



Monthly Environmental Monitoring Report

Yancoal Hunter Valley Operations

January 2018

CONTENTS

- 1.0 INTRODUCTION4
- 2.0 AIR QUALITY.....4
 - 2.1 Meteorological Monitoring4
 - 2.1.1 Rainfall4
 - 2.1.2 Wind Speed and Direction4
 - 2.2 Depositional Dust6
 - 2.3 Suspended Particulates6
 - 2.3.1 HVAS PM₁₀ Results6
 - 2.3.2 TSP Results7
 - 2.3.3 Real Time PM₁₀ Results7
 - 2.3.4 Real Time Alarms for Air Quality.....8
- 3.0 WATER QUALITY9
 - 3.1.1 Surface Water9
 - 3.1.2 Site Water Use9
 - 3.1.3 HRSTS Discharge.....9
 - 3.2.1 Groundwater Monitoring Results9
- 4.0 BLASTING9
 - 4.1 Blast Monitoring Results.....9
- 5.0 NOISE13
 - 5.1 Attended Noise Monitoring Results13
- 6.0 OPERATIONAL DOWNTIME.....18
- 7.0 REHABILITATION18
- 8.0 COMPLAINTS.....19
- 9.0 ENVIRONMENTAL INCIDENTS19
- Appendix A: Meteorological Data20

Figures

Figure 1: Rainfall Summary 2018	4
Figure 2: HVO Corporate Wind Rose – January 2018	4
Figure 3: HVO Cheshunt Wind Rose – January 2018	4
Figure 4: Air Quality Monitoring Location Plan	5
Figure 5: Depositional Dust Results – January 2018	6
Figure 6: Individual PM ₁₀ Results – January 2018	7
Figure 7: Year to Date Average PM ₁₀ – January 2018	7
Figure 8: Year to Date Average Total Suspended Particulates – January 2018	7
Figure 9: Real Time PM ₁₀ 24hr average and YTD average – January 2018	8
Figure 10: Moses Crossing Blast Monitoring Results – January 2018	10
Figure 11: Jerrys Plains Blast Monitoring Results – January 2018	10
Figure 12: Maison Dieu Blast Monitoring Results – January 2018	10
Figure 13: Warkworth Blast Monitoring Results – January 2018	10
Figure 14: Knodlers Lane Blast Monitoring Results – January 2018	11
Figure 15: Blast Monitoring Location Plan	12
Figure 16: Noise Monitoring Location Plan	17
Figure 17: Operational Downtime by Equipment Type – January 2018	18
Figure 18: Rehabilitation YTD – January 2018	18
Figure 19: Complaints Graph - January 2018	19

Tables

Table 1: Monthly Rainfall HVO	4
Table 2: Blasting Criteria	9
Table 3: L _{Aeq, 15 minute} HVO South - Impact Assessment Criteria – January 2018	13
Table 4: L _{Aeq, 15 minute} HVO South - Land Acquisition Criteria – January 2018	13
Table 5: L _{A1, 1minute} HVO South - Impact Assessment Criteria – January 2018	14
Table 6: L _{Aeq, 15minute} HVO North – Impact Assessment Criteria – January 2018	14
Table 7: L _{Aeq, 15minute} HVO North - Land Acquisition Criteria – January 2018	14
Table 8: L _{A1, 1Minute} HVO North - Impact Assessment Criteria – January 2018	15
Table 9: Low Frequency Noise Assessment - January 2018	16
Table 10: Meteorological Data - HVO Corporate Meteorological Station – January 2018	21

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	02/03/2018
1.1	Environmental Specialist	Final	20/3/2018

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 1st January to 31st January 2018.

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 2018 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2018	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January	8.2	8.2

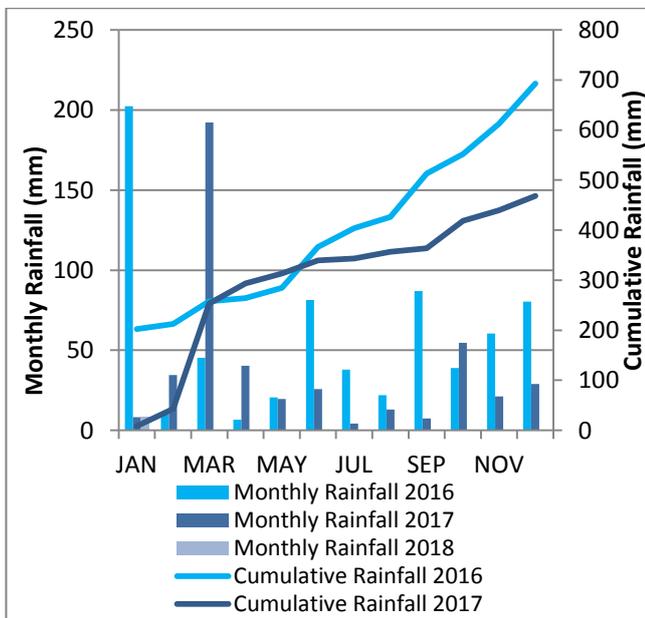


Figure 1: Rainfall Summary 2018

2.1.2 Wind Speed and Direction

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

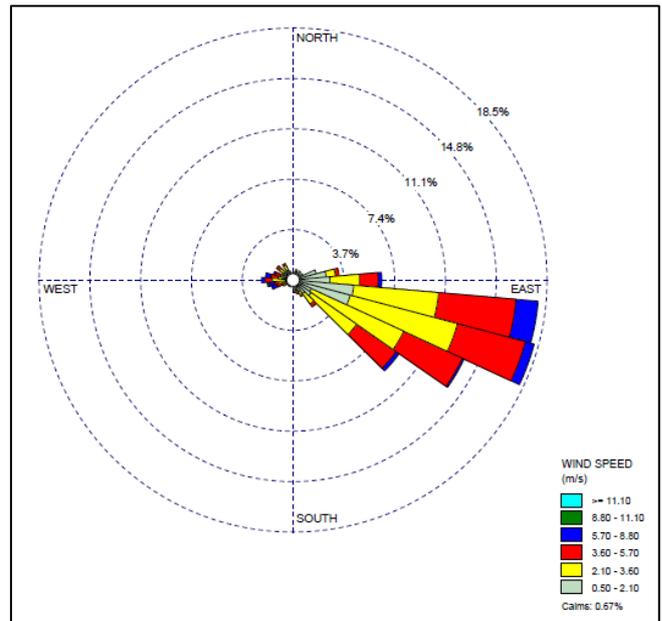


Figure 2: HVO Corporate Wind Rose – January 2018

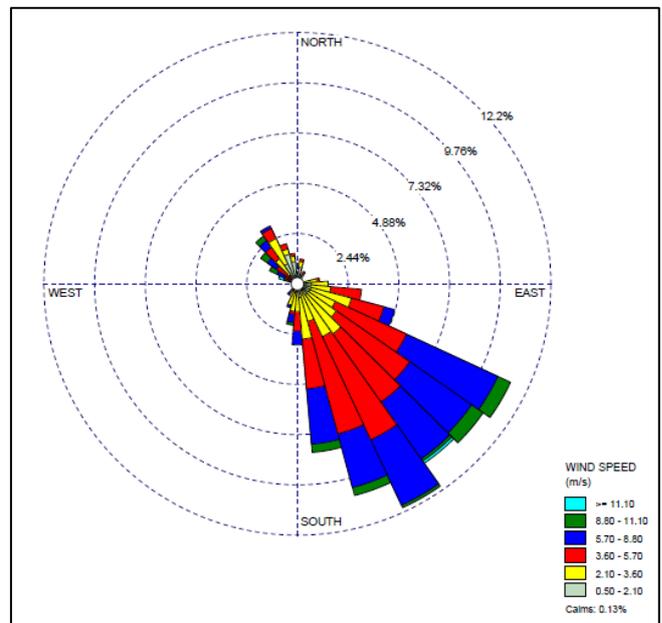


Figure 3: HVO Cheshunt Wind Rose – January 2018

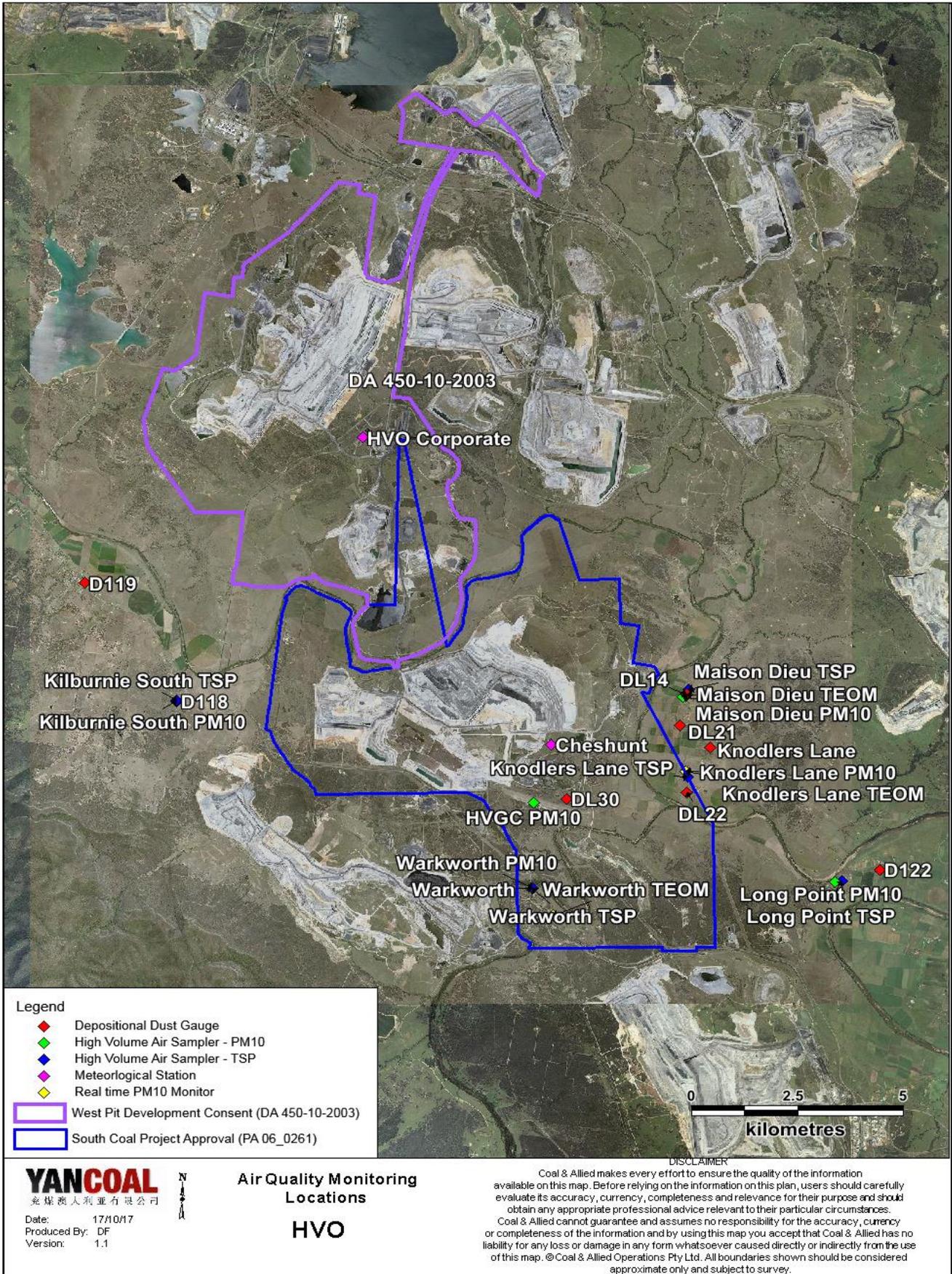


Figure 4: Air Quality Monitoring Location Plan

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 year-to-date average and the annual impact assessment criteria.

During the reporting period the D118, DL30 and Warkworth monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m² per month.

The field notes associated with the D118, DL30 and Warkworth monitor's results indicates no evidence to suggest that the result was contaminated. Accordingly, this result will be included in the annual average calculation.

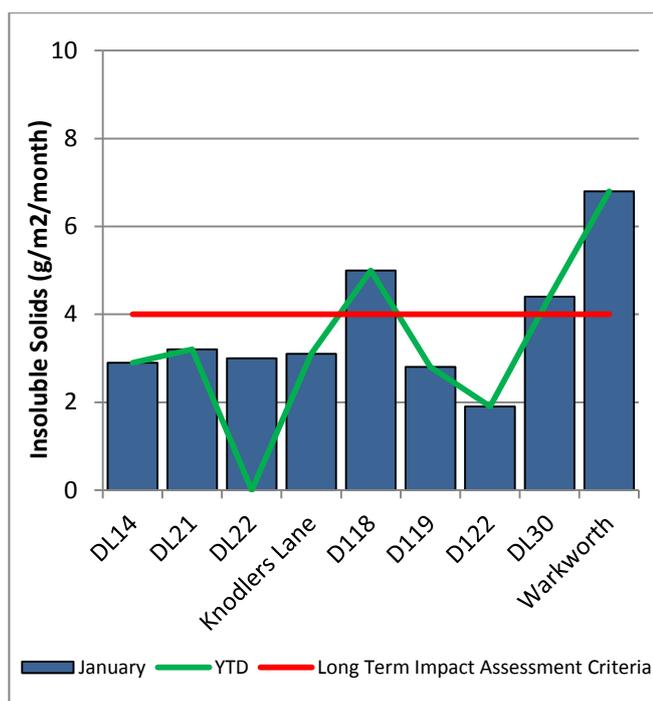


Figure 5: Depositional Dust Results – January 2018

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 (PM₁₀). 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 PM₁₀ Results

Figure 6 shows individual PM₁₀ results at each monitoring station against the short term impact assessment criteria of 50 µg/m³.

Data was not available on 13/01/2018 at the Long Point HVAS due to HVAS motor fault.

On 7/01/2018 three HVAS PM₁₀ units recorded results which were greater than the short term (24hr) PM₁₀ impact assessment criteria; Knodlers Lane (57 µg/m³), Long Point (110 µg/m³) and Glider Club (55µg/m³).

Investigation determined that HVO's maximum contribution at each monitor is as follows:

- Knodlers Lane – 19.5 µg/m³; or 35.5% of the measured result.
- Long Point – less than 19.5 µg/m³; or less than 18% of the measured result.
- Glider Club - 17.5 µg/m³; or 31.8% of the measured result.

Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

On 19/01/2018 three HVAS PM₁₀ units recorded results which were greater than the short term (24hr) PM₁₀ impact assessment criteria; Kilburnie South (68 µg/m³), Knodlers Lane (51 µg/m³) and Warkworth (56µg/m³).

Investigation determined that HVO's maximum contribution at each monitor is as follows:

- Kilburnie South –23 µg/m³; or 51.1% of the measured result.
- Knodlers Lane – 6 µg/m³; or 13.3% of the measured result.
- Warkworth – 0.7 µg/m³ HVO could not have been a significant contributor as wind direction was primarily not from the direction of HVO during the monitoring period.

Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

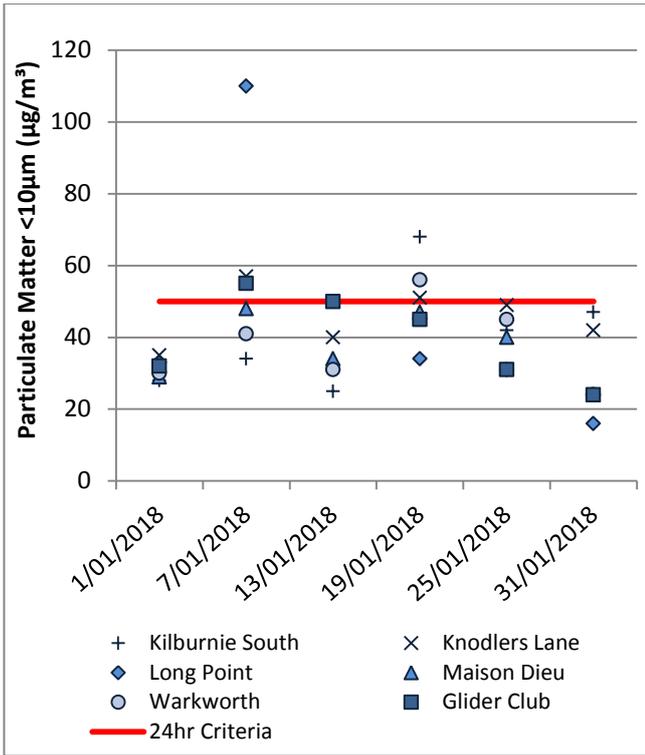


Figure 6: Individual PM₁₀ Results – January 2018

Figure 7 shows the year to date annual average PM₁₀ results. An assessment of HVO's contribution to the annual average will be reported on in the 2018 Annual Review.

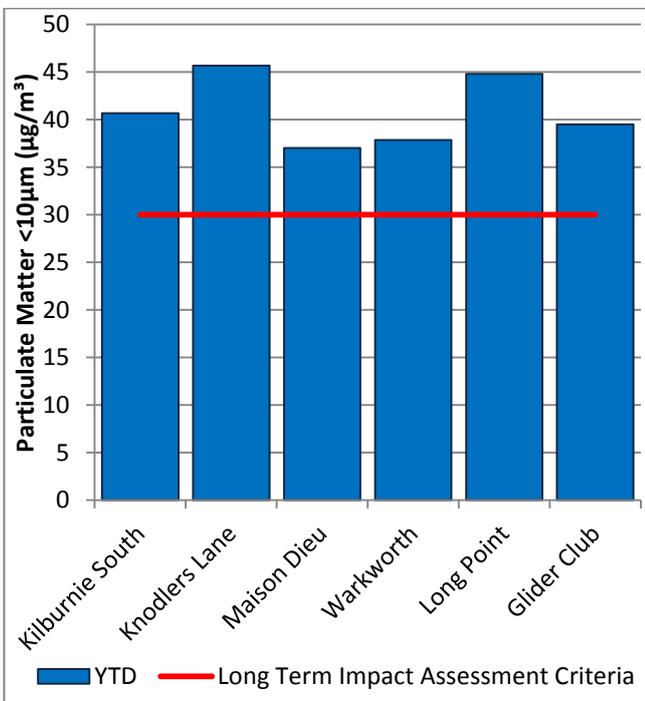


Figure 7: Year to Date Average PM₁₀ – January 2018

2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³. An assessment of HVO's contribution to the annual average will be reported on in the 2018 Annual Review.

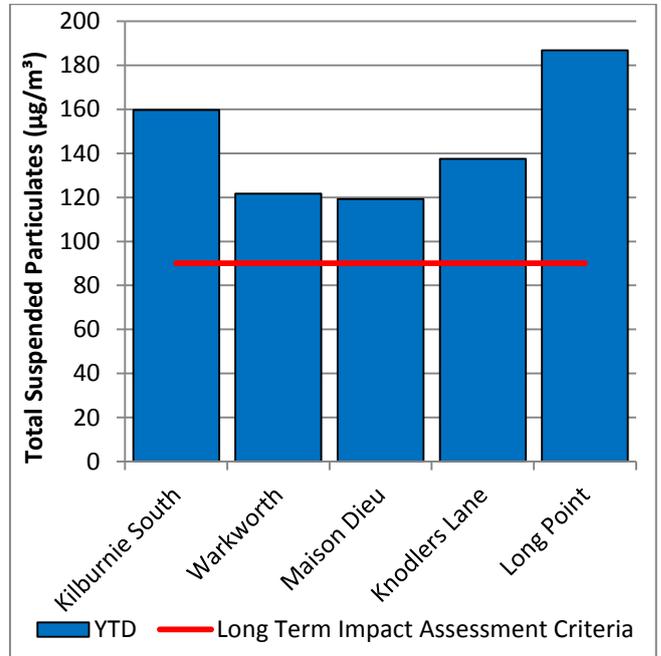


Figure 8: Year to Date Average Total Suspended Particulates – January 2018

2.3.3 Real Time PM₁₀ Results

Hunter Valley Operations maintains a network of real time PM₁₀ 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 PM₁₀ monitoring are used as a reactive measure to guide mining operations to ensure 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 PM₁₀ result and the year to date 24 hour PM₁₀ annual average.

One result recorded elevated levels at the Maison Dieu TEOM on 23 January 2018. This measurement was assessed for HVO's maximum potential contribution based on mining activities and meteorological conditions on this day resulting in a maximum estimated contribution of <5 µg/m³ from the direction of HVO.

Three results recorded elevated levels at the Knodlers Lane TEOM. These measurements were assessed for HVO's maximum potential contribution based on mining activities and meteorological conditions on these days.

potential contribution based on mining activities and meteorological conditions on these days.

Investigation into result on 19 January 2018 resulted in <9.0 $\mu\text{g}/\text{m}^3$ as maximum estimated contributions from the direction of HVO.

Resulting in the following maximum estimated contributions from the direction of HVO:

- 19 January 2018 – 12.1 $\mu\text{g}/\text{m}^3$; and
- 24 January 2018 – 0.2 $\mu\text{g}/\text{m}^3$.

Investigation into results on 16 and 20 January at Knodlers Lane found that wind was not from the direction of HVO at any time during the monitoring period and it can be concluded that HVO was not a contributor for these results.

2.3.4 Real Time Alarms for Air Quality

During January the real time monitoring system generated 185 automated air quality related alarms. 73 were related to adverse weather conditions and 112 alarms relating to PM_{10} .

Two results recorded elevated levels at the Warkworth TEOM. These measurements were assessed for HVO's maximum

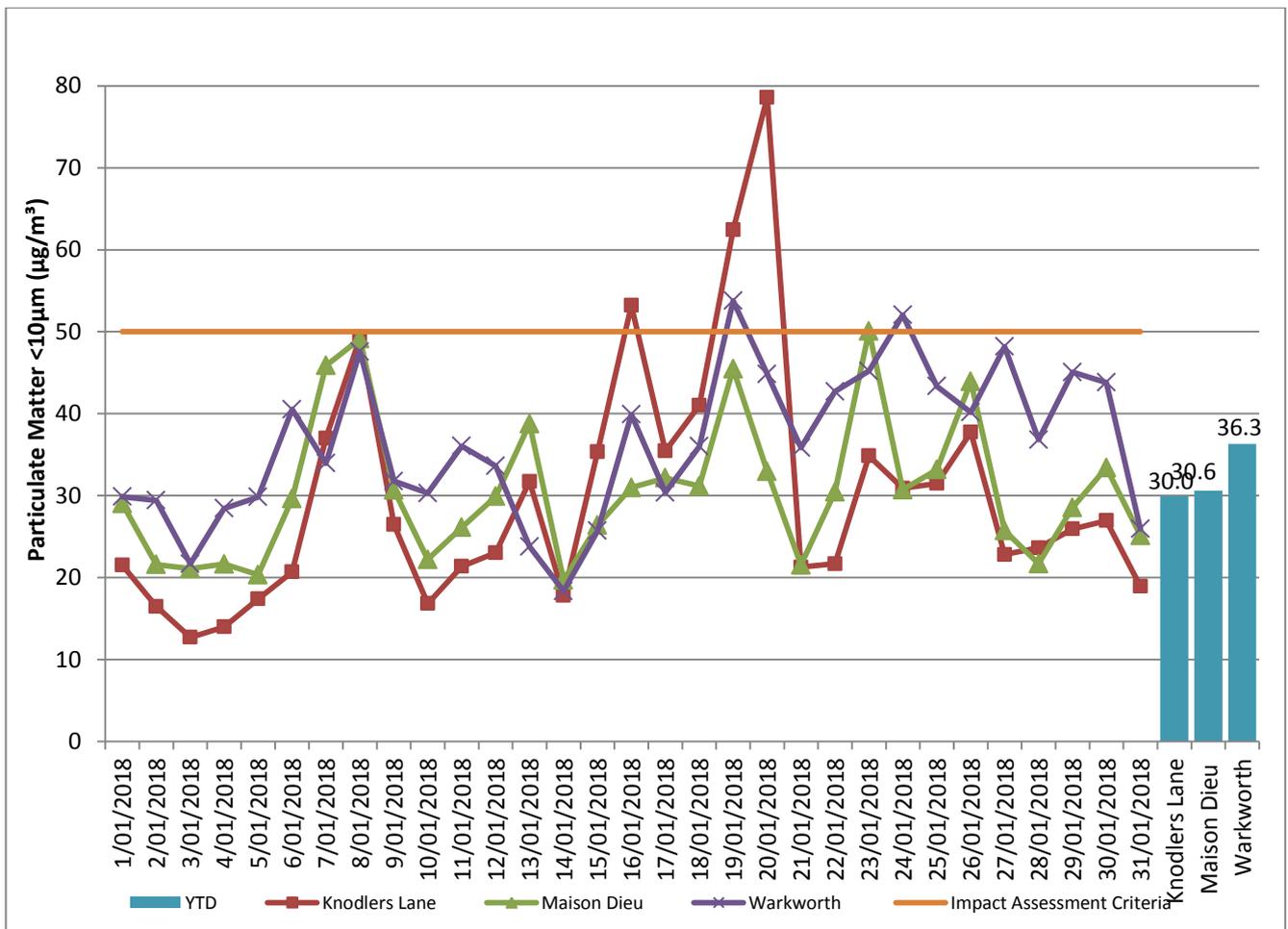


Figure 9: Real Time PM_{10} 24hr average and YTD average – January 2018

3.0 WATER QUALITY

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

3.1.1 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 March 2018 report.

3.1.2 Site Water Use

Under water allocation licences issued by the NSW DPI Water, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO extracted 31.5ML of water from the Hunter River.

3.1.3 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

3.2.1 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 March 2018 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 15.

Blasting criteria are summarised in Table 2.

Table 2: 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%

During the reporting period one blast event exceeded the airblast overpressure criteria of 120.0 dB at Moses Crossing and Jerrys Plains blast monitors. As per management plan, the incident was reported externally and is under investigation.

4.1 Blast Monitoring Results

During January 20 blasts were initiated at HVO. Figure 10 through to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

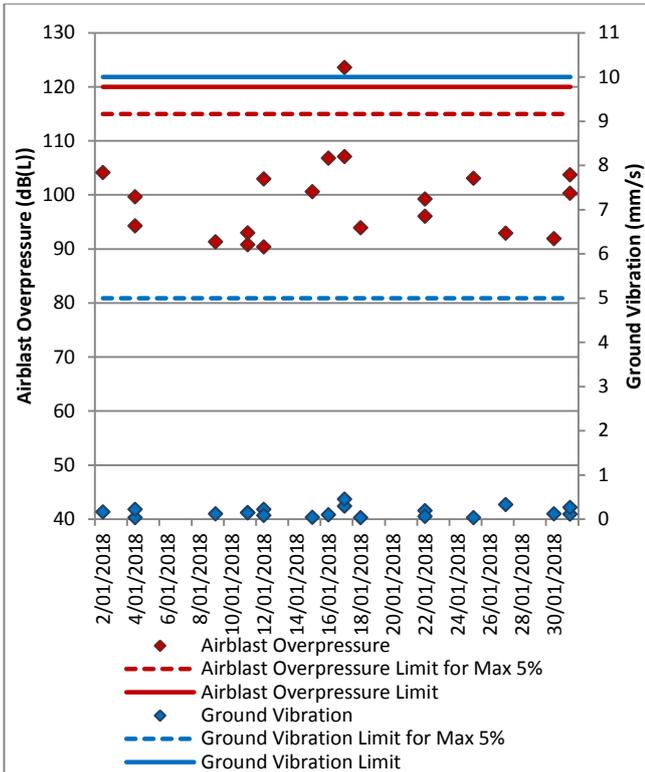


Figure 10: Moses Crossing Blast Monitoring Results – January 2018

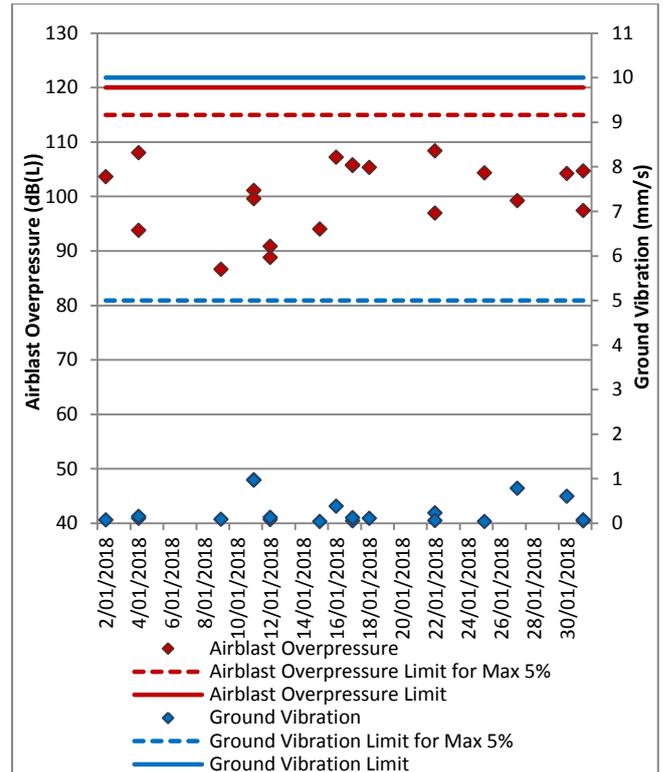


Figure 12: Maison Dieu Blast Monitoring Results – January 2018

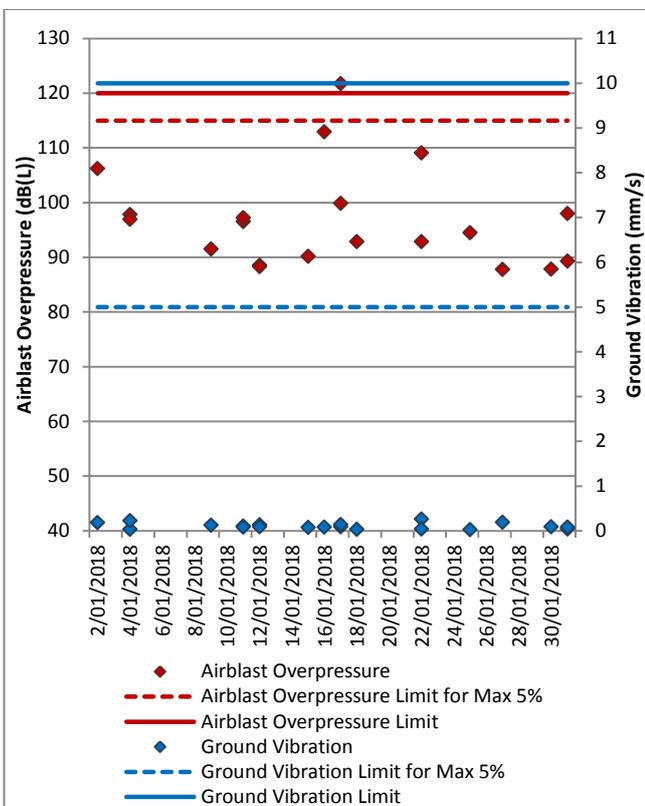


Figure 11: Jerrys Plains Blast Monitoring Results – January 2018

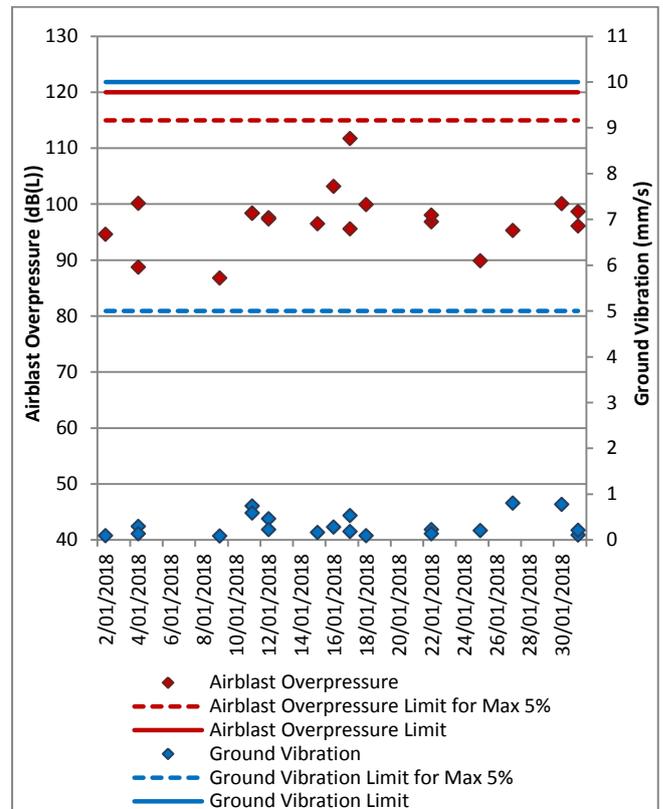


Figure 13: Warkworth Blast Monitoring Results – January 2018

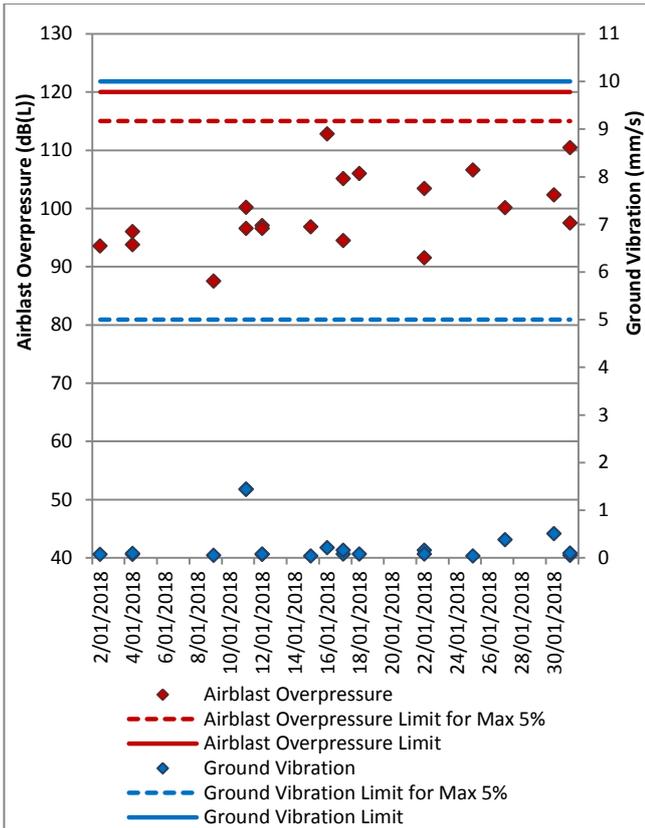


Figure 14: Knodlers Lane Blast Monitoring Results – January 2018

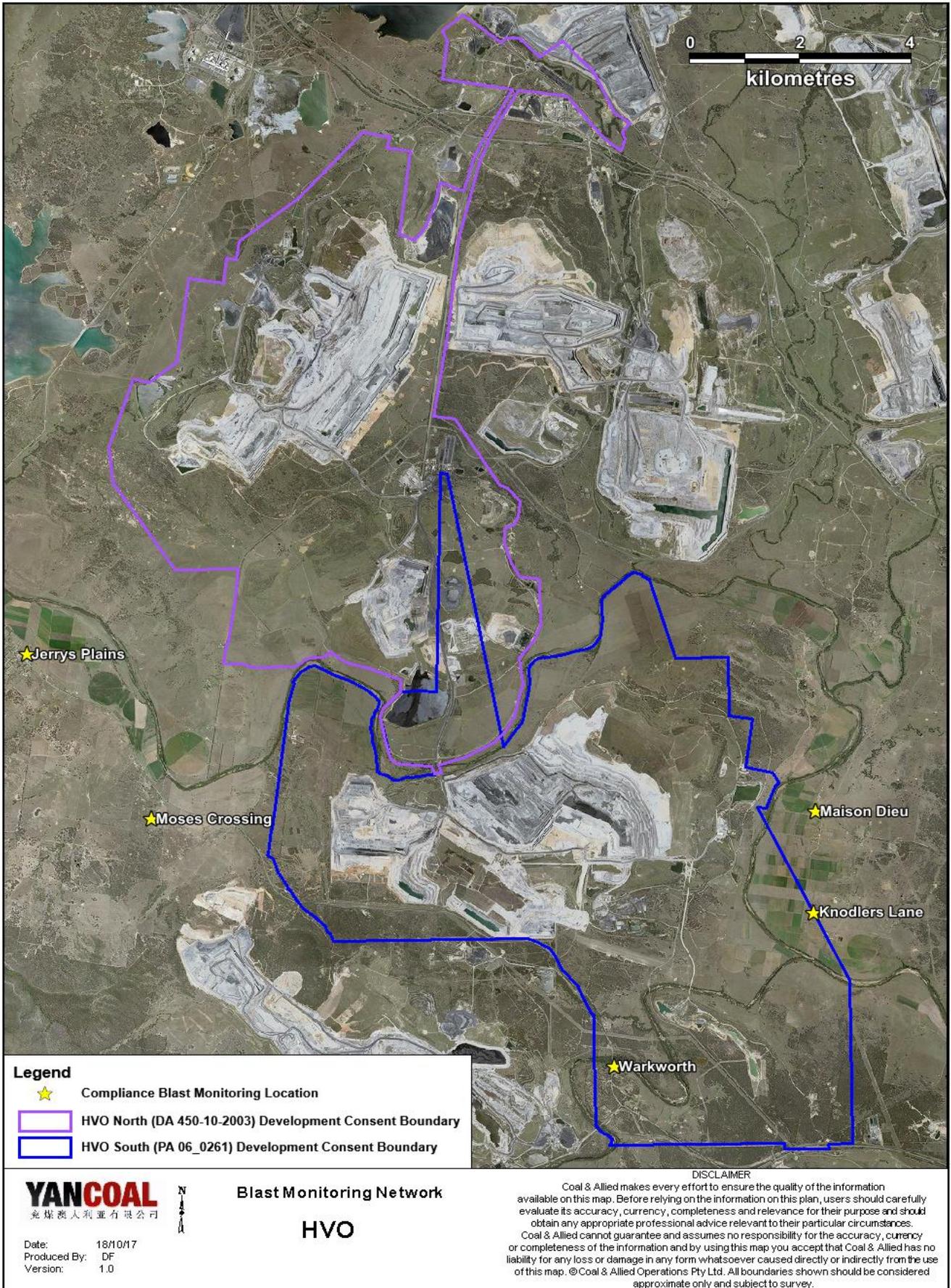


Figure 15: Blast Monitoring Location Plan

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 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night of 16 January 2018. Monitoring results are detailed in Table 3 to Table 8 .

Table 3: L_{Aeq, 15 minute} HVO South - Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB (A)	Criterion Applies? ^{1,6}	HVO South L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	16/01/2018 21:00	6.1	-1	37	No	IA	NA
Maison Dieu	16/01/2018 21:19	6.7	-1	37	No	IA	NA
Shearers Lane	16/01/2018 21:39	5.9	-1	41	No	IA	NA
Kilburnie South	16/01/2018 22:43	6.8	-1	36	No	30	NA
Jerrys Plains Village	16/01/2018 21:29	5.7	-1	35	No	IA	NA
Jerrys Plains East	16/01/2018 21:00	6.1	-1	35	No	IA	NA
Long Point	16/01/2018 21:00	6.1	-1	35	No	IA	NA
HVGC	16/01/2018 22:58	5.7	-1	55	No	<25	NA

Table 4: L_{Aeq, 15 minute} HVO South - Land Acquisition Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB (A)	Criterion Applies? ^{1,6}	HVO South L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	16/01/2018 21:00	6.1	-1	41	No	IA	NA
Maison Dieu	16/01/2018 21:19	6.7	-1	41	No	IA	NA
Shearers Lane	16/01/2018 21:39	5.9	-1	41	No	IA	NA
Kilburnie South	16/01/2018 22:43	6.8	-1	41	No	30	NA
Jerrys Plains Village	16/01/2018 21:29	5.7	-1	40	No	IA	NA
Jerrys Plains East	16/01/2018 21:00	6.1	-1	40	No	IA	NA
Long Point	16/01/2018 21:00	6.1	-1	40	No	IA	NA
HVGC	16/01/2018 22:58	5.7	-1	NA	No	<25	NA

Table 5: L_{A1, 1minute} HVO South - Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB (A)	Criterion Applies? ^{1,6}	HVO South L _{A1, 1min} dB ^{2,4}	Exceedance ³
Knodlers Lane	16/01/2018 21:00	6.1	-1	45	No	IA	NA
Maison Dieu	16/01/2018 21:19	6.7	-1	45	No	IA	NA
Shearers Lane	16/01/2018 21:39	5.9	-1	45	No	IA	NA
Kilburnie South	16/01/2018 22:43	6.8	-1	45	No	35	NA
Jerrys Plains Village	16/01/2018 21:29	5.7	-1	45	No	IA	NA
Jerrys Plains East	16/01/2018 21:00	6.1	-1	45	No	IA	NA
Long Point	16/01/2018 21:00	6.1	-1	45	No	IA	NA
HVGC	16/01/2018 22:58	5.7	-1	NA	NA	<25	NA

Notes

1. 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);

2. Estimated or measured L_{Aeq,15minute} dB attributed to HVO South Pit Area;

3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;

4. Bolded results in red indicate exceedance of criteria;

5. Atmospheric data is sourced from the HVO Corporate or Cheshunt weather station using logged met data;

6. Criterion may or may not apply due to rounding of meteorological data values

Table 6: L_{Aeq, 15minute} HVO North – Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB (A)	Criterion Applies? ^{1,6}	HVO North L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	16/01/2018 21:00	3.7	-1	35	No	IA	NA
Maison Dieu	16/01/2018 21:19	3.4	-1	35	No	IA	NA
Shearers Lane	16/01/2018 21:39	3.1	-1	35	No	IA	NA
Kilburnie South	16/01/2018 22:43	2.3	3	39	Yes	IA	Nil
Jerrys Plains Village	16/01/2018 21:29	3.1	-1	36	No	IA	NA
Jerrys Plains East	16/01/2018 21:00	3.7	-1	39	No	IA	NA
Long Point	16/01/2018 21:00	3.7	-1	35	No	IA	NA
HVGC	16/01/2018 22:58	2.1	3	NA	NA	IA	NA

Table 7: L_{Aeq,15minute} HVO North - Land Acquisition Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB (A)	Criterion Applies? ^{1,6}	HVO North L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	16/01/2018 21:00	3.7	-1	41	No	IA	NA
Maison Dieu	16/01/2018 21:19	3.4	-1	41	No	IA	NA
Shearers Lane	16/01/2018 21:39	3.1	-1	41	No	IA	NA
Kilburnie South	16/01/2018 22:43	2.3	3	41	Yes	IA	Nil
Jerrys Plains Village	16/01/2018 21:29	3.1	-1	41	No	IA	NA
Jerrys Plains East	16/01/2018 21:00	3.7	-1	41	No	IA	NA
Long Point	16/01/2018 21:00	3.7	-1	41	No	IA	NA
HVGC	16/01/2018 22:58	2.1	3	NA	NA	IA	NA

Table 8: L_{A1, 1Minute} HVO North - Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB (A)	Criterion Applies? ^{1,6}	HVO North L _{A1, 1min} dB ^{2,4}	Exceedance ³
Knodlers Lane	16/01/2018 21:00	3.7	-1	46	No	IA	NA
Maison Dieu	16/01/2018 21:19	3.4	-1	46	No	IA	NA
Shearers Lane	16/01/2018 21:39	3.1	-1	46	No	IA	NA
Kilburnie South	16/01/2018 22:43	2.3	3	46	Yes	IA	Nil
Jerrys Plains Village	16/01/2018 21:29	3.1	-1	46	No	IA	NA
Jerrys Plains East	16/01/2018 21:00	3.7	-1	46	No	IA	NA
Long Point	16/01/2018 21:00	3.7	-1	46	No	IA	NA
HVGC	16/01/2018 22:58	2.1	3	NA	NA	IA	NA

Notes

1. 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;
2. Estimated or measured LAeq,15minute dB attributed to HVO North Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate or Cheshunt weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values

5.2 NPfl Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfl), the applicability of the low frequency modification penalty has been assessed. During January 2018 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in Table 9.

Table 9: Low Frequency Noise Assessment - January 2018

Location	Date and Time	Measured Site Only LA _{eq} dB (Sth/Nth)	Site Only LC _{eq} dB ³ (Sth/Nth)	Site Only LC _{eq} -LA _{eq} dB ^{1,4} (Sth/Nth)	Result Max exceedance of ref spectrum dB ^{2,3,4} (Sth/Nth)	Penalty dB(A)	Exceedance
Knodlers Lane	16/01/2018 21:00	IA/IA	NA/NA	NA/NA	NA/NA	0	Nil
Maison Dieu	16/01/2018 21:19	IA/IA	NA/NA	NA/NA	NA/NA	0	Nil
Shearers Lane	16/01/2018 21:39	IA/IA	NA/NA	NA/NA	NA/NA	0	Nil
Kilburnie South	16/01/2018 22:43	30/IA	NA/NA	NA/NA	NA/NA	0	Nil
Jerrys Plains Village	16/01/2018 21:29	IA/IA	NA/NA	NA/NA	NA/NA	0	Nil
Jerrys Plains East	16/01/2018 21:00	IA/IA	NA/NA	NA/NA	NA/NA	0	Nil
Long Point	16/01/2018 21:00	IA/IA	NA/NA	NA/NA	NA/NA	0	Nil
HVGC	16/01/2018 22:58	<25/IA	NA/NA	NA/NA	NA/NA	0	Nil

Notes:

1. As per NPfl, if LC_{eq} - LA_{eq} >= 15 dB further assessment of low frequency noise required.
2. As per NPfl, compare measured spectrum against reference spectrum to determine if the low frequency modifying factor is triggered and application of penalty is required;
3. Bold results and penalties in red are where the relevant modifying factor trigger was exceeded; and
4. 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.

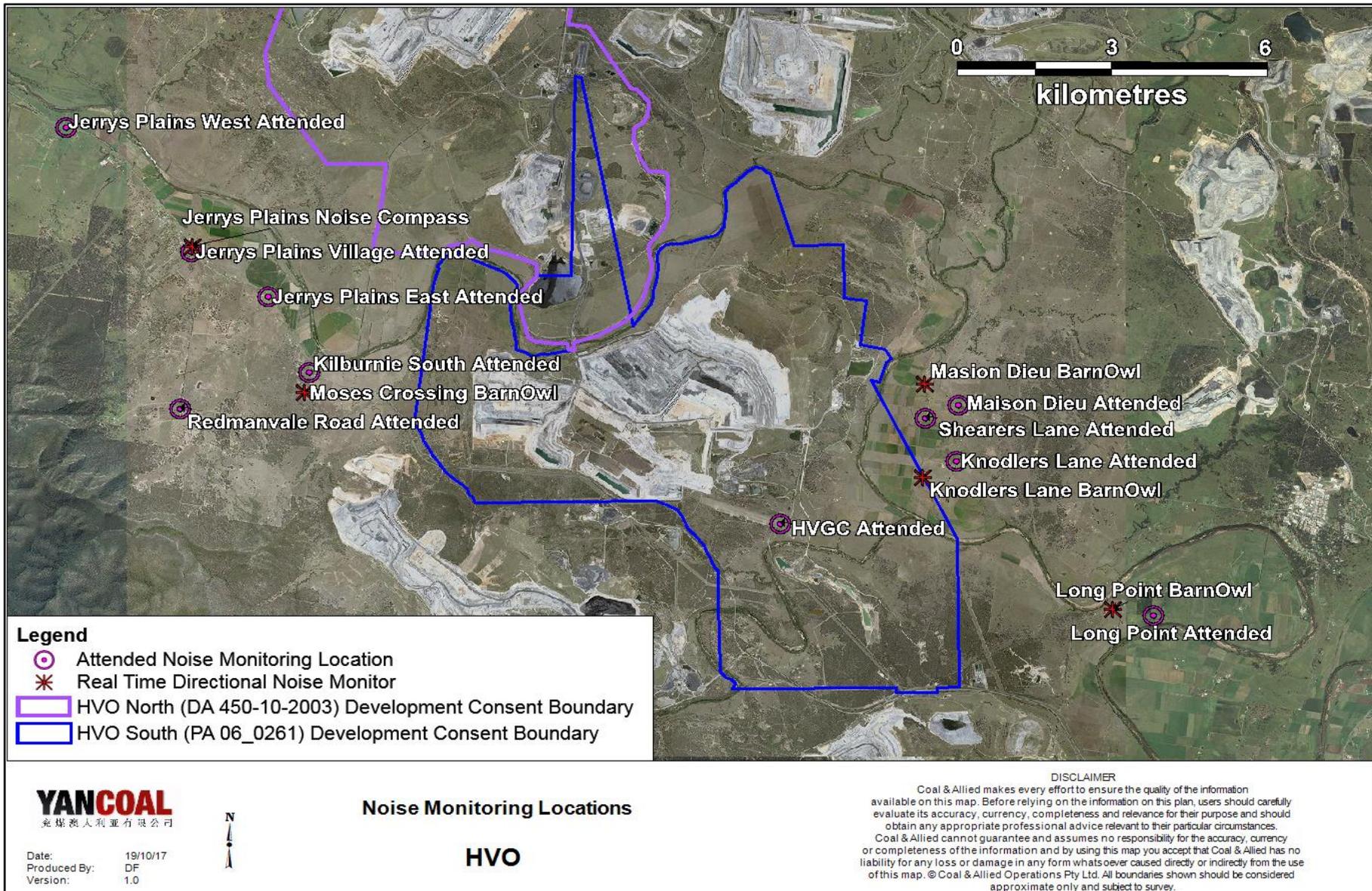


Figure 16: Noise Monitoring Location Plan

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 6.1, 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 January, a total of 808 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 17.

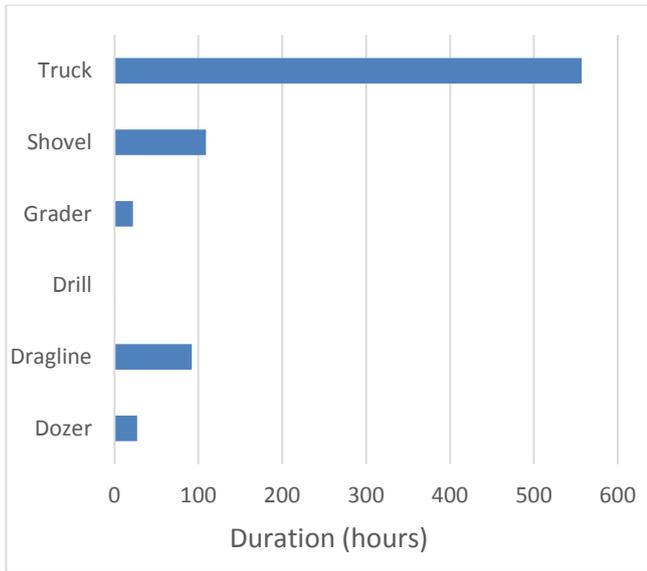


Figure 17: Operational Downtime by Equipment Type – January 2018

7.0 REHABILITATION

During January 0.9 Ha of land was released and 4.0 Ha of land was bulk shaped. Year to date progress can be viewed in Figure 18.

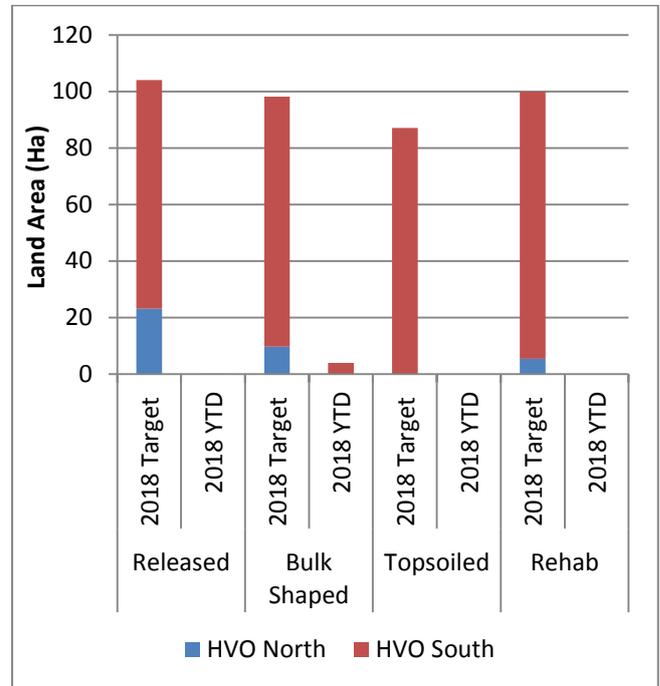


Figure 18: Rehabilitation YTD – January 2018

8.0 COMPLAINTS

6 complaints were received during the reporting period. Details of complaints received YTD are shown in Figure 19 below.

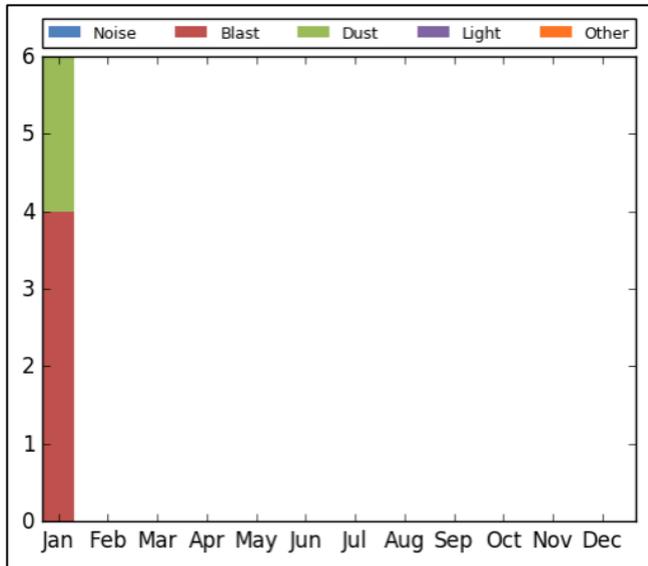


Figure 19: Complaints Graph - January 2018

9.0 ENVIRONMENTAL INCIDENTS

During the reporting period one blast that exceeded the airblast overpressure criteria of 120.0 dB at Moses Crossing and Jerrys Plains blast monitors was reported to the Department of Planning and Environment and the EPA. The incident is currently under investigation.

Appendix A: Meteorological Data

Table 10: Meteorological Data - HVO Corporate Meteorological Station – January 2018

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)
1/01/2018	36	16	89	13	1324	156	3.3	0.0
2/01/2018	33	17	98	31	1330	105	3.1	6.4
3/01/2018	28	15	100	42	1532	129	3.6	0.2
4/01/2018	29	14	89	29	1503	107	2.7	0.0
5/01/2018	34	12	89	12	1347	111	2.2	0.0
6/01/2018	40	14	89	7	1102	195	2.0	0.0
7/01/2018	43	24	50	7	1064	269	3.4	0.0
8/01/2018	42	21	76	10	1194	166	2.4	1.0
9/01/2018	36	20	88	17	1397	158	2.4	0.6
10/01/2018	25	16	91	48	1448	107	4.0	0.0
11/01/2018	30	16	82	41	1670	110	2.6	0.0
12/01/2018	39	16	97	16	1412	134	1.4	0.0
13/01/2018	36	17	82	21	1499	249	5.3	0.0
14/01/2018	26	14	92	16	1574	164	4.0	0.0
15/01/2018	28	11	70	17	1606	134	2.7	0.0
16/01/2018	27	13	65	22	1337	111	4.1	0.0
17/01/2018	29	11	77	16	1080	126	2.3	0.0
18/01/2018	34	14	85	5	1096	135	2.4	0.0
19/01/2018	39	12	90	5	1061	143	2.4	0.0
20/01/2018	38	12	84	3	1087	104	3.0	0.0
21/01/2018	37	13	100	13	1180	105	2.6	0.0
22/01/2018	41	25	53	6	1076	182	3.2	0.0
23/01/2018	38	23	59	9	1142	122	2.8	0.0
24/01/2018	39	18	83	11	1012	107	2.2	0.0
25/01/2018	35	18	87	25	1328	115	2.2	0.0
26/01/2018	35	19	85	25	1232	111	2.1	0.0
27/01/2018	36	19	89	19	1027	122	2.6	0.0
28/01/2018	35	19	81	22	1327	117	3.8	0.0
29/01/2018	33	17	96	25	1395	110	3.7	0.0
30/01/2018	37	15	93	10	1013	141	2.2	0.0
31/01/2018	27	15	82	48	838	119	4.0	0.0

“-“ Indicates that data was not available due to technical issues.