

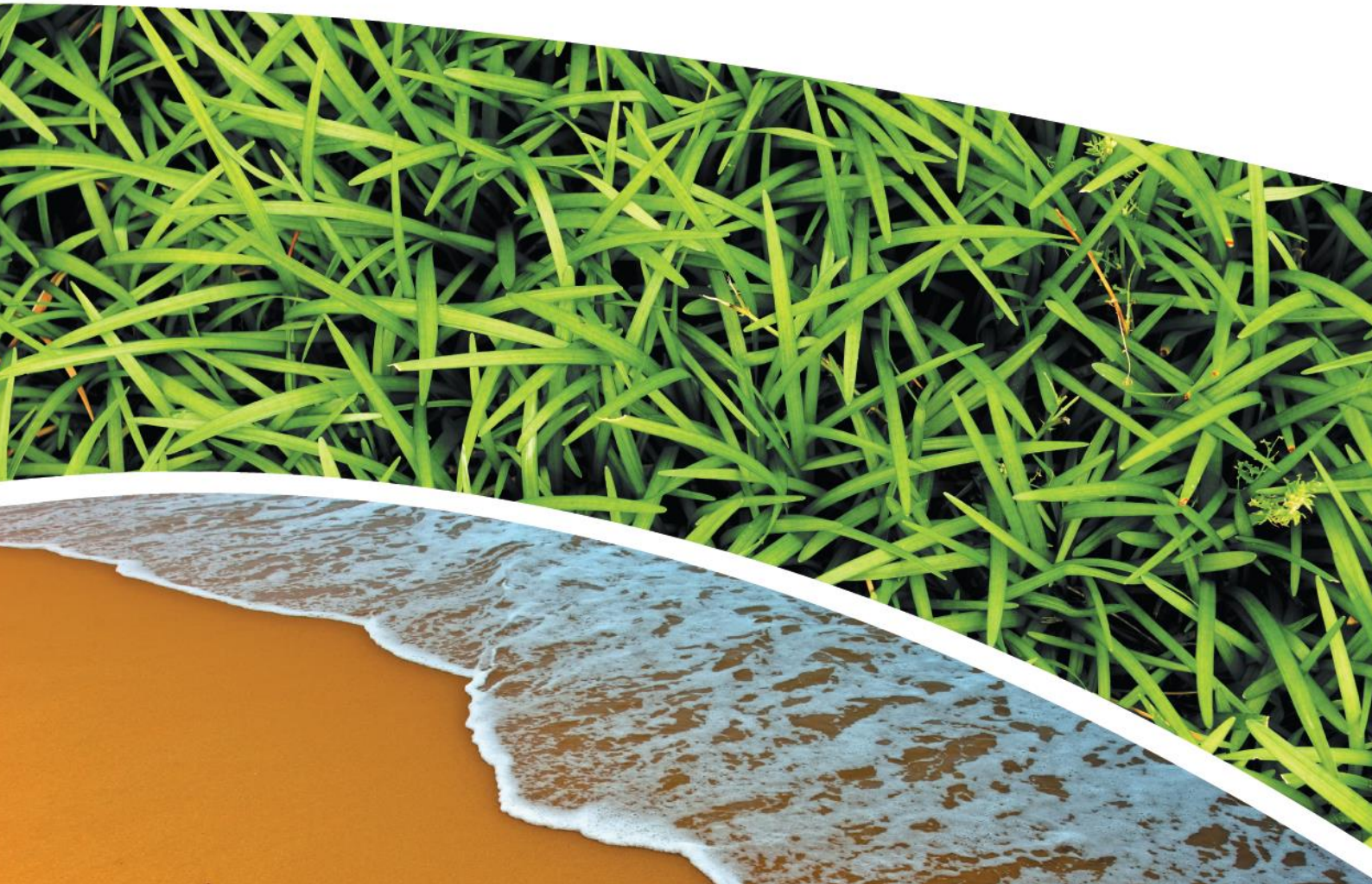
**SURFACE WATER, DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING**

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

**Prepared by RCA Australia**

**RCA ref 6880-1765/0**

**March 2018**



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|-----------------|---------|----------|-----------|--------------------------------------|---|------------|
| Rev No          | Comment | Author   | Reviewer  | Approved for Issue (Project Manager) |   |            |
|                 |         |          |           | Name                                 | Signature   | Date       |
| /0              | Final   | C Rocher | D Mauldin | C Rocher                             |  | 16.04.2018 |

| DOCUMENT DISTRIBUTION |        |                    |   |            |
|-----------------------|--------|--------------------|---|------------|
| Rev No                | Copies | Format             | Issued to   | Date       |
| /0                    | 1      | Electronic (email) | Pine Dale Mine – Graham Goodwin<br><a href="mailto:graham.goodwin@energyaustralia.com.au">graham.goodwin@energyaustralia.com.au</a> | 16.04.2018 |
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RCA LE ref 6880-1765/0

16 April 2018

Pine Dale Mine  
PO Box 202  
WALLERAWANG NSW 2845

Attention Mr Graham Goodwin

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**REPORT COMPILED FOR  
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE  
DETAILING SURFACE WATER, GROUNDWATER DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING  
MARCH 2018**

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## 1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of March 2018.

Samples received were sampled by RCA Laboratories – Environmental staff.

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

## 2 ANALYTICAL PROCEDURES

The analytical procedures used by RCA Laboratories – Environmental (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**. ALS Environmental has been used to obtain analysis of anions, cations and dissolved metals (NATA Accreditation number 825).

**Table 1** *Analytical Test Methods*

| ANALYSIS   | METHOD              | UNITS                   | ANALYSING LABORATORY             | NATA / NON-NATA ANALYSIS |
|--|---------------------|-------------------------|----------------------------------|--------------------------|
| 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> .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            |

### 3 WATER MONITORING RESULTS

#### 3.1 GROUNDWATER

A total of 2 on-site groundwater samples were collected during the month of March 2018. Water quality analysis results are shown in **Table 2**.

**Table 2** Groundwater Analysis Results – Monthly Monitoring

| ANALYSIS                                    | UNITS | P6          | P7          |
|---|-------|-------------|-------------|
| Sample Number                               | -     | 03186880009 | 03186880010 |
| Date Sampled                                | -     | 14/03/18    | 14/03/18    |
| Time Sampled                                | -     | 8:12        | 10:20       |
| Depth to Water from Surface                 | m     | 25.19       | 6.92        |
| Water Level (AHD)                           | m     | 891.76      | 887.48      |
| Temperature                                 | °C    | 16.7        | 16.1        |
| pH  | pH    | <b>6.05</b> | <b>6.16</b> |
| Conductivity                                | µS/cm | <b>1480</b> | 815         |
| Turbidity                                   | NTU   | 3.0         |             |
| Dissolved Oxygen                            | mg/L  | 43          |             |
| TSS   | mg/L  | <5          |             |
| Oil and Grease                              | mg/L  | 83          |             |
| Bicarbonate Alkalinity (CaCO <sub>3</sub> ) | mg/L  | 83          |             |
| Total Alkalinity (CaCO <sub>3</sub> )       | mg/L  | 564         |             |
| Sulfate (as SO <sub>4</sub> )               | mg/L  | 39          |             |
| Chloride                                    | mg/L  | 134         |             |
| Calcium                                     | mg/L  | 60          |             |
| Magnesium                                   | mg/L  | 56          |             |
| Sodium                                      | mg/L  | 18          |             |
| Potassium                                   | mg/L  | 0.076       |             |
| Cobalt (dissolved)                          | mg/L  | 2.58        |             |
| Manganese (dissolved)                       | mg/L  | 0.13        |             |
| Nickel (dissolved)                          | mg/L  | 0.021       |             |
| Zinc (dissolved)                            | mg/L  | 30.6        |             |
| Iron (dissolved)                            | mg/L  | 3.0         |             |
| <b>Trigger Levels</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      |

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

■ Indicates analysis was not required

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

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

### 3.2 EPA SURFACE WATER MONITORING

Routine quarterly surface water monitoring was not required to be undertaken during March 2018. The next round of quarterly surface water monitoring is scheduled to be undertaken in May 2018.

## 4 AIR QUALITY MONITORING RESULTS

### 4.1 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.

HVAS Total Suspended Particulate analysis results are shown in **Table 3**. PM<sub>10</sub> Suspended Particulate Matter results are shown in **Table 4**.

**Table 3** Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$  0°C 101.3 kPa)

| RUN DATE  | TSP ( $\mu\text{g}/\text{m}^3$ ) | SAMPLE NUMBER | FILTER NUMBER | DATE FILTER OFF | TIME FILTER OFF | FIELD TECH | HOURS RUN |
|-----------|----------------------------------|---------------|---------------|-----------------|-----------------|------------|-----------|
| 02-Mar-18 | 16                               | 03186880029   | 9410966       | 06-Mar-18       | 10:35           | Client     | 24.00     |
| 08-Mar-18 | 9                                | 03186880031   | 9410992       | 13-Mar-18       | 16:05           | Client     | 24.00     |
| 14-Mar-18 | 21                               | 03186880033   | 9410494       | 19-Mar-18       | 8:35            | Client     | 24.00     |
| 20-Mar-18 | 36                               | 03186880035   | 9410999       | 21-Mar-18       | 7:50            | Client     | 24.00     |
| 26-Mar-18 | 17                               | 03186880037   | 9417827       | 27-Mar-18       | 10:35           | Client     | 24.00     |

**Table 4** Suspended Particulate Matter PM<sub>10</sub> ( $\mu\text{g}/\text{m}^3$  0°C 101.3 kPa)

| RUN DATE  | PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ ) | SAMPLE NUMBER | FILTER NUMBER | DATE FILTER OFF | TIME FILTER OFF | FIELD TECH | HOURS RUN |
|-----------|---|---------------|---------------|-----------------|-----------------|------------|-----------|
| 02-Mar-18 | 8   | 03186880030   | 9410928       | 06-Mar-18       | 10:40           | Client     | 24.00     |
| 08-Mar-18 | 5   | 03186880032   | 9410993       | 13-Mar-18       | 16:10           | Client     | 23.02     |
| 14-Mar-18 | 6   | 03186880034   | 9410998       | 19-Mar-18       | 8:40            | Client     | 24.00     |
| 20-Mar-18 | 16  | 03186880036   | 9410500       | 21-Mar-18       | 7:55            | Client     | 24.00     |
| 26-Mar-18 | 6   | 03186880038   | 9520631       | 27-Mar-18       | 10:40           | 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* (from April 2017 to March 2018) for the TSP unit is  $19.8\mu\text{g}/\text{m}^3$ , which is below the allowable limit of  $90\mu\text{g}/\text{m}^3$ .

#### 4.1.2 PM<sub>10</sub> Summary

The NSW EPA 24h Maximum PM<sub>10</sub> allowable limit is  $50\mu\text{g}/\text{m}^3$ . The EPA Annual Mean PM<sub>10</sub> allowable limit is  $25\mu\text{g}/\text{m}^3$ . All PM<sub>10</sub> HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the PM<sub>10</sub> unit is  $9.4\mu\text{g}/\text{m}^3$ , which is below the allowable limit of  $25\mu\text{g}/\text{m}^3$ . The 24 hour maximum allowable limit of  $50\mu\text{g}/\text{m}^3$  was not exceeded during the month of March 2018.

#### 4.1.3 Comments

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

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

## 4.2 DEPOSITIONAL DUST

Depositional Dust Gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. Depositional Dust monitoring results are shown in **Table 5**.

**Table 5** *Depositional Dust Monitoring - Deposited Matter – March 2018*

| SAMPLE NUMBER | DEPOSIT GAUGE | DATE SAMPLE STARTED | DATE SAMPLE COMPLETED | NUMBER OF DAYS | NOTES   | INSOLUBLE SOLIDS (g/m <sup>2</sup> .month) | ASH (g/m <sup>2</sup> .month) | COMBUSTIBLE MATTER (g/m <sup>2</sup> .month) |
|---------------|---------------|---------------------|-----------------------|----------------|---------|--|-------------------------------|--|
| 03186880019   | D1            | 12/02/2018          | 13/03/2018            | 29             | IT      | 0.9  | 0.3                           | 0.6  |
| 03186880020   | D2            | 12/02/2018          | 13/03/2018            | 29             | Removed | --   | --                            | --   |
| 03186880021   | D3            | 12/02/2018          | 13/03/2018            | 29             | IT      | 0.6  | 0.4                           | 0.2  |
| 03186880022   | D4            | 12/02/2018          | 13/03/2018            | 29             | IT      | 0.3  | 0.1                           | 0.2  |
| 03186880023   | D5            | 12/02/2018          | 13/03/2018            | 29             | IT      | 0.8  | 0.5                           | 0.3  |
| 03186880024   | D6            | 12/02/2018          | 13/03/2018            | 29             | IT      | 0.7  | 0.4                           | 0.3  |

Glossary of Terms Used in Notes:

IT Insects and tree litter

-- No data. Depositional dust gauge D2 is located on private property and was requested to be removed by the property owner.

### 4.2.1 Allowable Depositional Dust Limits

The EPA long term (annual average) Dust Limit is 4g/m<sup>2</sup> per month. All Depositional Dust results during this monitoring period are in compliance with consent conditions. The annual average for Dust Gauges D1, D2, D3, D4, D5 and D6 are all less than or equal to 0.7g/m<sup>2</sup> per month, which is below the allowable Annual average long term limit of 4g/m<sup>2</sup> per month.

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

## 5 BLASTING RESULTS

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

## 6 NOISE MONITORING RESULTS

Quarterly noise monitoring for the quarter 1 period (January – March 2018), was undertaken during March 2018. The noise monitoring results are contained in *RCA Australia Environmental Noise Survey Report 6880-N144.0*.

## 7 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.

## 8 SUMMARY

During the month of March 2018 environmental monitoring results were found to be generally in compliance with EPL 4911 with the exception of pH in groundwater samples P6 and P7 and electrical conductivity in groundwater sample P6.

Standing water levels within the site groundwater bores were compliant with their respective trigger levels. Groundwater bore P6 reported a pH below the lower trigger level range criterion whilst the electrical conductivity exceeded the site specific trigger level. Groundwater bore P6 reported a pH compliant with the trigger level range; the electrical conductivity exceeded the trigger level.

Rolling annual averages from both the TSP and PM<sub>10</sub> High Volume Air Samplers are currently well 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.

Pine Dale Mine ceased operation in March 2014 and therefore no blasting occurred at the site.

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Please contact the undersigned if you have any queries.

Yours sincerely



Carmen Rocher  
Environmental Engineer  
RCA Australia Pty Ltd



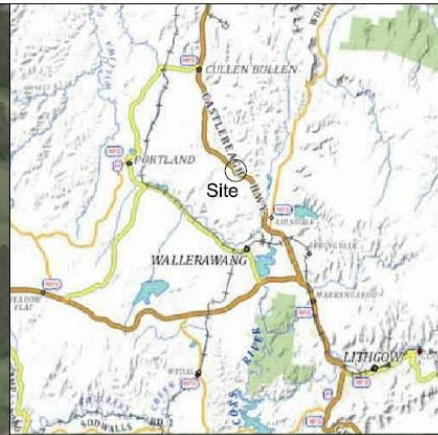
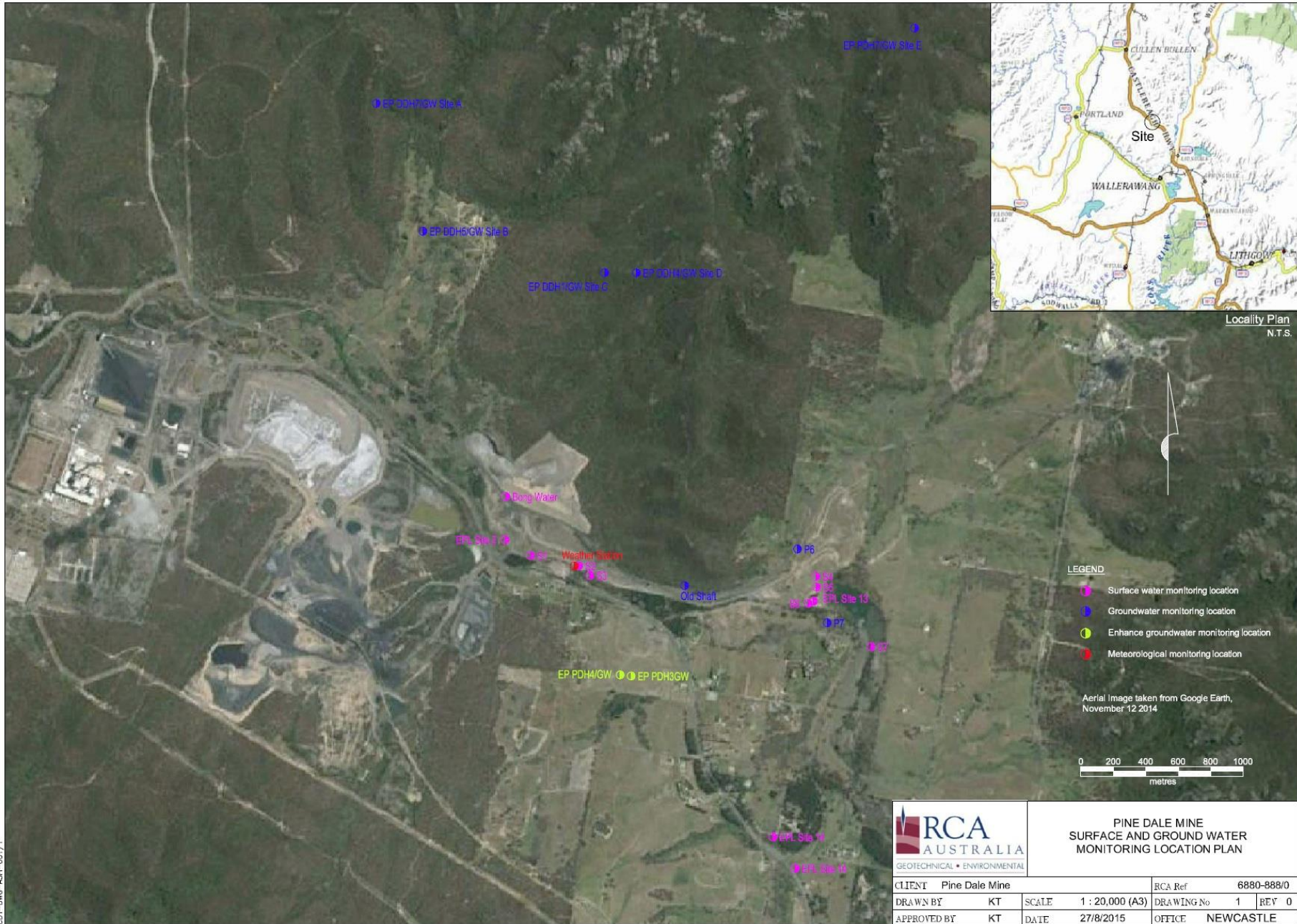
Denton Mauldin  
Environmental Services Manager  
RCA Australia Pty Ltd



# Appendix 1

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## Surface Water Groundwater and Air Quality Monitoring Locations



Locality Plan  
N.T.S.

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

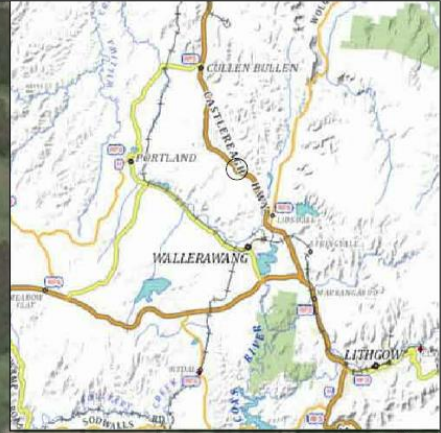
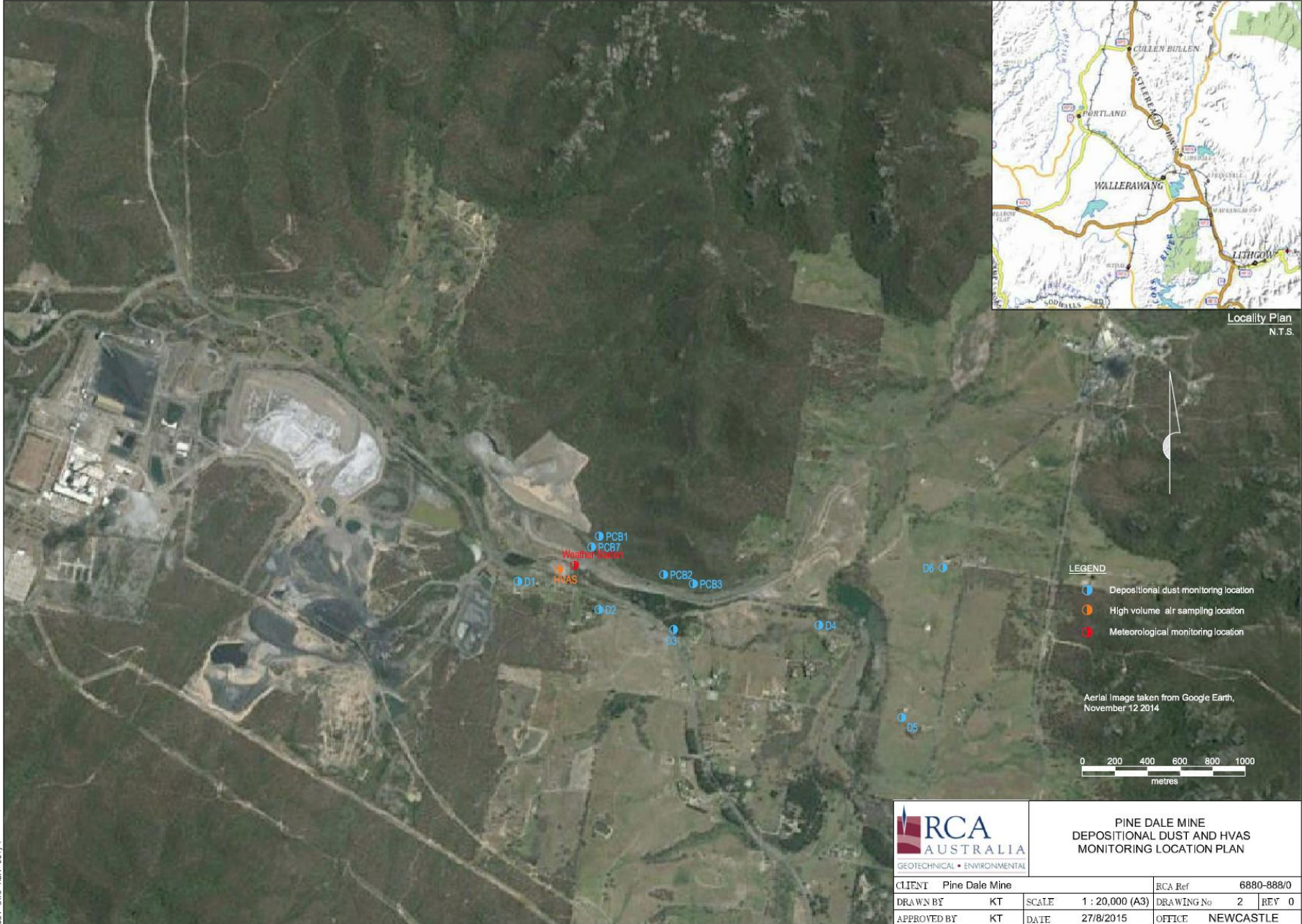
Aerial Image taken from Google Earth,  
November 12 2014



**PINE DALE MINE  
SURFACE AND GROUND WATER  
MONITORING LOCATION PLAN**

|             |                |            |                 |
|-------------|----------------|------------|-----------------|
| CLIENT      | Pine Dale Mine | RCA Ref    | 6880-888/0      |
| DRAWN BY    | KT             | SCALE      | 1 : 20,000 (A3) |
| APPROVED BY | KT             | DATE       | 27/8/2015       |
|             |                | DRAWING No | 1               |
|             |                | REV        | 0               |
|             |                | OFFICE     | NEWCASTLE       |

6880-888/0-1



Locality Plan  
N.T.S.

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

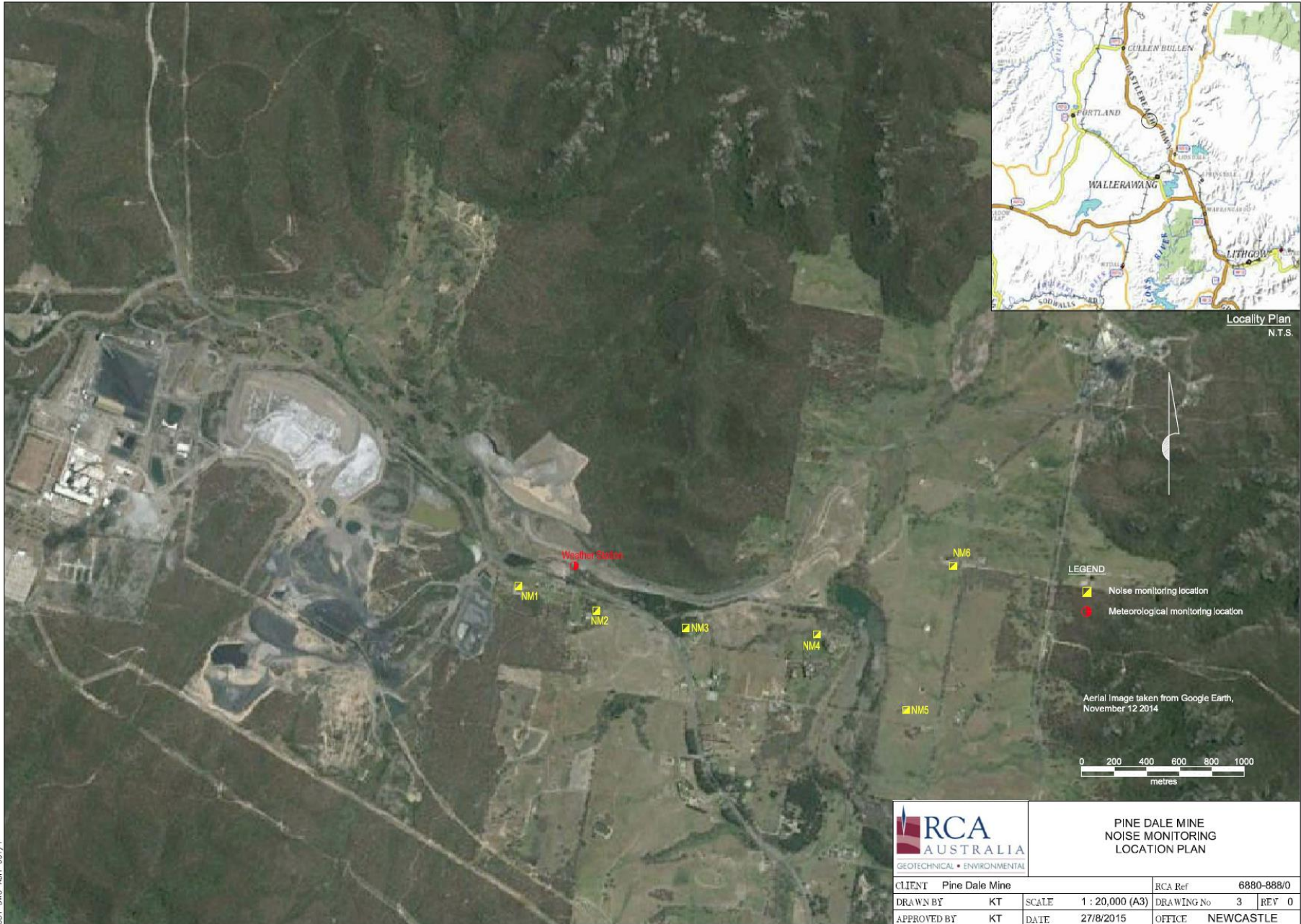
Aerial Image taken from Google Earth, November 12 2014



**PINE DALE MINE  
DEPOSITIONAL DUST AND HVAS  
MONITORING LOCATION PLAN**

|             |                |            |                 |
|-------------|----------------|------------|-----------------|
| CLIENT      | Pine Dale Mine | RCA Ref    | 6880-888/0      |
| DRAWN BY    | KT             | SCALE      | 1 : 20,000 (A3) |
| APPROVED BY | KT             | DATE       | 27/8/2015       |
|             |                | DRAWING No | 2               |
|             |                | OFFICE     | NEWCASTLE       |
|             |                | REV        | 0               |

COT-DWC-ASH-001/1



Locality Plan  
N.T.S.

- LEGEND**
- Noise monitoring location
  - Meteorological monitoring location

Aerial Image taken from Google Earth,  
November 12 2014



**PINE DALE MINE  
NOISE MONITORING  
LOCATION PLAN**

|             |                |       |                 |            |           |
|-------------|----------------|-------|-----------------|------------|-----------|
| CLIENT      | Pine Dale Mine |       | RCA Ref         | 6880-888/0 |           |
| DRAWN BY    | KT             | SCALE | 1 : 20,000 (A3) | DRAWING No | 3 REV 0   |
| APPROVED BY | KT             | DATE  | 27/8/2015       | OFFICE     | NEWCASTLE |

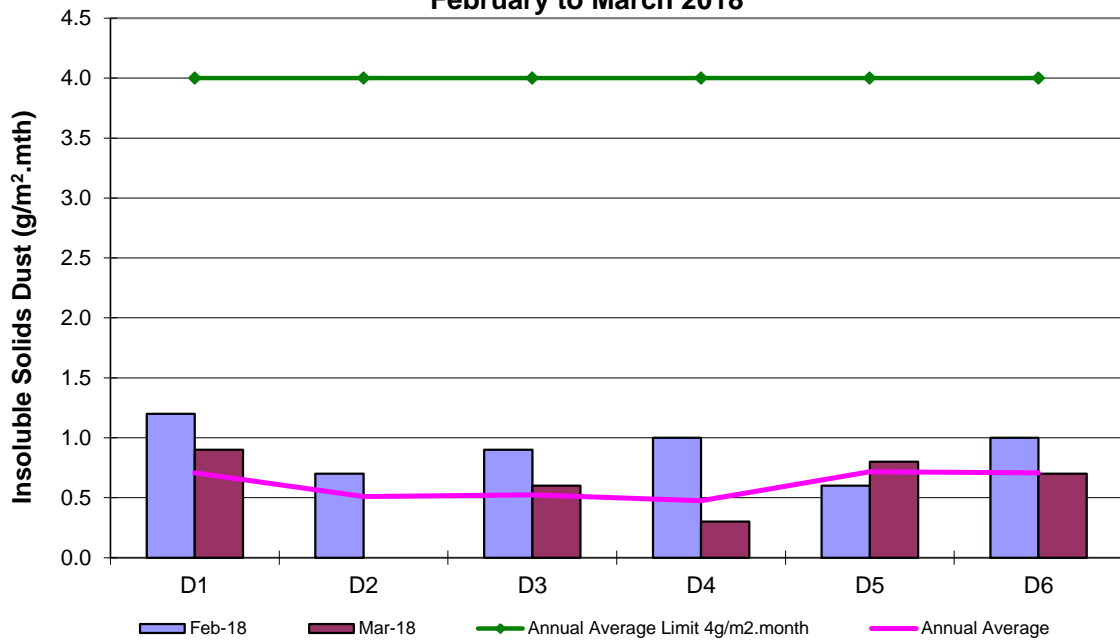
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# Appendix 2

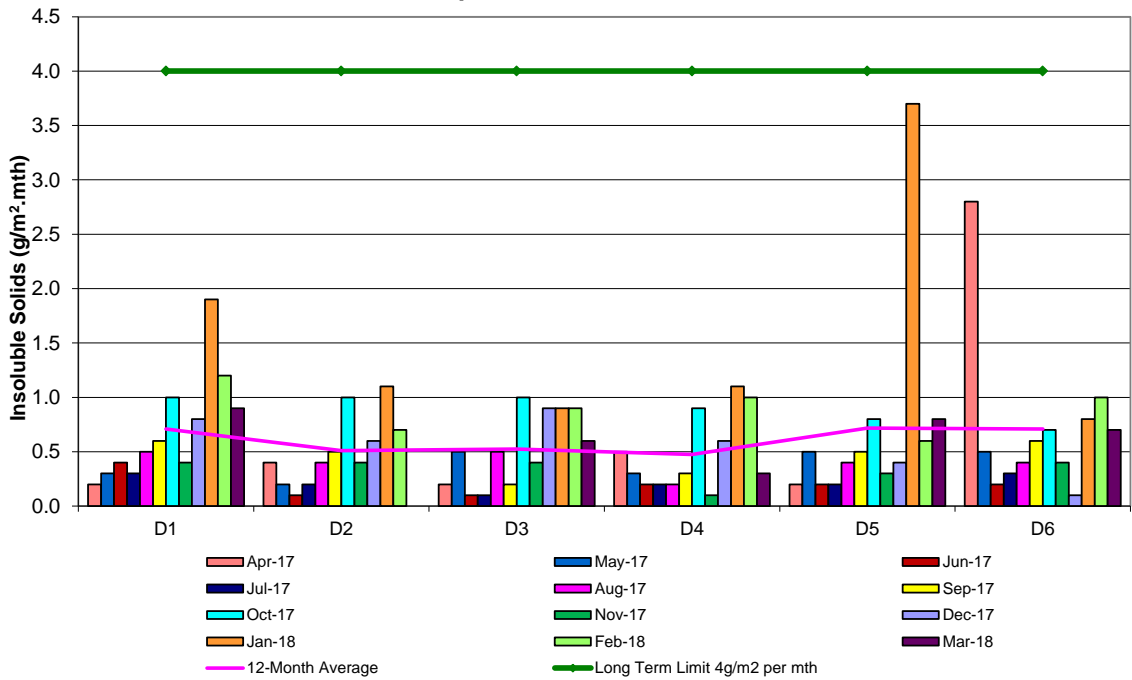
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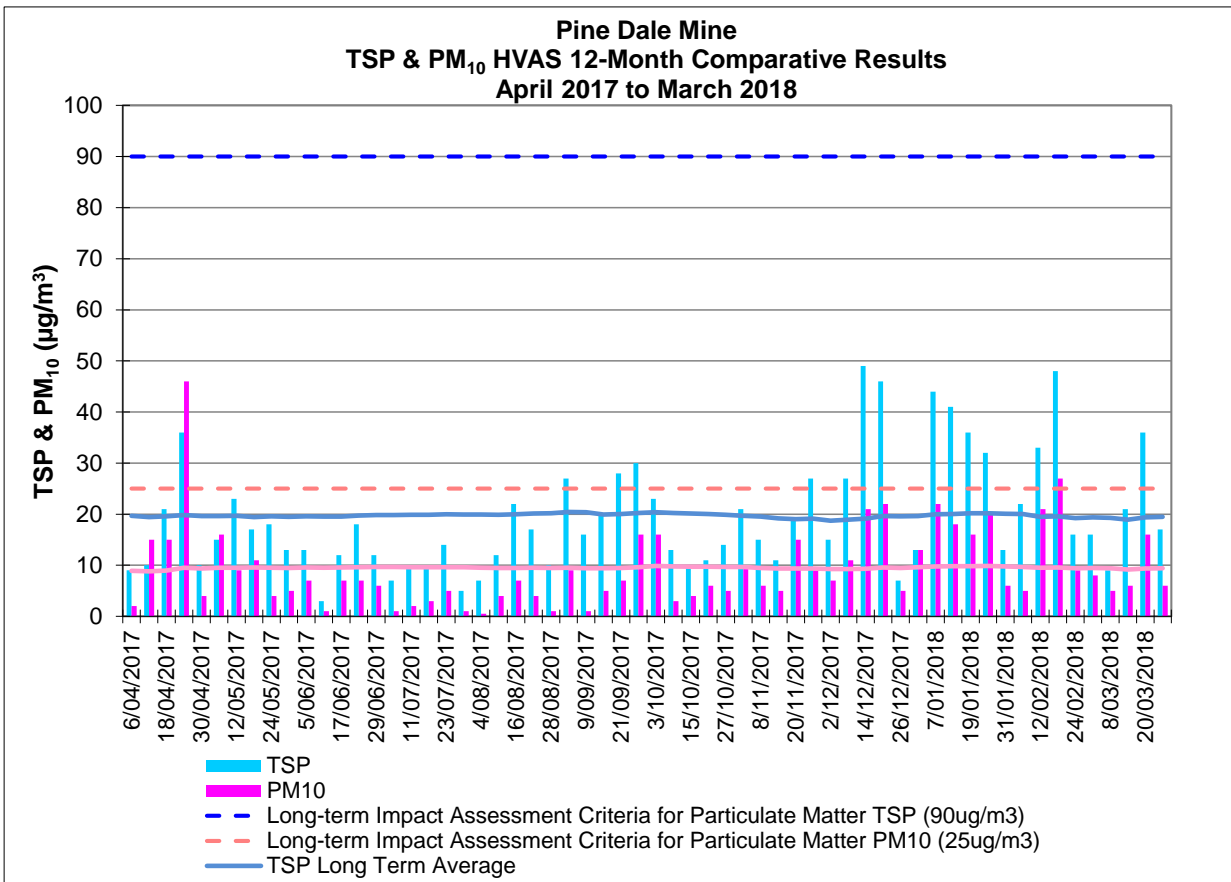
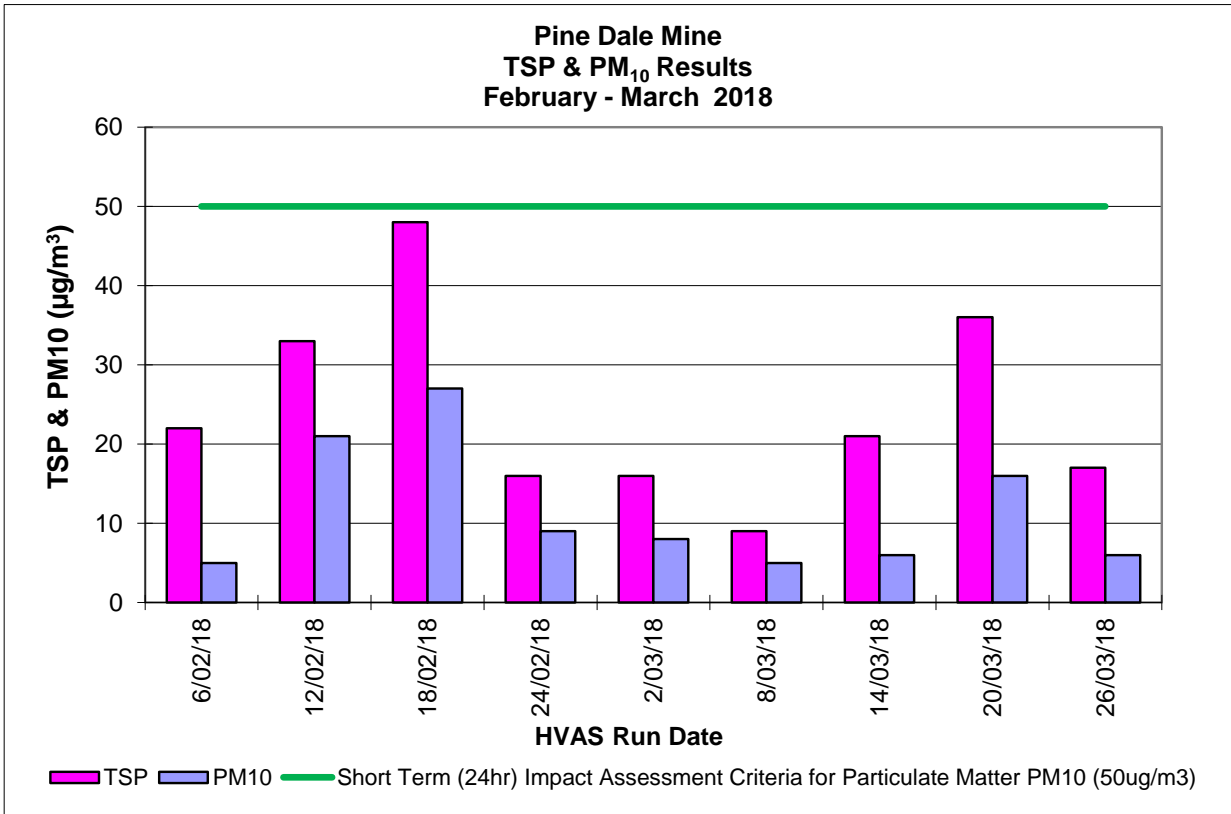
Depositional Dust and HVAS Graphs

**Pine Dale Mine  
Depositional Dust Gauge Comparative Results  
February to March 2018**



**Pine Dale Mine  
Deposited Matter - Insoluble Solids 12 Months Comparative Results  
April 2017 to March 2018**





# Appendix 3

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Meteorological Data



