

# HUNTER VALLEY OPERATIONS



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## Monthly Environmental Monitoring Report May 2021

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# 1 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<sup>st</sup> to 31<sup>st</sup> May 2021 (the 'Reporting Period').

## 2 Air Quality

### 2.1 Meteorological Monitoring

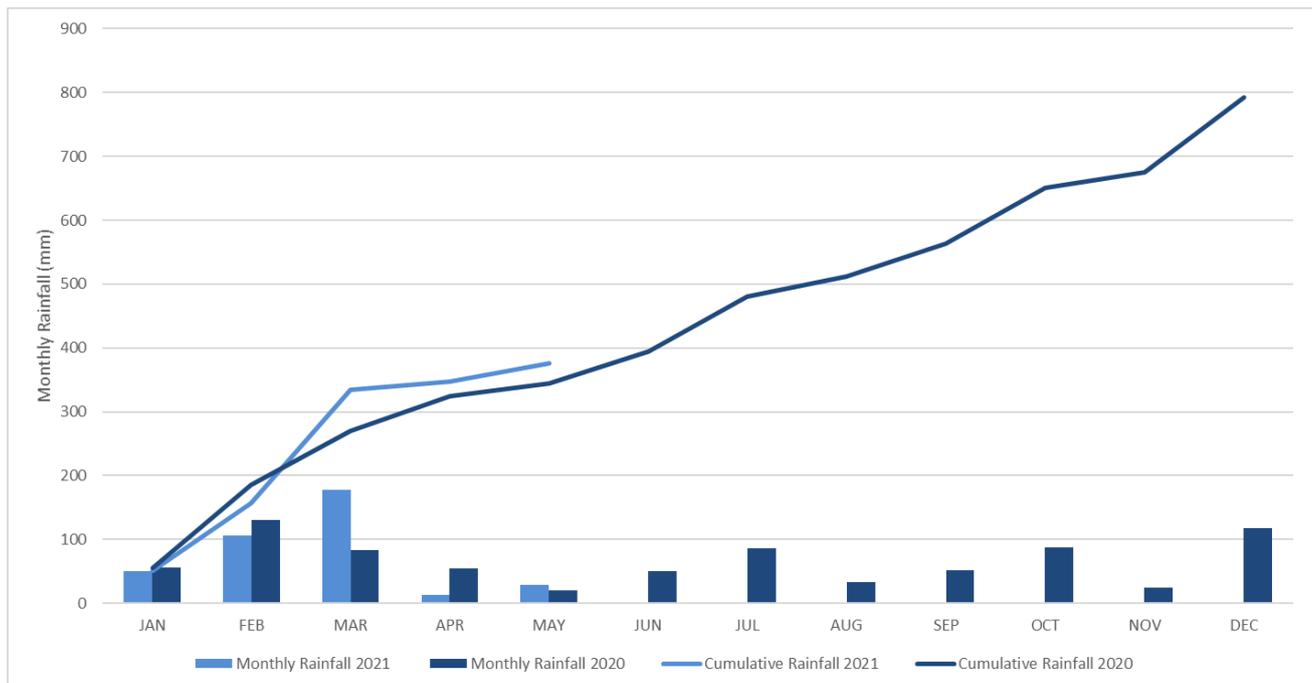
HVO maintains two meteorological stations: 'HVO Corporate' and 'Cheshunt' (refer to **Figure 4**)

#### 2.1.1 Rainfall

Rainfall for the period is summarised in **Table 1**. The 2021 and 2020 trends are shown in **Figure 1**.

**Table 1 - Rainfall data for the reporting period**

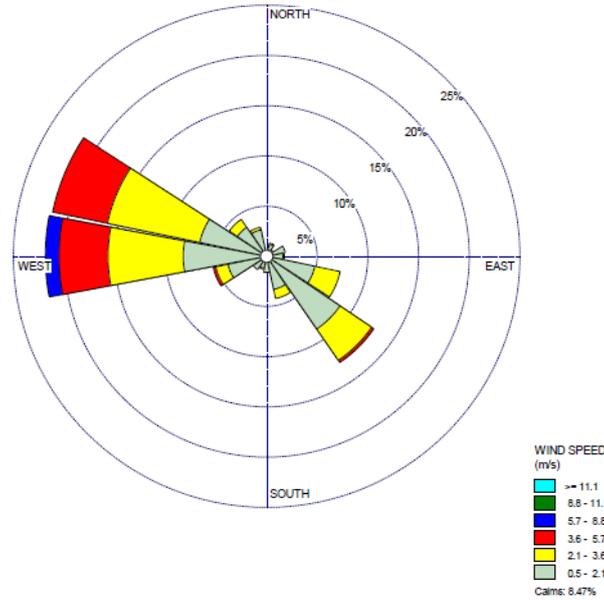
2021	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January	50.6	50.6
February	106.4	157
March	178	335
April	12.8	347.8
May	28.2	376



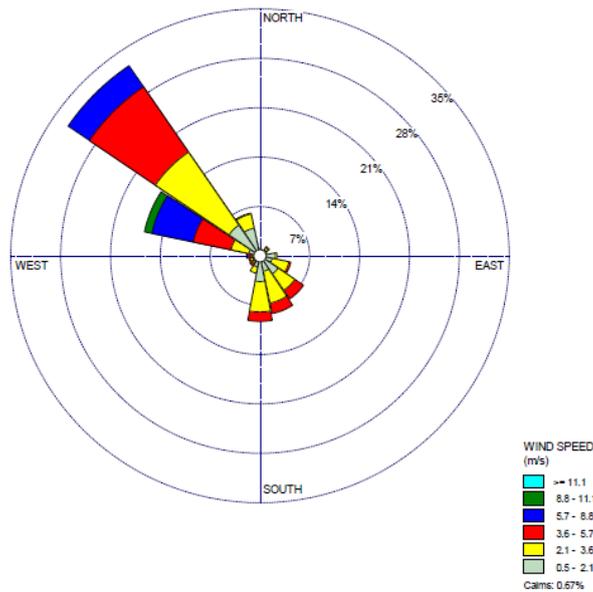
**Figure 1 - Rainfall Summary 2021**

## 2.1.2 Wind Speed and Direction

North Westerly winds were prevailing during the reporting period as shown in **Figure 2** (HVO Corporate) and **Figure 3** (HVO Cheshunt).



**Figure 2 - HVO Corporate Wind Rose for the reporting period**



**Figure 3 - HVO Cheshunt Wind Rose for the reporting period**

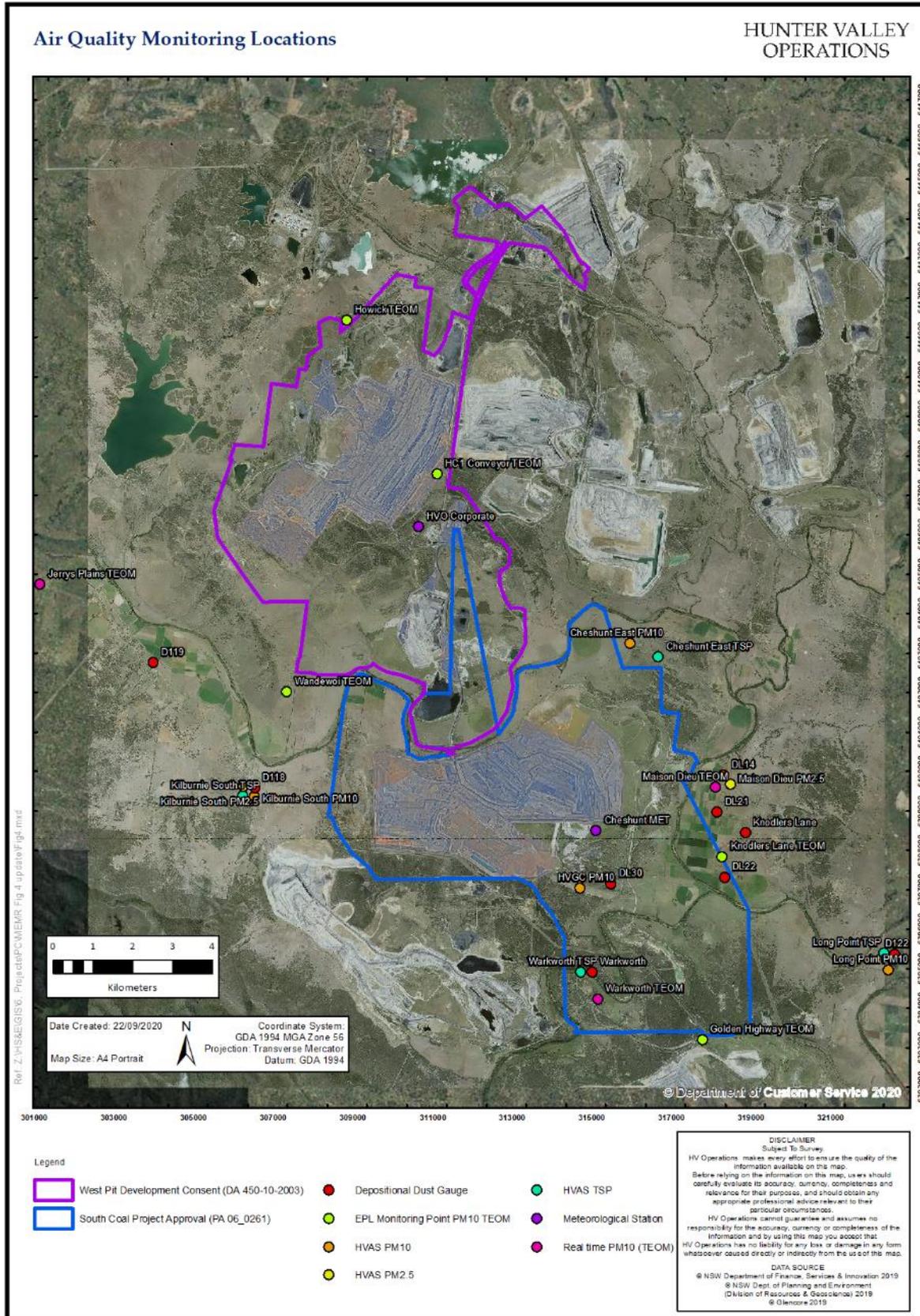


Figure 4 - Air Quality Monitoring Location Plan

## 2.2 Depositional Dust

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

**Figure 5** displays insoluble solids results from depositional dust gauges during the reporting period compared against the annual impact assessment criteria. Any monthly results deemed to be contaminated (due to presence of bird droppings, insects, etc.) are not displayed. An assessment of HVO’s contribution against the long-term impact assessment criteria will be provided in the 2021 Annual Review.

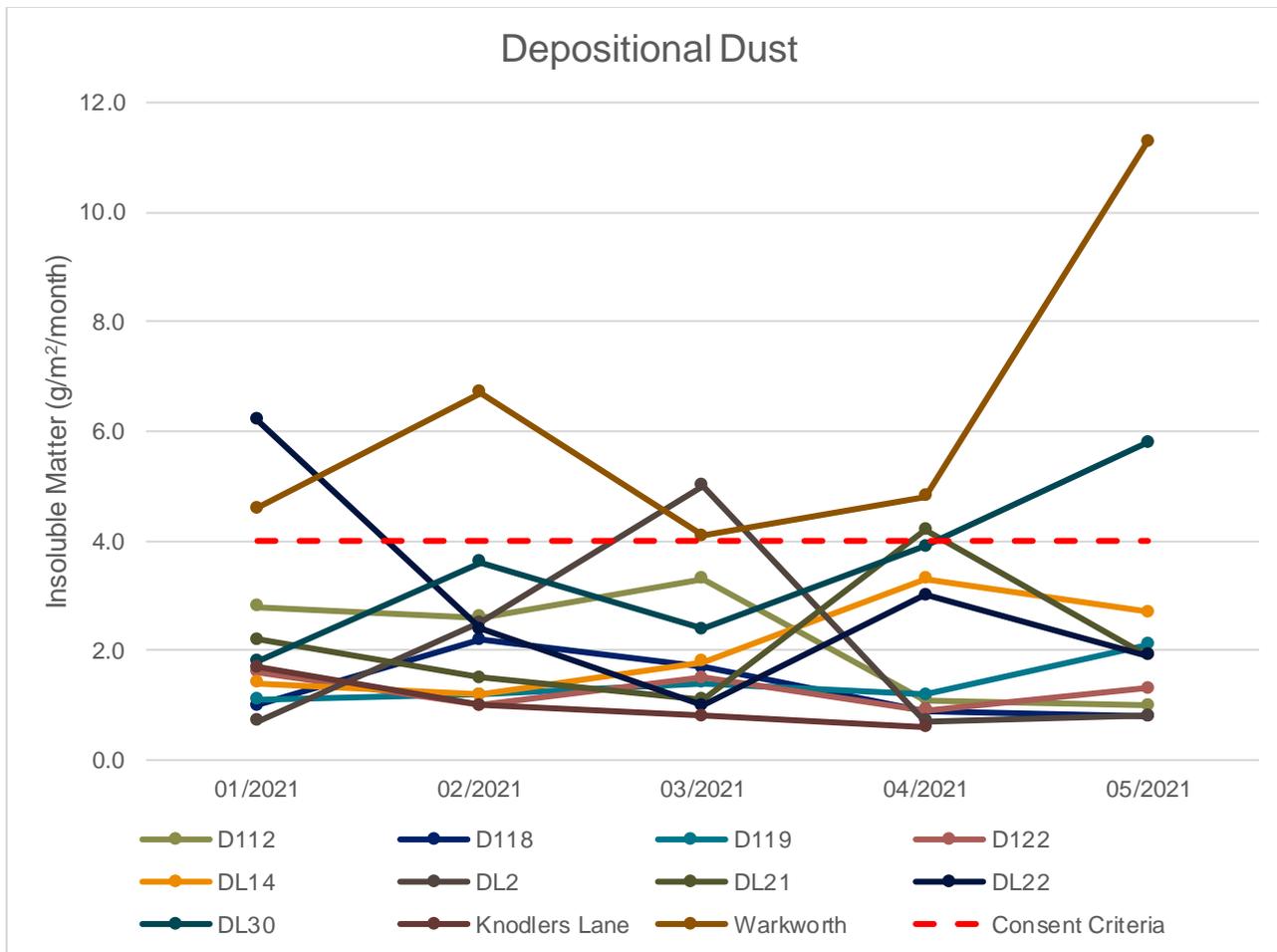


Figure 5 - Depositional Dust Results for the reporting period

## 2.3 Suspended Particles

Suspended particles 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 Kilburnie South and Maison Dieu HVAS also monitor Particulate Matter <2.5µm (PM<sub>2.5</sub>). The location of these monitors can be seen in Figure 4. Each HVAS runs for 24-hours on a six-day cycle.

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

#### 2.3.1.1 Performance against short term impact assessment criteria

Figure 6 shows individual PM<sub>10</sub> results at each monitoring station against the short-term impact assessment criteria of 50µg/m<sup>3</sup>. All monitors were below the relevant short-term impact assessment criteria during the reporting period.

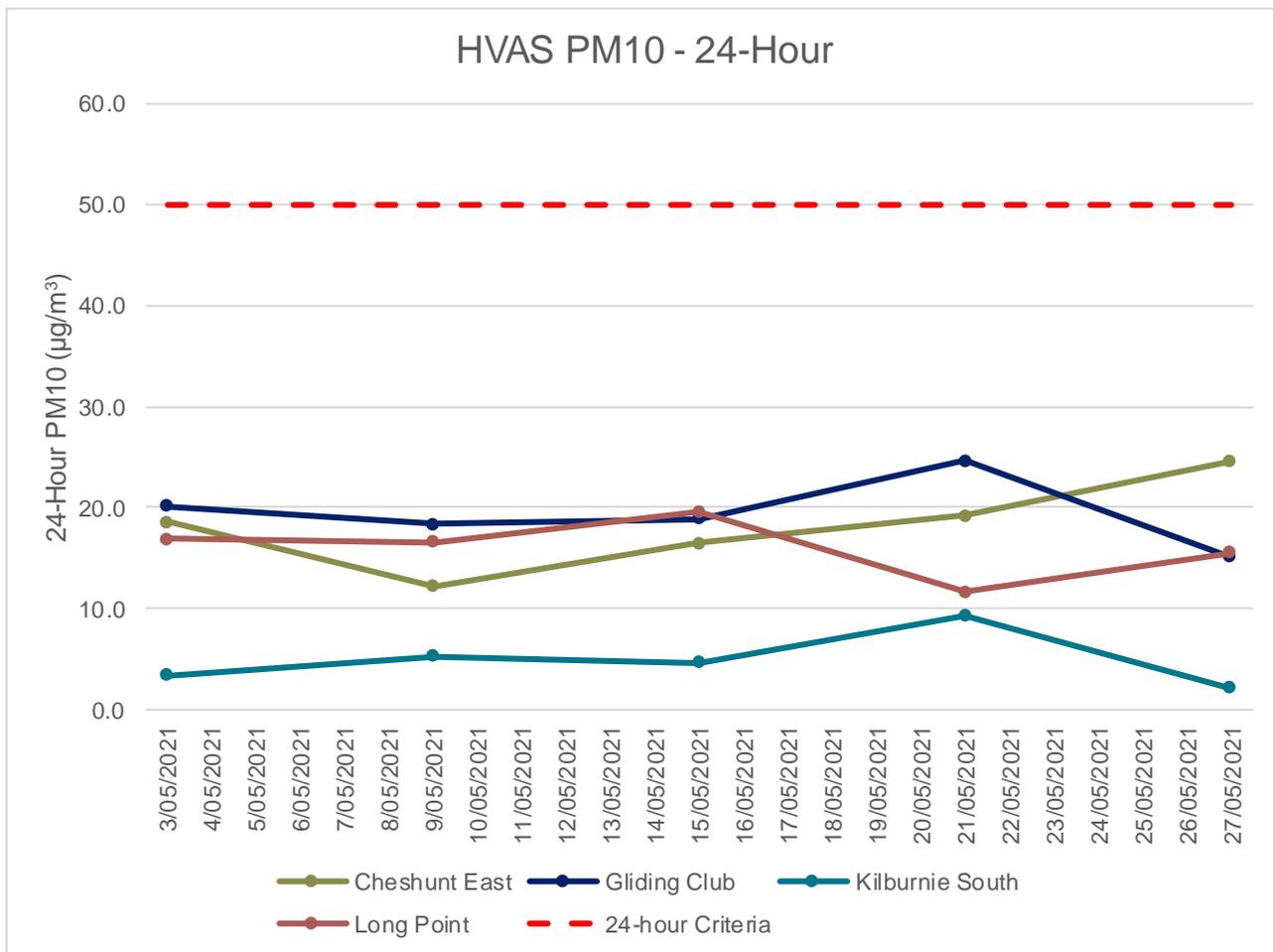


Figure 6 - Individual PM<sub>10</sub> Results for the reporting period

### 2.3.1.2 Performance against long term impact assessment criteria

Figure 7 shows the year to date annual average PM<sub>10</sub> results. All monitors were below the relevant long term impact assessment criteria during the reporting period. An assessment of HVO’s contribution against the long-term impact assessment criteria will be provided in the 2021 Annual Review.

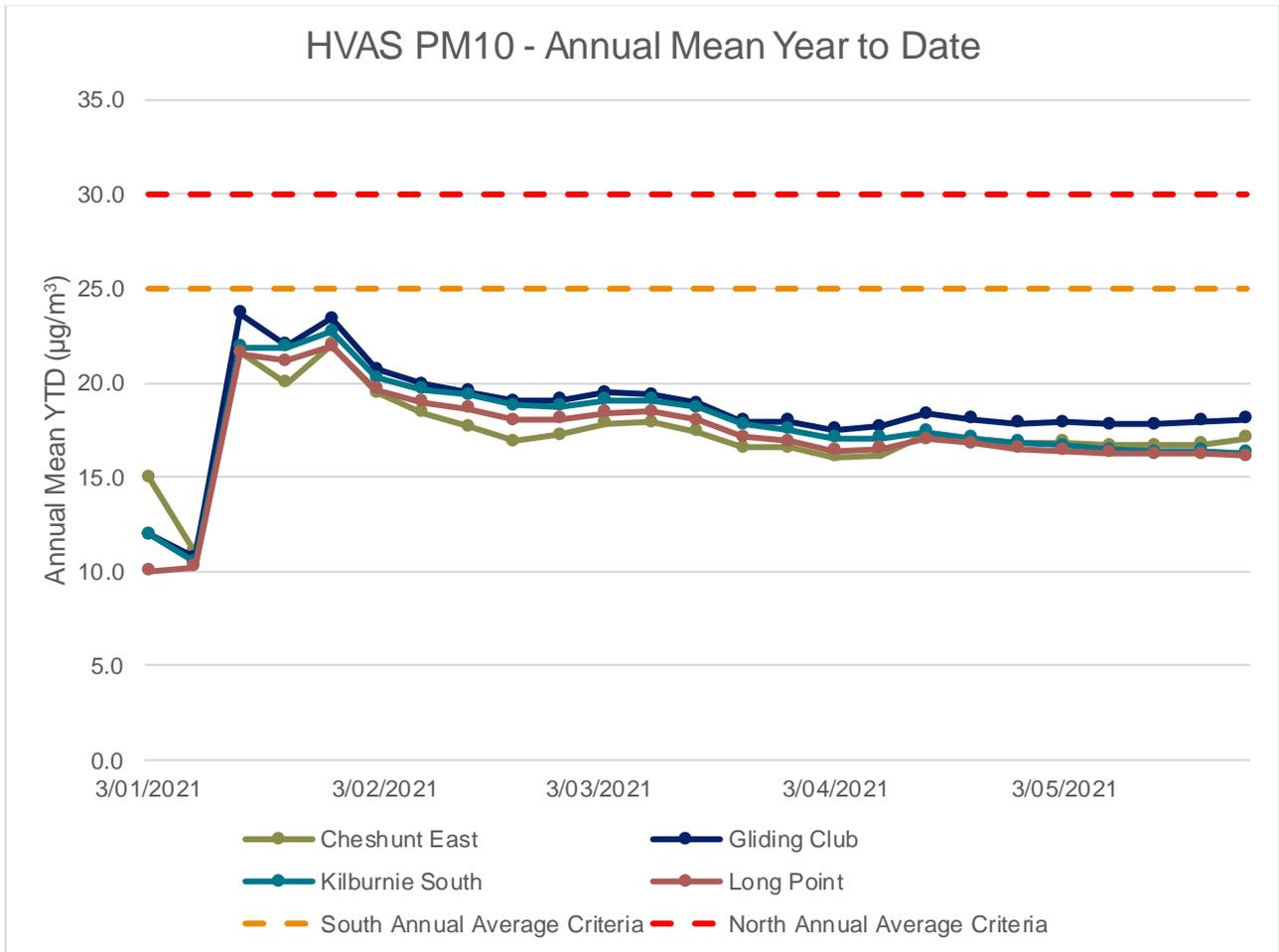


Figure 7 - Year to Date Average PM<sub>10</sub> as at end of May 2021

## 2.3.2 HVAS PM<sub>2.5</sub> Results

HVO monitors PM<sub>2.5</sub> at two HVAS locations, Kilburnie South and Maison Dieu.

### 2.3.2.1 Performance against short term impact assessment criteria

Figure 8 shows individual PM<sub>2.5</sub> results at each monitoring station against the HVO South short-term impact assessment criteria of 25µg/m<sup>3</sup>.

All monitors were below the relevant short-term impact assessment criteria during the reporting period.

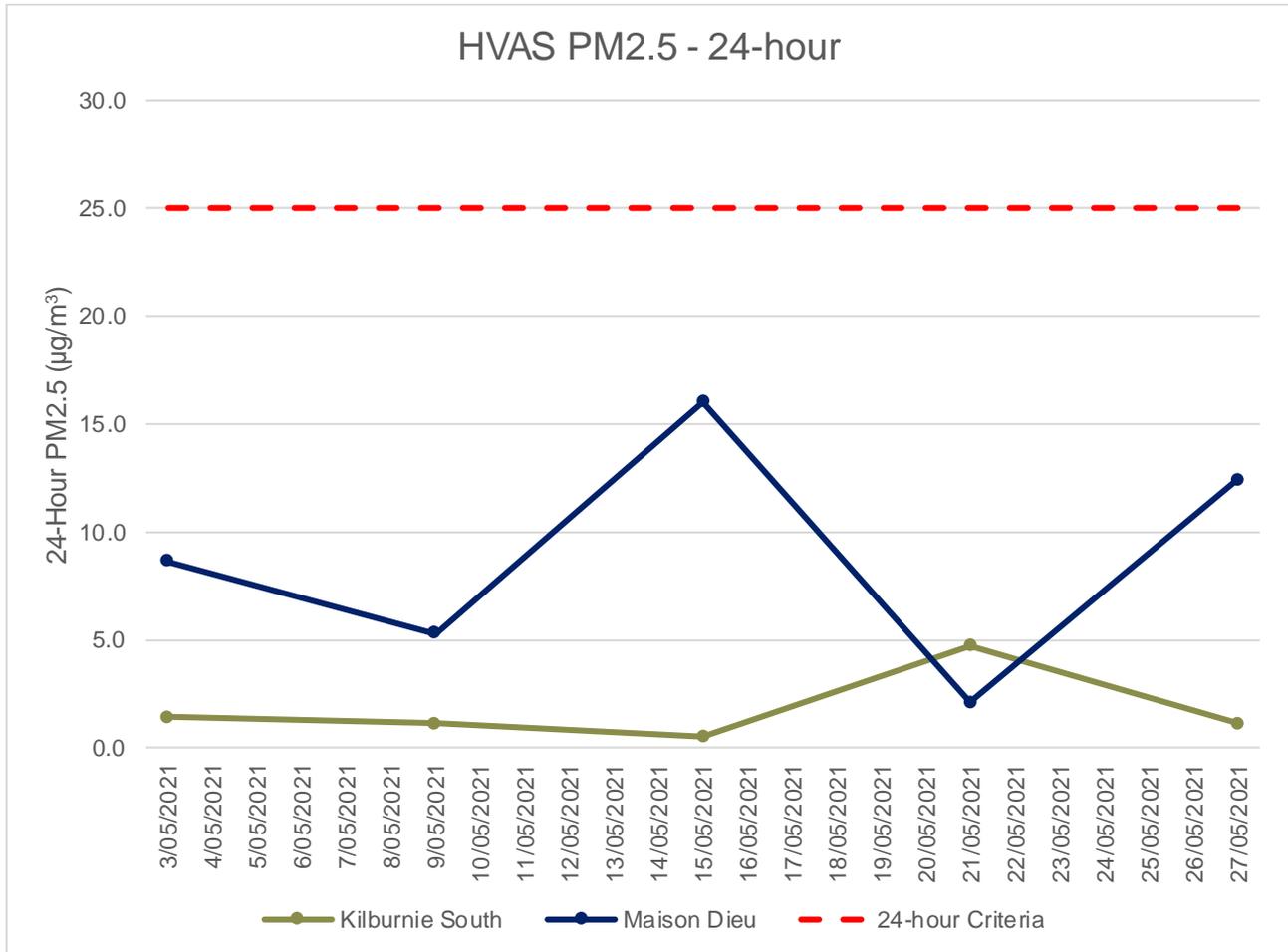


Figure 8 - Individual PM<sub>2.5</sub> Results for the reporting period

### 2.3.2.2 Performance against long term impact assessment criteria

Figure 9 shows the year to date annual average PM<sub>2.5</sub> results. During the reporting period, both monitors recorded an annual average above the PM<sub>2.5</sub> Annual Rolling Mean criteria of 8µg/m<sup>3</sup>.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2021 Annual Review.

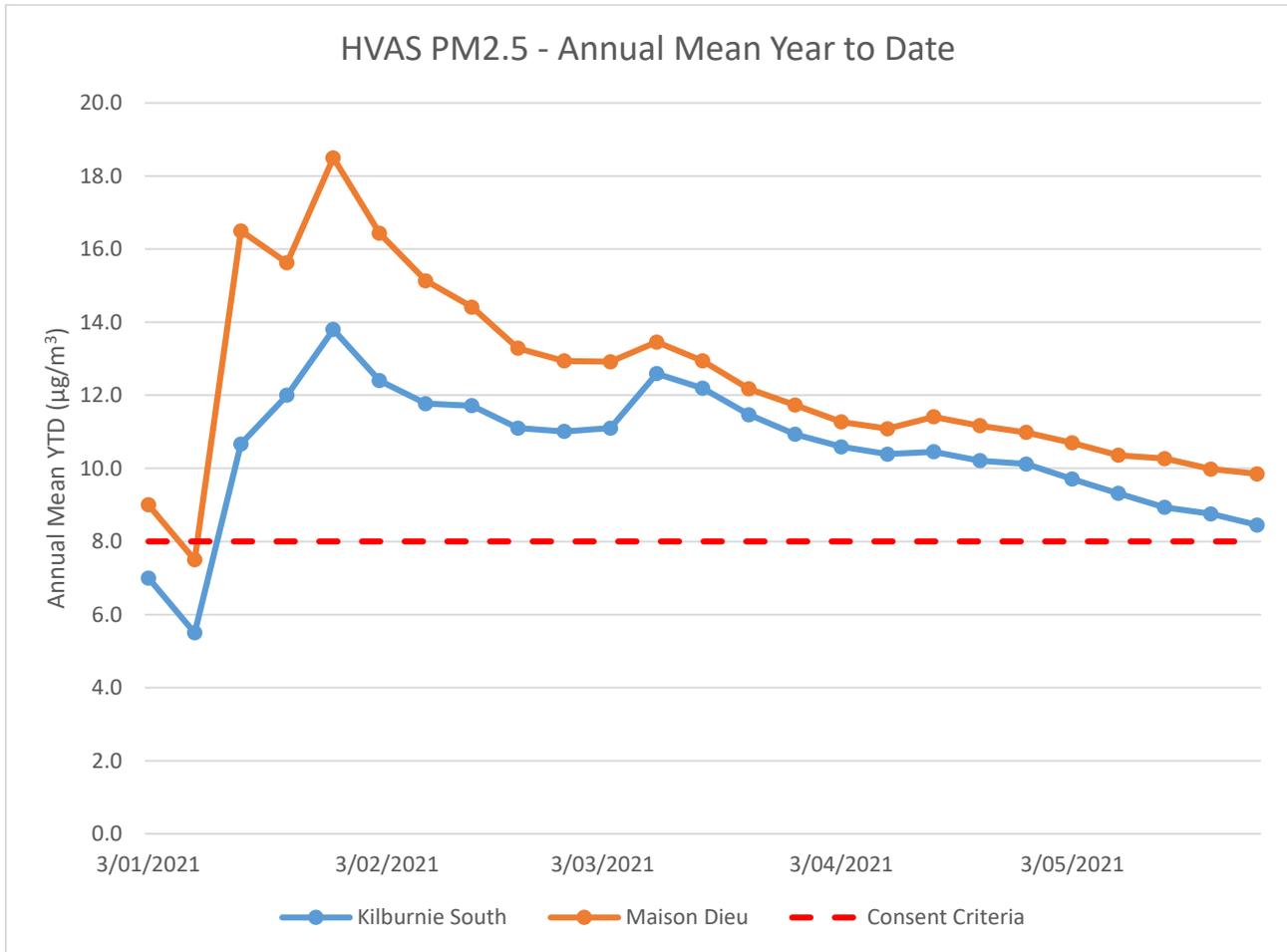


Figure 9 - Year to Date Average PM<sub>2.5</sub> as at end of May 2021

## 2.3.3 TSP Results

### 2.3.3.1 Performance against long term impact assessment criteria

Figure 10 shows the annual average TSP results compared against the long-term impact assessment criteria of 90µg/m<sup>3</sup>.

All monitors were below the relevant long-term impact assessment criteria during the reporting period.

An assessment of HVO’s contribution against the long-term impact assessment criteria will be provided in the 2021 Annual Review.

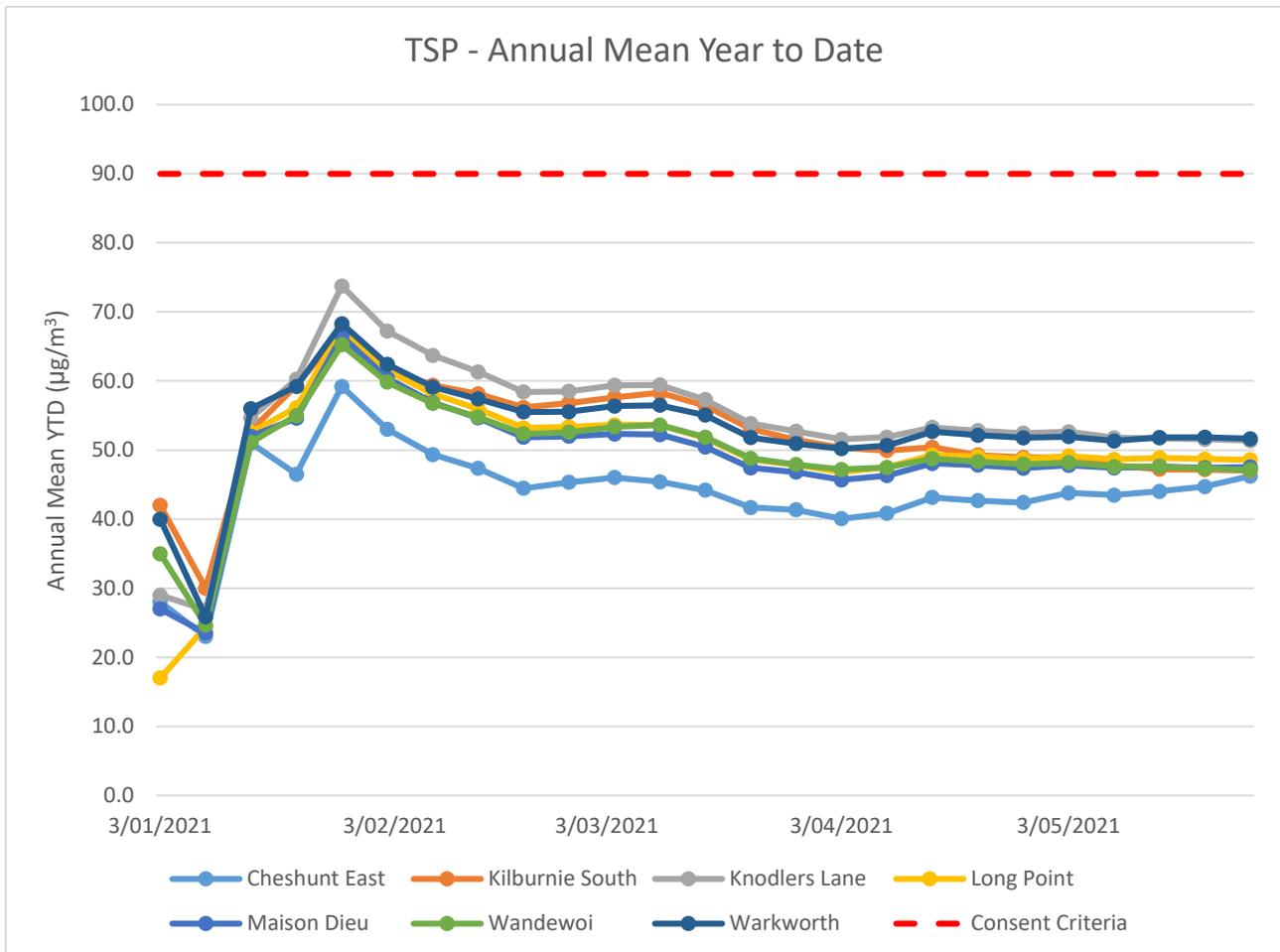


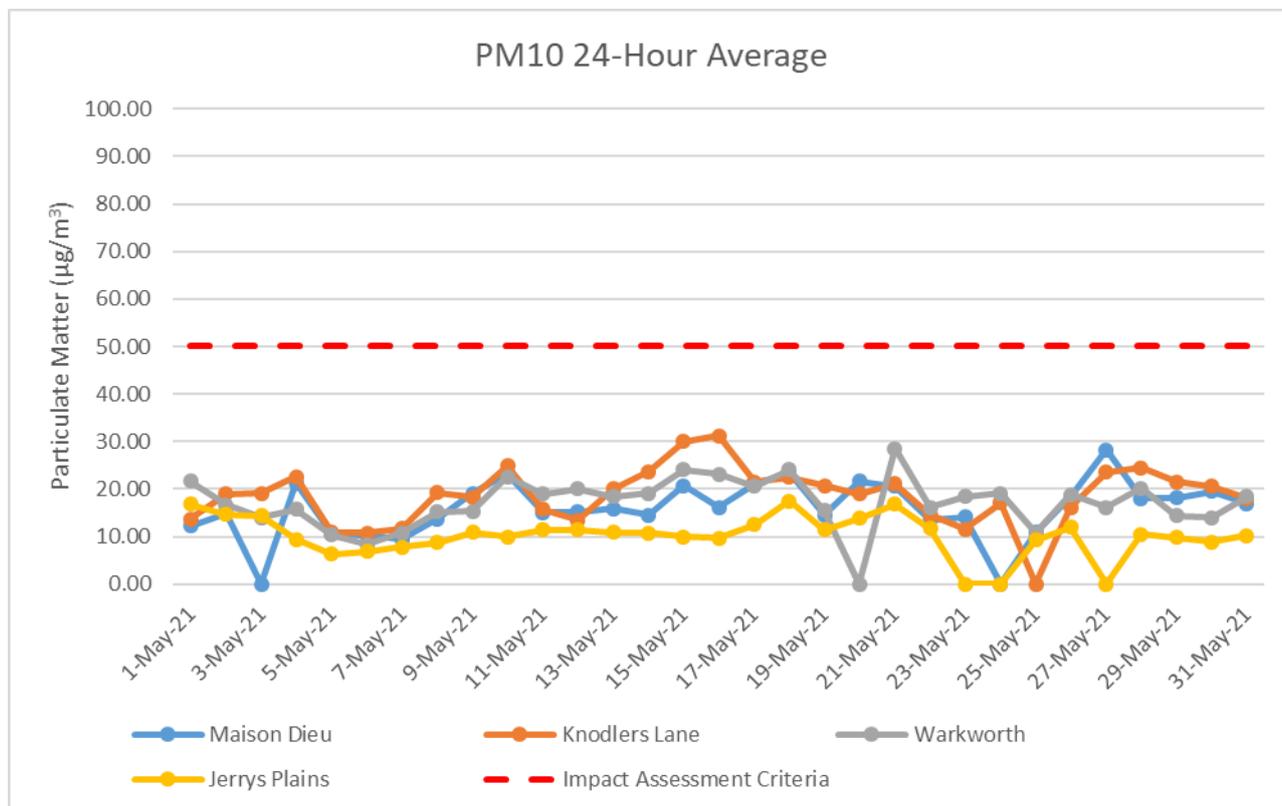
Figure 10 - Year to Date Average Total Suspended Particulates at end of May 2021

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

HVO maintains a network of real time PM<sub>10</sub> monitors. The real time air quality monitoring stations continuously record information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger levels. 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.

**Figure 11** shows the daily 24-hour average PM<sub>10</sub> result from the real time monitoring sites. The year to date annual averages for each monitoring site are shown in **Figure 12**.

All results were below the relevant short or long term impact assessment criteria during the reporting period.



**Figure 11 - Real Time PM<sub>10</sub> 24hr for the reporting 2021**

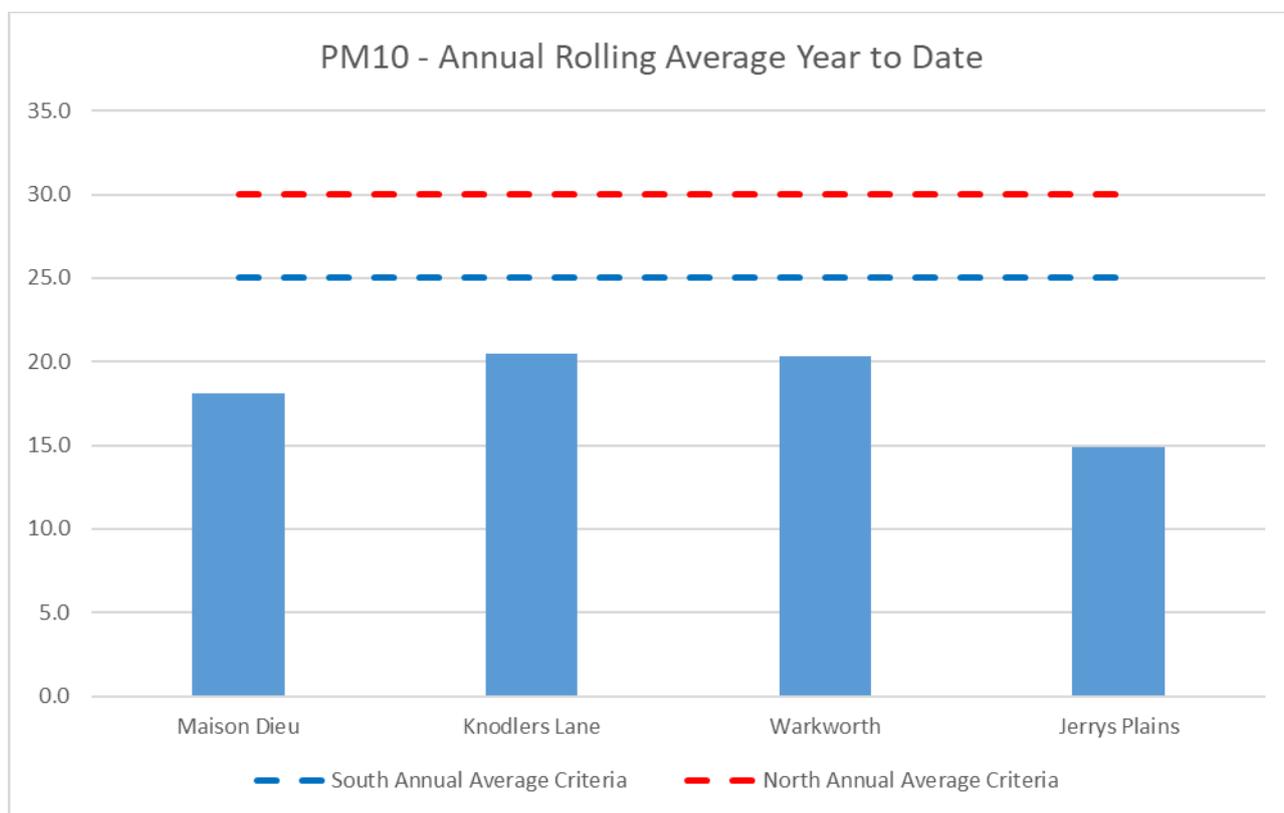


Figure 12 - Real Time PM<sub>10</sub> Annual Average May 2021

## 2.3.5 Real Time Alarms for Air Quality

The real time monitoring system generated 24 automated air quality related alarms during the reporting period. 19 alarms related to adverse weather conditions and 5 alarms related to dust conditions.

## 3 Water Quality

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

### 3.1 Surface Water

Surface watercourses are sampled on a quarterly sampling regime. Water quality is assessed through the parameters of pH, electrical conductivity (EC) and Total Suspended Solids (TSS). The location of surface water monitoring points across HVO are shown in **Figure 13**.

Results from monitoring on site dams, the Hunter River and other natural tributaries are provided on a quarterly basis. Results will be provided in the June 2021 Monthly Environmental Monitoring Report.

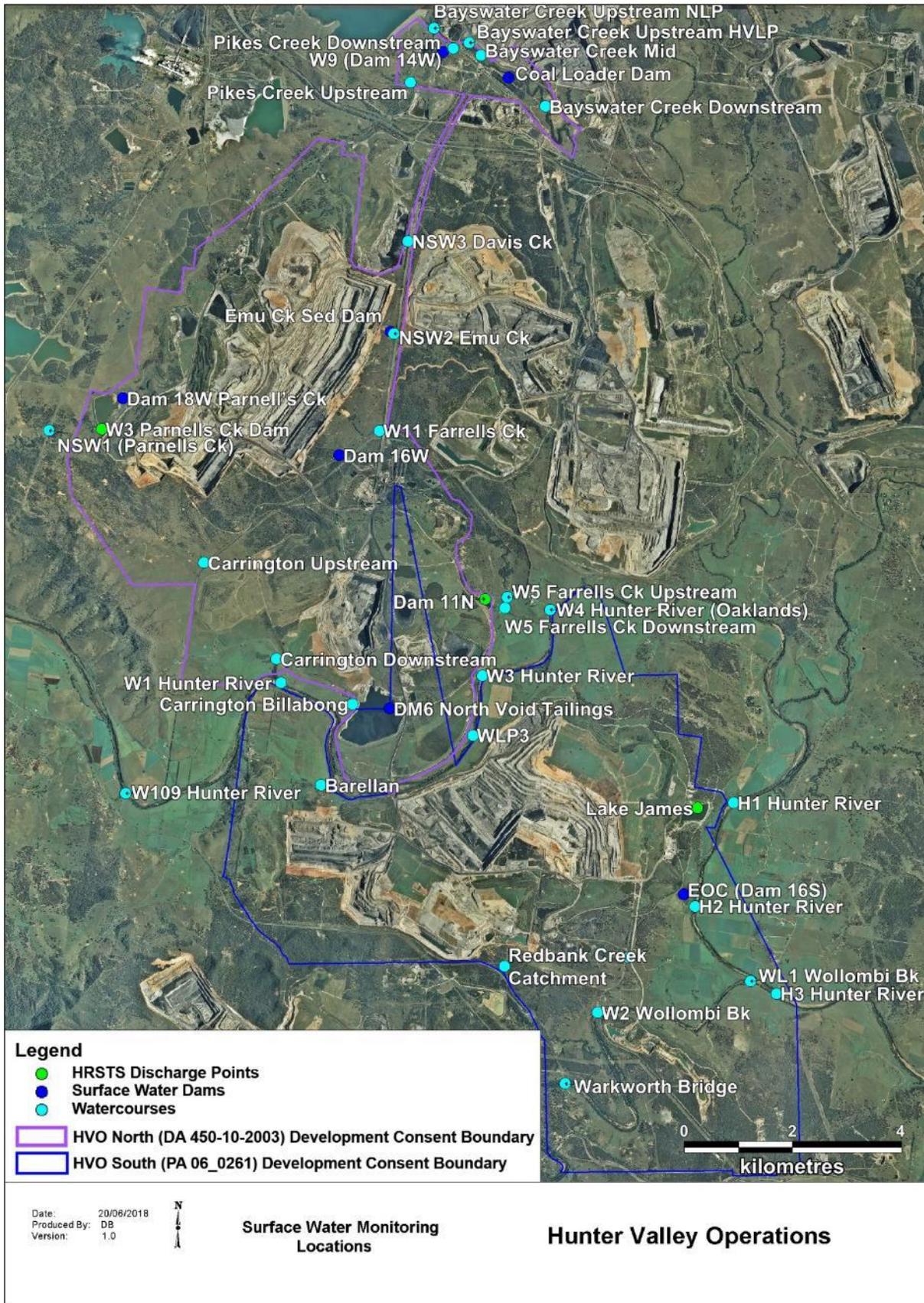


Figure 13 - HVO Surface Water Monitoring Locations

### 3.1.1 Surface Water Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis and to highlight potentially adverse surface water impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses are outlined in the HVO Water Management Plan.

Surface water trigger tracking results are provided on a quarterly basis; results will appear in the June 2021 report.

### 3.2 Site Water Use

HVO is permitted to extract water from the Hunter River under water allocation licenses issued by Water NSW.

During the reporting period, HVO extracted 0 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, HVO discharged 0 ML of water 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 Groundwater Monitoring Program. The location of groundwater monitoring points across HVO are show in **Figure 14**.

Groundwater monitoring results are provided on a quarterly basis. Results will be provided in the June 2021 Monthly Environmental Monitoring Report.

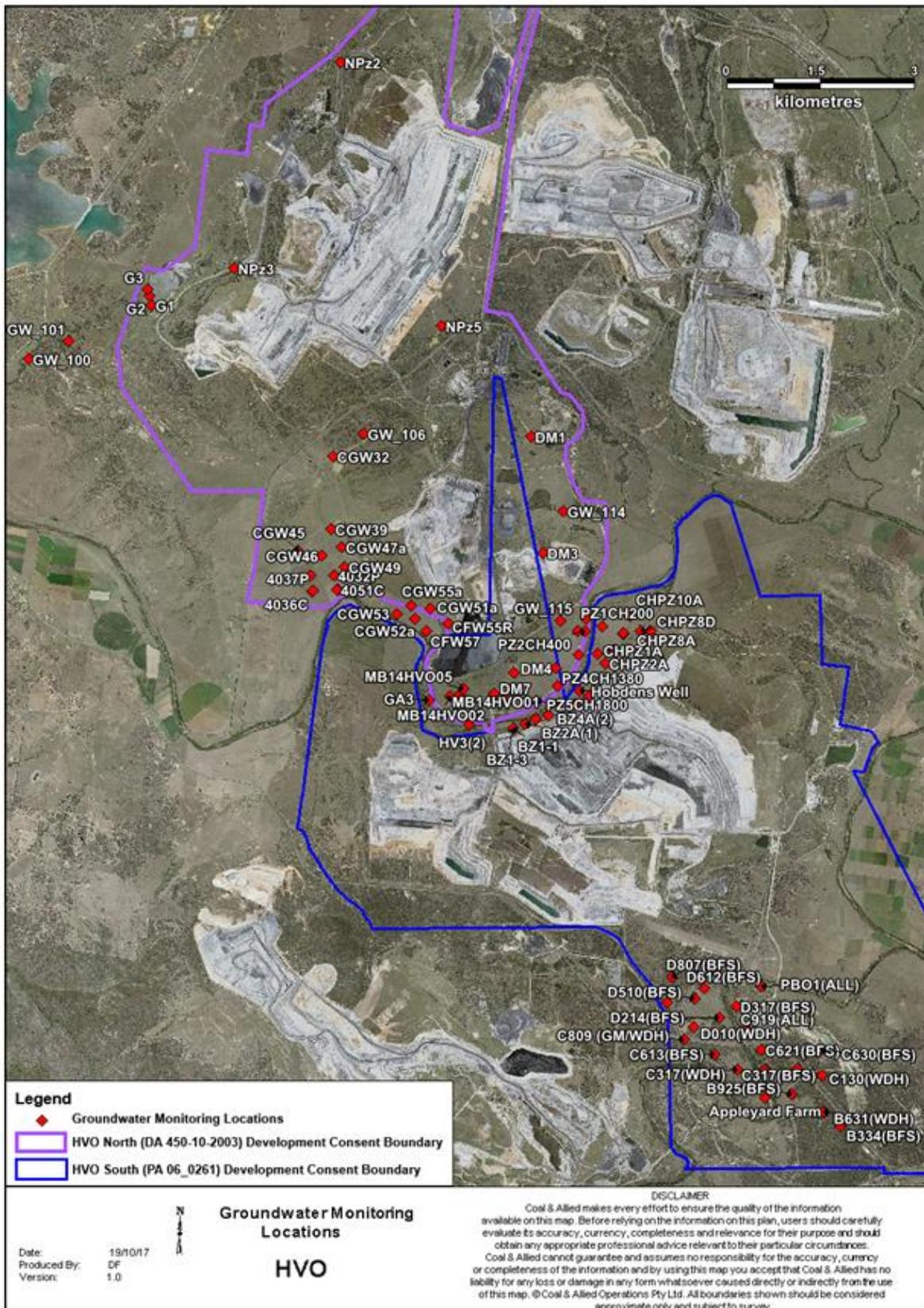


Figure 14 Groundwater monitoring Locations at HVO

### 3.4.1 Groundwater Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis and to highlight potentially adverse groundwater impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses is outlined in the HVO Water Management Plan.

Groundwater trigger tracking results are provided on a quarterly basis. Results will be provided in the June 2021 Monthly Environmental Monitoring Report.

## 4 Blasting

HVO maintains a network of blast monitoring units 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 for HVO 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% of blasts
Ground Vibration (mm/s)	Comments
5	5% of the total number of blasts in a 12-month period
10	0% of blasts

# 4.1 Blast Monitoring Results

Twenty six (26) blasts were initiated at HVO during the reporting period. Blast monitoring results for the period are shown in Table 3 and Table 4

**Table 3 - Overpressure Blast Monitoring Results for the reporting period**

Date and Time	Moses Crossing (dB)	Jerrys Plains Village (dB)	Maison Dieu (dB)	Warkworth (dB)	Knodlers Lane (dB)
3/05/2021 14:23	89.71	87.64	91.58	93.76	95.62
4/05/2021 13:29	80.80	82.05	88.25	83.18	95.72
5/05/2021 13:32	94.33	86.48	98.77	98.14	100.95
8/05/2021 13:00	95.11	99.40	102.58	102.39	101.87
10/05/2021 14:21	84.00	84.07	104.97	92.36	107.97
10/05/2021 14:22	89.51	93.57	101.67	97.09	102.64
12/05/2021 16:45	87.24	85.80	97.66	98.17	88.51
12/05/2021 16:46	92.34	95.98	97.66	98.17	97.79
13/05/2021 13:29	100.76	102.58	99.45	88.99	110.76
15/05/2021 16:45	81.57	86.38	100.05	92.79	96.47
17/05/2021 13:19	93.19	91.29	96.32	96.30	97.24
17/05/2021 13:20	95.79	97.12	99.82	103.12	99.71
18/05/2021 13:18	81.31	79.45	80.34	91.71	86.70
18/05/2021 13:19	84.15	86.54	88.40	85.44	80.46
19/05/2021 16:52	82.09	82.11	99.29	98.39	101.48
19/05/2021 16:52	82.09	82.11	90.53	86.64	91.03
20/05/2021 13:19	92.59	88.74	103.13	97.41	109.46
22/05/2021 12:55	91.18	94.37	95.97	94.07	93.81
22/05/2021 13:07	91.97	93.09	86.49	89.92	92.57
24/05/2021 14:57	89.82	102.01	94.64	87.75	94.17
26/05/2021 16:37	82.74	91.44	102.27	100.41	104.75
26/05/2021 16:41	86.63	94.94	93.90	92.73	101.25
26/05/2021 16:42	83.51	89.63	101.42	91.29	104.77
28/05/2021 13:44	94.42	86.66	101.59	85.42	101.37
29/05/2021 16:24	87.44	83.58	99.61	85.39	95.27
31/05/2021 13:21	79.54	82.34	78.26	92.11	80.76

**Table 4 - Ground Vibration Blast Monitoring Results for the reporting period**

Date and Time	Moses Crossing (mm/s)	Jerrys Plains Village (mm/s)	Maison Dieu (mm/s)	Warkworth (mm/s)	Knodlers Lane (mm/s)
3/05/2021 14:23	0.26	0.12	0.23	0.69	0.20
4/05/2021 13:29	0.20	0.15	0.11	0.14	0.10
5/05/2021 13:32	0.17	0.05	0.58	1.11	0.34
8/05/2021 13:00	0.13	0.06	0.46	1.00	0.76
10/05/2021 14:21	0.10	0.04	0.04	0.42	0.08
10/05/2021 14:22	0.22	0.08	0.17	0.76	0.19
12/05/2021 16:45	0.14	0.04	0.44	0.63	0.35
12/05/2021 16:46	0.14	0.06	0.44	1.15	0.35
13/05/2021 13:29	0.12	0.07	0.06	0.23	0.09
15/05/2021 16:45	0.10	0.03	0.05	0.64	0.24
17/05/2021 13:19	0.17	0.08	0.24	0.67	0.40
17/05/2021 13:20	0.16	0.10	0.55	0.90	0.46
18/05/2021 13:18	0.14	0.09	0.05	0.62	0.08
18/05/2021 13:19	0.13	0.16	0.09	0.60	0.08
19/05/2021 16:52	0.12	0.05	0.21	0.31	0.14
19/05/2021 16:52	0.10	0.03	0.05	0.24	0.08
20/05/2021 13:19	0.18	0.07	0.51	0.81	0.62
22/05/2021 12:55	0.12	0.05	0.10	0.29	0.11
22/05/2021 13:07	0.24	0.08	0.26	0.61	0.21
24/05/2021 14:57	0.10	0.03	0.04	0.22	0.08
26/05/2021 16:37	0.17	0.05	0.61	0.97	0.82
26/05/2021 16:41	0.10	0.02	0.24	0.34	0.08
26/05/2021 16:42	0.27	0.16	0.24	0.44	0.19
28/05/2021 13:44	0.12	0.08	0.06	0.69	0.08
29/05/2021 16:24	0.10	0.03	0.06	0.22	0.08
31/05/2021 13:21	0.14	0.10	0.07	0.23	0.08

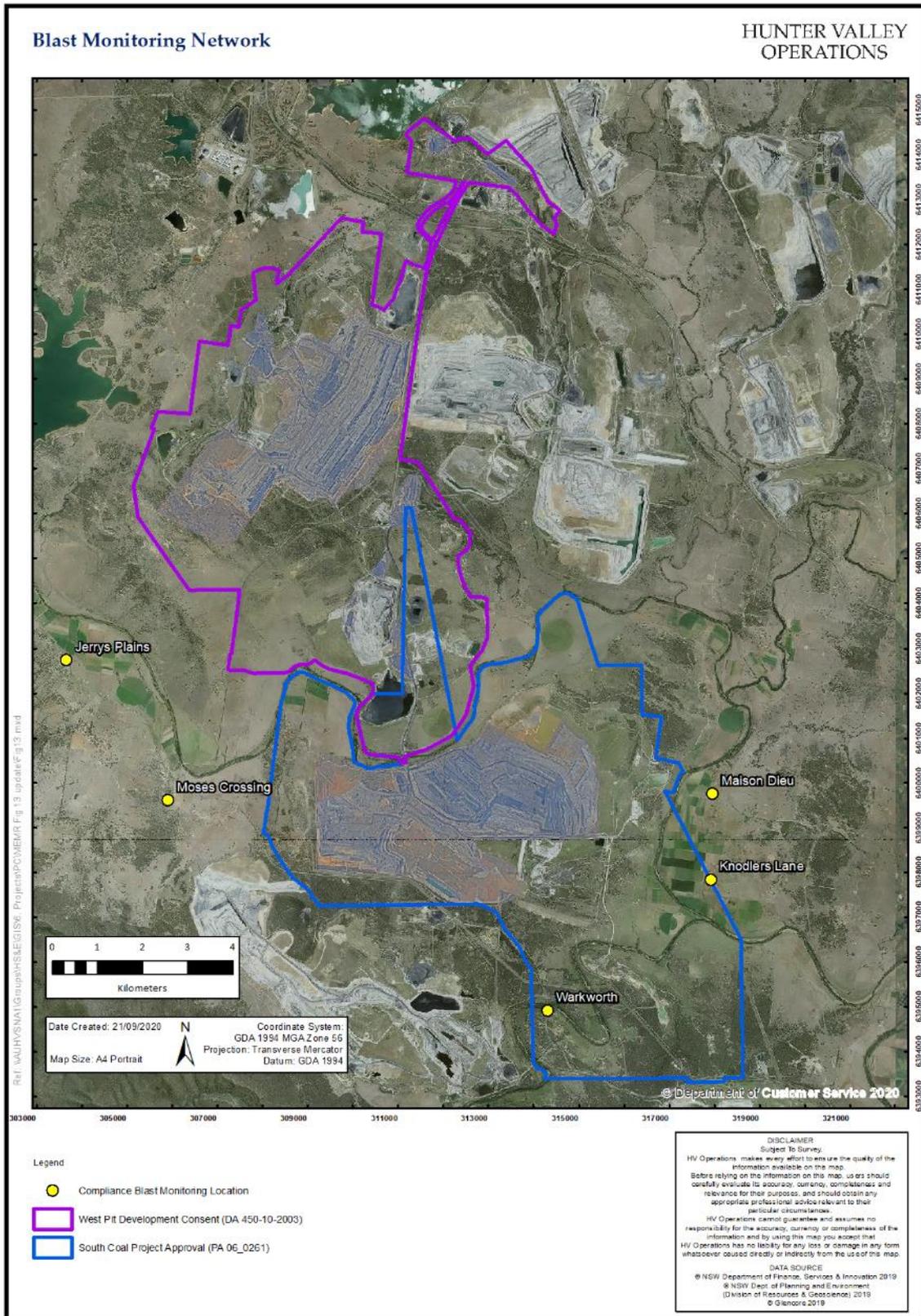


Figure 15 - Blast Monitoring Location Plan

## 5 Noise

Routine attended noise monitoring occurs at defined locations around HVO, as described in the HVO Noise Monitoring Program. The noise monitoring aims to quantify and describe the acoustic environment around the site and compare results with specified limits. The attended noise monitoring locations are displayed in **Figure 16**.

### 5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations around HVO on the night of 17 May 2021. All monitoring levels were below relevant criteria. Monitoring results are detailed in **Table 7** to **Table 11**.

**Table 5 - LAeq,15minute HVO North Against Impact Assessment Criteria for the reporting period**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class	Criterion dB(A)	Criterion Applies <sup>2</sup>	HVO North LAeq dB <sup>3,4,5,6</sup>	Exceedance <sup>4,5</sup>
Shearers Lane	17/05/2021 21:10	1.6	E	35	Yes	IA	Nil
Knodlers Lane	17/05/2021 21:52	1.1	D	35	Yes	IA	Nil
Maison Dieu	17/05/2021 21:32	1	E	35	Yes	IA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	0.6	E	35	Yes	IA	Nil
Kilburnie South	17/05/2021 23:50	0.6	D	39	Yes	IA	Nil
Jerrys Plains East	17/05/2021 23:19	0	G	39	No	<25	NA
Jerrys Plains Village	17/05/2021 21:13	1.6	E	40	Yes	32	Nil
Jerrys Plains West	17/05/2021 21:42	1.1	D	40	Yes	29	Nil
HVGC	18/05/2021 0:25	0.9	E	NA	Yes	IA	NA

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only LAeq 15 minute attributed to HVO South Pit Area, including modifying factors if applicable;

5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval therefore criterion not applicable;

6. IA means inaudible, there was no site noise at the monitoring location; and

**Table 6 - LAeq,15minute HVO North Against Land Acquisition Criteria for the reporting period**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class	Criterion dB(A)	Criterion Applies <sup>2</sup>	HVO North LAeq dB <sup>3,4,6</sup>	Exceedance <sup>4,5</sup>
Shearers Lane	17/05/2021 21:10	1.6	E	41	Yes	IA	Nil
Knodlers Lane	17/05/2021 21:52	1.1	D	41	Yes	IA	Nil
Maison Dieu	17/05/2021 21:32	1	E	41	Yes	IA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	0.6	E	41	Yes	IA	Nil
Kilburnie South	17/05/2021 23:50	0.6	D	41	Yes	IA	Nil
Jerrys Plains East	17/05/2021 23:19	0	G	41	No	<25	NA
Jerrys Plains Village	17/05/2021 21:13	1.6	E	41	Yes	32	Nil
Jerrys Plains West	17/05/2021 21:42	1.1	D	41	Yes	29	Nil
HVGC	18/05/2021 0:25	0.9	E	NA	Yes	IA	NA

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only LAeq 15 minute attributed to HVO South Pit Area, including modifying factors if applicable;

5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval therefore criterion not applicable;

6. IA means inaudible, there was no site noise at the monitoring location; and

**Table 7 - LA1,1minute HVO North Against Impact Assessment Criteria for the reporting period**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class	Criterion dB(A)	Criterion Applies <sup>2</sup>	HVO North L <sub>Aeq</sub> dB <sup>3,4,6</sup>	Exceedance <sup>4,5</sup>
Shearers Lane	17/05/2021 21:10	1.6	E	46	Yes	IA	Nil
Knodlers Lane	17/05/2021 21:52	1.1	D	46	Yes	IA	Nil
Maison Dieu	17/05/2021 21:32	1	E	46	Yes	IA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	0.6	E	46	Yes	IA	Nil
Kilburnie South	17/05/2021 23:50	0.6	D	46	Yes	IA	Nil
Jerrys Plains East	17/05/2021 23:19	0	G	46	No	<25	NA
Jerrys Plains Village	17/05/2021 21:13	1.6	E	46	Yes	37	Nil
Jerrys Plains West	17/05/2021 21:42	1.1	D	46	Yes	36	Nil
HVGC	18/05/2021 0:25	0.9	E	NA	Yes	IA	NA

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only L<sub>Aeq</sub> 15 minute attributed to HVO South Pit Area, including modifying factors if applicable;
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval therefore criterion not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and

**Table 8 - LAeq,15minute HVO South Against Impact Assessment Criteria for the reporting period**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class	Criterion dB(A)	Criterion Applies <sup>2</sup>	HVO South LAeq dB <sup>3,4,6</sup>	Exceedance <sup>4,5</sup>
Shearers Lane	17/05/2021 21:10	2.2	D	41	Yes	<25	Nil
Knodlers Lane	17/05/2021 21:52	1.8	D	40	Yes	IA	Nil
Maison Dieu	17/05/2021 21:32	1.9	E	39	Yes	IA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	1.5	D	37	Yes	IA	Nil
Kilburnie South	17/05/2021 23:50	1.3	E	39	Yes	IA	Nil
Jerrys Plains East	17/05/2021 23:19	1.8	D	38	Yes	IA	Nil
Jerrys Plains Village	17/05/2021 21:13	2.2	D	35	Yes	IA	Nil
Jerrys Plains West	17/05/2021 21:42	1.8	D	35	Yes	IA	Nil
HVGC	18/05/2021 0:25	0.7	F	35	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only LAeq 15 minute attributed to HVO South Pit Area, including modifying factors if applicable;

6. IA means inaudible, there was no site noise at the monitoring location; and

**Table 9 - LA1,1minute HVO South Against Impact Assessment Criteria for the reporting period**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class	Criterion dB(A)	Criterion Applies <sup>2</sup>	HVO South L <sub>Aeq</sub> dB <sup>3,4,6,7</sup>	Exceedance <sup>4,5</sup>
Shearers Lane	17/05/2021 21:10	2.2	D	45	Yes	30	Nil
Knodlers Lane	17/05/2021 21:52	1.8	D	45	Yes	IA	Nil
Maison Dieu	17/05/2021 21:32	1.9	E	45	Yes	IA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	1.5	D	45	Yes	IA	Nil
Kilburnie South	17/05/2021 23:50	1.3	E	45	Yes	IA	Nil
Jerrys Plains East	17/05/2021 23:19	1.8	D	45	Yes	IA	NA
Jerrys Plains Village	17/05/2021 21:13	2.2	D	45	Yes	IA	Nil
Jerrys Plains West	17/05/2021 21:42	1.8	D	45	Yes	IA	Nil
HVGC	18/05/2021 0:25	0.7	F	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only L<sub>Aeq</sub> 15 minute attributed to HVO South Pit Area, including modifying factors if applicable;
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval therefore criterion not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and

## 5.2 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. No penalties were applied for monitoring undertaken through the reporting period. The assessments for the low frequency noise are shown in **Table 10** and **Table 11**.

**Table 10 - Modifying Factor Assessment HVO North for the reporting period**

Location	Date and Time	Measured HVO North $L_{Aeq}dB$	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality <sup>1</sup>	Low-frequency Modifying Factor?	Maximum Exceedance of NPfI Reference Spectrum <sup>1,2</sup>	Total Penalty $dB^2$
Shearers Lane	17/05/2021 21:10	IA	Yes	No	No	NA	No	NA	Nil
Knodlers Lane	17/05/2021 21:52	IA	Yes	No	No	NA	No	NA	Nil
Maison Dieu	17/05/2021 21:32	IA	Yes	No	No	NA	No	NA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	IA	Yes	No	No	NA	No	NA	Nil
Kilburnie South	17/05/2021 23:50	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	17/05/2021 23:19	<25	No	No	No	NA	No	NA	Nil
Jerrys Plains Village	17/05/2021 21:13	32	Yes	No	No	NA	No	NA	Nil
Jerrys Plains West	17/05/2021 21:42	29	Yes	No	No	NA	No	NA	Nil
HVGC	18/05/2021 0:25	IA	Yes	No	No	NA	No	NA	Nil

1. NA means not applicable;

**Table 11 - Modifying Factor Assessment HVO South for the reporting period**

Location	Date and Time	Measured HVO South $L_{Aeq}dB$	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality <sup>1</sup>	Low-frequency Modifying Factor?	Maximum Exceedance of NPFI Reference Spectrum <sup>1,2</sup>	Total Penalty dB <sup>2</sup>
Shearers Lane	17/05/2021 21:10	<25	Yes	No	No	NA	No	NA	Nil
Knodlers Lane	17/05/2021 21:52	IA	Yes	No	No	NA	No	NA	Nil
Maison Dieu	17/05/2021 21:32	IA	Yes	No	No	NA	No	NA	Nil
Long Point (Dights Crossing)	17/05/2021 22:42	IA	Yes	No	No	NA	No	NA	Nil
Kilburnie South	17/05/2021 23:50	33	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	17/05/2021 23:19	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains Village	17/05/2021 21:13	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains West	17/05/2021 21:42	IA	Yes	No	No	NA	No	NA	Nil
HVGC	18/05/2021 0:25	IA	Yes	No	No	NA	No	NA	Nil

1. NA means not applicable;

### 5.3 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis, shown in **Figure 16**. 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 that require investigation.

HVO investigates and responds to noise alarms with appropriate modification to operations. Changes in response to a noise alarm can include replacing equipment with alternative units, changing or relocating tasks, or shutting down equipment. It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in **Section 5.1**. Real time monitoring data includes non-mine noise sources such as animals, road traffic and weather.

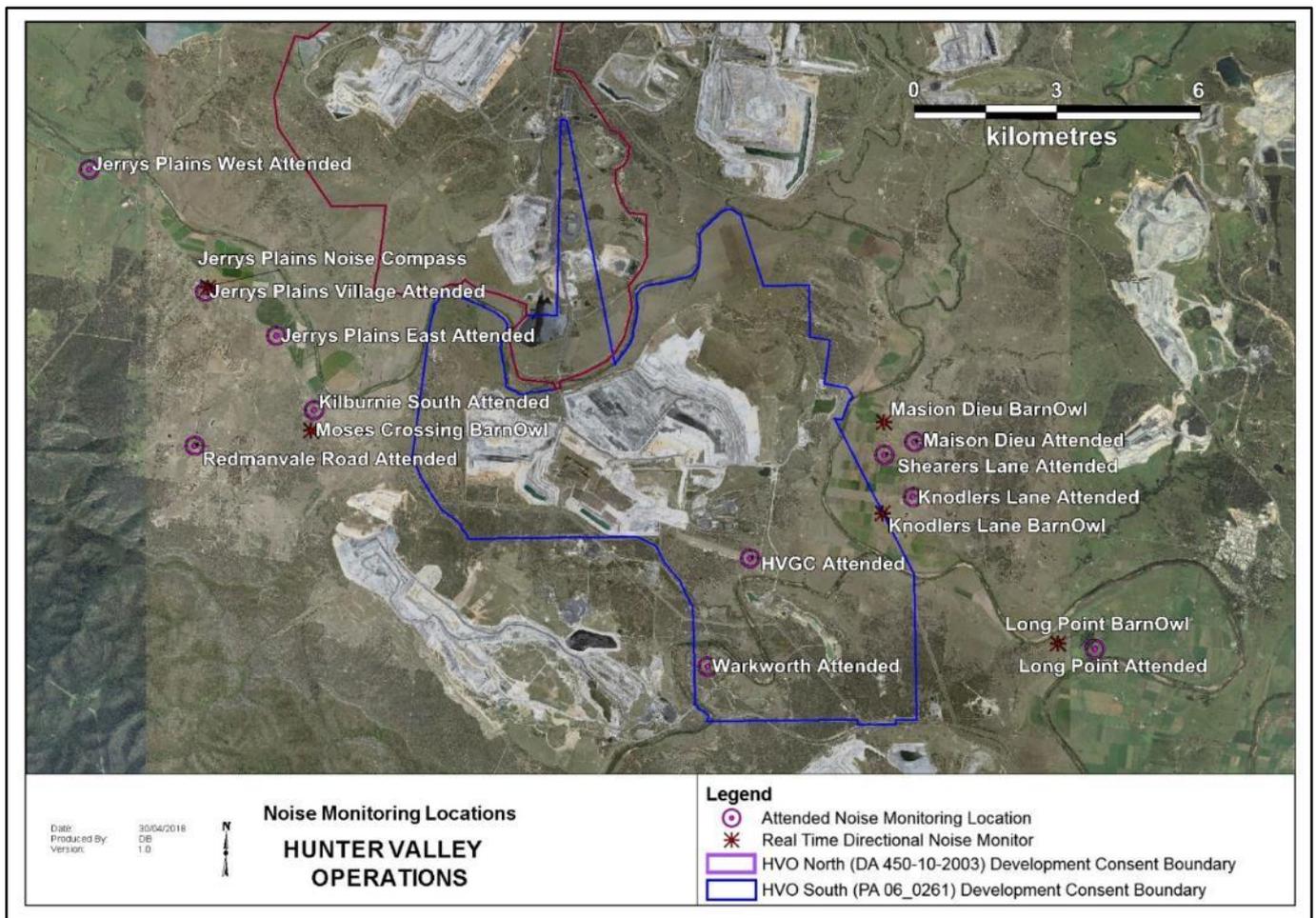


Figure 16 - Noise Monitoring Location Plan

## 6 Operational Downtime

A total of 43.8 hours of equipment downtime were logged in response to real time monitoring and inspections for environmental factors such as noise and dust during the reporting period. Operational downtime by equipment type is show in **Figure 17**. Note that these delays are instances where operations were completely stopped and does not include occasions where operations were changed/modified but not stopped (e.g. changed from exposed dump to in-pit dump).

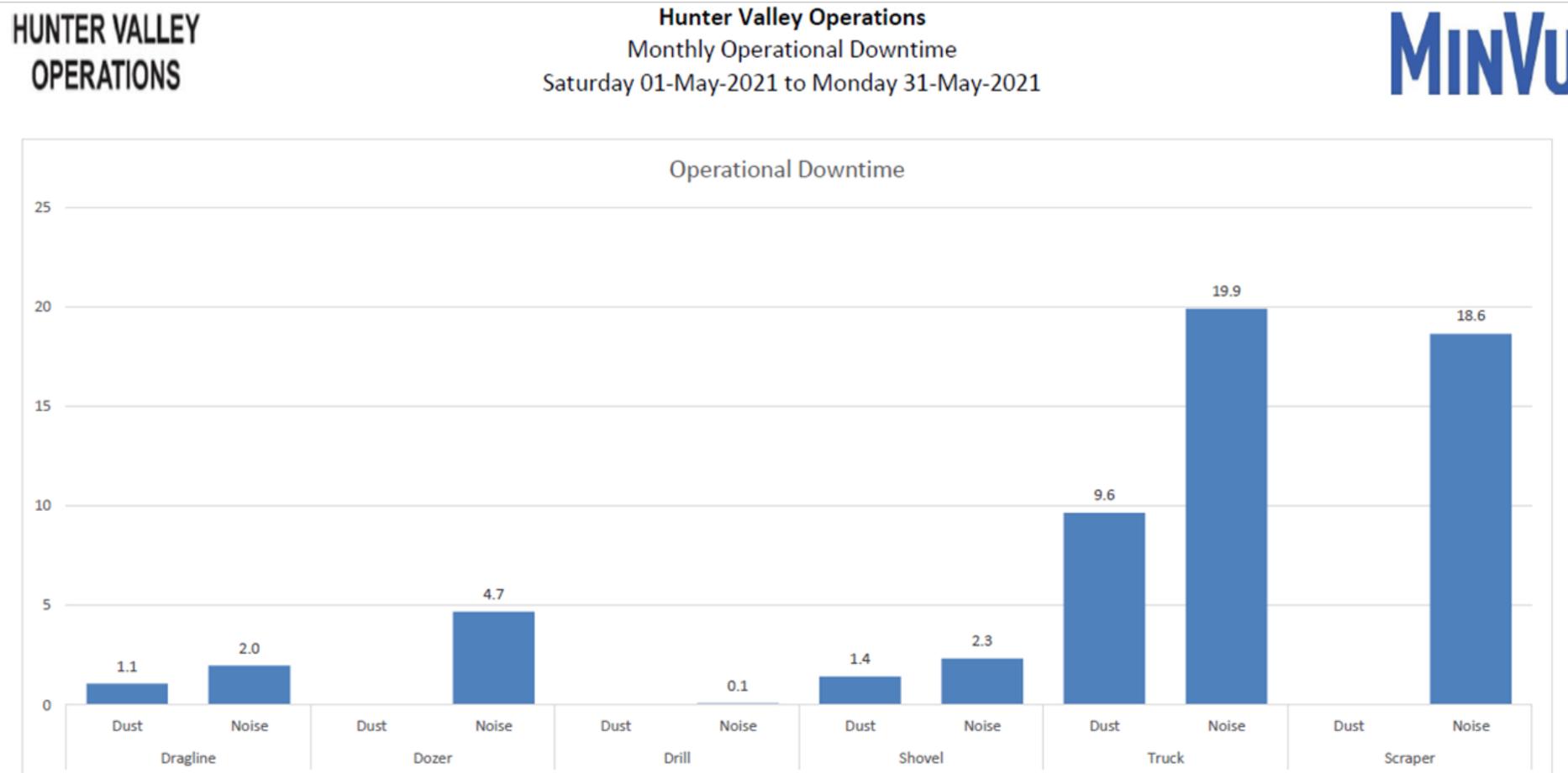


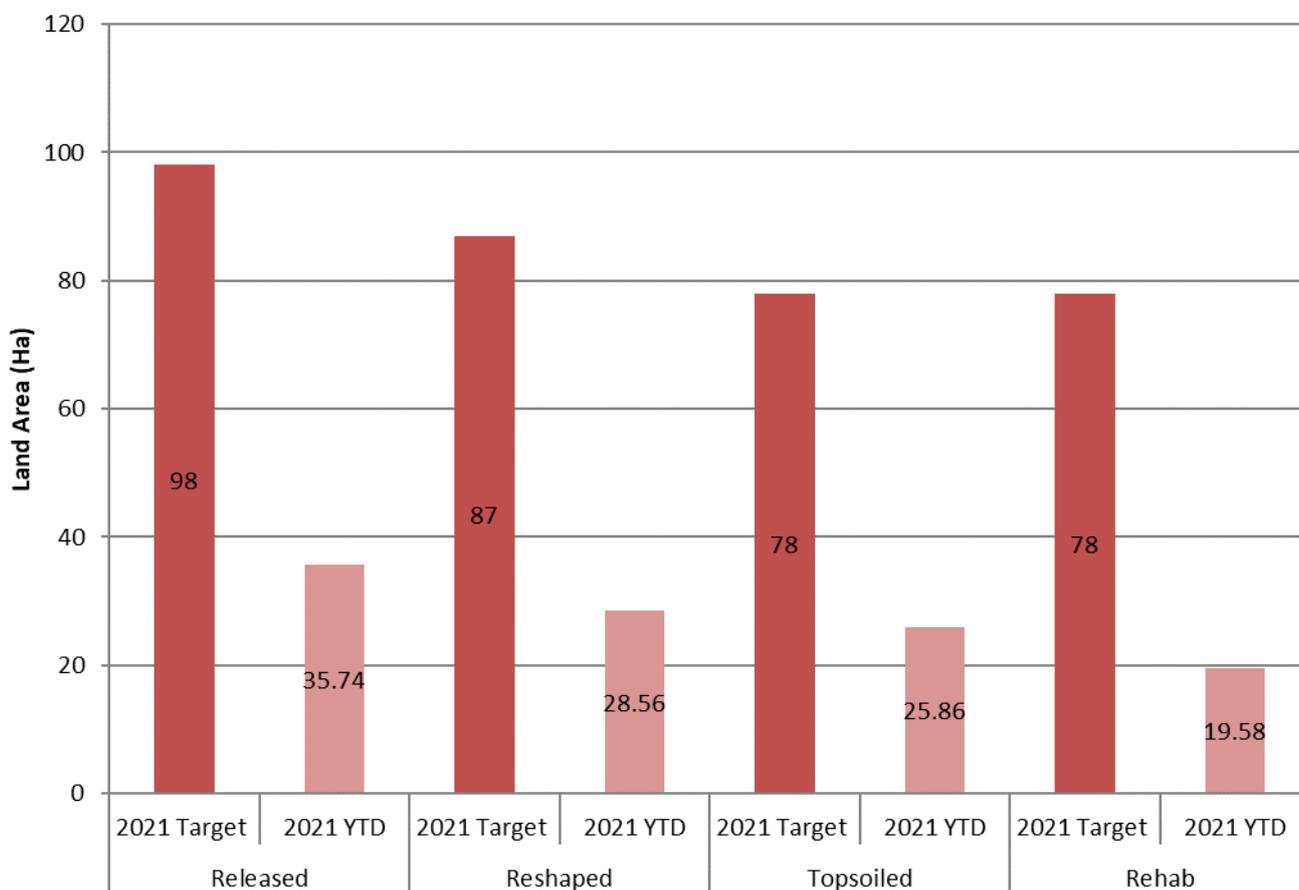
Figure 17 - Operational Downtime by Equipment Type for the reporting period

# 7 Rehabilitation

The following activities related to rehabilitation were completed during the reporting period:

- 0 Ha of land was reshaped
- 1.84 Ha of land was released (became available for the application of topsoil)
- 0 Ha of land was topsoiled
- 4.57 Ha of land was rehabilitated

Year to date progress is shown in **Figure 18**.



**Figure 18 - Rehabilitation YTD May 2021**

# 8 Complaints

Five (5) complaints were received during the reporting period. Details of complaints received are shown in Table 12.

**Table 12 - Complaints Summary 2021**

Month	Noise	Dust	Blast	Lighting	Other	Total
January	1	-	-	1	-	2
February	-	-	-	-	-	-
March	-	-	-	-	-	-
April	-	-	3	1	-	4
May	2	-	2	1	-	5
June						
July						
August						
September						
October						
November						
December						
<b>Total</b>	<b>3</b>	<b>-</b>	<b>5</b>	<b>3</b>	<b>-</b>	<b>11</b>

## 9 Environmental Incidents

During May there were five (5) reportable environmental incidents. These will be discussed in the next annual review.

- **04/05/2021 – Missed Sample at Maison Dieu TEOM**

There was an issue with the logger at the TEOM from 1:50am on 3 May which was resolved at 14:00pm the same day. There was no capture of meaningful data at the monitoring location during this time, resulting in a 46% data capture for the 24 hour period.

- **21/05/2021 – Missed Sample at Warkworth TEOM**

There was an issue with the TEOM from 1:30am on 20 May which was resolved at 12:30pm, with meaningful data available from 4:00pm. 38% of meaningful data was recorded for the monitoring day. The outage was found to be caused by tripping of a residual current device.

- **25/05/2021 – Missed Sample at Jerrys Plains TEOM**

There was an issue with the TEOM from 7:30pm 22 May. Recording of meaningful data resumed at 11:30am 24 May. The unit recorded 0% meaningful data on 23 May, and 54% meaningful data on 24 May. The outage has been advised to be caused by data lockup at the monitor. This monitor is operated as part of the Upper Hunter Air Quality Monitoring Network and are outside of HVO control.

- **25/05/2021 – Missed Sample at Maison Dieu TEOM**

There was an issue with the TEOM from 8:00pm 23 May. Recording of meaningful data resumed at 1:30pm 24 May. The unit recorded 46% meaningful data on 24 May. The outage has been advised to be caused by data lockup at the monitor. This monitor is operated as part of the Upper Hunter Air Quality Monitoring Network and are outside of HVO control.

- **28/05/2021 – Missed Sample at Jerrys Plains TEOM**

There was an issue with the TEOM from 8:00pm 23 May. Recording of meaningful data resumed at 1:30pm 24 May. The unit recorded 46% meaningful data on 24 May. The outage has been advised to be caused by data lockup at the monitor. This monitor is operated as part of the Upper Hunter Air Quality Monitoring Network and are outside of HVO control.

## Appendix A - Meteorological Data

Date	Air Temp Max (°C)	Air Temp Min (°C)	Relative Humidity (Max %)	Relative Humidity (Min %)	Solar Radiation Maximum (W/Sq. M)	Average Wind Direction (°)	Average Wind Speed (m/sec)	Rainfall (mm)
1/05/2021	21.66	-2.011	110.6	48.93	825	137.6	1.298	0
2/05/2021	21.19	-3.023	110	42.43	783.7	144	1.005	0
3/05/2021	24.16	-3.253	110.3	27.11	617.2	246.3	1.482	0.2
4/05/2021	15.31	-2.045	109	60.93	157.9	228.5	1.346	1.8
5/05/2021	17.64	-4.331	111.5	58.42	939	157.1	0.911	0.2
6/05/2021	18.2	-0.904	109.5	72.93	727.5	186.1	1.625	10.6
7/05/2021	22.23	0.978	109.5	55.87	1011	210.7	1.227	1.2
8/05/2021	23.24	0.076	109	44.59	748.3	274.6	2.243	0.2
9/05/2021	16.68	-1.173	100	61.11	357.8	224.8	1.103	0.4
10/05/2021	23.55	10.46	88.7	40.76	712.9	267.5	2.868	0
11/05/2021	19.94	6.964	111.3	61.14	848	275	2.647	12.4
12/05/2021	20.53	4.617	100	68.1	920	186.9	1.511	0
13/05/2021	20.6	6.829	110.5	46.67	773.5	273.6	2.858	0
14/05/2021	18.5	4.588	86	36.91	652.7	280.2	4.086	0
15/05/2021	17.2	1.83	85.2	36.07	933	283.5	4.133	0
16/05/2021	16.11	-0.615	78.74	23.77	630.3	286.7	3.523	0
17/05/2021	19.02	-0.553	81.3	39.46	626	228.1	2.589	0
18/05/2021	20.28	0.277	97.4	36.16	623.7	202	1.087	0
19/05/2021	20.43	-0.223	100	30.46	626.8	263.3	1.907	0
20/05/2021	21.39	3.581	92.2	33.98	607.6	245.6	2.423	0
21/05/2021	17.59	1.958	110.1	53.51	808	166.8	1.213	1
22/05/2021	18.38	2.667	110.8	59.22	794	149.3	1.148	0.2
23/05/2021	19.56	1.587	113	55.65	744.3	195.3	1.284	0
24/05/2021	20.25	5.48	108.6	59.1	881	171.9	1.698	0
25/05/2021	21.29	2.995	112.6	48.82	624.2	212	1.306	0

Date	Air Temp Max (°C)	Air Temp Min (°C)	Relative Humidity (Max %)	Relative Humidity (Min %)	Solar Radiation Maximum (W/Sq. M)	Average Wind Direction (°)	Average Wind Speed (m/sec)	Rainfall (mm)
26/05/2021	21.38	4.712	89.3	29.11	870	258.2	3.165	0
27/05/2021	18.41	1.157	87.1	30.5	597.7	279.9	2.663	0
28/05/2021	17.7	0.081	90.2	30.39	606.6	214.4	2.497	0
29/05/2021	16.47	-0.493	78.71	44.32	585.8	142.3	1.924	0
30/05/2021	17.25	3.605	83.7	51.1	936	155.1	1.231	0
31/05/2021	18.48	1.419	100	45.39	568.8	201.7	1.235	0