

**HUNTER VALLEY  
OPERATIONS**



**Monthly  
Environmental  
Monitoring Report**

**Hunter Valley Operations**

**April 2019**

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## Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environment & Community Officer	Draft	20/05/2019
1.1	Environment & Community Coordinator	Final	9/07/2019



# 1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Hunter Valley Operations (HVO). This report includes all monitoring data collected for the period 1 April to 30 April 2019.

## 2.0 AIR QUALITY

### 2.1 Meteorological Monitoring

HVO maintains two meteorological stations; 'Corporate' and 'Cheshunt' (Refer to Figure 4: Air Quality Monitoring Location Plan).

#### 2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the 2019 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2019	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
April	1.4	244.4

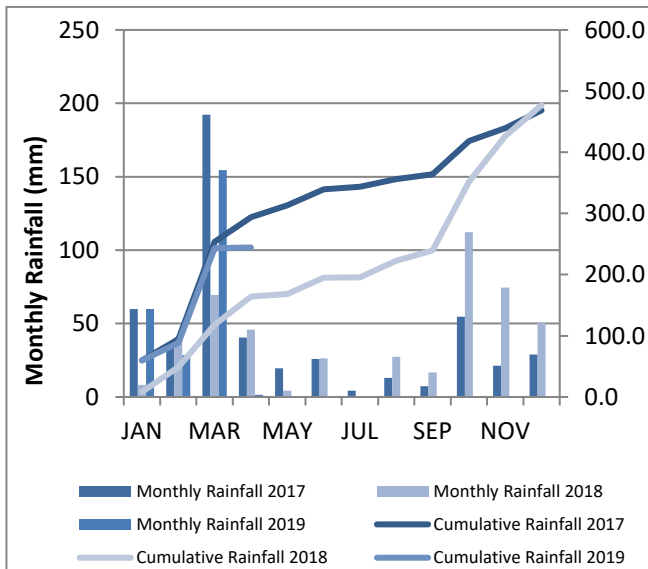


Figure 1: Rainfall Summary 2019

#### 2.1.2 Wind Speed and Direction

South-Easterly winds were dominant during April as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

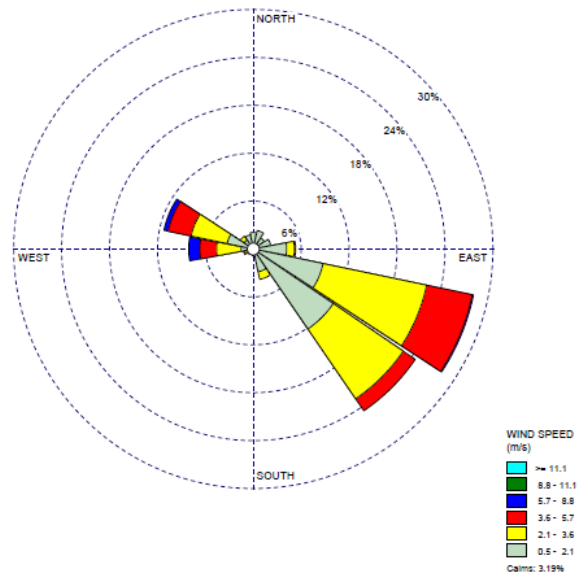


Figure 2: HVO Corporate Wind Rose - April 2019

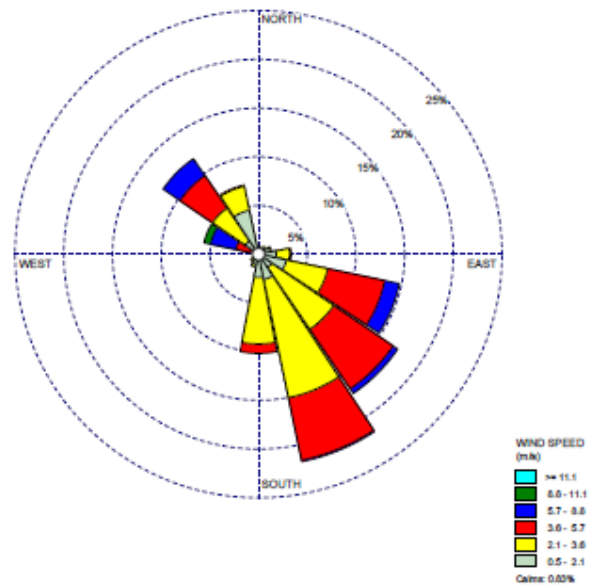


Figure 3: HVO Cheshunt Wind Rose - April 2019

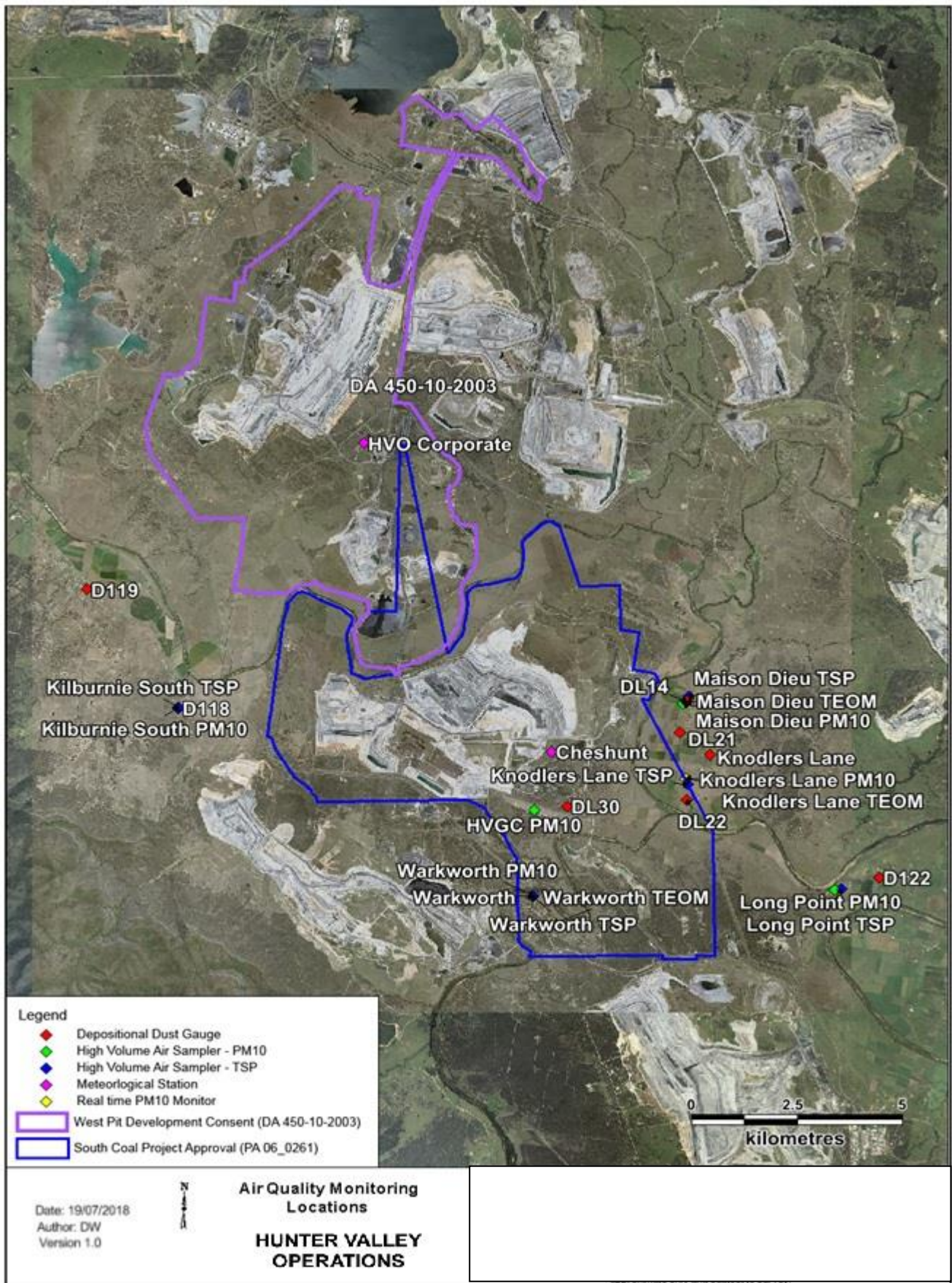


Figure 4: Air Quality Monitoring Location Plan

## 2.2 Depositional Dust

To monitor regional air quality, HVO operates and maintains a network of nine depositional dust gauges, situated on private and mine owned land surrounding HVO.

Figure 5 displays insoluble solids results from depositional dust gauges during the reporting period compared against the annual impact assessment criteria.

During the reporting period, D118 and DL22 monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m<sup>2</sup> per month. No sample was collected for the Warkworth monitor due to a broken sample jar.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

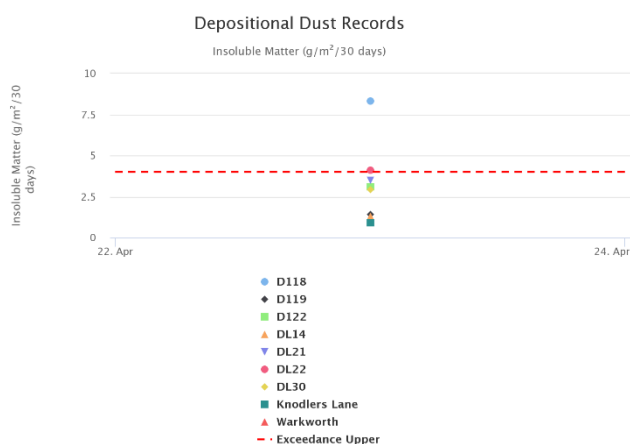


Figure 5: Depositional Dust Results – April 2019

## 2.3 Suspended Particulates

Suspended particulates are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM<sub>10</sub>). The location of these monitors can be found in Figure 4. Each HVAS was run for 24 hours on a six-day cycle.

### 2.3.1 HVAS PM<sub>10</sub> Results

Figure 6 shows individual PM<sub>10</sub> results at each monitoring station against the short term impact assessment criteria of 50 µg/m<sup>3</sup>.

On 8 April 2019, the Knodlers Lane HVAS unit recorded an elevated 24 hour averages of 76µg/m<sup>3</sup>, with HVO's maximum contribution was calculated to be 53.5 µg/m<sup>3</sup> or 70.4% of the total measured result.

On 26 April 2019, the Knodlers Lane HVAS unit recorded an elevated 24 hour averages of 54µg/m<sup>3</sup>, with HVO's maximum contribution was calculated to be 22 µg/m<sup>3</sup> or 40.7% of the total measured result.

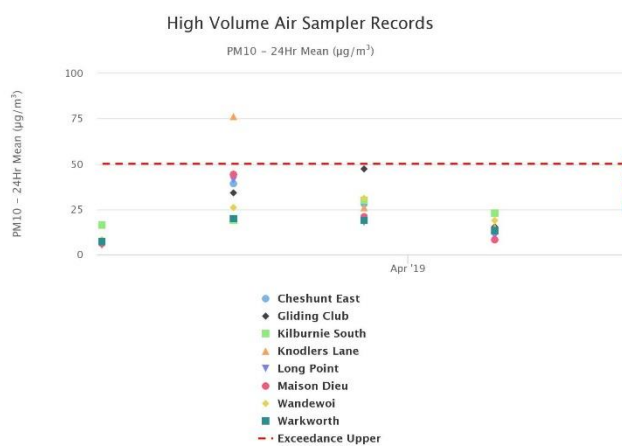


Figure 6: Individual PM<sub>10</sub> Results – April 2019

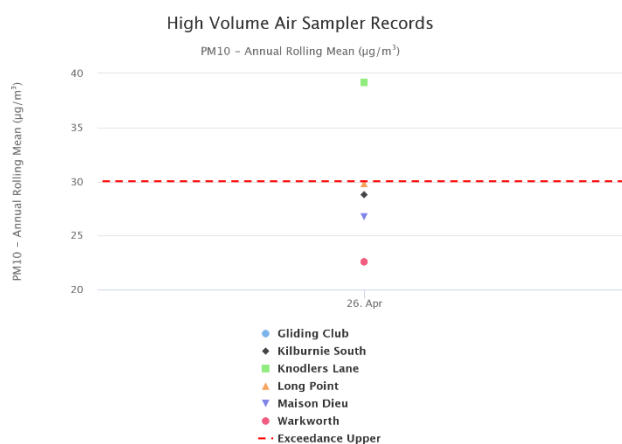


Figure 7 shows the year to date annual average PM<sub>10</sub> results.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

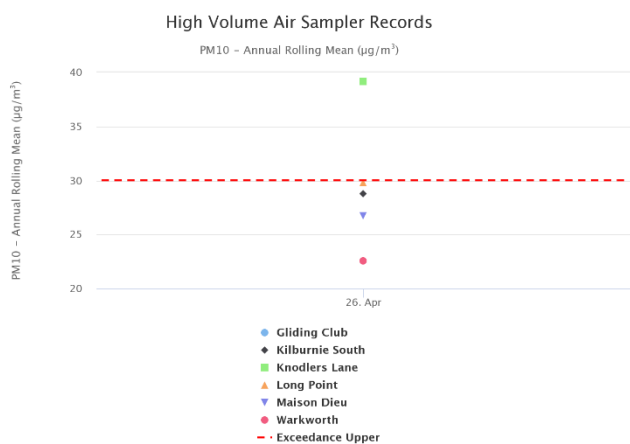


Figure 7: Year to Date Average PM<sub>10</sub> – as at end of April 2019

### 2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m<sup>3</sup>.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

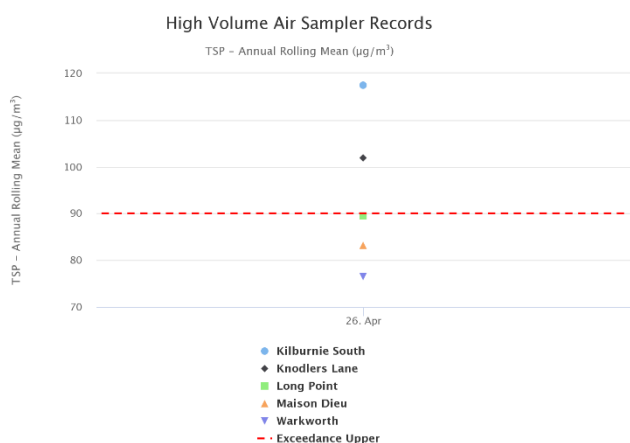


Figure 8: Year to Date Average Total Suspended Particulates – as at end of April 2019

### 2.3.3 Real Time PM<sub>10</sub> Results

Hunter Valley Operations maintains a network of real time PM<sub>10</sub> monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger limits. Results from real time PM<sub>10</sub> monitoring are used as a reactive measure to guide mining operations to help achieve compliance with the relevant conditions of the project approval.

Results for real time dust sampling is shown in Figure 9, including the daily 24 hour average PM<sub>10</sub> result and the year to date 24 hour PM<sub>10</sub> annual average.

Results from investigations of elevated results are presented in Table 2.

### 2.3.4 Real Time Alarms for Air Quality

During April the real time monitoring system generated 223 automated air quality related alarms. 90 alarms were related to adverse weather conditions and 133 alarms relating to PM<sub>10</sub>.



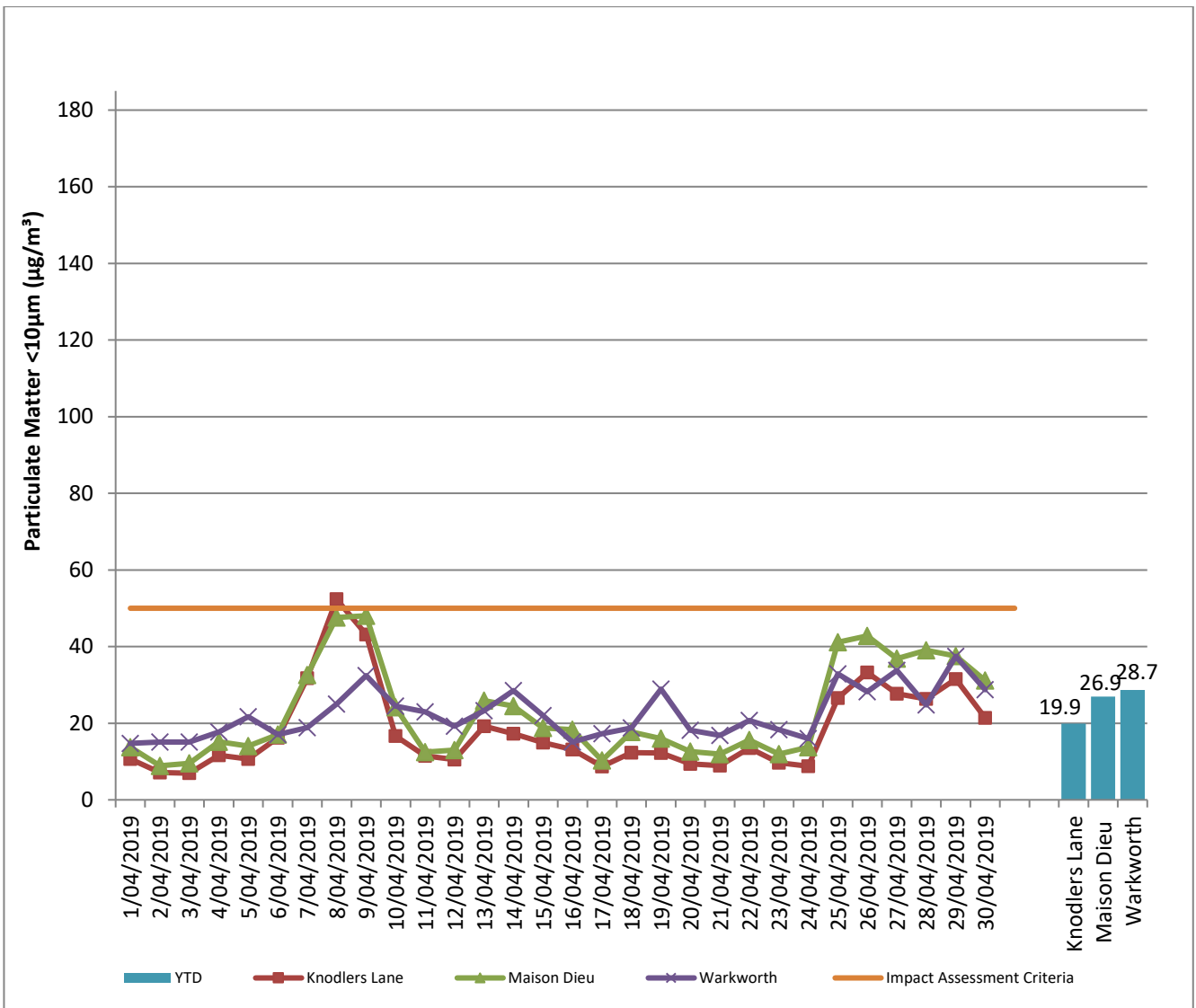


Figure 9: Real Time PM<sub>10</sub> 24hr average and YTD average – April 2019

**Table 2: Real-time PM10 Investigation Results**

<b>Date</b>	<b>Site</b>	<b>Total Measured Result (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Estimated contribution from HVO (<math>\mu\text{g}/\text{m}^3</math> / %)</b>	<b>Discussion</b>
08/04/2019	Knodlers Lane TEOM	52.4	18.9 $\mu\text{g}/\text{m}^3$  Or  36%	An internal investigation determined HVO maximum potential contribution to be in the order of 18.9 $\mu\text{g}/\text{m}^3$ or 36% of the total measured based on prevailing wind conditions and upwind TEOM monitoring results.

## **3.0 WATER QUALITY**

HVO maintains a network of surface water and groundwater monitoring sites.

### **3.1 Surface Water**

Surface water courses are sampled on a quarterly sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS).

Results of monitoring on Site Dams and the Hunter River as well as other natural tributaries are provided on a quarterly basis, results will appear in the June 2019 report.

### **3.2 Site Water Use**

Under water allocation licences issued by the Water NSW, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO extracted 281.6 ML of water from the Hunter River.

### **3.3 HRSTS Discharge**

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing discharge from licensed discharge points Dam 11N (to Farrell's Creek), Lake James (to the Hunter River) and Parnell's Dam (to Parnell's Creek). Discharges can only take place subject to HRSTS regulations.

During the reporting period no water was discharged under the HRSTS.

### **3.4 Groundwater Monitoring Results**

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Results of groundwater monitoring are reported quarterly and as such will be reported in the June 2019 monthly report.

## 4.0 BLASTING

HVO have a network of five blast monitoring units. These are located at nearby privately owned residences and function as regulatory compliance monitors. The location of these monitors can be found in Figure 12.

Blasting criteria are summarised in Table 3.

**Table 3: Blasting Criteria**

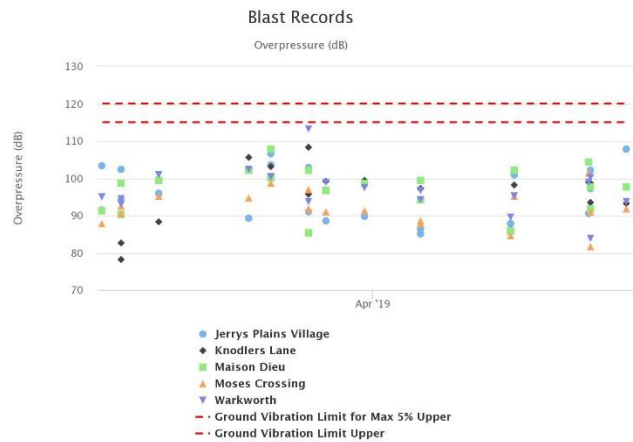
Airblast Overpressure (dB(L))	Comments
115	5% of the total number of blasts in a 12 month period
120	0%
Ground Vibration (mm/s)	Comments
5	5% of the total number of blasts in a 12 month period
10	0%

## 4.1 Blast Monitoring Results

During April, 12 blasts were initiated at HVO



Figure 10 and 11 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 3.



**Figure 10: Overpressure Blast Monitoring Results – April 2019**

**Figure 11: Ground Vibration Blast Monitoring Results – April 2019**

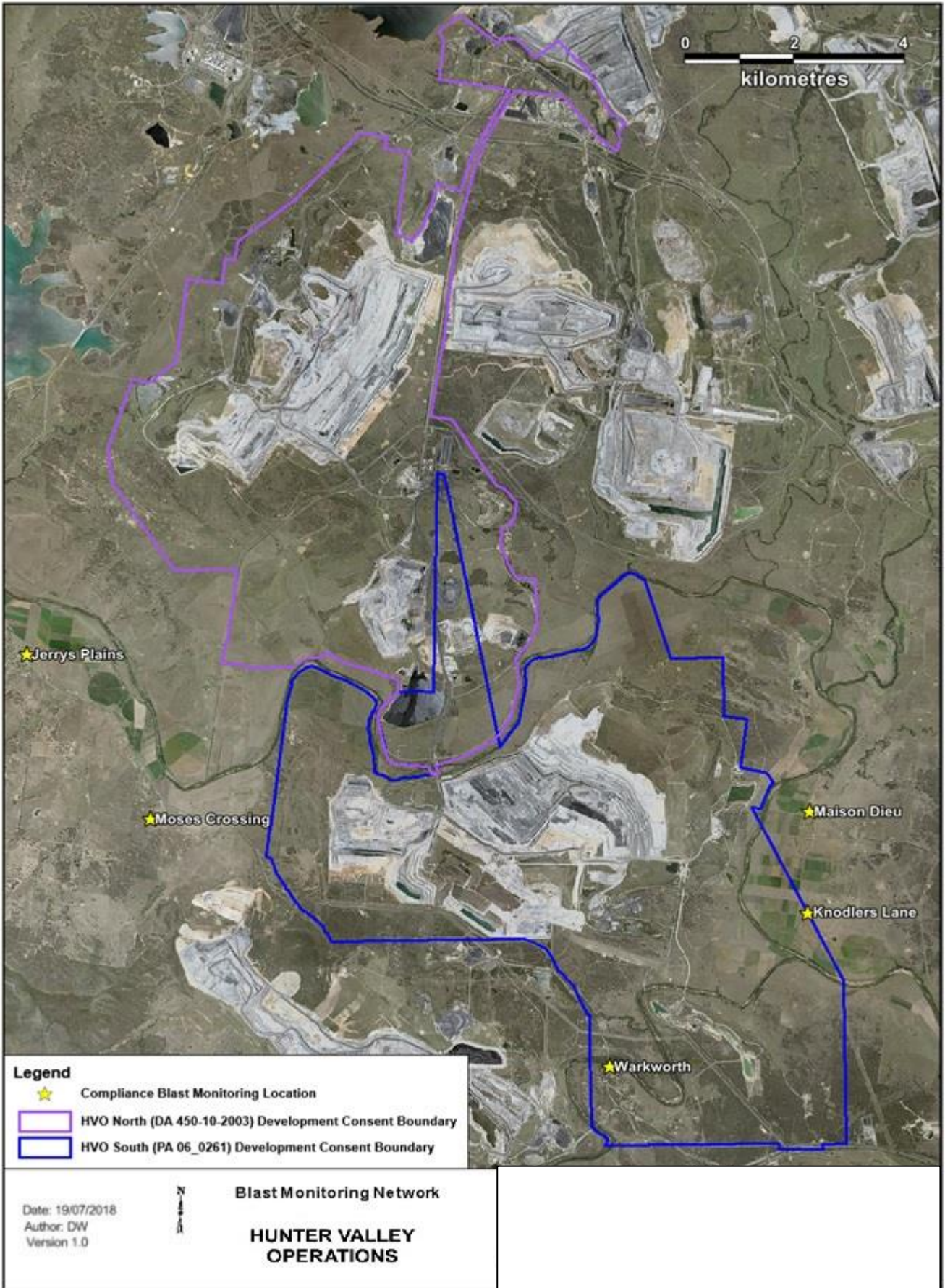


Figure 12: Blast Monitoring Location Plan

## 5.0 NOISE

Routine attended noise monitoring is carried out at defined locations around HVO as described in the HVO Noise Monitoring Programme. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Unattended monitoring (real time noise monitoring) also occurs at five sites surrounding HVO. The attended noise monitoring locations are displayed in Figure 13.

### 5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night of 4-5 April 2019. Monitoring results are detailed in Table 4 to Table 8 . During April attended noise monitoring, noise levels complied with the relevant development consent noise limits at all monitoring locations.

**Table 4: LAeq, 15 minute HVO South - Impact Assessment Criteria – April 2019**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	VTG °C/100m <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO South LAeq dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
Knodlers Lane	5/04/2019 0:12	2.5	-1	39	Yes	IA	Nil
Maison Dieu	4/04/2019 23:51	3.3	0.5	39	No	<30	NA
Shearers Lane	4/04/2019 23:29	3.5	-1	41	No	NM	NA
Kilburnie South	4/04/2019 22:54	3.1	-1	39	No	32	NA
Jerrys Plains Village	4/04/2019 21:21	3.9	0.5	35	No	IA	NA
Jerrys Plains East	4/04/2019 21:00	3.9	-1	35	No	IA	NA
Long Point Road	4/04/2019 21:00	3.9	-1	35	No	IA	NA
HVGC	4/04/2019 23:37	3.5	-1	55	No	IA	NA

**Notes:**

1. Atmospheric data is sourced from the HVO Cheshunt weather station (MTW Charlton Ridge for Long Point) using logged meteorological data;
2. Assumed noise emission limits apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq, 15minute attributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of criteria;
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;

**Table 5: LA1, 1minute HVO South - Impact Assessment Criteria – April 2019**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	VTG °C/100m <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO South LA1, 1min dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
Knodlers Lane	5/04/2019 0:12	2.5	-1	45	Yes	IA	Nil
Maison Dieu	4/04/2019 23:51	3.3	0.5	45	No	40	NA
Shearers Lane	4/04/2019 23:29	3.5	-1	45	No	NM	NA
Kilburnie South	4/04/2019 22:54	3.1	-1	45	No	35	NA
Jerrys Plains Village	4/04/2019 21:21	3.9	0.5	45	No	IA	NA
Jerrys Plains East	4/04/2019 21:00	3.9	-1	45	No	IA	NA
Long Point Road	4/04/2019 21:00	3.9	-1	45	No	IA	NA
HVGC	4/04/2019 23:37	3.5	-1	NA	NA	IA	NA

**Notes:**

1. Atmospheric data is sourced from the HVO Cheshunt weather station (or MTW Charlton Ridge for Long Point) using logged meteorological data;
2. Assumed noise emission limits (see Section 2.3 of this report for more information) apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. These are results for HVO South Pit Area in the absence of all other noise sources;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;

**Table 6: LAeq, 15minute HVO North – Impact Assessment Criteria – April 2019**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	VTG °C/100m <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO North LAeq dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
Knodlers Lane	5/04/2019 0:12	1.4	0.5	35	Yes	IA	Nil
Maison Dieu	4/04/2019 23:51	1.5	0.5	35	Yes	IA	Nil
Shearers Lane	4/04/2019 23:29	1.8	0.5	35	Yes	IA	Nil
Kilburnie South	4/04/2019 22:54	1.9	0.5	39	Yes	IA	Nil
Jerrys Plains Village	4/04/2019 21:21	2.6	-1	36	Yes	IA	Nil
Jerrys Plains East	4/04/2019 21:00	3.1	-1	39	No	IA	NA
Long Point Road	4/04/2019 21:00	3.1	-1	35	No	IA	NA
HVGC	4/04/2019 23:37	1.8	0.5	NA	NA	IA	NA

**Notes:**

1. Atmospheric data is sourced from the HVO Corp. weather station (or MTW Charlton Ridge for Long Point) using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq, 15minute attributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable.

**Table 7: LAeq,15minute HVO North - Land Acquisition Criteria – April 2019**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	VTG °C/100m <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO North LAeq dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
Knodlers Lane	5/04/2019 0:12	1.4	0.5	41	Yes	IA	Nil
Maison Dieu	4/04/2019 23:51	1.5	0.5	41	Yes	IA	Nil
Shearers Lane	4/04/2019 23:29	1.8	0.5	41	Yes	IA	Nil
Kilburnie South	4/04/2019 22:54	1.9	0.5	41	Yes	IA	Nil
Jerrys Plains Village	4/04/2019 21:21	2.6	-1	41	Yes	IA	Nil
Jerrys Plains East	4/04/2019 21:00	3.1	-1	41	No	IA	NA
Long Point Road	4/04/2019 21:00	3.1	-1	41	No	IA	NA
HVGC	4/04/2019 23:37	1.8	0.5	NA	NA	IA	NA

**Notes:**

1. Atmospheric data is sourced from the HVO Corp. weather station (or MTW Charlton Ridge for Long Point) using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq, 15minute attributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable.



**Table 8: LA1, 1Minute HVO North - Impact Assessment Criteria – April 2019**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	VTG °C/100m <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO North LA1, 1min dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
Knodlers Lane	5/04/2019 0:12	1.4	0.5	46	Yes	IA	Nil
Maison Dieu	4/04/2019 23:51	1.5	0.5	46	Yes	IA	Nil
Shearers Lane	4/04/2019 23:29	1.8	0.5	46	Yes	IA	Nil
Kilburnie South	4/04/2019 22:54	1.9	0.5	46	Yes	IA	Nil
Jerrys Plains Village	4/04/2019 21:21	2.6	-1	46	Yes	IA	Nil
Jerrys Plains East	4/04/2019 21:00	3.1	-1	46	No	IA	NA
Long Point Road	4/04/2019 21:00	3.1	-1	46	No	IA	NA
HVGC	4/04/2019 23:37	1.8	0.5	NA	NA	IA	NA

**Notes:**

1. Atmospheric data is sourced from the HVO Corp. (or MTW Charlton Ridge for Long Point) weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. These are results for HVO North Pit Area in the absence of all other noise sources;
4. Bold results in red indicate exceedance of criteria;
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable

## 5.2 NPfI Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. During April 2019 all measurements were compliant. The assessment for low frequency noise is shown in Table 9.

**Table 9: Low Frequency Noise Assessment – April 2019**

Location	Date and Time	Measured Site Only LA <sub>eq</sub> dB (Sth/Nth)	Site Only LC <sub>eq</sub> dB <sup>1</sup> (Sth/Nth)	Site-Only L <sub>C</sub> eq – LA <sub>eq</sub> dB <sup>1,2</sup> (Sth/Nth)	Result Max exceedance of ref spectrum dB <sup>1,3</sup> (Sth/Nth)	Penalty dB(A) <sup>1</sup> (Sth/Nth)
Knodlers Lane	5/04/2019 0:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Maison Dieu	4/04/2019 23:51	<30/IA	NA/NA	NA/NA	NA/NA	NA/NA
Shearers Lane	4/04/2019 23:29	NM/IA	NA/NA	NA/NA	NA/NA	NA/NA
Kilburnie South	4/04/2019 22:54	32/IA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains Village	4/04/2019 21:21	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains East	4/04/2019 21:00	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Long Point Road	4/04/2019 21:00	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA

**Notes:**

1. Where it is not possible to determine the site only result due to the presence of other low frequency noise sources occurring during the measurement, or where criteria were not applicable due to meteorological conditions, this is noted as NA (not available) and no further assessment has been undertaken;
2. As per NPfI, if L<sub>C</sub>eq – LA<sub>eq</sub> ≥ 15 dB further assessment of low frequency noise required as detailed in Sections 2.4 and 3.3 of the attended noise report;
3. As per NPfI, compare measured spectrum against reference spectrum to determine if the low frequency modifying factor is triggered and application of penalty is required.

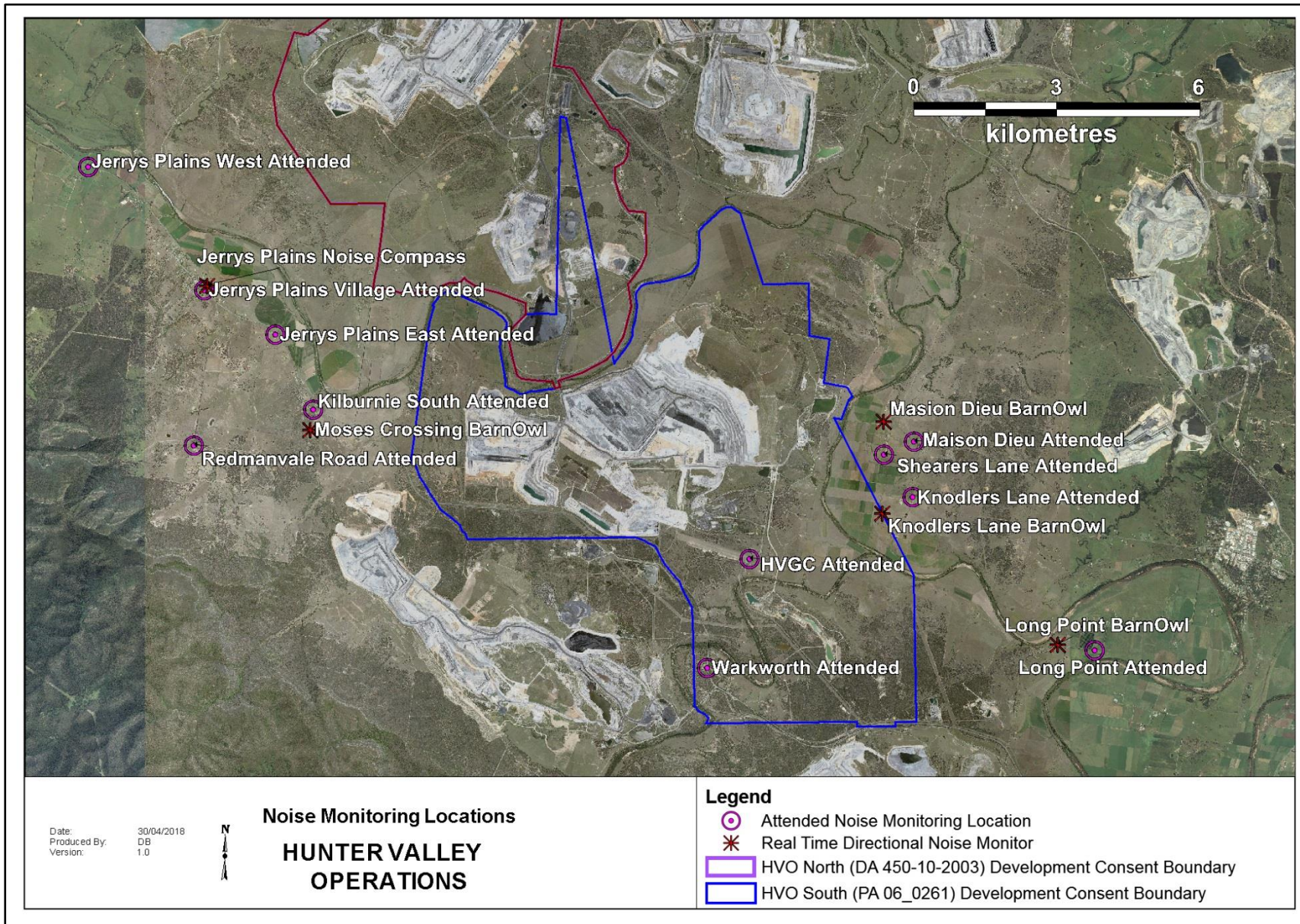


Figure 13: Noise Monitoring Location Plan

### 5.2.1 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis. Noise alarms are in place at five monitoring locations (Knodlers Lane, Maison Dieu, Jerrys Plains, Moses Crossing, and Long Point), which alert HVO staff to elevated noise levels likely to be attributable to HVO. Noise alarms are investigated and responded to with the appropriate level of operational modification. Changes in response to a noise alarm can include replacing equipment with quieter (noise attenuated) units, changing or relocating tasks, and shutting down equipment.

It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in Section 5.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

## 6.0 OPERATIONAL DOWNTIME

During April, a total of 6.05 hours of equipment downtime was logged in response to real time monitoring and visual inspections for environmental reasons such as dust, noise and meteorological conditions. Operational downtime by equipment type is shown in Figure 14.

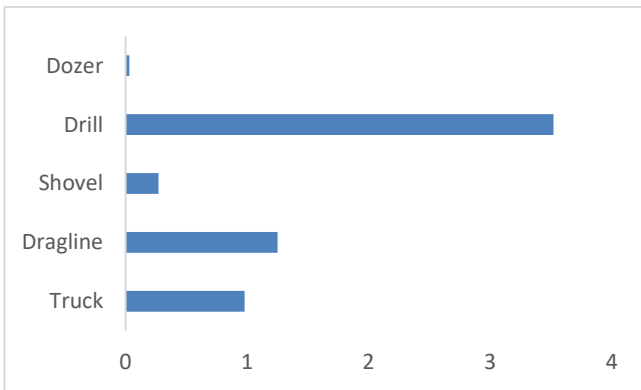


Figure 14: Operational Downtime by Equipment Type – April 2019

## 7.0 REHABILITATION

During April 1.65 Ha of land was released, 5.52 Ha of land was bulk shaped and 10.45 Ha of land was rehabilitated. Year to date progress can be viewed in Figure 15.

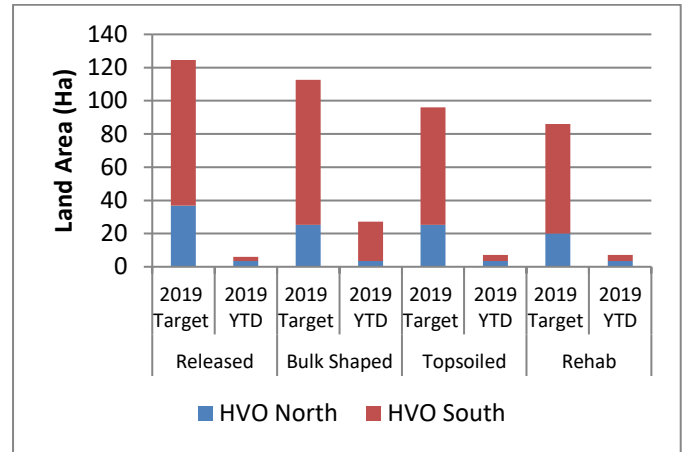


Figure 15: Rehabilitation YTD – April 2018

## 8.0 COMPLAINTS

Planning and Environment were notified once the invalid sample was confirmed.

One complaint was received during April in relation to regional dust levels.

Details of complaints received YTD are shown in Table 10 below.

**Table 10: Complaints Summary YTD**

	Noise	Dust	Blast	Lighting	Other	Total
<b>January</b>	-	-	-	-	-	-
<b>February</b>	-	-	-	-	-	-
<b>March</b>	-	1	-	-	-	1
<b>April</b>	-	1	-	-	-	1
<b>May</b>						
<b>June</b>						
<b>July</b>						
<b>August</b>						
<b>September</b>						
<b>October</b>						
<b>November</b>						
<b>December</b>						
<b>Total</b>	0	2	0	0	0	2

## 9.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were two recordable environmental incidents;

### **25 April 2019 – HVGC HVAS PM10 miss-capture**

The Environment and Community team were notified by the Hunter Valley Gliding Club that the PM10 High Volume Air Sampler (HVAS) at the site had been damaged by activities occurring at the club resulting in the sample not being captured on 26 April 2019 in accordance with the Air Quality Monitoring Programme. The power lead was removed from the unit on Friday 26 April for repair and returned to the unit on 30 April. The Department of

## **Appendix A: Meteorological Data**

**Table 11: Meteorological Data - HVO Corporate Meteorological Station – April 2019**

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/4/2019	23	4	100	36	1042	177	2	0.4
2/4/2019	22	9	100	60	1215	127	2	0.4
3/4/2019	25	8	100	35	809	134	2	0.2
4/4/2019	24	8	100	39	1110	130	2	0
5/4/2019	23	10	98	55	1108	134	2	0
6/4/2019	28	10	100	26	756	248	2	0
7/4/2019	31	12	73	14	755	279	3	0
8/4/2019	31	13	57	13	790	262	3	0
9/4/2019	31	10	79	15	1157	250	4	0
10/4/2019	22	6	82	33	1014	122	3	0
11/4/2019	23	5	90	37	1020	112	2	0
12/4/2019	23	8	98	38	913	118	2	0
13/4/2019	26	8	100	23	1071	173	1	0
14/4/2019	22	8	99	42	978	143	1	0
15/4/2019	23	7	100	33	874	135	1	0.2
16/4/2019	24	8	99	47	1025	128	2	0
17/4/2019	25	10	100	45	920	118	2	0
18/4/2019	26	13	100	36	709	154	2	0
19/4/2019	25	11	100	50	1080	117	2	0.2
20/4/2019	26	15	100	50	1007	117	3	0
21/4/2019	25	15	100	47	817	129	2	0
22/4/2019	25	14	100	48	764	125	2	0
23/4/2019	26	9	100	35	827	121	3	0
24/4/2019	26	14	100	35	750	131	2	0
25/4/2019	29	11	98	27	641	206	2	0
26/4/2019	27	12	43	22	794	273	5	0
27/4/2019	20	5	85	35	990	144	2	0
28/4/2019	24	7	90	17	663	262	3	0
29/4/2019	23	7	87	36	756	126	2	0
30/4/2019	22	4	100	44	626	148	1	0