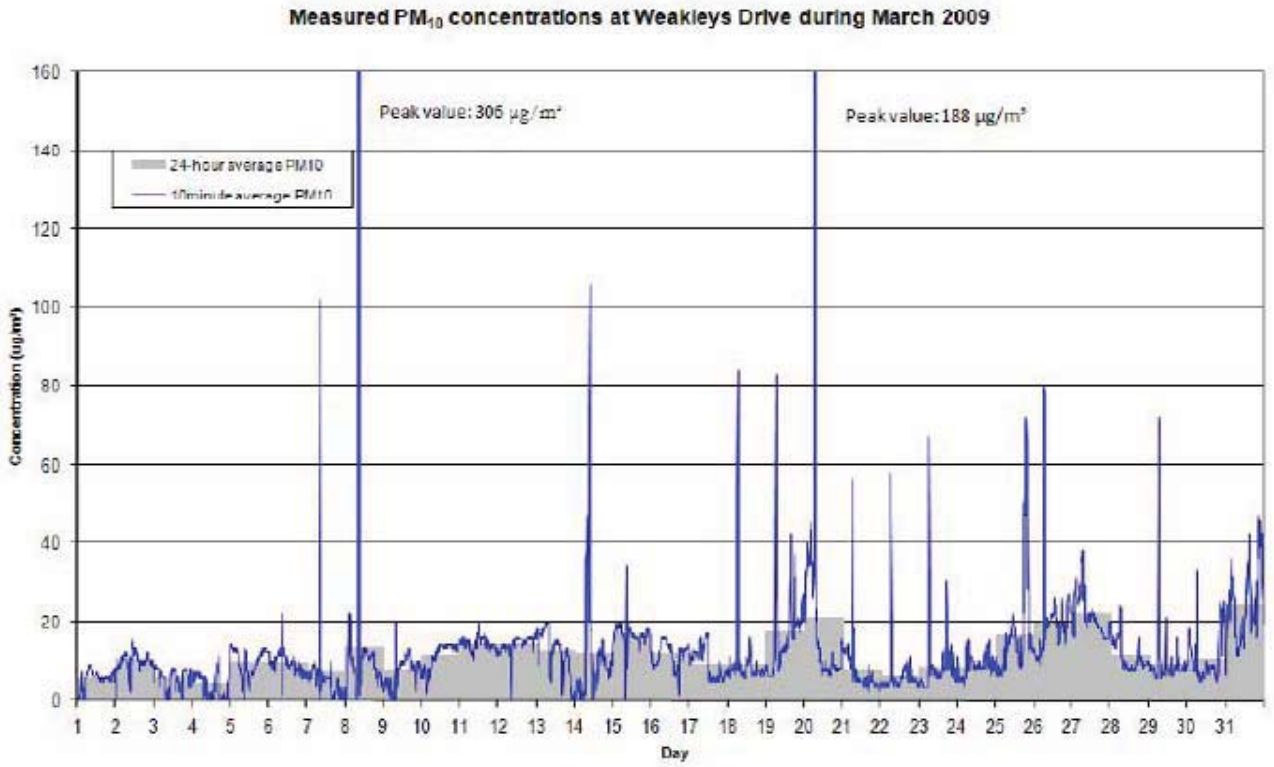


Figure 4: DustTrak sampling data, Weakleys Drive site

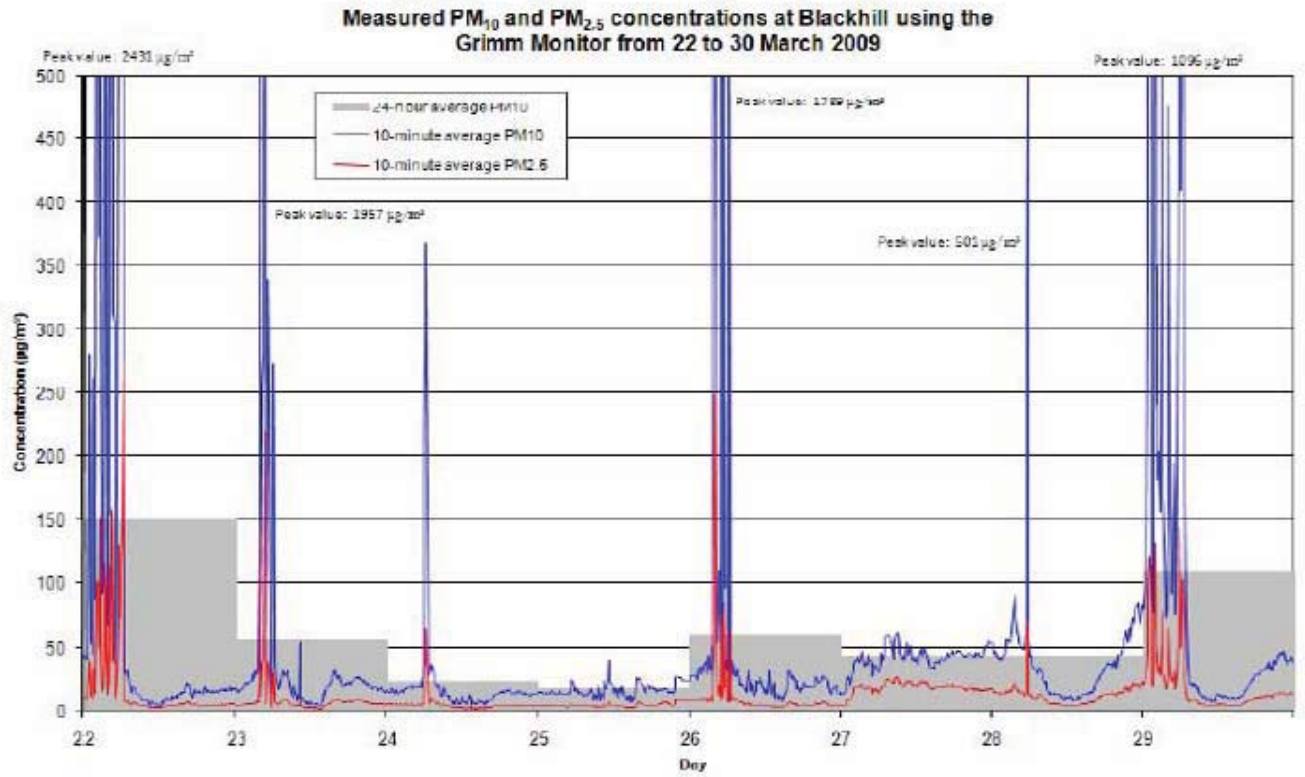


Figure 5: Grimm monitoring data

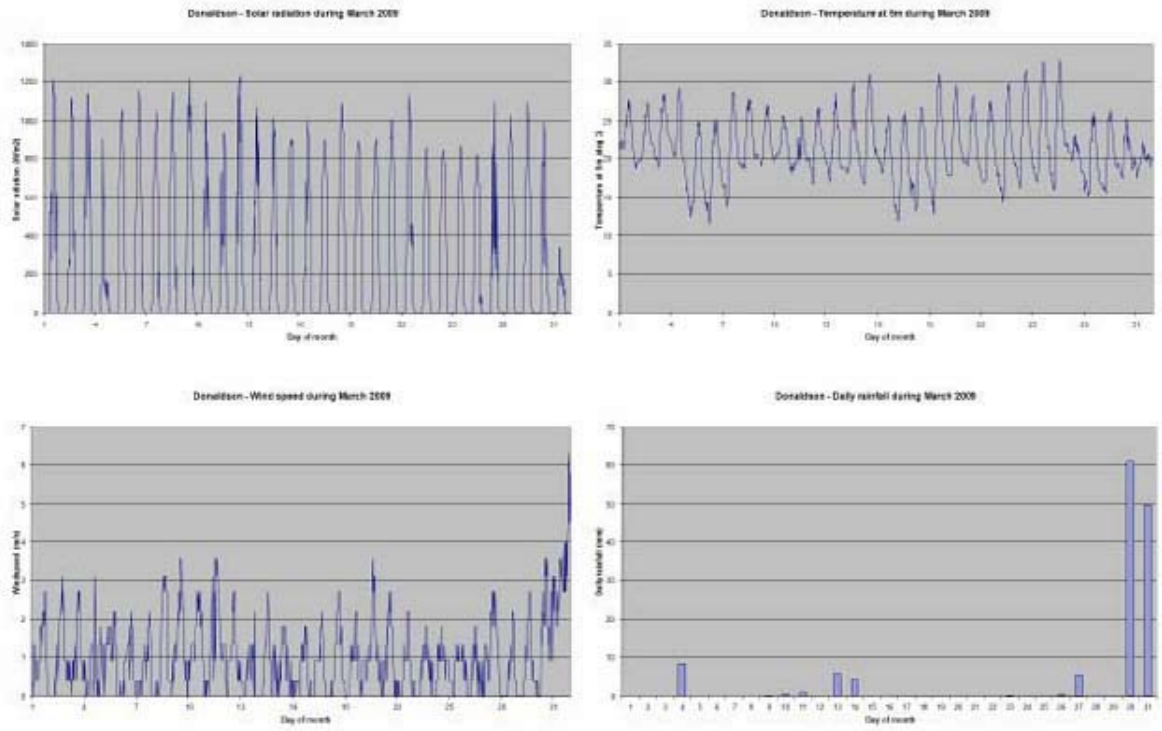


Figure 6: Meteorological conditions

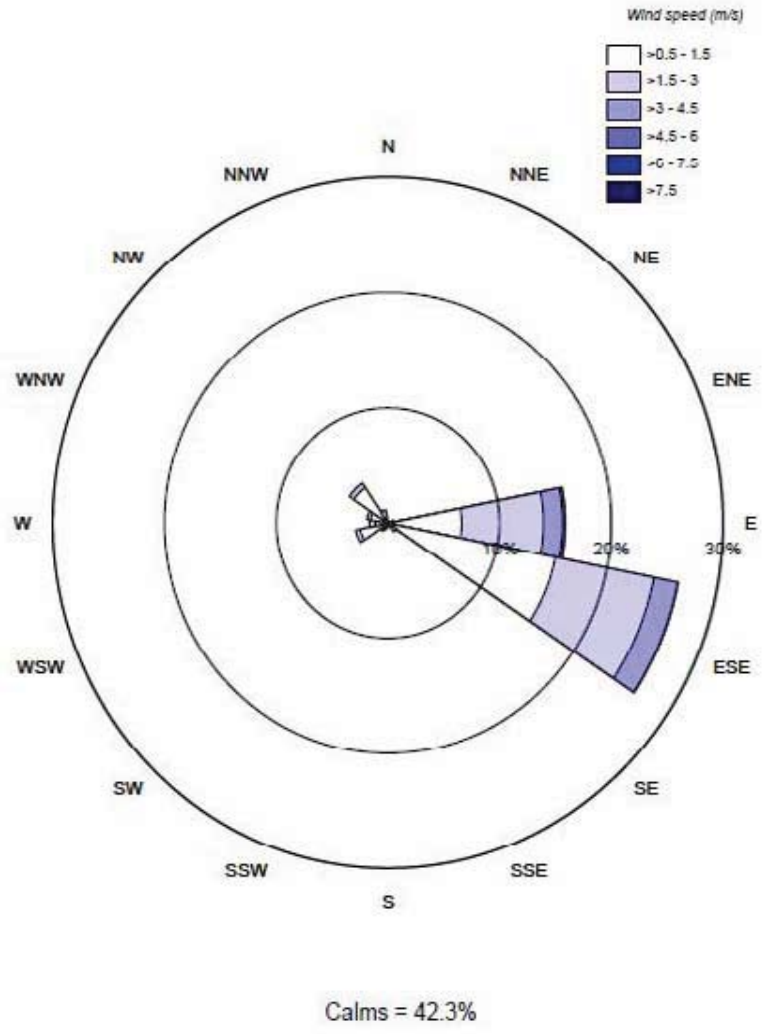


Figure 7: Windrose

DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA APRIL 2009 REPORT

Donaldson Coal

Job No: 2815

May 2009

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA APRIL 2009 REPORT**
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson Coal operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during April 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- temperature
- solar radiation
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during April 2009 are summarised in **Table 2.** A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for April 2009

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
6/04/2009	16	16	33
12/04/2009	14	14	24
18/04/2009	16	20	40
24/04/2009	8	6	27
30/04/2009	12	9	16
Annual average	**25**	**17**	**34**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration recorded in April 2009 was 20 $\mu g/m^3$, measured on the 18th at the Blackhill site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to April 2009 was 34 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 25 $\mu g/m^3$ and 17 $\mu g/m^3$ respectively for the 12 months to April 2009. These values are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. During the month of April, the DustTrak monitor located at the Blackhill site experienced an anomaly due to excessive rainfall. Data collected during the first 7 days of April was considered erroneous. The problem was rectified and the DustTrak returned to normal functioning on the 17th of April 2009. The DustTrak monitoring for the Blackhill site is available from the 17th to the 23rd of April 2009, when the DustTrak was subject to another power failure.

Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 18th of April at 13 $\mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 9th of April 2009. The available data show that 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was 21 $\mu g/m^3$, recorded on the 1st of April.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for April 2009.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for April 2009 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to April 2009

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
May-08	1.1	2.4 #	0.9	1.4	0.9	0.9	0.7	2.7	1.0 #	1.1	1.3 #
Jun-08	0.2	0.4 #	0.1	0.5	0.1 #	0.1	0.3	0.5 #	0.1	0.8	0.2
Jul-08	0.4	0.7 #	1.3 #	0.6	0.8 #	0.9	0.8	1.0	0.7	0.5	1.1
Aug-08	1.0 #	0.5 #	0.7 #	0.6 #	0.5	1.9 #	0.8 #	1.0 #	1.0 #	0.9 #	1.4
Sep-08	0.6 #	1.0 #	1.3 #	0.7 #	0.6 #	0.9 #	0.6	0.9	0.9 #	0.9 #	1.8 #
Oct-08	1.0 #	0.5 #	1.0 #	1.3 #	1.3 #	1.2	1.0 #	1.4 #	0.8 #	1.6 #	1.8 #
Nov-08	0.8 #	1.4 #	2.7 #	2.5	0.9 #	1.2 #	0.8 #	2.4 #	1.1 #	1.0 #	1.7 #
Dec-08	0.4 #	0.4 #	0.6 #	0.5 #	0.3 #	1.1 #	0.6 #	15 #	0.9 #	0.7 #	1.2 #
Jan-09	1.1 #	3.0 #	1.6 #	0.8 #	0.9 #	1.4 #	0.7 #	1.5 #	0.9 #	0.9 #	5.0 +
Feb-09	0.4 #	4.4 #	1.5 #	1.1 #	0.9	1.6 #	0.8	1.2	1.4	2.5 #	1.2
Mar-09	2.8 #	5.8 #	2.7 #	2.4 #	1.9 #	2.1 #	2.5 #	2.4 #	2.3 #	5.7 #	2.7 #
Apr-09	2.0 #	0.8 #	0.8 #	0.6 #	0.6 #	3.2 #	1.1 #	1.1 #	1.0 #	0.6	0.9 #
Annual Average	**1.0**	**2.2**	**1.3**	**1.1**	**0.8**	**1.4**	**0.9**	**1.5**	**1.0**	**1.4**	**1.4**

Data supplied by Metford Laboratories. # Insects/bird droppings reported. +Invalid (excess bird droppings).

The highest dust deposition measurement recorded in April 2009 was 3.2 g/m²/month at DG6; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates for the gauges in the network were low and significantly below the amount goal of 4 g/m²/month, indicating good air quality with respect to dust deposition.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in April 2009 are shown in Figure 6 and a windrose plot is shown in Figure 7

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during April. Total rainfall for the month was 189 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 48.2% of the time. This is quite a high percentage and is less than the value for April 2008. The relatively large fraction of clam winds may arise from the generally forested area and the specific location of the weather station.

APPENDIX A

ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1

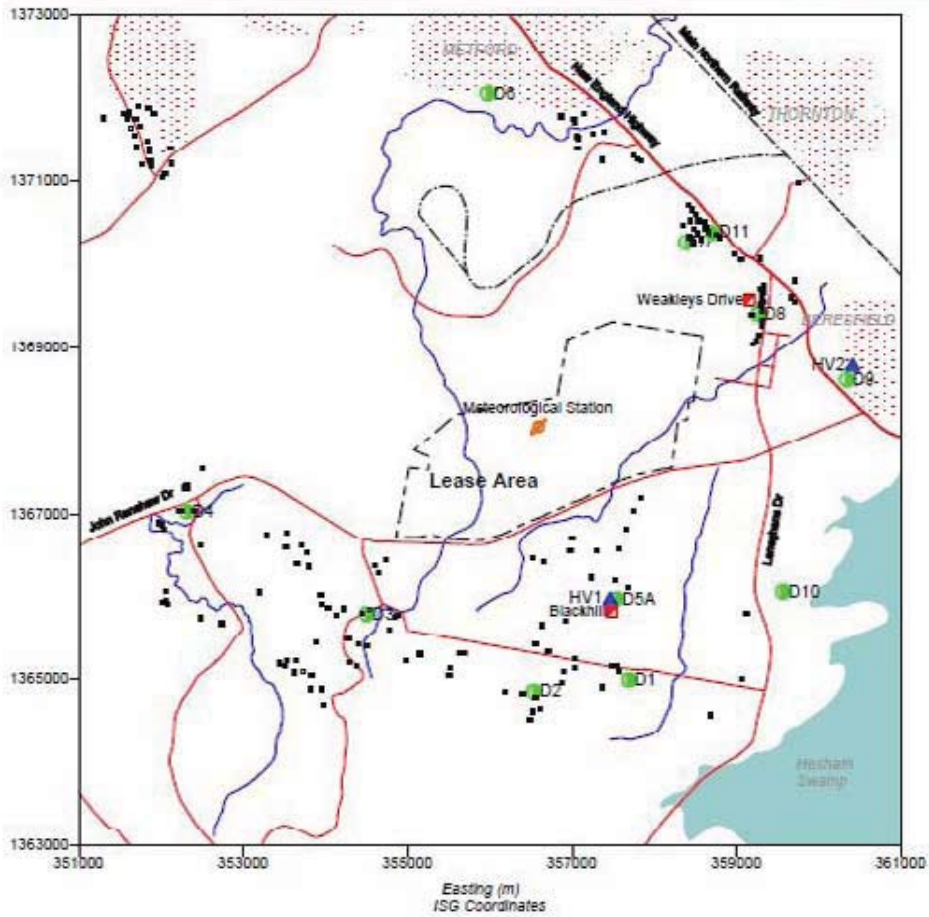
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2'	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#

May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9

 # - sample contaminated

+ - sample invalid

FIGURES



Location of Project Area

Figure 1: Project Location

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to April 2009

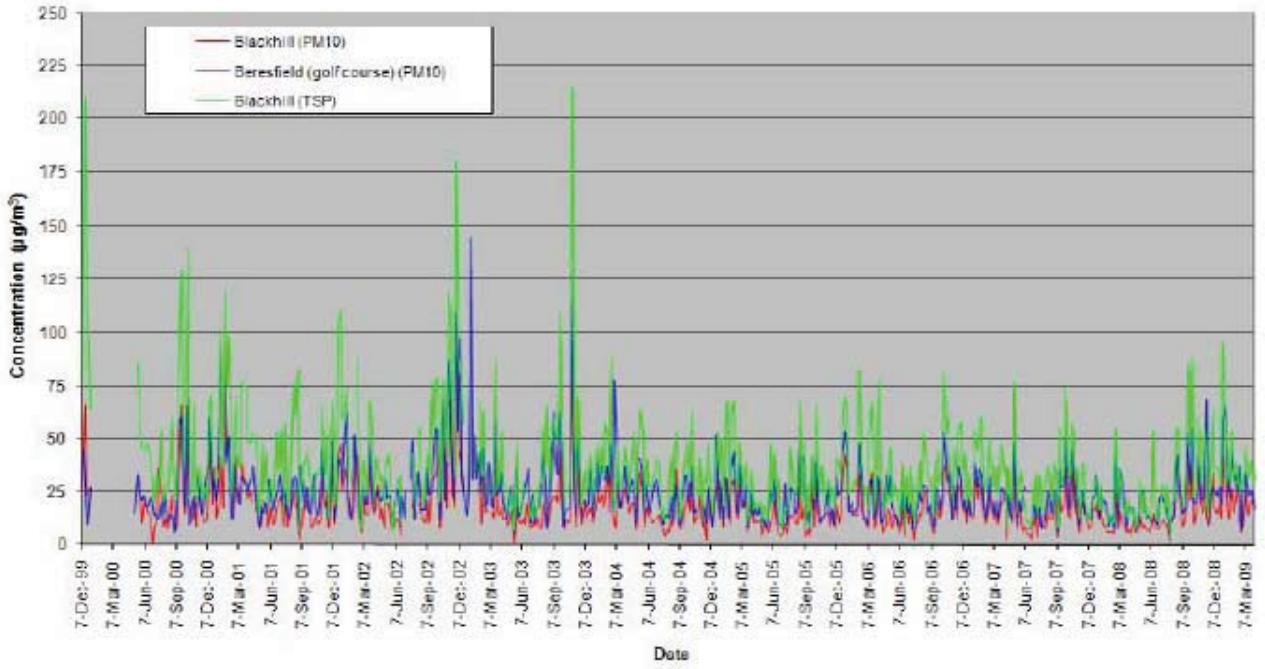


Figure 2: High Volume Air Sampling data

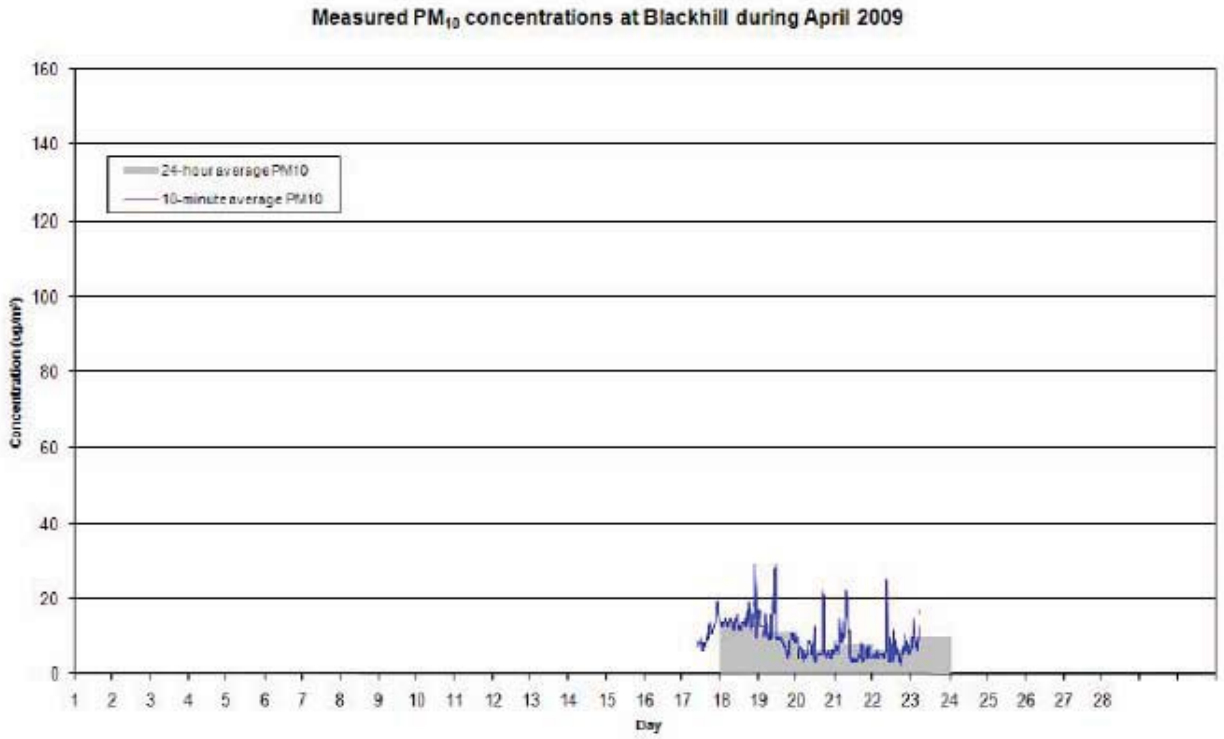


Figure 3: DustTrak sampling data, Blakchill site

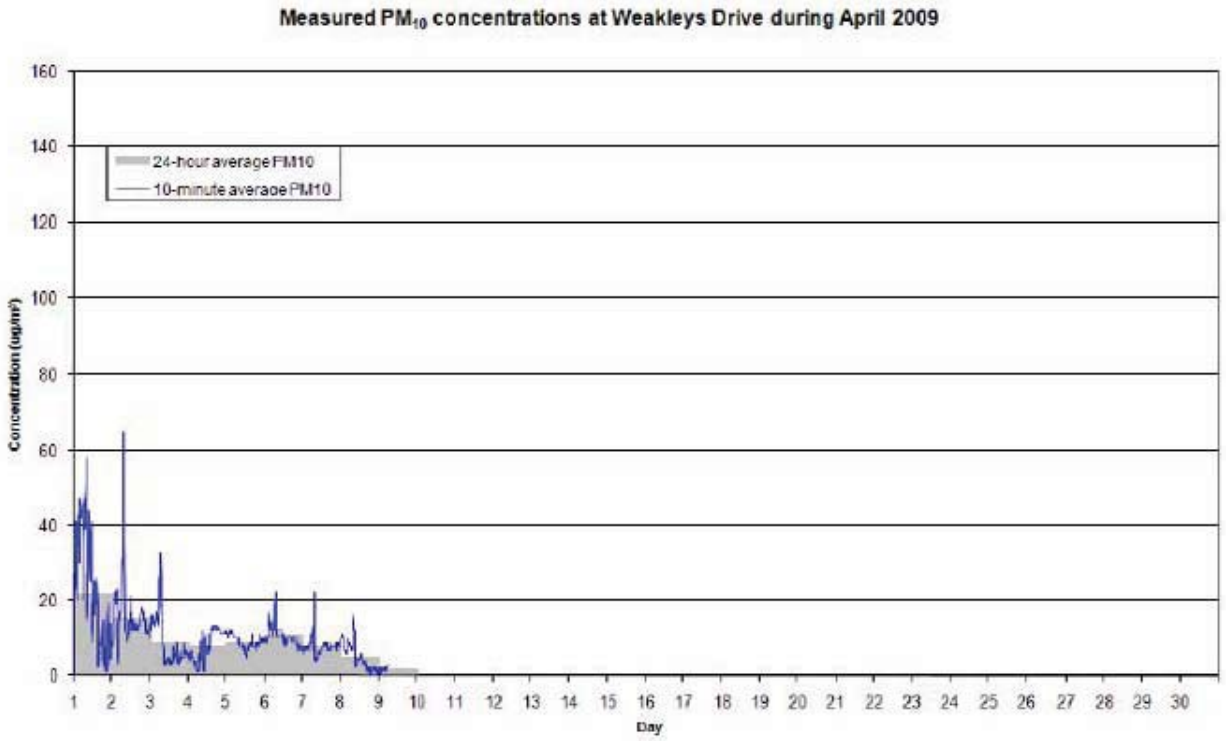


Figure 4: DustTrak sampling data, Weakleys Drive site

No Grimm monitoring was scheduled for April 2009

Figure 5: Grimm monitoring data

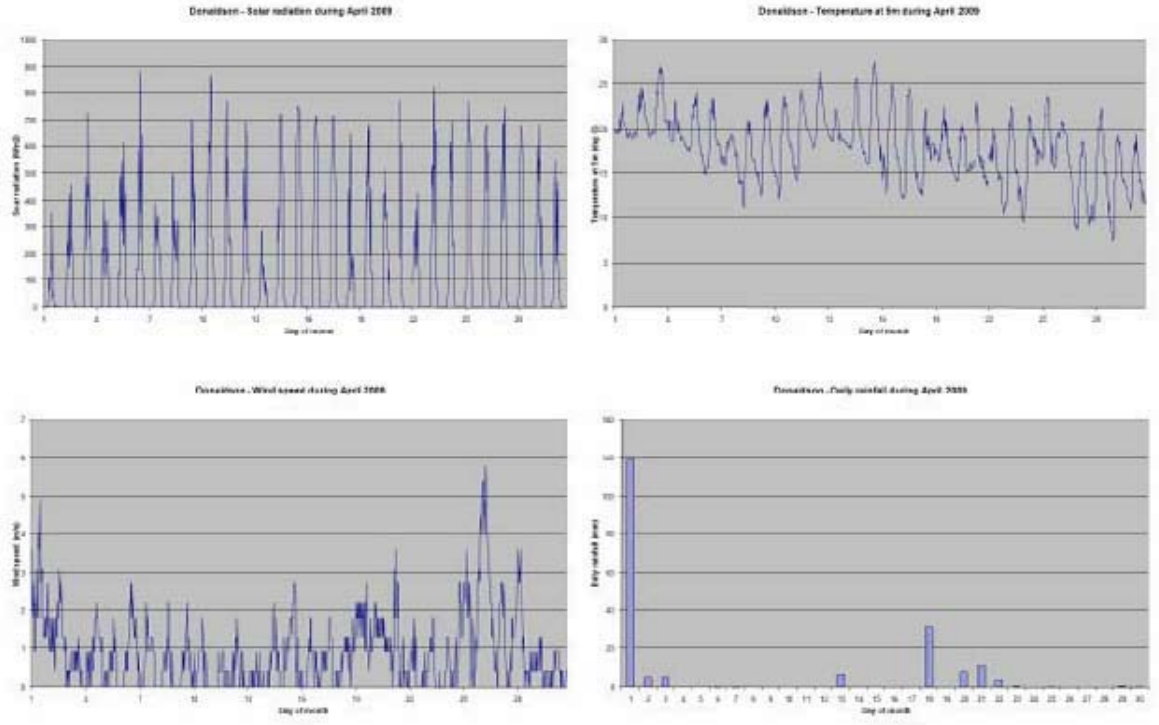


Figure 6: Meteorological conditions

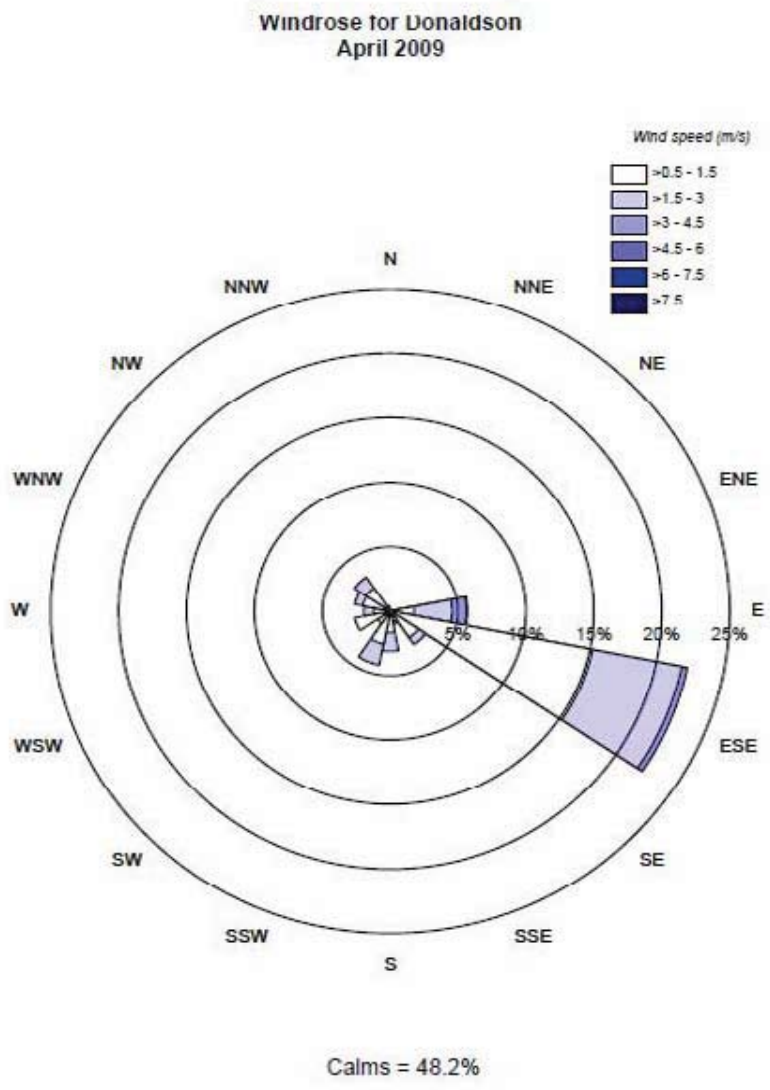


Figure 7: Windrose

DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA MAY 2009 REPORT

Donaldson Coal

Job No: 2815

August 2009

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA MAY 2009 REPORT**
JOB NUMBER:	**2815**
PREPARED FOR:	Phil Brown **DONALDSON COAL**
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson Coal operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during May 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment, Climate Change and Water (DECCW) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	Grimm (1 week per quarter)	PM_{10}, $PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- temperature
- solar radiation
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during May 2009 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for May 2009

Date	Beresfield PM_{10} (µg/m³)	Blackhill PM_{10} (µg/m³)	Blackhill TSP (µg/m³)
6/05/2009	10	7	13
12/05/2009	13	17	27
18/05/2009	14	16	37
28/05/2009	10	17	26
30/05/2009	8	7	13
Annual average	**24**	**18**	**35**

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration recorded in May 2009 was 17 µg/m³, measured on the 12th and 28th at the Blackhill site. On this occasion the measured PM_{10} concentration did not exceed the 50 µg/m³ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 µg/m³ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to May 2009 was 35 µg/m³.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 24 µg/m³ and 18 µg/m³ respectively for the 12 months to May 2009. These values are below the DECCW's annual average PM_{10} air quality criterion of 30 µg/m³.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. During the month of May, the DustTrak monitor located at the Blackhill site experienced a power failure. The DustTrak monitoring for the Blackhill site is available from the 12th to the 20th of May 2009, when the DustTrak was subject to another power failure.

Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 14th of May at 18 $\mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 12th to the 30th of May 2009. The available data show that 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was 18 $\mu g/m^3$, recorded on the 23rd of May.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for May 2009.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for May 2009 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to May 2009

Month	Monthly dust deposition rate (g/m²/month)										
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Jun-08	0.2	0.4 #	0.1	0.5	0.1 #	0.1	0.3	0.5 #	0.1	0.8	0.2
Jul-08	0.4	0.7 #	1.3 #	0.6	0.8 #	0.9	0.8	1.0	0.7	0.5	1.1
Aug-08	1.0 #	0.5 #	0.7 #	0.6 #	0.5	1.9 #	0.8 #	1.0 #	1.0 #	0.9 #	1.4
Sep-08	0.6 #	1.0 #	1.3 #	0.7 #	0.6 #	0.9 #	0.6	0.9	0.9 #	0.9 #	1.8 #
Oct-08	1.0 #	0.5 #	1.0 #	1.3 #	1.3 #	1.2	1.0 #	1.4 #	0.8 #	1.6 #	1.8 #
Nov-08	0.8 #	1.4 #	2.7 #	2.5	0.9 #	1.2 #	0.8 #	2.4 #	1.1 #	1.0 #	1.7 #
Dec-08	0.4 #	0.4 #	0.6 #	0.5 #	0.3 #	1.1 #	0.6 #	15+	0.9 #	0.7 #	1.2 #
Jan-09	1.1 #	3.0 #	1.6 #	0.8 #	0.9 #	1.4 #	0.7 #	1.5 #	0.9 #	0.9 #	5.0 +
Feb-09	0.4 #	4.4 #	1.5 #	1.1 #	0.9	1.6 #	0.8	1.2	1.4	2.5 #	1.2
Mar-09	2.8 #	5.8 #	2.7 #	2.4 #	1.9 #	2.1 #	2.5 #	2.4 #	2.3 #	5.7 #	2.7 #
Apr-09	2.0 #	0.8 #	0.8 #	0.6 #	0.6 #	3.2 #	1.1 #	1.1 #	1.0 #	0.6	0.9 #
May-09	0.6 #	1.6 #	0.8 #	2.4	0.9 #	5.6 +	1.4 #	1.1	1.3	0.7 #	1.5 #
Annual Average	**0.9**	**2.1**	**1.3**	**1.2**	**0.8**	**1.4**	**1.0**	**1.3**	**1.0**	**1.4**	**1.4**

Data supplied by Metford Laboratories. # Insects/bird droppings reported. +Invalid (excess bird droppings).

The highest dust deposition measurement recorded in May 2009 was 5.6 g/m²/month at DG6; however the accompanying laboratory report showed the sample was contaminated with bird droppings. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates for the gauges in the network were low and significantly below the amount goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in May 2009 are shown in Figure 6 and a windrose plot is shown in Figure 7

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during May. Total rainfall for the month was 125.7 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east and west. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 57.5% of the time. This is quite a high percentage and is less than the value for May 2008. The relatively large fraction of clam winds may arise from the generally forested area and the specific location of the weather station.

APPENDIX A

ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1

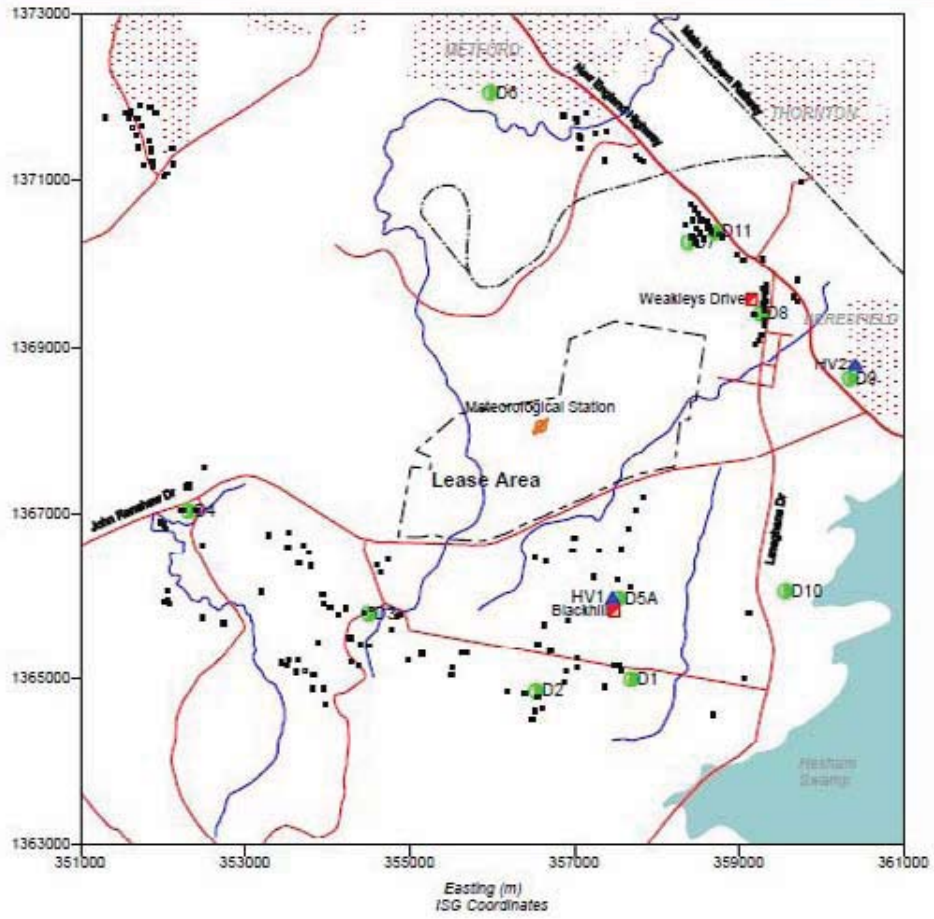
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2†	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#

May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5

 # - sample contaminated

+ - sample invalid

FIGURES



Location of Project Area

Figure 1: Project Location

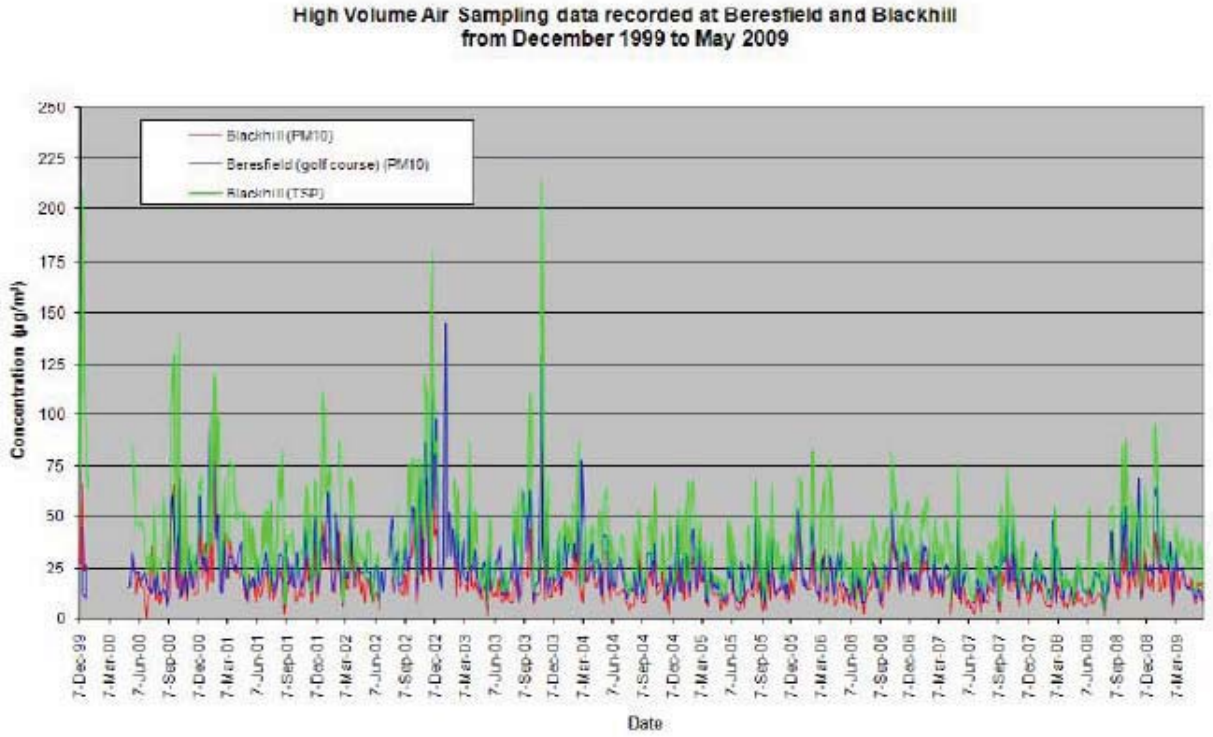


Figure 2: High Volume Air Sampling data

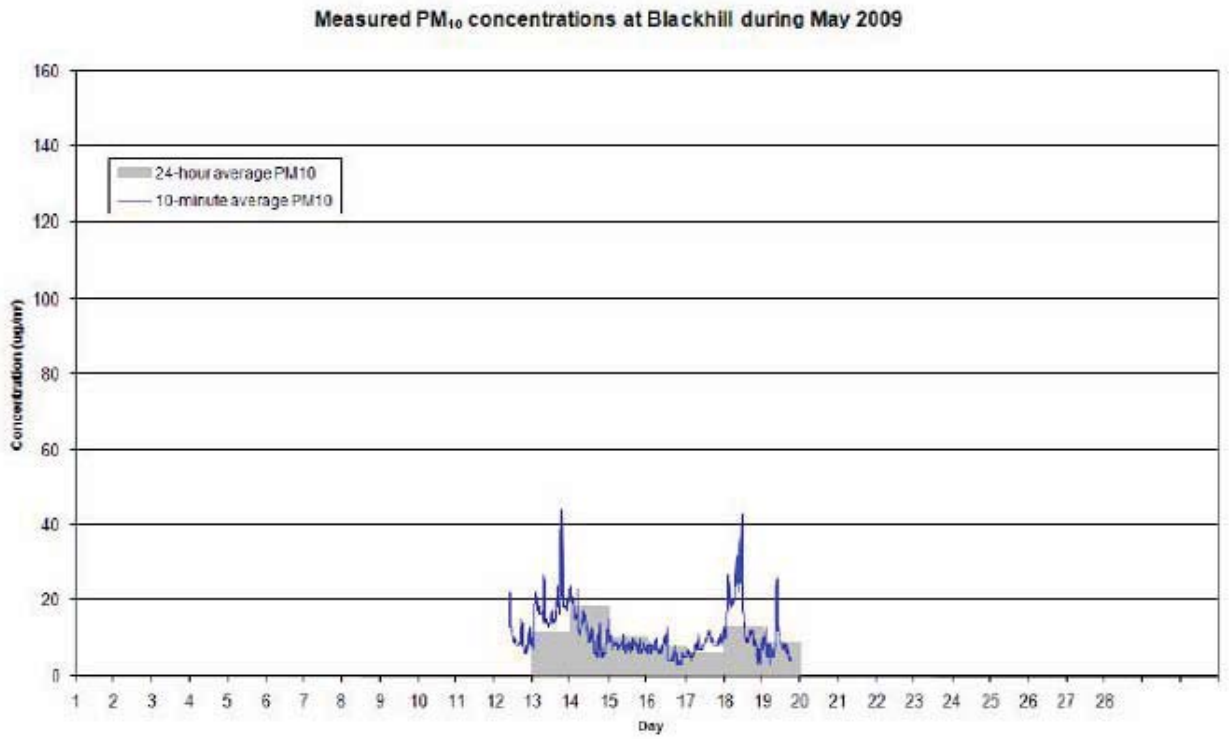


Figure 3: DustTrak sampling data, Blackhill site

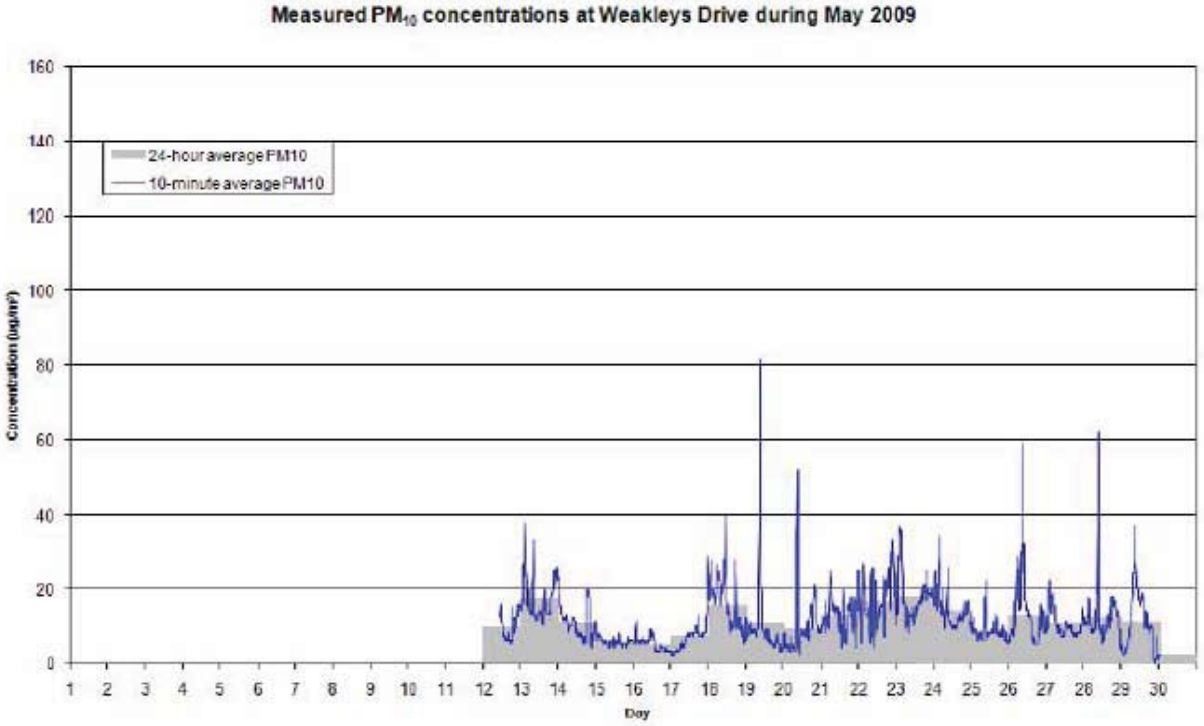


Figure 4: DustTrak sampling data, Weakleys Drive site

No Grimm monitoring was scheduled for May 2009

Figure 5: Grimm monitoring data

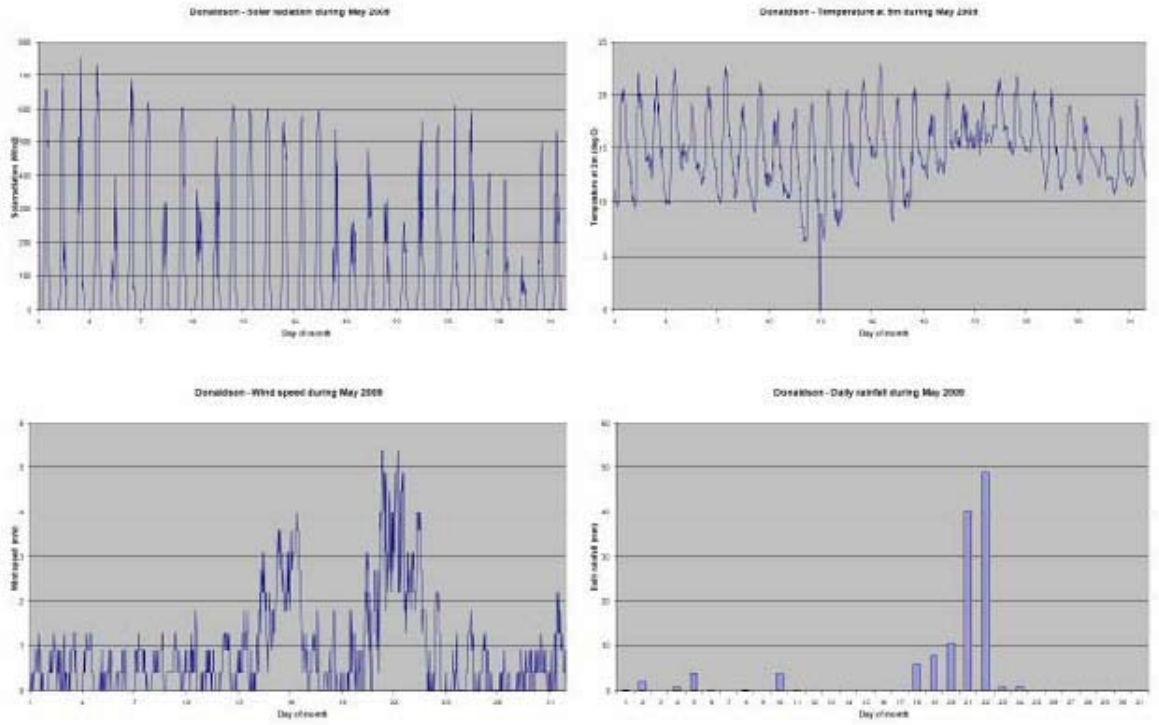


Figure 6: Meteorological conditions

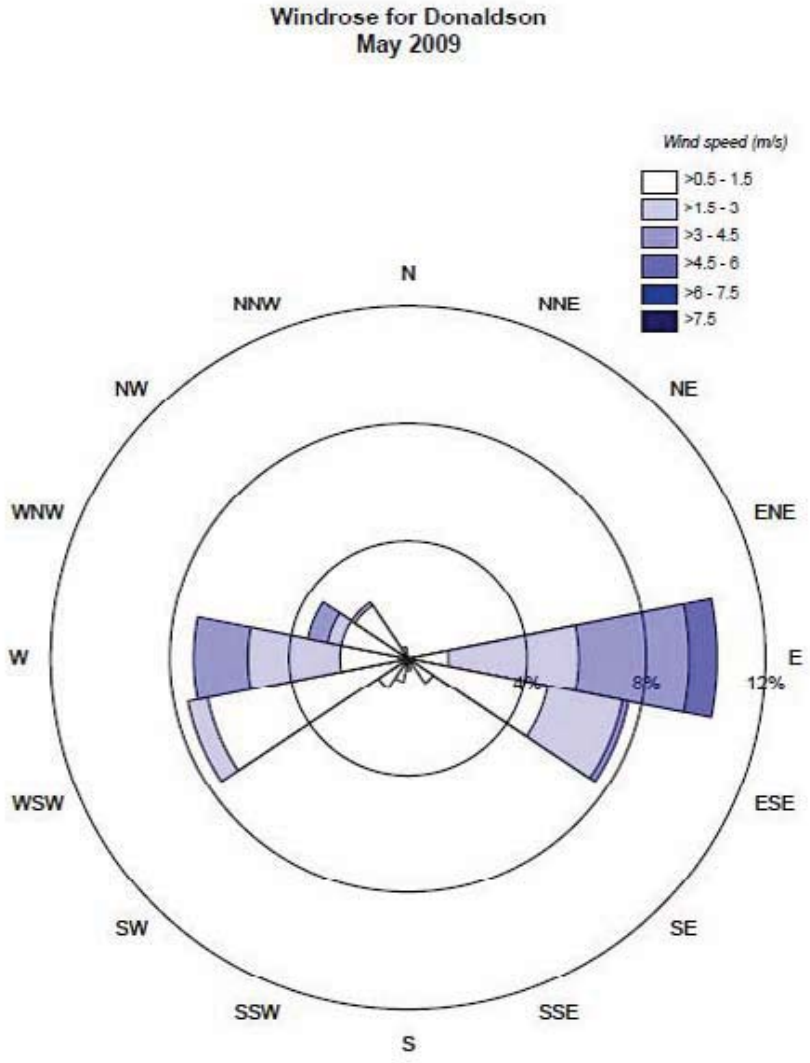


Figure 7: Windrose

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