

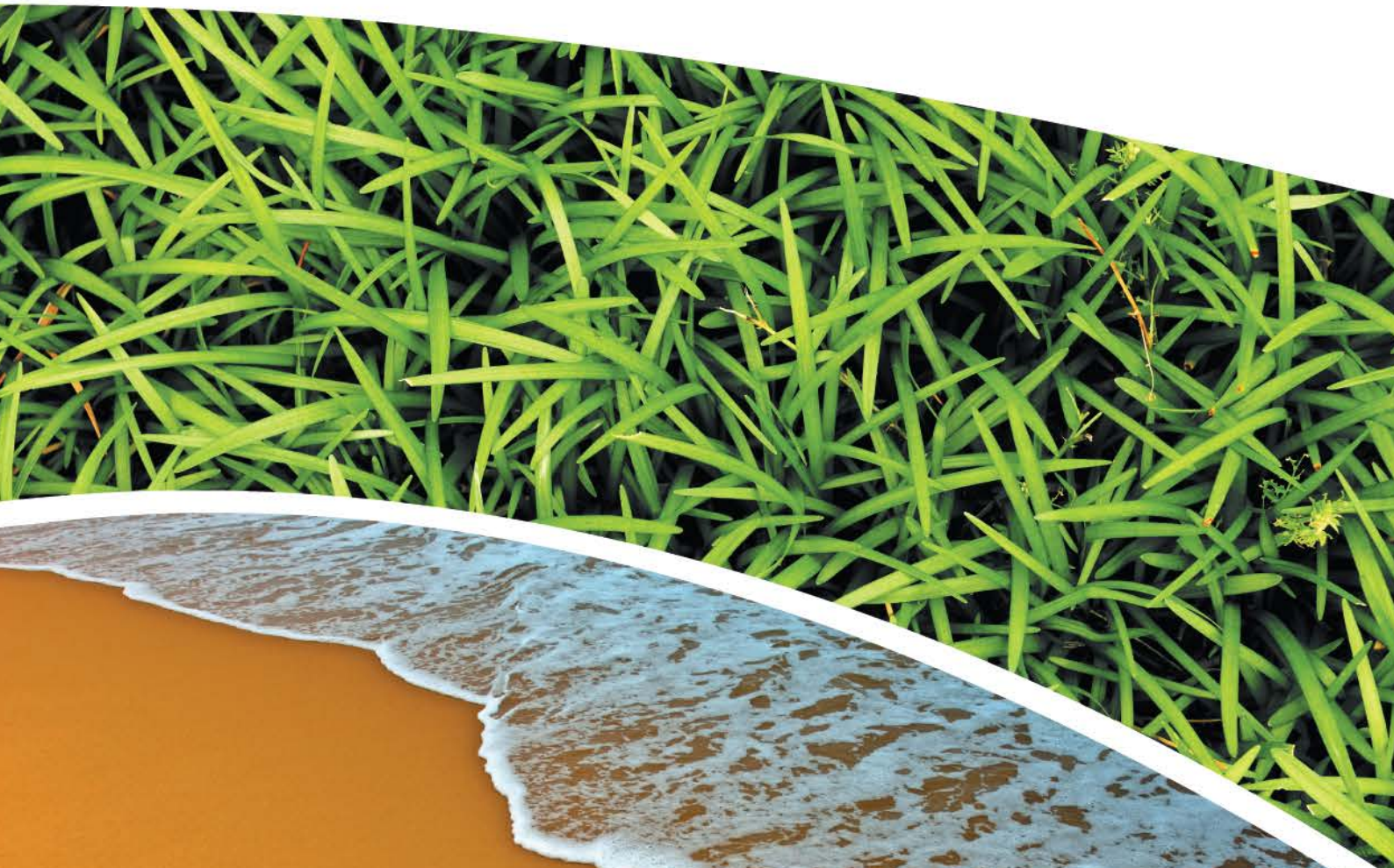


**AIR, WATER AND METEOROLOGICAL MONITORING – MARCH 2019  
PINE DALE MINE, BLACKMANS FLAT**

**Prepared for Pine Dale Mine Community Consultative Committee**

**Prepared by RCA Australia**

**RCA ref 6880-1793/0**



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RCA ref 6880-1793/0

23 April 2019

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Attention: Mr Graham Goodwin

Geotechnical Engineering

Engineering Geology

Environmental Engineering

Hydrogeology

Construction Materials Testing

Environmental Monitoring

Sound & Vibration

Occupational Hygiene

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**REPORT COMPILED FOR COMMUNITY CONSULTATIVE COMMITTEE  
DETAILING AIR, WATER AND METEOROLOGICAL MONITORING AT PINE DALE  
MINE  
MARCH 2019**

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## **1 INTRODUCTION**

This report presents the results of air, water and meteorological monitoring undertaken at Pine Dale Mine, Blackmans Flat during the month of March 2019.

Air and water samples were collected by RCA Laboratories – Environmental staff. Meteorological data was obtained from the site weather station.

This report satisfies the requirements to monitor environmental parameters as presented in the Pine Dale Mine Environmental Protection Licence (EPL 4911).

## **2 ANALYTICAL PROCEDURES**

The analytical procedures used by RCA Laboratories – Environmental (NATA Accreditation number 9811) are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**.

**Table 1** Analytical Test Methods

<b>Analysis</b>	<b>Method</b>	<b>Units</b>	<b>Analysing Laboratory</b>	<b>NATA Accreditation Status</b>
Determination of Suspended Particulate Matter	ENV-LAB003	µg/m <sup>3</sup>	RCA Laboratories – Environmental	NATA Analysis
Determination of Particulate Matter – Deposited Matter	ENV-LAB004	g/m <sup>2</sup> per month	RCA Laboratories – Environmental	NATA Analysis
pH	ENV-LAB006	pH	RCA Laboratories – Environmental	NATA Analysis
Conductivity	ENV-LAB010	µS/cm	RCA Laboratories – Environmental	NATA Analysis
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories – Environmental	NATA Analysis
Turbidity	ENV-LAB037	NTU	RCA Laboratories - Environmental	NATA Analysis
Oil and Grease	ENV-LAB022	mg/L	RCA Laboratories - Environmental	Non-NATA Analysis
Major Anions (Alkalinity, Cl, SO <sub>4</sub> )	ED037, ED041, ED045	mg/L	ALS	NATA Analysis
Major Cations (Ca, Mg, Na, K)	ED093	mg/L	ALS	NATA Analysis
Dissolved Metals	EG020F	mg/L	ALS	NATA Analysis

ALS Environmental has been used to obtain analysis of anions, cations and dissolved metals (NATA Accreditation number 825).

### 3 WATER MONITORING RESULTS

#### 3.1 GROUNDWATER

A total of two (2) groundwater samples were collected from within the Pine Dale Mine site during March 2019. Water quality analysis results are shown in **Table 2**. Groundwater monitoring locations are shown in **Appendix A**.

**Table 2** Groundwater Analysis Results

Analysis	Units	P6	P7
Sample Number	-	03196880009	03196880010
Date Sampled	-	12/03/19	12/03/19
Time Sampled	-	8:40	10:42
Depth to Water from Surface	m	25.27	6.63
Water Level (AHD)	m	891.68	887.77
Temperature	°C	15.9	17.0
pH	pH	<b>6.09</b>	<b>6.24</b>
Conductivity	µS/cm	<b>1860</b>	830
Turbidity	NTU	97	
Dissolved Oxygen	mg/L	1.20	
Total Suspended Solids	mg/L	69	
Oil and Grease	mg/L	<5	
Bicarbonate Alkalinity (CaCO <sub>3</sub> )	mg/L	72	
Total Alkalinity (CaCO <sub>3</sub> )	mg/L	72	
Sulphate (as SO <sub>4</sub> )	mg/L	913	
Chloride	mg/L	53	
Calcium	mg/L	156	
Magnesium	mg/L	73	
Sodium	mg/L	76	
Potassium	mg/L	19	
Cobalt (dissolved)	mg/L	0.059	
Manganese (dissolved)	mg/L	3.18	
Nickel (dissolved)	mg/L	0.104	
Zinc (dissolved)	mg/L	0.063	
Iron (dissolved)	mg/L	40.8	
<b>Trigger Values</b>			
pH trigger level ^	pH	6.2 – 8.0	6.3 – 8.0
Conductivity trigger level	µS/cm	1180	852
Water Level (AHD) #	m	887.90	883.28

■ Indicates analysis was not required.

^ pH trigger value is exceeded if the pH is outside the nominated range.

# Water Level trigger is exceeded if the AHD water level drops below the nominated trigger level.

Results shown in ***bold italics*** indicates exceedance of trigger level.

### 3.2 SURFACE WATER MONITORING

Quarterly surface water monitoring was not required to be undertaken in March 2019. The next quarterly monitoring round will be undertaken in May 2019.

## 4 AIR QUALITY RESULTS

### 4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

Monitoring of particulate matter less than 10 micrometres (PM<sub>10</sub>) and total suspended particulates (TSP) is undertaken at Pine Dale Mine using High Volume Air Samplers (HVAS). HVAS at this facility conform to AS/NZS 3580.9.3:2015, AS/NZS 3580.9.6:2015 and AS/NZS 3580.1.1:2016. The locations of these HVAS units are shown in **Appendix A**.

HVAS Total Suspended Particulate results are shown in **Table 3**. PM<sub>10</sub> results are shown in **Table 4**. HVAS Monitoring locations are shown in **Appendix A**. Graphical HVAS result presentations are shown in **Appendix B**.

**Table 3** Total Suspended Particulates (TSP)

Run Date	TSP ( $\mu\text{g}/\text{m}^3$ )	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
03-Mar-19	13	03196880031	9655152	05-Mar-19	13:18	Client	24.00
09-Mar-19	49	03196880033	9655154	12-Mar-19	13:30	Client	24.15
15-Mar-19	18	03196880035	9656035	19-Mar-19	10:44	Client	24.00
21-Mar-19	19	03196880037	9656037	25-Mar-19	10:55	Client	24.00
27-Mar-19	24	03196880039	9656039	31-Mar-19	16:54	Client	24.00

**Table 4** Suspended Particulate Matter <math> < 10 \mu\text{m}</math> ( $\text{PM}_{10}$ )

Run Date	$\text{PM}_{10}$ ( $\mu\text{g}/\text{m}^3$ )	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
03-Mar-19	6	03196880032	9655153	05-Mar-19	13:20	Client	24.00
09-Mar-19	20	03196880034	9655155	12-Mar-19	13:35	Client	24.13
15-Mar-19	8	03196880036	9656036	19-Mar-19	10:49	Client	24.00
21-Mar-19	7	03196880038	9656038	25-Mar-19	11:00	Client	24.00
27-Mar-19	9	03196880040	9656040	31-Mar-19	16:57	Client	24.00

#### 4.1.1 TSP SUMMARY

The NSW EPA Annual Mean TSP allowable limit is  $90\mu\text{g}/\text{m}^3$ . All TSP HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (April 2018 to March 2019) for the TSP unit is  $29.4\mu\text{g}/\text{m}^3$ . The twelve monthly graph is provided in **Appendix B**.

#### 4.1.2 $\text{PM}_{10}$ SUMMARY

The NSW EPA twenty four hour maximum  $\text{PM}_{10}$  allowable limit is  $50\mu\text{g}/\text{m}^3$ . The EPA annual mean  $\text{PM}_{10}$  allowable limit is  $25\mu\text{g}/\text{m}^3$ . All  $\text{PM}_{10}$  HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the  $\text{PM}_{10}$  unit is  $12.4\mu\text{g}/\text{m}^3$ , which is below the allowable annual limit (refer **Appendix B**). The 24 hour maximum allowable limit of  $50\mu\text{g}/\text{m}^3$  was not exceeded on any sampling event during the month of March 2019.

## 4.2 DEPOSITIONAL DUST MONITORING

The depositional dust monitoring exposure period for March 2019 was 7 February – 11 March 2019. Depositional dust gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. Depositional dust monitoring results are shown in **Table 5**. Depositional dust monitoring locations are shown in **Appendix A**.

Depositional dust gauge D2 is situated on private property; this gauge was removed at the request of the property owner in March 2018 and monitoring has therefore ceased at this location.



**Table 5** *Depositional Dust Monitoring*

Deposit Gauge	Number of Days	Notes	Insoluble Solids	Ash	Combustible Matter
D1	32	IT	1.7	1.2	0.5
D3	32	I	1.9	1.6	0.3
D4	32	I	2.6	1.6	1.0
D5	32	I	1.2	0.9	0.3
D6	32	I	1.0	0.8	0.2

All units are g/m<sup>2</sup>/month

I indicates insects noted to be present in sample.

T indicates tree litter in samples (eg. leaves, twigs, gum nuts).

#### **4.2.1 ALLOWABLE DEPOSITIONAL DUST LIMITS**

The EPA long term (annual average) deposited dust limit is 4g/m<sup>2</sup> per month. The rolling annual depositional dust results for all sites within the period (April 2018 – March 2019) are in compliance with consent conditions. The annual average for dust gauges D1, D3, D4, D5 and D6 are all less than or equal to 1.6g/m<sup>2</sup> per month. Annual averages are shown in the depositional dust gauge graphs provided in **Appendix B**.

## **5 METEOROLOGICAL MONITORING**

Pine Dale Mine records meteorological data continuously via an onsite weather station. Details of the weather data recorded during the period 1 to 31 March 2019 are shown in **Appendix C**.

Data availability during this period was 100%.

## **6 BLASTING RESULTS**

No blasting was undertaken during this month as mining operations have ceased since the end of March 2014.

## **7 NOISE MONITORING RESULTS**

Quarterly noise monitoring is required to be undertaken on a quarterly basis. The first quarter monitoring is required to be undertaken in the January – March 2019 period. Quarter 1 monitoring was undertaken in March 2019. Noise monitoring results are shown in RCA Australia Noise Monitoring Report 13856-403.0 *Pine Dale Mine Operation Attended Noise – March 2019*.

## **8 OPERATIONAL ACTIVITIES**

All of the approved minable reserves at the Pine Dale Mine have now been exhausted. Operational mining and the last coal sales ceased as of the end of March 2014.

All former operators have been made redundant; however some statutory positions still remain. Pine Dale Mine has been placed in care and maintenance since April 2014.

## 9 SUMMARY

During the month of March 2019 environmental monitoring results were found to be generally in compliance with EPL 4911 with the exception of:

- Electrical conductivity in groundwater sample P6 was in excess of the of the site specific trigger value.
- pH in groundwater samples P6 and P7 were below the lower pH trigger level.

Rolling annual averages from both the TSP and PM<sub>10</sub> High Volume Air Samplers are currently below the EPA Annual Mean TSP and PM<sub>10</sub> criterion of 90µg/m<sup>3</sup> and 25µg/m<sup>3</sup> respectively. Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m<sup>2</sup>.month based upon a rolling average of the past 12 months.

Meteorological monitoring was undertaken for the entire month March with 100% data capture.

Pine Dale Mine ceased operation in March 2014 and therefore no blasting occurred at the site. No noise monitoring was undertaken during March 2019.

This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Yours faithfully

**RCA AUSTRALIA**

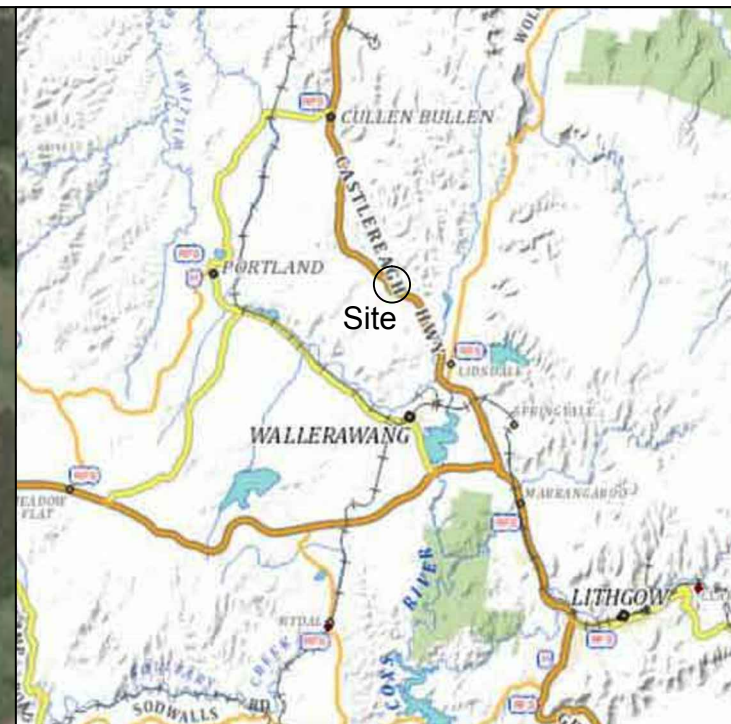
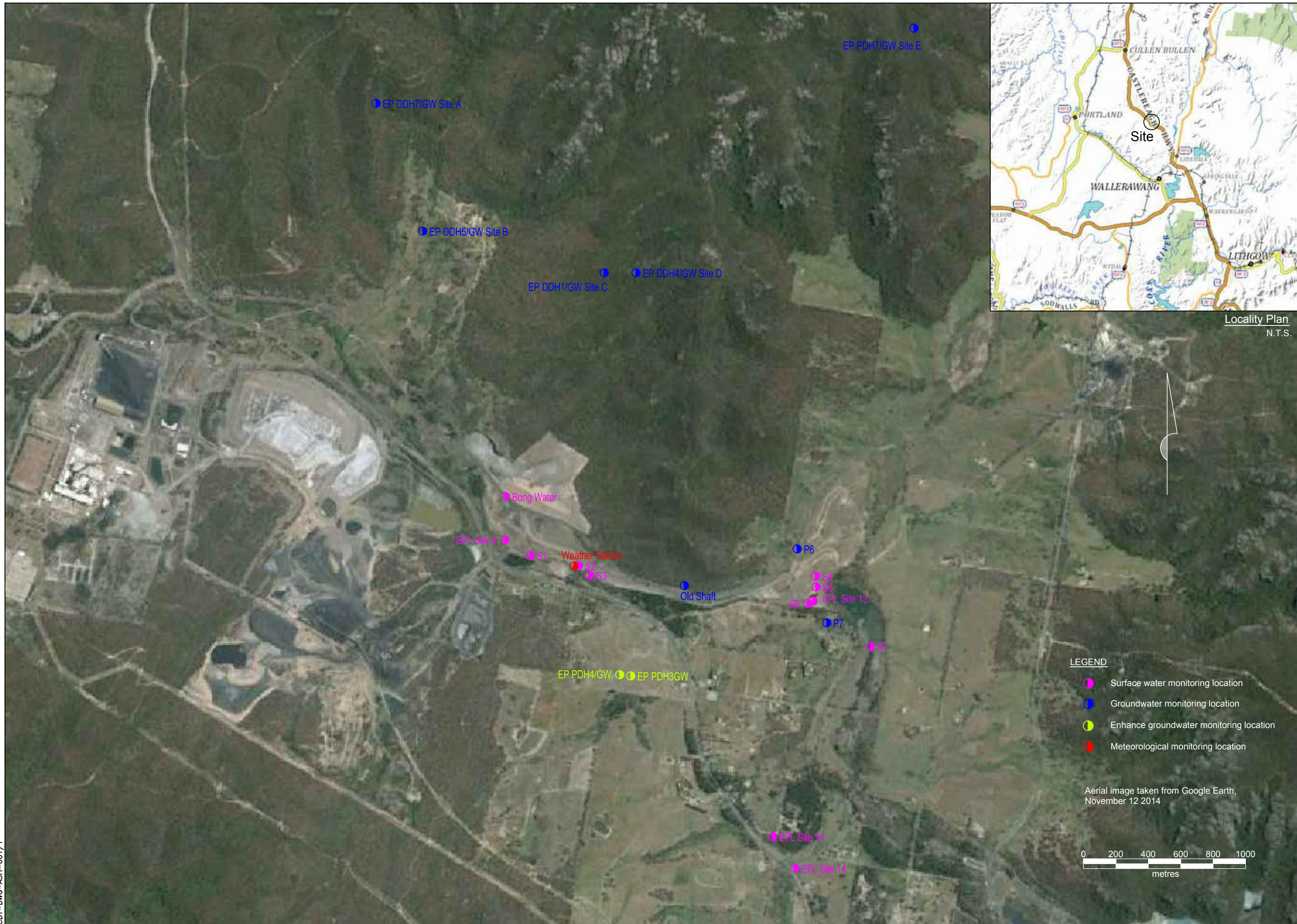


Carmen Rocher  
Environmental Engineer

# Appendix A

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## Monitoring Locations

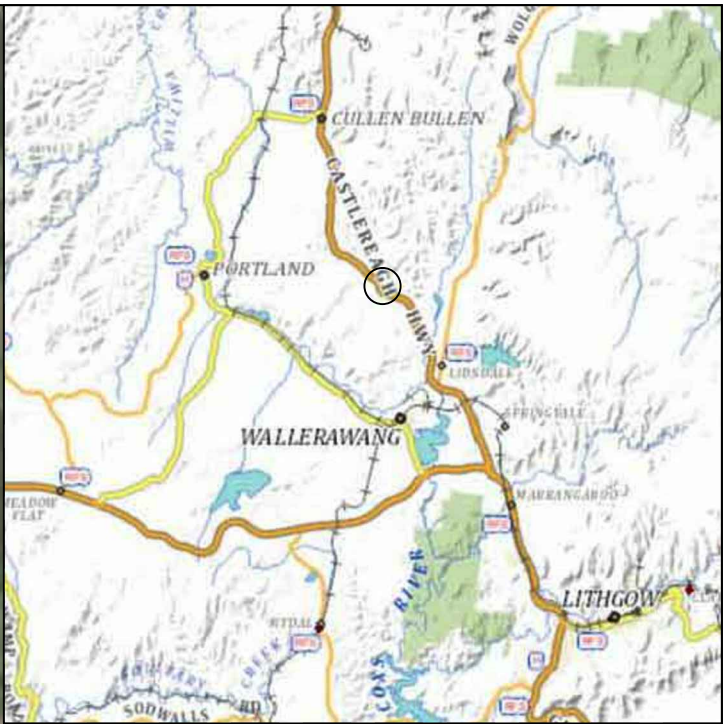
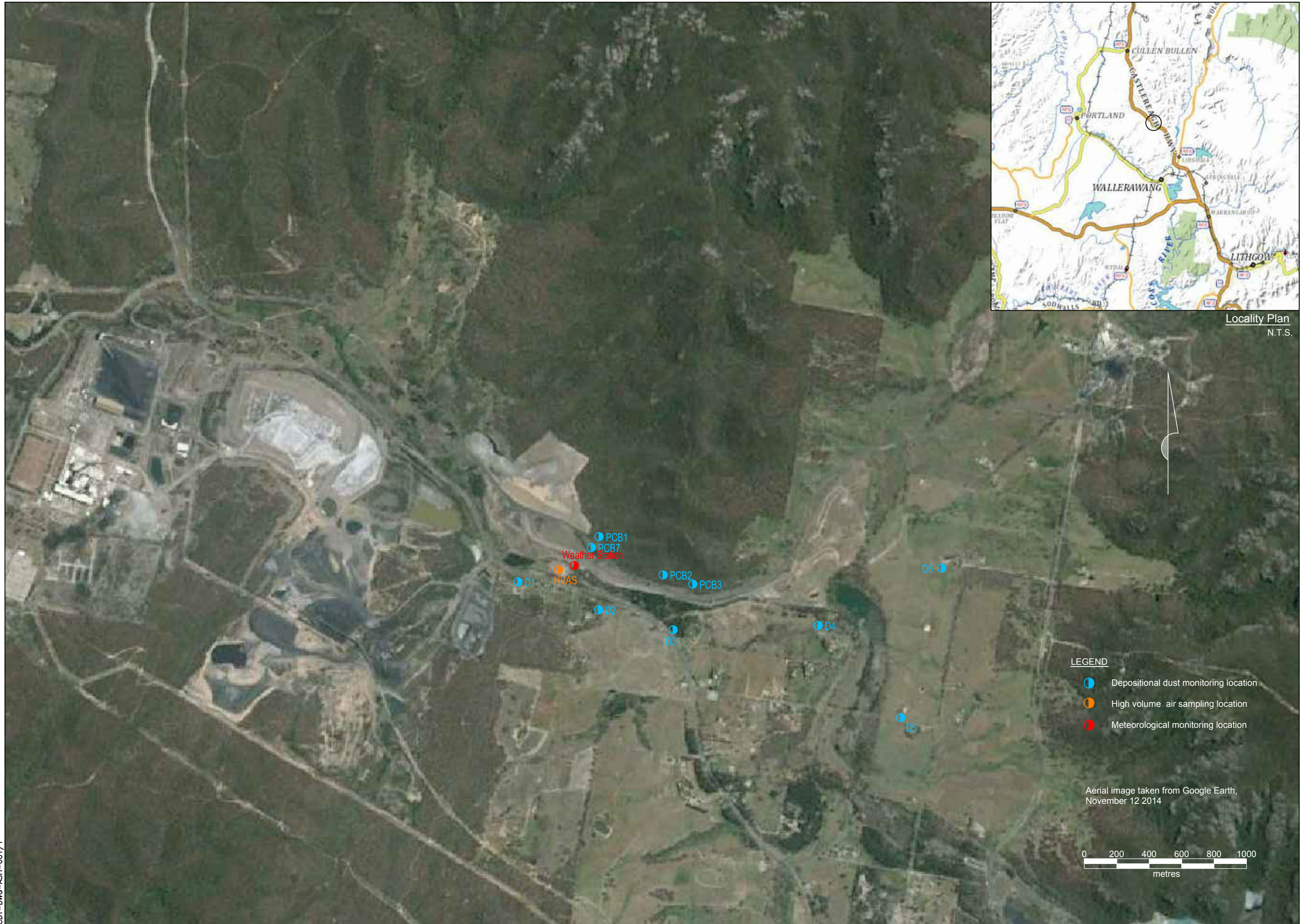


Locality Plan  
N.T.S.

- LEGEND**
- Surface water monitoring location
  - Groundwater monitoring location
  - Enhance groundwater monitoring location
  - Meteorological monitoring location

Aerial image taken from Google Earth,  
November 12 2014





Locality Plan  
N.T.S.



- PCB1
- PCB7
- NVAS
- Weather Station
- D1
- D2
- D3
- D4
- D5
- D6
- PCB2
- PCB3

- LEGEND**
- Depositional dust monitoring location
  - High volume air sampling location
  - Meteorological monitoring location

Aerial image taken from Google Earth,  
November 12 2014

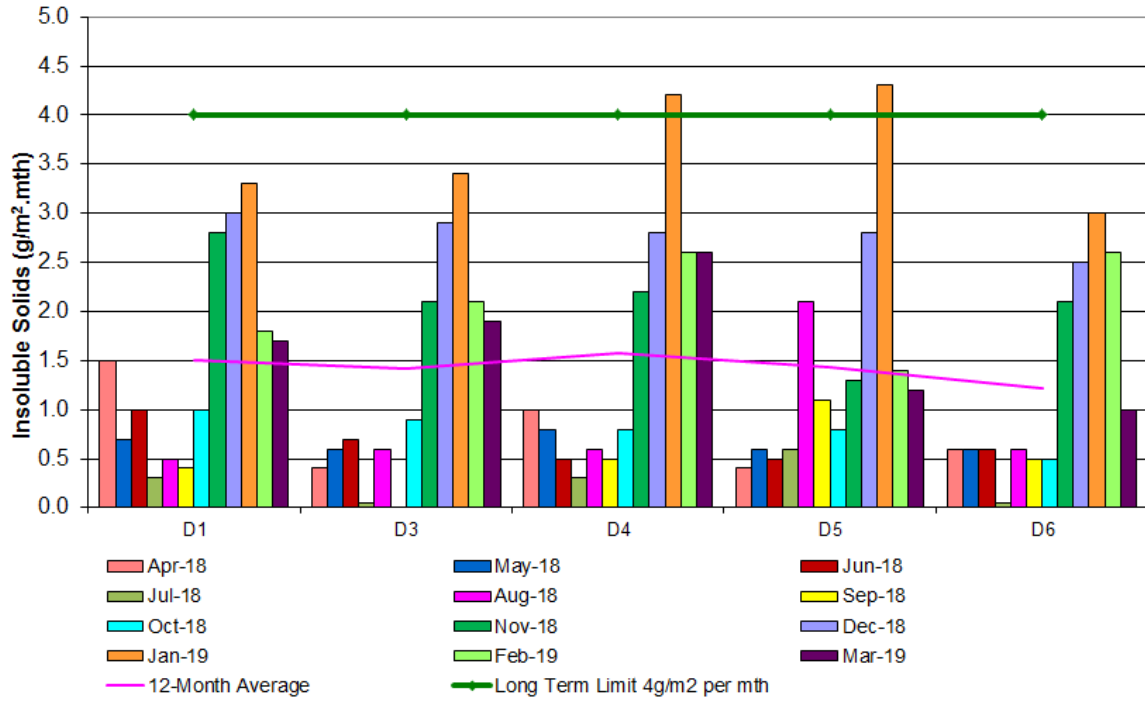


# Appendix B

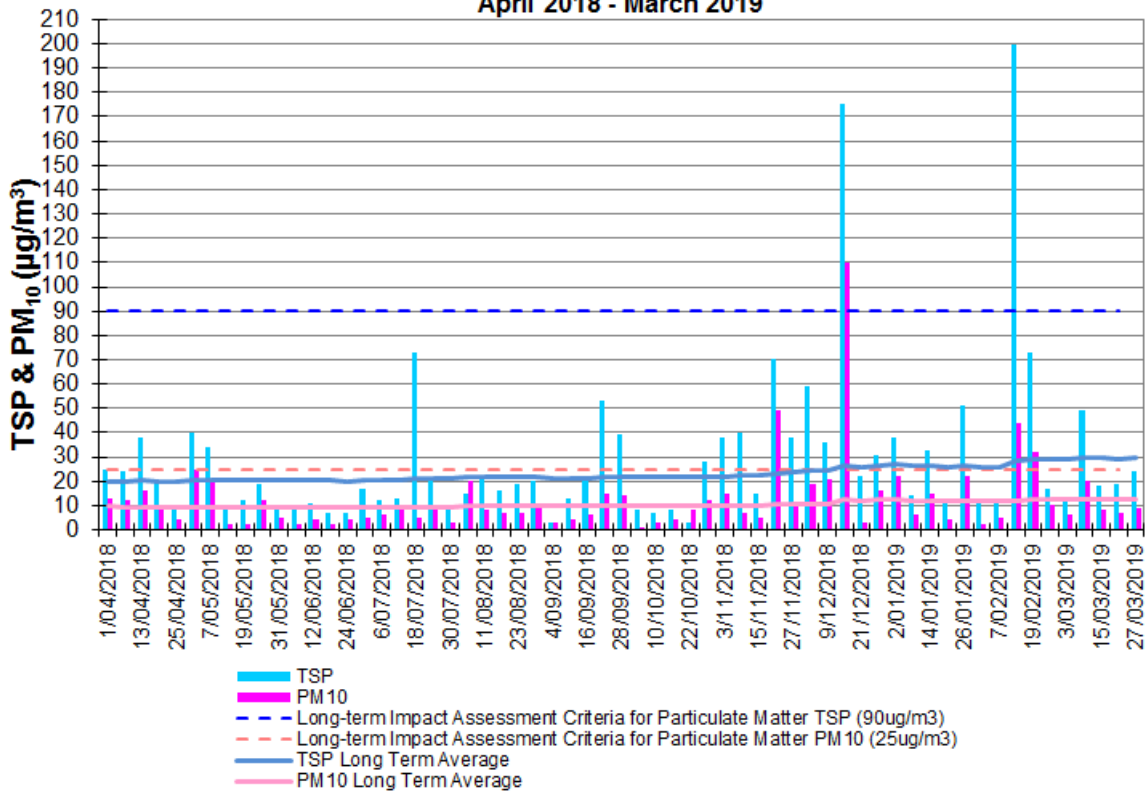
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## Depositional Dust and HVAS Graphs

**Pine Dale Mine  
Deposited Matter - Insoluble Solids 12 Months Comparative Results  
April 2018 to March 2019**



**Pine Dale Mine  
TSP & PM<sub>10</sub> HVAS 12-Month Comparative Results  
April 2018 - March 2019**

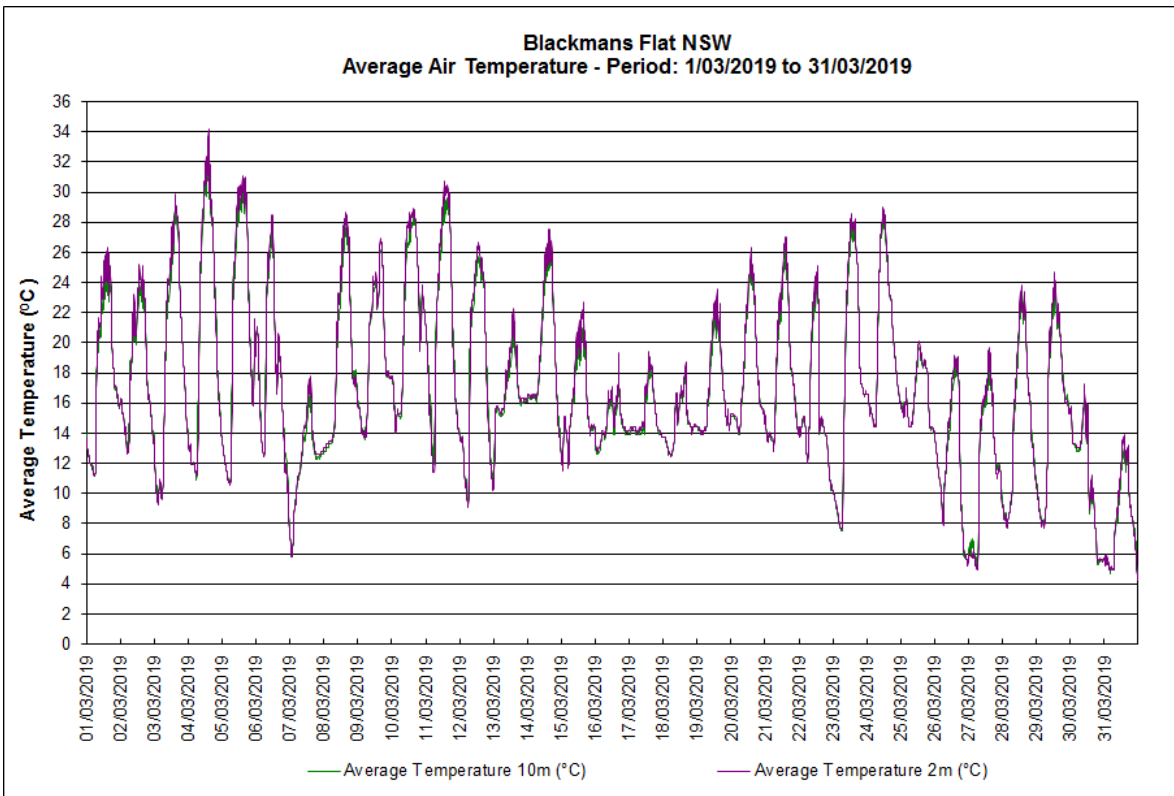
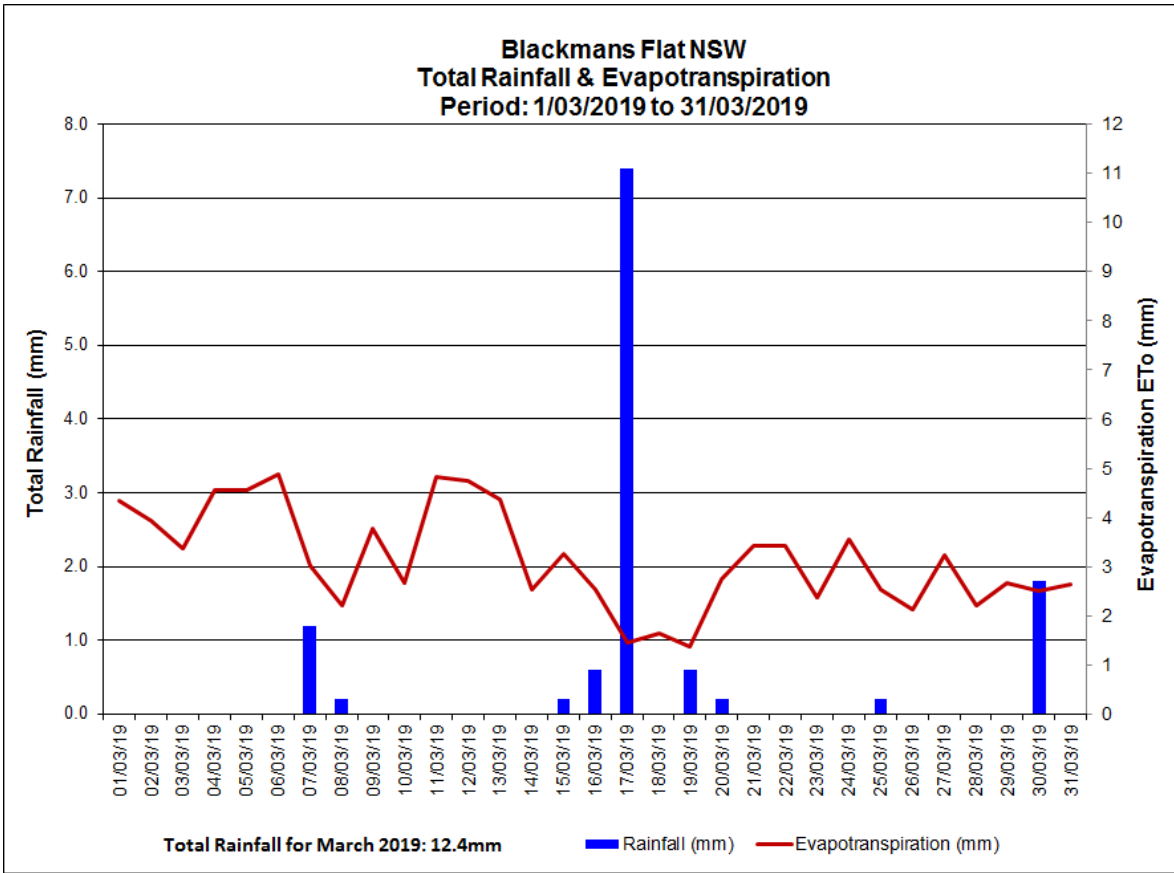


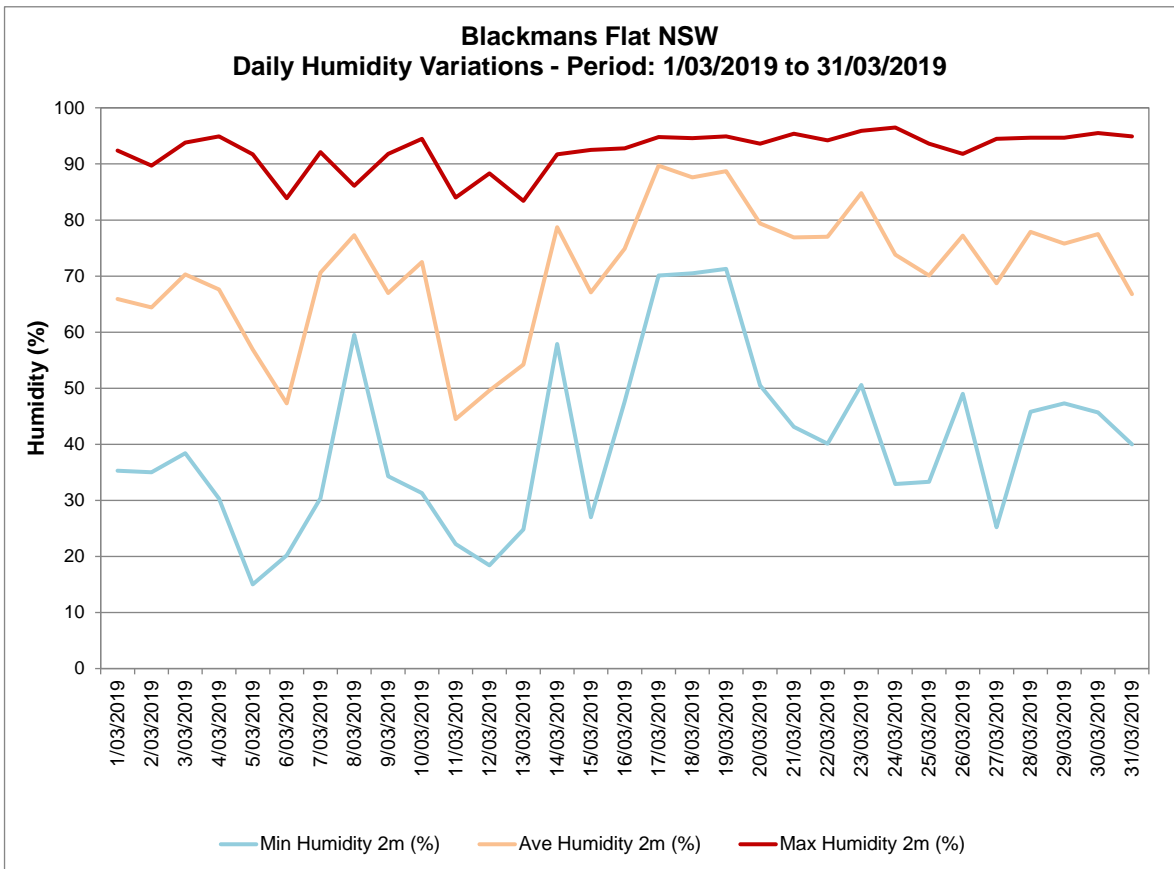
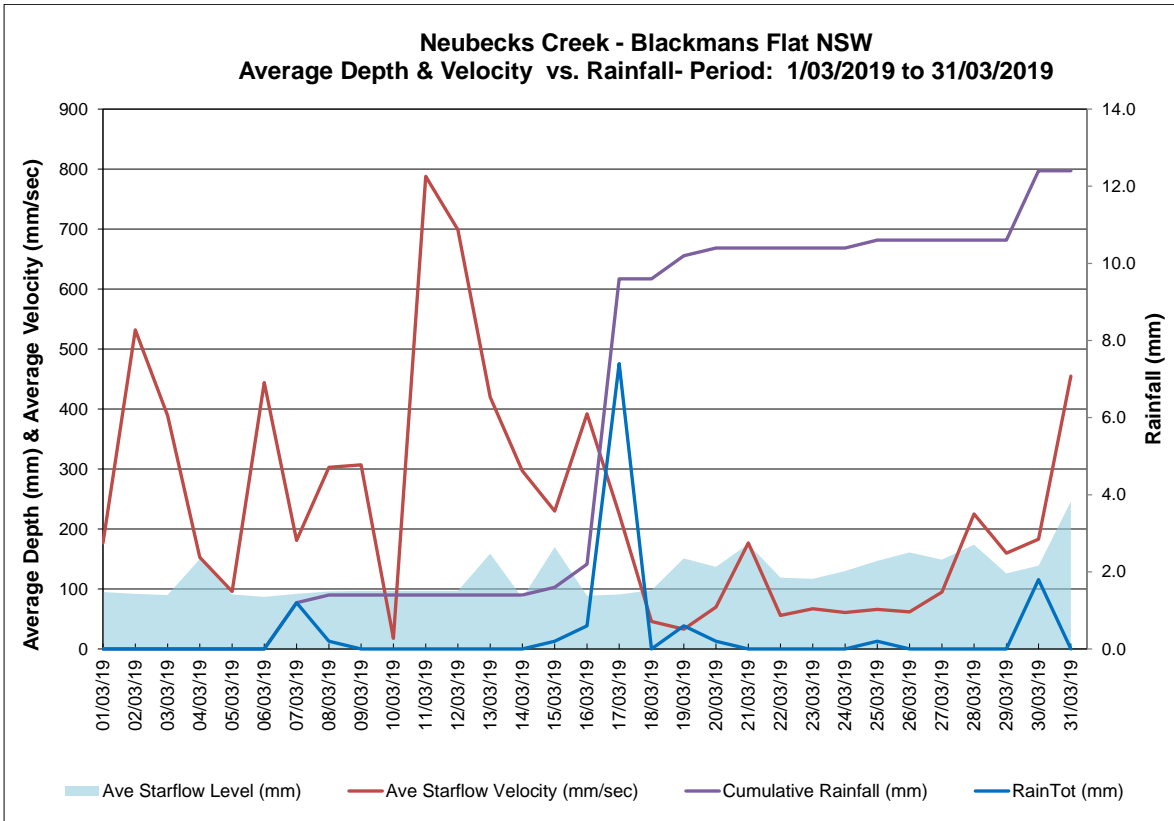
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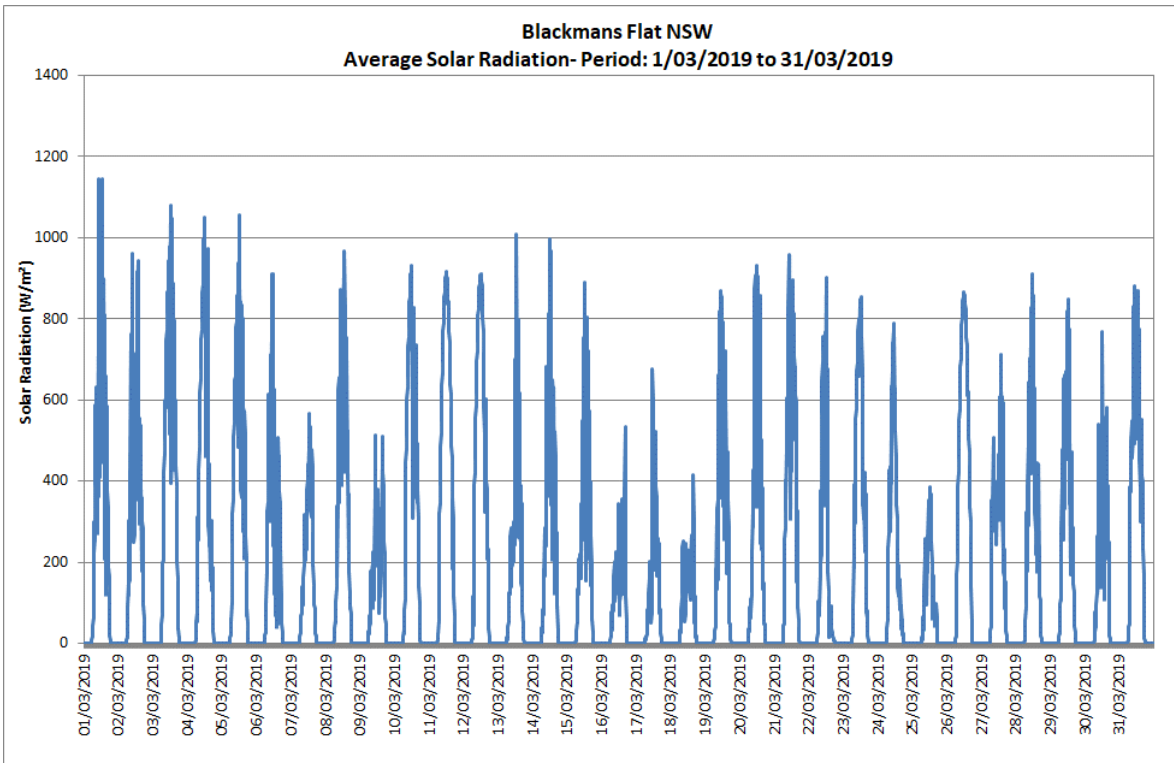
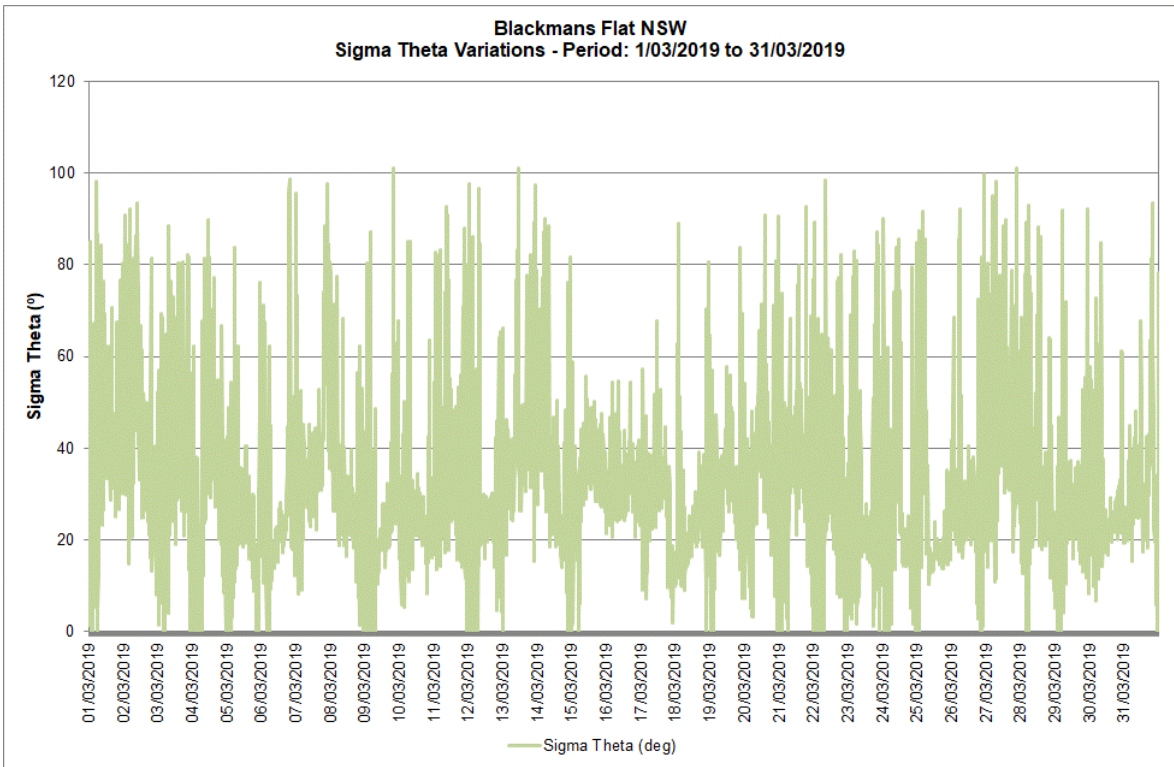
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Meteorological Data



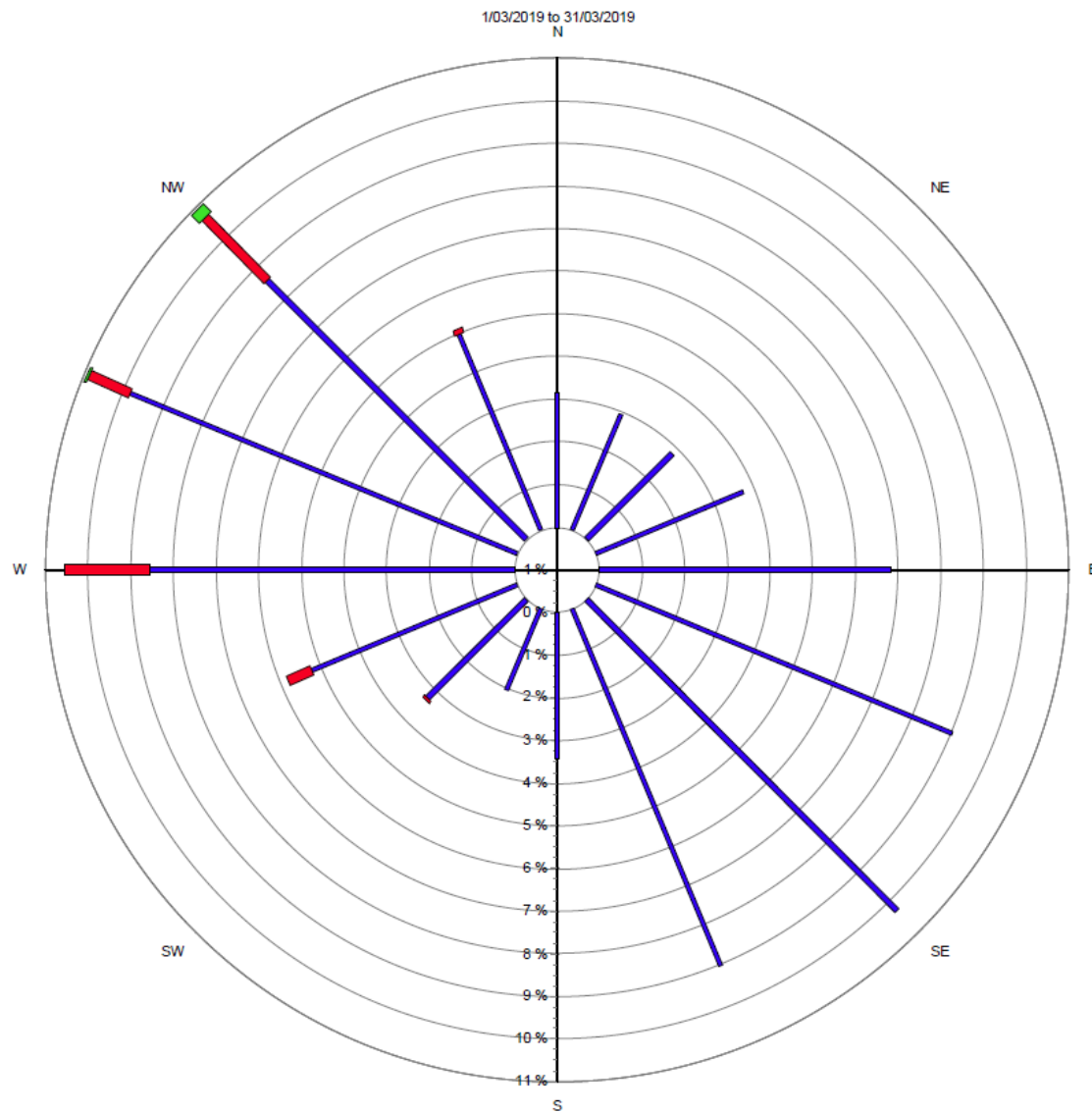
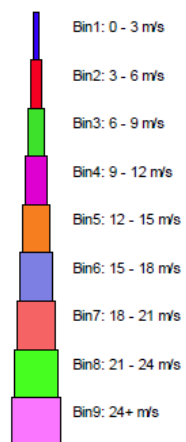






# Blackmans Flat Windrose

1/03/2019 to 31/03/2019



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