

12 March 2019

Julie Thomas
Environmental Superintendent
Muswellbrook Coal Company Ltd

Dear Julie,

Ambient Air Monitoring - Muscle Creek Rd - February 2019

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was appointed by Muswellbrook Coal Company Ltd (MCC) to provide static real time atmospheric monitoring for Hydrogen Sulfide (H₂S) and Sulfur Dioxide (SO₂) at one location on Muscle Creek Road, Muswellbrook.

Monitoring is conducted using a GrayWolf TG-501 Toxic Gas Probe with Hydrogen Sulfide and Sulfur Dioxide sensors capable of reading in the parts per billion range. Data is recorded as 5 minute average concentrations on a tablet computer with live data then transmitted to an online account at regular intervals where it can be viewed and downloaded for further analysis by MCC and AECOM staff.

Meteorology data is obtained from the onsite MCC weather station, located approximately 6km to the northwest of the monitoring location. Wind data will be analysed each month with the aim of identifying any trends or relationships between the wind data and monitoring results. Results are reported on a monthly basis with this report presenting results for the period 1 February to 28 February 2019.

2.0 Site Location

The monitoring location on Muscle Creek Rd was chosen due to it being downwind of the mine site during the prevailing north westerly winds. Siting was performed in accordance with AS 3580.1.1 2016.



Figure 1 Muscle Creek Rd Monitoring Location

3.0 Assessment Criteria

The gaseous ambient air quality criteria in **Table 1** and **Table 2** are reproduced from the MCC Development Consent (DA 205/2002, Condition 28).

Table 1 H₂S Assessment Criteria

Analyte Averaging Period	Criteria	Unit
H ₂ S 1 Hour Average	500	ppb
H ₂ S 24 Hour Average	100	ppb

Table 2 SO₂ Assessment Criteria

Analyte Averaging Period	Criteria	Unit
SO ₂ 1 Hour Average	200	ppb
SO ₂ 24 Hour Average	80	ppb

4.0 Methodology

Monitoring is performed by a GrayWolf TG-501 Toxic Gas Probe fitted with H₂S and SO₂ sensors. The unit is enclosed in a weatherproof case with the sensor at a height of approximately 1.8m above the ground. While the sensor is designed as a passive sampler, a small fan has been installed to generate airflow past the sensor ensuring adequate air movement to provide a representative atmosphere for gas analysis.

The GrayWolf monitor measures gasses in parts per million (ppm) with the following limits of detection (LOD).

- H₂S: 0.01 ppm; and
- SO₂: 0.01 ppm.

Readings are logged in parts per million (ppm) and are converted to parts per billion (ppb) for reporting purposes, with the LOD's being 10 ppb for both H₂S and SO₂. For the calculation of 1hr and 24hr averages, where the instrument returns a zero reading, half the instrument LOD value is used (5 ppb).

5.0 Results

A summary of the H₂S and SO₂ results for February 2019 is presented in **Table 3**. **Table 4** provides a summary of 24hr (midnight to midnight) averages along with maximum 1hr averages for each day. Data is shown graphically against the relevant criteria in **Figure 2** and **Figure 3** with 1 hour data attached in **Tables 5** and **6**. There is no data reported for 14 February as the monitor was offline during this day. It should be noted that the plots present 1 hour rolling averages calculated from raw data.

Table 3 Gaseous Monitoring Results – February 2019

Parameter	Units	Hydrogen Sulfide (H ₂ S)	Sulfur Dioxide (SO ₂)
Maximum 1 Hour Average	ppb	55.0	11.3
Maximum 24 Hour Average	ppb	13.3	5.6
Number of Exceedances – 1 Hour	-	0	0
Number of Exceedances – 24 Hour	-	0	0

There were no exceedances of the applicable criteria for either H₂S or SO₂ for the February 2019 monitoring period. The data capture rates for February 2019 were 90.9% for both H₂S and SO₂.

Table 4 24hr Averages (Midnight to Midnight) and Maximum 1hr Averages – February 2019

Date	Hydrogen Sulfide (H ₂ S) (ppb)		Sulfur Dioxide (SO ₂) (ppb)	
	24hr Average	Maximum 1hr Average	24hr Average	Maximum 1hr Average
1/2/2019	5*	5*	5.1	6.3
2/2/2019	5.1	6.3	5.0	5.4
3/2/2019	6.9	17.5	5.1	5.8
4/2/2019	9.1	55.0	5.3	9.2
5/2/2019	6.0	12.5	5*	5*
6/2/2019	5.5	10.8	5.0	5.4
7/2/2019	6.5	12.5	5.1	5.8
8/2/2019	7.8	30.0	5.1	6.7
9/2/2019	5.7	15.0	5.0	5.4
10/2/2019	8.2	25.8	5.2	5.8
11/2/2019	11.5	50.8	5.2	5.8
12/2/2019	13.3	38.3	5.6	9.2
13/2/2019	5.3	5.8	5.2	5.4
14/2/2019	No Data	No Data	No Data	No Data
15/2/2019	5.1	6.3	5*	5*
16/2/2019	5.4	11.3	5.2	5.8
17/2/2019	8.5	21.3	5.4	10.0
18/2/2019	8.7	22.9	5.3	6.3
19/2/2019	7.7	16.3	5.6	11.3
20/2/2019	5*	5*	5.1	7.3
21/2/2019	5.1	6.3	5.1	6.4
22/2/2019	5.2	8.8	5.1	5.5
23/2/2019	5.0	5.4	5.1	5.8
24/2/2019	5.0	5.4	5.2	8.2
25/2/2019	5*	5*	5.2	9.4
26/2/2019	6.6	25.0	5.3	7.3
27/2/2019	5.0	5.4	5.2	6.4
28/2/2019	5.2	7.1	5.3	8.2
Criteria	100	500	80	200
Capture Rate	90.9%		90.9%	

* All raw data returned less than the instrument limit of detection. Half of the LOD value reported. Refer **Section 4.0**.

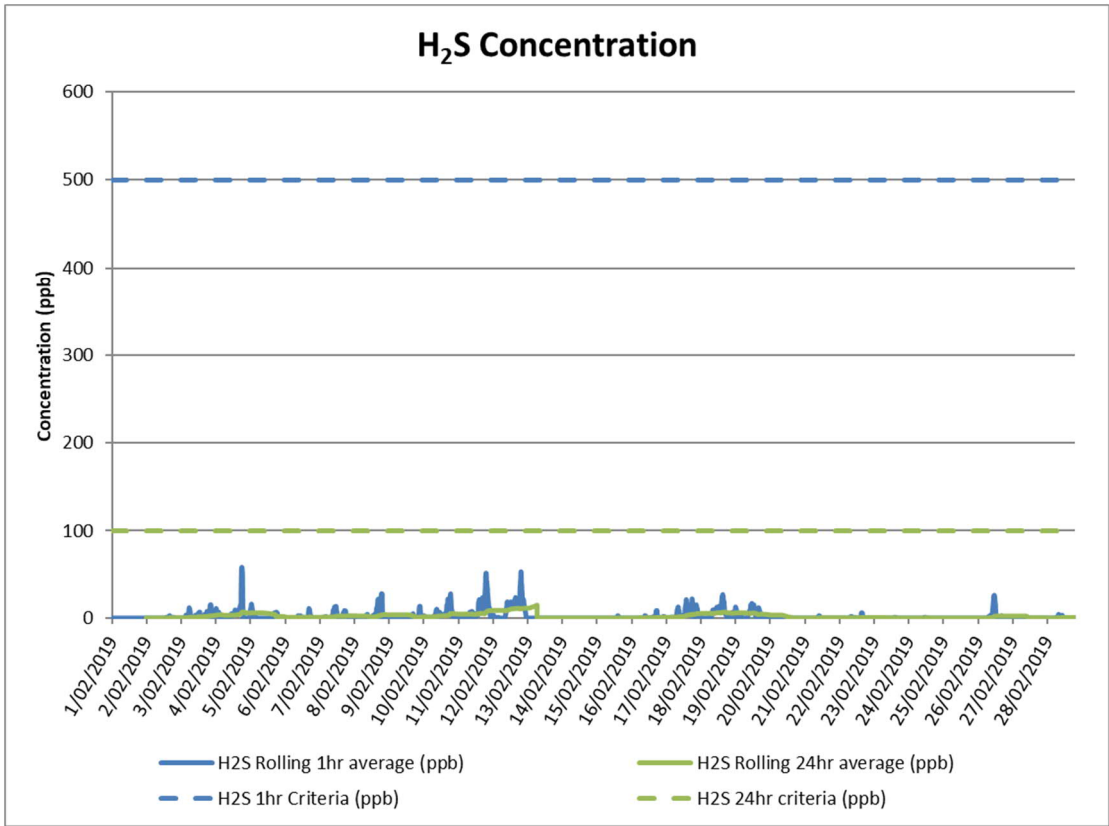


Figure 2 H₂S Concentrations – February 2019

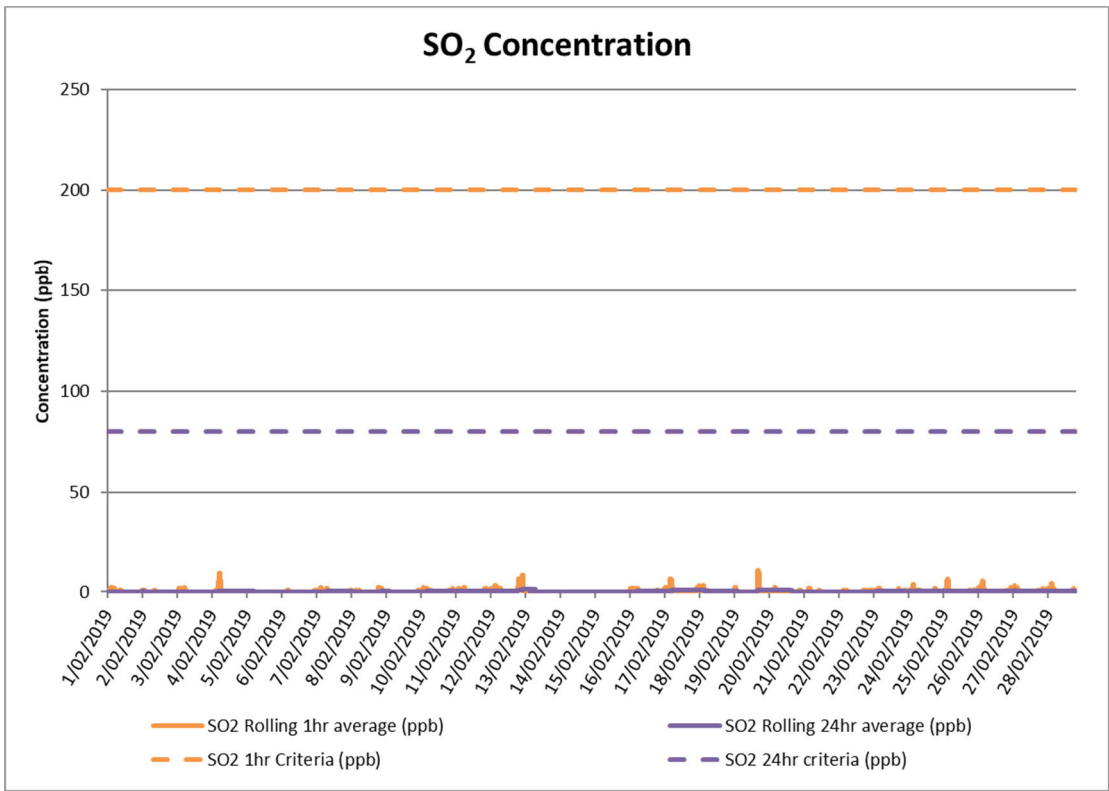


Figure 3 SO₂ Concentrations – February 2019

5.1 Meteorology

Meteorology data sourced from MCC's onsite meteorology station for February indicated winds were predominately from the South East quadrant. The average wind speed for the month was 3.65 m/s.

When winds are from the South East, the monitoring location is generally up wind of the mine site. A wind rose for this monitoring period can be found attached as **Figure 4**.

6.0 Conclusion

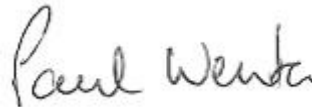
AECOM commenced ambient air quality monitoring on Muscle Creek Rd on 26 July 2017. Monitoring results for the period 1 to 28 February 2019 returned no exceedances of either the 1hr or 24hr criteria for H₂S or SO₂. Wind data obtained from the MCC meteorology station indicates that winds for this period were predominantly from the South East placing the monitoring location generally up wind of the mine site for the majority of February.

Yours faithfully,



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encl: Hourly Monitoring Data, Wind Rose

Table 5 H₂S 1hr Data (ppb) – February 2019

Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average
1/02/2019	0	5	2/02/2019	0	5	3/02/2019	0	5	4/02/2019	0	10.4	5/02/2019	0	12.5
1/02/2019	1	5	2/02/2019	1	5	3/02/2019	1	5	4/02/2019	1	8.3	5/02/2019	1	12.1
1/02/2019	2	5	2/02/2019	2	5	3/02/2019	2	5.4	4/02/2019	2	6.7	5/02/2019	2	5.8
1/02/2019	3	5	2/02/2019	3	5	3/02/2019	3	6.7	4/02/2019	3	5.4	5/02/2019	3	5.8
1/02/2019	4	5	2/02/2019	4	5	3/02/2019	4	5.8	4/02/2019	4	6.7	5/02/2019	4	5
1/02/2019	5	5	2/02/2019	5	5	3/02/2019	5	12.5	4/02/2019	5	5.8	5/02/2019	5	5
1/02/2019	6	5	2/02/2019	6	5	3/02/2019	6	5	4/02/2019	6	5	5/02/2019	6	5
1/02/2019	7	5	2/02/2019	7	5	3/02/2019	7	5	4/02/2019	7	5	5/02/2019	7	5
1/02/2019	8	5	2/02/2019	8	5	3/02/2019	8	5	4/02/2019	8	5	5/02/2019	8	5
1/02/2019	9	5	2/02/2019	9	5	3/02/2019	9	6.3	4/02/2019	9	5	5/02/2019	9	5
1/02/2019	10	5	2/02/2019	10	5	3/02/2019	10	5.4	4/02/2019	10	7.1	5/02/2019	10	5
1/02/2019	11	5	2/02/2019	11	5	3/02/2019	11	7.1	4/02/2019	11	6.7	5/02/2019	11	5
1/02/2019	12	5	2/02/2019	12	5	3/02/2019	12	10.0	4/02/2019	12	7.1	5/02/2019	12	5
1/02/2019	13	5	2/02/2019	13	5.4	3/02/2019	13	5	4/02/2019	13	10.8	5/02/2019	13	5
1/02/2019	14	5	2/02/2019	14	5	3/02/2019	14	5.4	4/02/2019	14	7.5	5/02/2019	14	5
1/02/2019	15	5	2/02/2019	15	6.3	3/02/2019	15	5.4	4/02/2019	15	9.2	5/02/2019	15	5
1/02/2019	16	5	2/02/2019	16	5	3/02/2019	16	7.9	4/02/2019	16	10.4	5/02/2019	16	7.5
1/02/2019	17	5	2/02/2019	17	5	3/02/2019	17	7.1	4/02/2019	17	16.3	5/02/2019	17	7.9
1/02/2019	18	5	2/02/2019	18	5.4	3/02/2019	18	7.9	4/02/2019	18	55.0	5/02/2019	18	8.3
1/02/2019	19	5	2/02/2019	19	5	3/02/2019	19	5	4/02/2019	19	5	5/02/2019	19	5
1/02/2019	20	5	2/02/2019	20	5	3/02/2019	20	17.5	4/02/2019	20	5	5/02/2019	20	5
1/02/2019	21	5	2/02/2019	21	5	3/02/2019	21	5	4/02/2019	21	5	5/02/2019	21	5
1/02/2019	22	5	2/02/2019	22	5	3/02/2019	22	6.3	4/02/2019	22	5	5/02/2019	22	5
1/02/2019	23	5	2/02/2019	23	5	3/02/2019	23	8.3	4/02/2019	23	5.4	5/02/2019	23	5
Maximum		5			6.3			17.5			55.0			12.5

Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average
6/02/2019	0	5	7/02/2019	0	5	8/02/2019	0	5	9/02/2019	0	5	10/02/2019	0	5
6/02/2019	1	5	7/02/2019	1	5	8/02/2019	1	5	9/02/2019	1	5	10/02/2019	1	6.3
6/02/2019	2	5	7/02/2019	2	5.4	8/02/2019	2	5	9/02/2019	2	5	10/02/2019	2	5
6/02/2019	3	5	7/02/2019	3	5.4	8/02/2019	3	5	9/02/2019	3	5	10/02/2019	3	5
6/02/2019	4	5	7/02/2019	4	5.4	8/02/2019	4	5	9/02/2019	4	5	10/02/2019	4	5
6/02/2019	5	5	7/02/2019	5	5.4	8/02/2019	5	5.4	9/02/2019	5	5	10/02/2019	5	5
6/02/2019	6	5	7/02/2019	6	5	8/02/2019	6	5.5	9/02/2019	6	5	10/02/2019	6	5
6/02/2019	7	5	7/02/2019	7	5	8/02/2019	7	5	9/02/2019	7	5	10/02/2019	7	5
6/02/2019	8	5	7/02/2019	8	5	8/02/2019	8	5	9/02/2019	8	5	10/02/2019	8	5.8
6/02/2019	9	6.3	7/02/2019	9	6.7	8/02/2019	9	7.1	9/02/2019	9	5	10/02/2019	9	8.3
6/02/2019	10	5.8	7/02/2019	10	12.1	8/02/2019	10	5	9/02/2019	10	5	10/02/2019	10	10.0
6/02/2019	11	5.4	7/02/2019	11	12.5	8/02/2019	11	5	9/02/2019	11	6.3	10/02/2019	11	8.3
6/02/2019	12	5	7/02/2019	12	10.8	8/02/2019	12	5	9/02/2019	12	5	10/02/2019	12	8.8
6/02/2019	13	5.4	7/02/2019	13	5.8	8/02/2019	13	5.8	9/02/2019	13	5	10/02/2019	13	5.8
6/02/2019	14	5	7/02/2019	14	5	8/02/2019	14	6.7	9/02/2019	14	6.3	10/02/2019	14	6.3
6/02/2019	15	5	7/02/2019	15	5.8	8/02/2019	15	7.5	9/02/2019	15	5.4	10/02/2019	15	7.1
6/02/2019	16	6.7	7/02/2019	16	6.3	8/02/2019	16	13.3	9/02/2019	16	6.7	10/02/2019	16	7.9
6/02/2019	17	10.8	7/02/2019	17	9.2	8/02/2019	17	21.7	9/02/2019	17	6.7	10/02/2019	17	16.7
6/02/2019	18	5.8	7/02/2019	18	9.6	8/02/2019	18	13.8	9/02/2019	18	6.7	10/02/2019	18	17.5
6/02/2019	19	5	7/02/2019	19	5.4	8/02/2019	19	30.0	9/02/2019	19	5	10/02/2019	19	25.8
6/02/2019	20	5	7/02/2019	20	5	8/02/2019	20	5	9/02/2019	20	5	10/02/2019	20	11.3
6/02/2019	21	5	7/02/2019	21	5	8/02/2019	21	5.4	9/02/2019	21	5	10/02/2019	21	5.8
6/02/2019	22	5	7/02/2019	22	5	8/02/2019	22	5	9/02/2019	22	15.0	10/02/2019	22	5
6/02/2019	23	5	7/02/2019	23	5.4	8/02/2019	23	5	9/02/2019	23	5	10/02/2019	23	5
Maximum		10.8			12.5			30.0			15.0			25.8

Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average
11/02/2019	0	5	12/02/2019	0	5.8	13/02/2019	0	5.8	14/02/2019	0	No Data	15/02/2019	0	No Data
11/02/2019	1	5.4	12/02/2019	1	6.3	13/02/2019	1	5	14/02/2019	1	No Data	15/02/2019	1	No Data
11/02/2019	2	5	12/02/2019	2	5.4	13/02/2019	2	5	14/02/2019	2	No Data	15/02/2019	2	No Data
11/02/2019	3	5	12/02/2019	3	5	13/02/2019	3	No Data	14/02/2019	3	No Data	15/02/2019	3	No Data
11/02/2019	4	5	12/02/2019	4	5	13/02/2019	4	No Data	14/02/2019	4	No Data	15/02/2019	4	No Data
11/02/2019	5	5	12/02/2019	5	5.4	13/02/2019	5	No Data	14/02/2019	5	No Data	15/02/2019	5	No Data
11/02/2019	6	5	12/02/2019	6	5	13/02/2019	6	No Data	14/02/2019	6	No Data	15/02/2019	6	No Data
11/02/2019	7	5	12/02/2019	7	5	13/02/2019	7	No Data	14/02/2019	7	No Data	15/02/2019	7	No Data
11/02/2019	8	6.3	12/02/2019	8	5	13/02/2019	8	No Data	14/02/2019	8	No Data	15/02/2019	8	No Data
11/02/2019	9	7.5	12/02/2019	9	5	13/02/2019	9	No Data	14/02/2019	9	No Data	15/02/2019	9	No Data
11/02/2019	10	10.4	12/02/2019	10	7.9	13/02/2019	10	No Data	14/02/2019	10	No Data	15/02/2019	10	No Data
11/02/2019	11	5.8	12/02/2019	11	18.3	13/02/2019	11	No Data	14/02/2019	11	No Data	15/02/2019	11	No Data
11/02/2019	12	8.3	12/02/2019	12	13.8	13/02/2019	12	No Data	14/02/2019	12	No Data	15/02/2019	12	No Data
11/02/2019	13	7.1	12/02/2019	13	15.8	13/02/2019	13	No Data	14/02/2019	13	No Data	15/02/2019	13	5
11/02/2019	14	6.3	12/02/2019	14	15.0	13/02/2019	14	No Data	14/02/2019	14	No Data	15/02/2019	14	5
11/02/2019	15	19.6	12/02/2019	15	16.7	13/02/2019	15	No Data	14/02/2019	15	No Data	15/02/2019	15	5
11/02/2019	16	12.5	12/02/2019	16	20.0	13/02/2019	16	No Data	14/02/2019	16	No Data	15/02/2019	16	6.3
11/02/2019	17	14.2	12/02/2019	17	19.2	13/02/2019	17	No Data	14/02/2019	17	No Data	15/02/2019	17	5
11/02/2019	18	18.3	12/02/2019	18	19.2	13/02/2019	18	No Data	14/02/2019	18	No Data	15/02/2019	18	5
11/02/2019	19	11.3	12/02/2019	19	11.7	13/02/2019	19	No Data	14/02/2019	19	No Data	15/02/2019	19	5
11/02/2019	20	50.8	12/02/2019	20	37.5	13/02/2019	20	No Data	14/02/2019	20	No Data	15/02/2019	20	5
11/02/2019	21	34.2	12/02/2019	21	38.3	13/02/2019	21	No Data	14/02/2019	21	No Data	15/02/2019	21	5
11/02/2019	22	15.0	12/02/2019	22	19.2	13/02/2019	22	No Data	14/02/2019	22	No Data	15/02/2019	22	5
11/02/2019	23	6.7	12/02/2019	23	12.9	13/02/2019	23	No Data	14/02/2019	23	No Data	15/02/2019	23	5
Maximum		50.8			38.3			5.8			No Data			6.3

Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average
16/02/2019	0	5	17/02/2019	0	5.8	18/02/2019	0	7.1	19/02/2019	0	7.9	20/02/2019	0	5
16/02/2019	1	5	17/02/2019	1	5	18/02/2019	1	5.8	19/02/2019	1	5.8	20/02/2019	1	5
16/02/2019	2	5	17/02/2019	2	5	18/02/2019	2	7.1	19/02/2019	2	12.9	20/02/2019	2	5
16/02/2019	3	5	17/02/2019	3	5	18/02/2019	3	5.4	19/02/2019	3	6.3	20/02/2019	3	5
16/02/2019	4	5	17/02/2019	4	5	18/02/2019	4	5	19/02/2019	4	5	20/02/2019	4	5
16/02/2019	5	5	17/02/2019	5	5	18/02/2019	5	5	19/02/2019	5	5	20/02/2019	5	5
16/02/2019	6	5	17/02/2019	6	5.5	18/02/2019	6	5	19/02/2019	6	5.5	20/02/2019	6	5
16/02/2019	7	5	17/02/2019	7	5	18/02/2019	7	5	19/02/2019	7	5.4	20/02/2019	7	5
16/02/2019	8	5	17/02/2019	8	5	18/02/2019	8	7.1	19/02/2019	8	5	20/02/2019	8	5
16/02/2019	9	5	17/02/2019	9	7.5	18/02/2019	9	5	19/02/2019	9	5	20/02/2019	9	5
16/02/2019	10	5	17/02/2019	10	15.4	18/02/2019	10	10.0	19/02/2019	10	5	20/02/2019	10	5
16/02/2019	11	6.7	17/02/2019	11	6.3	18/02/2019	11	9.2	19/02/2019	11	6.3	20/02/2019	11	5
16/02/2019	12	5	17/02/2019	12	6.3	18/02/2019	12	8.8	19/02/2019	12	10.0	20/02/2019	12	5
16/02/2019	13	5	17/02/2019	13	5.8	18/02/2019	13	12.5	19/02/2019	13	16.3	20/02/2019	13	5
16/02/2019	14	5	17/02/2019	14	6.7	18/02/2019	14	10.4	19/02/2019	14	9.6	20/02/2019	14	5
16/02/2019	15	5	17/02/2019	15	13.8	18/02/2019	15	13.8	19/02/2019	15	15.4	20/02/2019	15	5
16/02/2019	16	5.4	17/02/2019	16	18.8	18/02/2019	16	11.7	19/02/2019	16	7.5	20/02/2019	16	5
16/02/2019	17	5.4	17/02/2019	17	8.3	18/02/2019	17	22.9	19/02/2019	17	9.0	20/02/2019	17	5
16/02/2019	18	5.4	17/02/2019	18	12.9	18/02/2019	18	20.0	19/02/2019	18	11.7	20/02/2019	18	5
16/02/2019	19	11.3	17/02/2019	19	7.1	18/02/2019	19	8.8	19/02/2019	19	9.6	20/02/2019	19	5
16/02/2019	20	5	17/02/2019	20	21.3	18/02/2019	20	5	19/02/2019	20	6.7	20/02/2019	20	5
16/02/2019	21	5	17/02/2019	21	5	18/02/2019	21	5	19/02/2019	21	5	20/02/2019	21	5
16/02/2019	22	5.4	17/02/2019	22	7.1	18/02/2019	22	7.9	19/02/2019	22	5	20/02/2019	22	5
16/02/2019	23	5	17/02/2019	23	14.6	18/02/2019	23	5	19/02/2019	23	5	20/02/2019	23	5
Maximum		11.3			21.3			22.9			16.3			5

Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average
21/02/2019	0	5	22/02/2019	0	5	23/02/2019	0	5	24/02/2019	0	5	25/02/2019	0	5
21/02/2019	1	5	22/02/2019	1	5	23/02/2019	1	5	24/02/2019	1	5	25/02/2019	1	5
21/02/2019	2	5	22/02/2019	2	5	23/02/2019	2	5	24/02/2019	2	5	25/02/2019	2	5
21/02/2019	3	5	22/02/2019	3	5	23/02/2019	3	5	24/02/2019	3	5	25/02/2019	3	5
21/02/2019	4	5	22/02/2019	4	5	23/02/2019	4	5	24/02/2019	4	5	25/02/2019	4	5
21/02/2019	5	5	22/02/2019	5	5	23/02/2019	5	5	24/02/2019	5	5	25/02/2019	5	5
21/02/2019	6	5	22/02/2019	6	5	23/02/2019	6	5	24/02/2019	6	5	25/02/2019	6	5
21/02/2019	7	5	22/02/2019	7	5	23/02/2019	7	5	24/02/2019	7	5	25/02/2019	7	5
21/02/2019	8	5	22/02/2019	8	5	23/02/2019	8	5	24/02/2019	8	5	25/02/2019	8	5
21/02/2019	9	5	22/02/2019	9	5	23/02/2019	9	5	24/02/2019	9	5	25/02/2019	9	5
21/02/2019	10	5	22/02/2019	10	5	23/02/2019	10	5	24/02/2019	10	5	25/02/2019	10	5
21/02/2019	11	5	22/02/2019	11	5.8	23/02/2019	11	5	24/02/2019	11	5	25/02/2019	11	5
21/02/2019	12	6.3	22/02/2019	12	5	23/02/2019	12	5	24/02/2019	12	5	25/02/2019	12	5
21/02/2019	13	5.4	22/02/2019	13	5.4	23/02/2019	13	5	24/02/2019	13	5	25/02/2019	13	5
21/02/2019	14	5	22/02/2019	14	5	23/02/2019	14	5	24/02/2019	14	5	25/02/2019	14	5
21/02/2019	15	5	22/02/2019	15	5	23/02/2019	15	5	24/02/2019	15	5.4	25/02/2019	15	5
21/02/2019	16	5	22/02/2019	16	5	23/02/2019	16	5	24/02/2019	16	5	25/02/2019	16	5
21/02/2019	17	5	22/02/2019	17	5	23/02/2019	17	5	24/02/2019	17	5	25/02/2019	17	5
21/02/2019	18	5	22/02/2019	18	8.8	23/02/2019	18	5.4	24/02/2019	18	5	25/02/2019	18	5
21/02/2019	19	5	22/02/2019	19	5.4	23/02/2019	19	5	24/02/2019	19	5	25/02/2019	19	5
21/02/2019	20	5	22/02/2019	20	5	23/02/2019	20	5	24/02/2019	20	5	25/02/2019	20	5
21/02/2019	21	5	22/02/2019	21	5	23/02/2019	21	5	24/02/2019	21	5	25/02/2019	21	5
21/02/2019	22	5	22/02/2019	22	5	23/02/2019	22	5	24/02/2019	22	5	25/02/2019	22	5
21/02/2019	23	5	22/02/2019	23	5	23/02/2019	23	5	24/02/2019	23	5	25/02/2019	23	5
Maximum		6.3			8.8			5.4			5.4			5

Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average	Date	Hour	H ₂ S 1hr Average
26/02/2019	0	5	27/02/2019	0	5	28/02/2019	0	5						
26/02/2019	1	5	27/02/2019	1	5	28/02/2019	1	5						
26/02/2019	2	5	27/02/2019	2	5	28/02/2019	2	5						
26/02/2019	3	5	27/02/2019	3	5	28/02/2019	3	5						
26/02/2019	4	5	27/02/2019	4	5.4	28/02/2019	4	5						
26/02/2019	5	5	27/02/2019	5	5	28/02/2019	5	5						
26/02/2019	6	5	27/02/2019	6	5	28/02/2019	6	5						
26/02/2019	7	5	27/02/2019	7	5	28/02/2019	7	5						
26/02/2019	8	5	27/02/2019	8	5	28/02/2019	8	5						
26/02/2019	9	5	27/02/2019	9	5	28/02/2019	9	5						
26/02/2019	10	5	27/02/2019	10	5	28/02/2019	10	5.4						
26/02/2019	11	5.8	27/02/2019	11	5	28/02/2019	11	5.4						
26/02/2019	12	6.3	27/02/2019	12	5	28/02/2019	12	7.1						
26/02/2019	13	6.3	27/02/2019	13	5	28/02/2019	13	5.4						
26/02/2019	14	16.3	27/02/2019	14	5.4	28/02/2019	14	5.8						
26/02/2019	15	25.0	27/02/2019	15	5	28/02/2019	15	6.3						
26/02/2019	16	7.5	27/02/2019	16	5	28/02/2019	16	5						
26/02/2019	17	5	27/02/2019	17	5	28/02/2019	17	5						
26/02/2019	18	5	27/02/2019	18	5	28/02/2019	18	5						
26/02/2019	19	5	27/02/2019	19	5	28/02/2019	19	5						
26/02/2019	20	6.3	27/02/2019	20	5	28/02/2019	20	5						
26/02/2019	21	5.4	27/02/2019	21	5	28/02/2019	21	5						
26/02/2019	22	5	27/02/2019	22	5	28/02/2019	22	5						
26/02/2019	23	5	27/02/2019	23	5	28/02/2019	23	5						
Maximum		25.0			5.4			7.1						

Table 6 SO₂ 1hr Data (ppb) – February 2019

Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average
1/02/2019	0	5.4	2/02/2019	0	5.4	3/02/2019	0	5	4/02/2019	0	5	5/02/2019	0	5
1/02/2019	1	5	2/02/2019	1	5	3/02/2019	1	5.8	4/02/2019	1	5	5/02/2019	1	5
1/02/2019	2	6.3	2/02/2019	2	5	3/02/2019	2	5	4/02/2019	2	5	5/02/2019	2	5
1/02/2019	3	5	2/02/2019	3	5	3/02/2019	3	5	4/02/2019	3	5.4	5/02/2019	3	5
1/02/2019	4	5.8	2/02/2019	4	5	3/02/2019	4	5.4	4/02/2019	4	6.7	5/02/2019	4	5
1/02/2019	5	5	2/02/2019	5	5	3/02/2019	5	5.8	4/02/2019	5	9.2	5/02/2019	5	5
1/02/2019	6	5	2/02/2019	6	5	3/02/2019	6	5	4/02/2019	6	6.4	5/02/2019	6	5
1/02/2019	7	5	2/02/2019	7	5	3/02/2019	7	5	4/02/2019	7	5	5/02/2019	7	5
1/02/2019	8	5.4	2/02/2019	8	5.4	3/02/2019	8	5	4/02/2019	8	5	5/02/2019	8	5
1/02/2019	9	5	2/02/2019	9	5	3/02/2019	9	5	4/02/2019	9	5	5/02/2019	9	5
1/02/2019	10	5	2/02/2019	10	5	3/02/2019	10	5	4/02/2019	10	5	5/02/2019	10	5
1/02/2019	11	5	2/02/2019	11	5	3/02/2019	11	5	4/02/2019	11	5	5/02/2019	11	5
1/02/2019	12	5	2/02/2019	12	5	3/02/2019	12	5	4/02/2019	12	5	5/02/2019	12	5
1/02/2019	13	5	2/02/2019	13	5	3/02/2019	13	5	4/02/2019	13	5	5/02/2019	13	5
1/02/2019	14	5	2/02/2019	14	5	3/02/2019	14	5	4/02/2019	14	5	5/02/2019	14	5
1/02/2019	15	5	2/02/2019	15	5	3/02/2019	15	5	4/02/2019	15	5	5/02/2019	15	5
1/02/2019	16	5	2/02/2019	16	5	3/02/2019	16	5	4/02/2019	16	5	5/02/2019	16	5
1/02/2019	17	5	2/02/2019	17	5	3/02/2019	17	5	4/02/2019	17	5	5/02/2019	17	5
1/02/2019	18	5	2/02/2019	18	5	3/02/2019	18	5	4/02/2019	18	5	5/02/2019	18	5
1/02/2019	19	5	2/02/2019	19	5	3/02/2019	19	5	4/02/2019	19	5	5/02/2019	19	5
1/02/2019	20	5	2/02/2019	20	5	3/02/2019	20	5	4/02/2019	20	5	5/02/2019	20	5
1/02/2019	21	5	2/02/2019	21	5	3/02/2019	21	5	4/02/2019	21	5	5/02/2019	21	5
1/02/2019	22	5	2/02/2019	22	5	3/02/2019	22	5	4/02/2019	22	5	5/02/2019	22	5
1/02/2019	23	5.4	2/02/2019	23	5	3/02/2019	23	5	4/02/2019	23	5	5/02/2019	23	5
Maximum		6.3			5.4			5.8			9.2			5

Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average
6/02/2019	0	5	7/02/2019	0	5	8/02/2019	0	5	9/02/2019	0	5	10/02/2019	0	5
6/02/2019	1	5	7/02/2019	1	5	8/02/2019	1	5	9/02/2019	1	5	10/02/2019	1	5.4
6/02/2019	2	5	7/02/2019	2	5.4	8/02/2019	2	5	9/02/2019	2	5	10/02/2019	2	5.8
6/02/2019	3	5	7/02/2019	3	5.8	8/02/2019	3	5.4	9/02/2019	3	5	10/02/2019	3	5.4
6/02/2019	4	5.4	7/02/2019	4	5.4	8/02/2019	4	5	9/02/2019	4	5	10/02/2019	4	5
6/02/2019	5	5	7/02/2019	5	5	8/02/2019	5	5.4	9/02/2019	5	5	10/02/2019	5	5.8
6/02/2019	6	5	7/02/2019	6	5	8/02/2019	6	5	9/02/2019	6	5	10/02/2019	6	5.5
6/02/2019	7	5	7/02/2019	7	5.8	8/02/2019	7	5	9/02/2019	7	5	10/02/2019	7	5.4
6/02/2019	8	5	7/02/2019	8	5	8/02/2019	8	5	9/02/2019	8	5	10/02/2019	8	5
6/02/2019	9	5	7/02/2019	9	5	8/02/2019	9	5	9/02/2019	9	5	10/02/2019	9	5
6/02/2019	10	5	7/02/2019	10	5	8/02/2019	10	5	9/02/2019	10	5	10/02/2019	10	5
6/02/2019	11	5	7/02/2019	11	5	8/02/2019	11	5	9/02/2019	11	5	10/02/2019	11	5
6/02/2019	12	5	7/02/2019	12	5	8/02/2019	12	5	9/02/2019	12	5	10/02/2019	12	5
6/02/2019	13	5	7/02/2019	13	5	8/02/2019	13	5	9/02/2019	13	5	10/02/2019	13	5
6/02/2019	14	5	7/02/2019	14	5	8/02/2019	14	5	9/02/2019	14	5	10/02/2019	14	5
6/02/2019	15	5	7/02/2019	15	5	8/02/2019	15	5	9/02/2019	15	5	10/02/2019	15	5
6/02/2019	16	5	7/02/2019	16	5	8/02/2019	16	5	9/02/2019	16	5	10/02/2019	16	5
6/02/2019	17	5	7/02/2019	17	5	8/02/2019	17	5	9/02/2019	17	5	10/02/2019	17	5
6/02/2019	18	5	7/02/2019	18	5	8/02/2019	18	5	9/02/2019	18	5	10/02/2019	18	5
6/02/2019	19	5	7/02/2019	19	5	8/02/2019	19	6.7	9/02/2019	19	5	10/02/2019	19	5
6/02/2019	20	5	7/02/2019	20	5	8/02/2019	20	5	9/02/2019	20	5	10/02/2019	20	5.4
6/02/2019	21	5	7/02/2019	21	5	8/02/2019	21	5.8	9/02/2019	21	5	10/02/2019	21	5
6/02/2019	22	5	7/02/2019	22	5	8/02/2019	22	5	9/02/2019	22	5	10/02/2019	22	5.4
6/02/2019	23	5.4	7/02/2019	23	5.4	8/02/2019	23	5	9/02/2019	23	5.4	10/02/2019	23	5.4
Maximum		5.4			5.8			6.7			5.4			5.8

Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average
11/02/2019	0	5.4	12/02/2019	0	5	13/02/2019	0	5.4	14/02/2019	0	No Data	15/02/2019	0	No Data
11/02/2019	1	5	12/02/2019	1	5.4	13/02/2019	1	5	14/02/2019	1	No Data	15/02/2019	1	No Data
11/02/2019	2	5	12/02/2019	2	5.8	13/02/2019	2	5	14/02/2019	2	No Data	15/02/2019	2	No Data
11/02/2019	3	5.8	12/02/2019	3	5.4	13/02/2019	3	No Data	14/02/2019	3	No Data	15/02/2019	3	No Data
11/02/2019	4	5.4	12/02/2019	4	5.8	13/02/2019	4	No Data	14/02/2019	4	No Data	15/02/2019	4	No Data
11/02/2019	5	5	12/02/2019	5	6.3	13/02/2019	5	No Data	14/02/2019	5	No Data	15/02/2019	5	No Data
11/02/2019	6	5.5	12/02/2019	6	5.9	13/02/2019	6	No Data	14/02/2019	6	No Data	15/02/2019	6	No Data
11/02/2019	7	5.8	12/02/2019	7	5.8	13/02/2019	7	No Data	14/02/2019	7	No Data	15/02/2019	7	No Data
11/02/2019	8	5	12/02/2019	8	5	13/02/2019	8	No Data	14/02/2019	8	No Data	15/02/2019	8	No Data
11/02/2019	9	5	12/02/2019	9	5	13/02/2019	9	No Data	14/02/2019	9	No Data	15/02/2019	9	No Data
11/02/2019	10	5	12/02/2019	10	5	13/02/2019	10	No Data	14/02/2019	10	No Data	15/02/2019	10	No Data
11/02/2019	11	5	12/02/2019	11	5	13/02/2019	11	No Data	14/02/2019	11	No Data	15/02/2019	11	No Data
11/02/2019	12	5	12/02/2019	12	5	13/02/2019	12	No Data	14/02/2019	12	No Data	15/02/2019	12	No Data
11/02/2019	13	5	12/02/2019	13	5	13/02/2019	13	No Data	14/02/2019	13	No Data	15/02/2019	13	5
11/02/2019	14	5	12/02/2019	14	5	13/02/2019	14	No Data	14/02/2019	14	No Data	15/02/2019	14	5
11/02/2019	15	5	12/02/2019	15	5	13/02/2019	15	No Data	14/02/2019	15	No Data	15/02/2019	15	5
11/02/2019	16	5	12/02/2019	16	5	13/02/2019	16	No Data	14/02/2019	16	No Data	15/02/2019	16	5
11/02/2019	17	5	12/02/2019	17	5	13/02/2019	17	No Data	14/02/2019	17	No Data	15/02/2019	17	5
11/02/2019	18	5	12/02/2019	18	5	13/02/2019	18	No Data	14/02/2019	18	No Data	15/02/2019	18	5
11/02/2019	19	5	12/02/2019	19	5	13/02/2019	19	No Data	14/02/2019	19	No Data	15/02/2019	19	5
11/02/2019	20	5.4	12/02/2019	20	6.7	13/02/2019	20	No Data	14/02/2019	20	No Data	15/02/2019	20	5
11/02/2019	21	5.4	12/02/2019	21	7.5	13/02/2019	21	No Data	14/02/2019	21	No Data	15/02/2019	21	5
11/02/2019	22	5.8	12/02/2019	22	6.7	13/02/2019	22	No Data	14/02/2019	22	No Data	15/02/2019	22	5
11/02/2019	23	5	12/02/2019	23	9.2	13/02/2019	23	No Data	14/02/2019	23	No Data	15/02/2019	23	5
Maximum		5.8			9.2			5.4			No Data			5

Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average
16/02/2019	0	5	17/02/2019	0	5	18/02/2019	0	5.8	19/02/2019	0	5	20/02/2019	0	5
16/02/2019	1	5	17/02/2019	1	5.4	18/02/2019	1	6.3	19/02/2019	1	5.4	20/02/2019	1	5
16/02/2019	2	5.4	17/02/2019	2	5.4	18/02/2019	2	5.8	19/02/2019	2	5.4	20/02/2019	2	5
16/02/2019	3	5.8	17/02/2019	3	6.3	18/02/2019	3	5.8	19/02/2019	3	5.8	20/02/2019	3	5
16/02/2019	4	5.4	17/02/2019	4	6.3	18/02/2019	4	5.8	19/02/2019	4	5	20/02/2019	4	5
16/02/2019	5	5.8	17/02/2019	5	5.4	18/02/2019	5	5.8	19/02/2019	5	5	20/02/2019	5	5
16/02/2019	6	5	17/02/2019	6	10.0	18/02/2019	6	5.5	19/02/2019	6	5	20/02/2019	6	7.3
16/02/2019	7	5.8	17/02/2019	7	6.3	18/02/2019	7	5.4	19/02/2019	7	5	20/02/2019	7	5
16/02/2019	8	5	17/02/2019	8	5	18/02/2019	8	5	19/02/2019	8	5	20/02/2019	8	5
16/02/2019	9	5	17/02/2019	9	5	18/02/2019	9	5	19/02/2019	9	5	20/02/2019	9	5
16/02/2019	10	5	17/02/2019	10	5	18/02/2019	10	5	19/02/2019	10	5	20/02/2019	10	5
16/02/2019	11	5	17/02/2019	11	5	18/02/2019	11	5	19/02/2019	11	5	20/02/2019	11	5
16/02/2019	12	5	17/02/2019	12	5	18/02/2019	12	5	19/02/2019	12	5	20/02/2019	12	5
16/02/2019	13	5	17/02/2019	13	5	18/02/2019	13	5	19/02/2019	13	5	20/02/2019	13	5
16/02/2019	14	5	17/02/2019	14	5	18/02/2019	14	5	19/02/2019	14	5	20/02/2019	14	5
16/02/2019	15	5	17/02/2019	15	5	18/02/2019	15	5	19/02/2019	15	5	20/02/2019	15	5
16/02/2019	16	5	17/02/2019	16	5	18/02/2019	16	5	19/02/2019	16	5	20/02/2019	16	5
16/02/2019	17	5	17/02/2019	17	5	18/02/2019	17	5	19/02/2019	17	5	20/02/2019	17	5
16/02/2019	18	5	17/02/2019	18	5	18/02/2019	18	5	19/02/2019	18	11.1	20/02/2019	18	5
16/02/2019	19	5	17/02/2019	19	5	18/02/2019	19	5	19/02/2019	19	11.3	20/02/2019	19	5
16/02/2019	20	5	17/02/2019	20	5.4	18/02/2019	20	5	19/02/2019	20	5.4	20/02/2019	20	5
16/02/2019	21	5.4	17/02/2019	21	5	18/02/2019	21	5	19/02/2019	21	5	20/02/2019	21	5
16/02/2019	22	5	17/02/2019	22	5	18/02/2019	22	5	19/02/2019	22	5	20/02/2019	22	5
16/02/2019	23	5	17/02/2019	23	5	18/02/2019	23	5	19/02/2019	23	5.4	20/02/2019	23	5
Maximum		5.8			10.0			6.3			11.3			7.3

Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average
21/02/2019	0	5.4	22/02/2019	0	5	23/02/2019	0	5	24/02/2019	0	5.4	25/02/2019	0	5
21/02/2019	1	5	22/02/2019	1	5	23/02/2019	1	5.4	24/02/2019	1	5	25/02/2019	1	5
21/02/2019	2	5	22/02/2019	2	5	23/02/2019	2	5.4	24/02/2019	2	5	25/02/2019	2	5
21/02/2019	3	5	22/02/2019	3	5	23/02/2019	3	5	24/02/2019	3	5	25/02/2019	3	5
21/02/2019	4	5	22/02/2019	4	5	23/02/2019	4	5	24/02/2019	4	5.4	25/02/2019	4	5.4
21/02/2019	5	5	22/02/2019	5	5	23/02/2019	5	5.4	24/02/2019	5	5	25/02/2019	5	5.4
21/02/2019	6	6.4	22/02/2019	6	5.5	23/02/2019	6	5.5	24/02/2019	6	8.2	25/02/2019	6	9.4
21/02/2019	7	5	22/02/2019	7	5	23/02/2019	7	5.4	24/02/2019	7	5	25/02/2019	7	5.4
21/02/2019	8	5	22/02/2019	8	5.4	23/02/2019	8	5	24/02/2019	8	5	25/02/2019	8	5
21/02/2019	9	5	22/02/2019	9	5	23/02/2019	9	5	24/02/2019	9	5.4	25/02/2019	9	5
21/02/2019	10	5	22/02/2019	10	5	23/02/2019	10	5	24/02/2019	10	5	25/02/2019	10	5
21/02/2019	11	5	22/02/2019	11	5	23/02/2019	11	5	24/02/2019	11	5.4	25/02/2019	11	5
21/02/2019	12	5	22/02/2019	12	5	23/02/2019	12	5	24/02/2019	12	5	25/02/2019	12	5
21/02/2019	13	5.4	22/02/2019	13	5	23/02/2019	13	5	24/02/2019	13	5	25/02/2019	13	5
21/02/2019	14	5	22/02/2019	14	5	23/02/2019	14	5	24/02/2019	14	5	25/02/2019	14	5
21/02/2019	15	5	22/02/2019	15	5	23/02/2019	15	5	24/02/2019	15	5	25/02/2019	15	5
21/02/2019	16	5	22/02/2019	16	5	23/02/2019	16	5	24/02/2019	16	5	25/02/2019	16	5
21/02/2019	17	5	22/02/2019	17	5	23/02/2019	17	5	24/02/2019	17	5	25/02/2019	17	5
21/02/2019	18	5	22/02/2019	18	5	23/02/2019	18	5	24/02/2019	18	5	25/02/2019	18	5
21/02/2019	19	5	22/02/2019	19	5	23/02/2019	19	5	24/02/2019	19	5	25/02/2019	19	5
21/02/2019	20	5	22/02/2019	20	5.4	23/02/2019	20	5.8	24/02/2019	20	5	25/02/2019	20	5
21/02/2019	21	5	22/02/2019	21	5	23/02/2019	21	5	24/02/2019	21	5.4	25/02/2019	21	5.4
21/02/2019	22	5	22/02/2019	22	5.4	23/02/2019	22	5	24/02/2019	22	5.4	25/02/2019	22	5
21/02/2019	23	5	22/02/2019	23	5	23/02/2019	23	5	24/02/2019	23	5	25/02/2019	23	5
Maximum		6.4			5.5			5.8			8.2			9.4

Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average	Date	Hour	SO ₂ 1hr Average
26/02/2019	0	5.4	27/02/2019	0	5	28/02/2019	0	5.4						
26/02/2019	1	5	27/02/2019	1	5	28/02/2019	1	5.4						
26/02/2019	2	5.4	27/02/2019	2	6.3	28/02/2019	2	5						
26/02/2019	3	5	27/02/2019	3	5.4	28/02/2019	3	5						
26/02/2019	4	6.3	27/02/2019	4	5.8	28/02/2019	4	5.8						
26/02/2019	5	5.4	27/02/2019	5	5.8	28/02/2019	5	5.8						
26/02/2019	6	7.3	27/02/2019	6	6.4	28/02/2019	6	8.2						
26/02/2019	7	7.1	27/02/2019	7	5.4	28/02/2019	7	5.4						
26/02/2019	8	5	27/02/2019	8	5	28/02/2019	8	5.4						
26/02/2019	9	5	27/02/2019	9	5	28/02/2019	9	5						
26/02/2019	10	5	27/02/2019	10	5	28/02/2019	10	5						
26/02/2019	11	5	27/02/2019	11	5	28/02/2019	11	5						
26/02/2019	12	5	27/02/2019	12	5	28/02/2019	12	5						
26/02/2019	13	5	27/02/2019	13	5	28/02/2019	13	5						
26/02/2019	14	5	27/02/2019	14	5	28/02/2019	14	5						
26/02/2019	15	5	27/02/2019	15	5	28/02/2019	15	5						
26/02/2019	16	5	27/02/2019	16	5	28/02/2019	16	5						
26/02/2019	17	5	27/02/2019	17	5	28/02/2019	17	5						
26/02/2019	18	5	27/02/2019	18	5	28/02/2019	18	5						
26/02/2019	19	5	27/02/2019	19	5	28/02/2019	19	5						
26/02/2019	20	5	27/02/2019	20	5	28/02/2019	20	5						
26/02/2019	21	5	27/02/2019	21	5.4	28/02/2019	21	5.4						
26/02/2019	22	5	27/02/2019	22	5	28/02/2019	22	5.4						
26/02/2019	23	5.4	27/02/2019	23	5	28/02/2019	23	5						
Maximum		7.3			6.4			8.2						

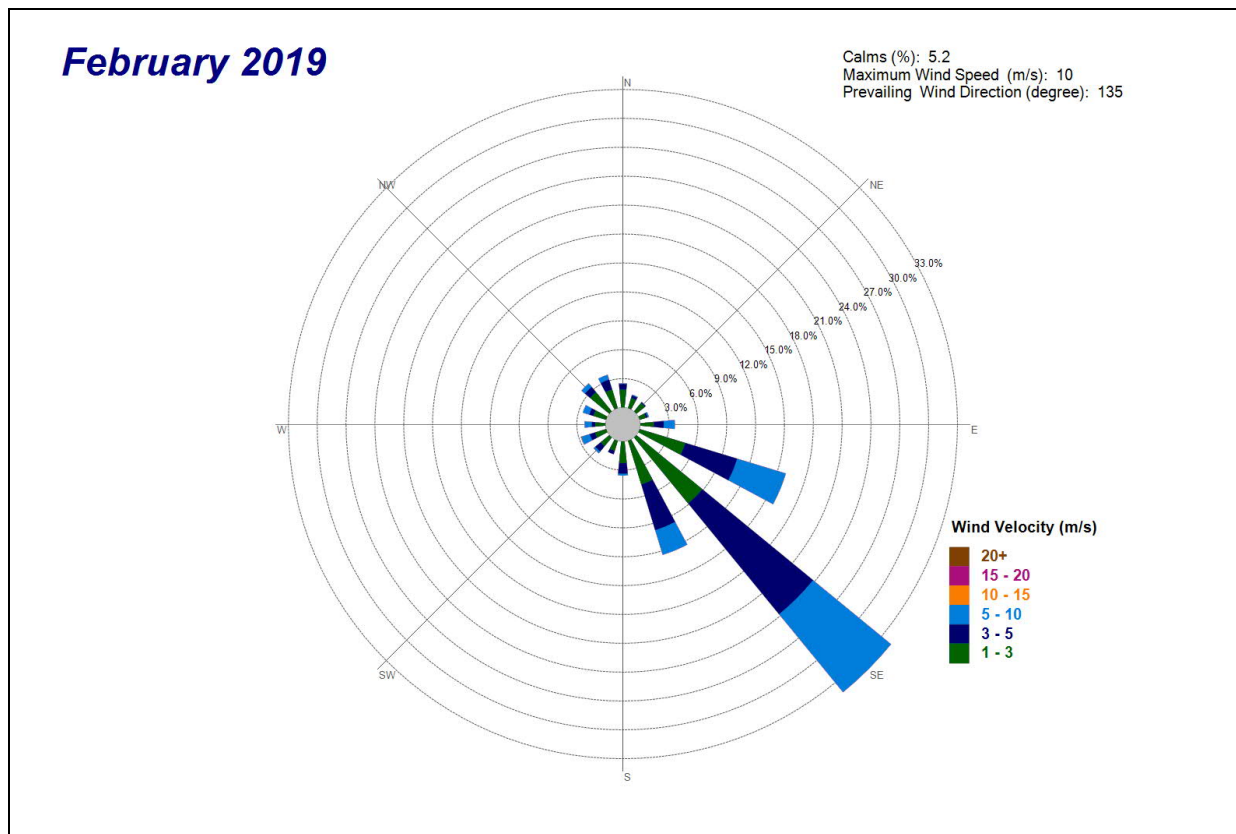


Figure 4 MCC February 2019 Meteorology Data