

**HUNTER VALLEY  
OPERATIONS**

**Monthly Environmental Monitoring Report**

**November 2019**

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## 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 November to 30 November 2019.

## 2.0 AIR QUALITY

### 2.1 Meteorological Monitoring

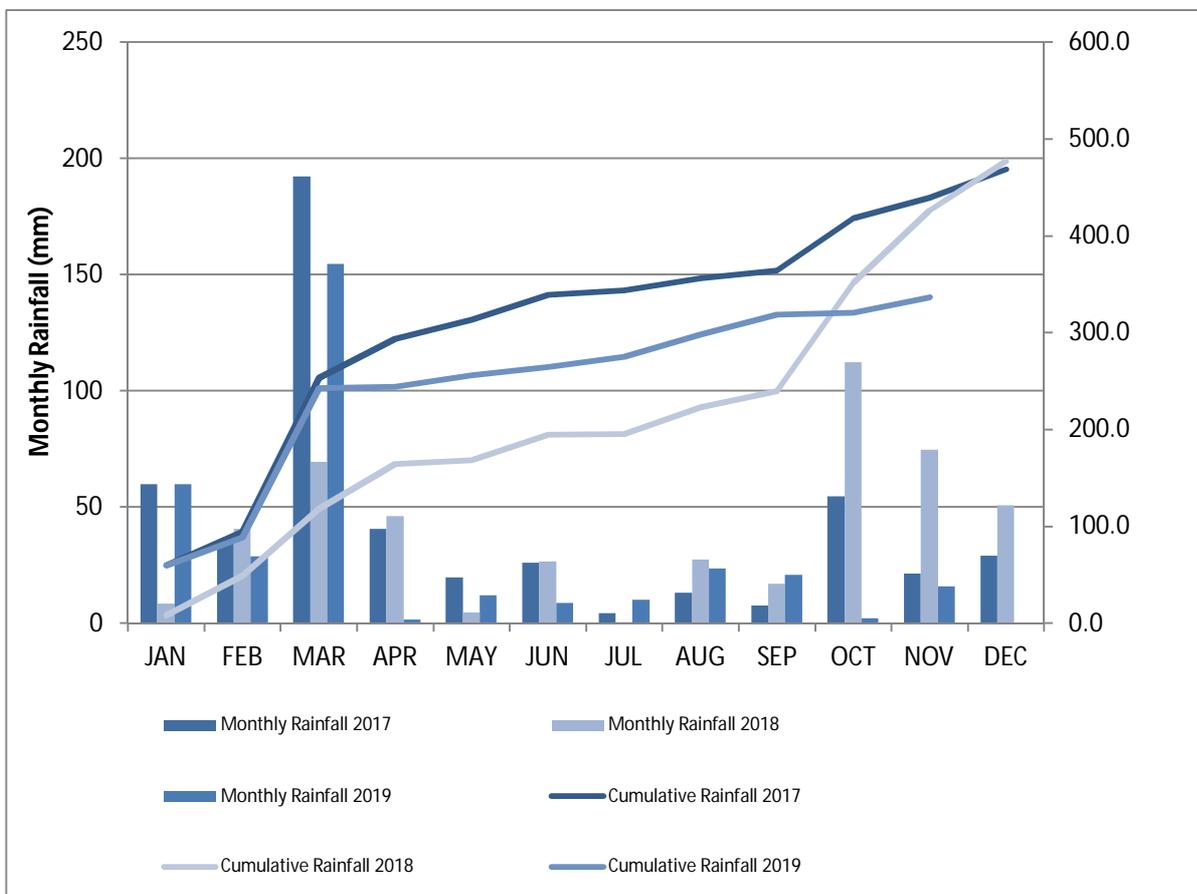
HVO maintains two meteorological stations; 'HVO Corporate' and 'Cheshunt' (Refer to Figure 4: Air Quality Monitoring Location Plan).

#### 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: Rainfall data - November 2019**

2019	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
November	15.8	336.6



**Figure 1: Rainfall Summary 2019**

### 2.1.2 Wind Speed and Direction

Westerly and north westerly winds were dominant during November as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

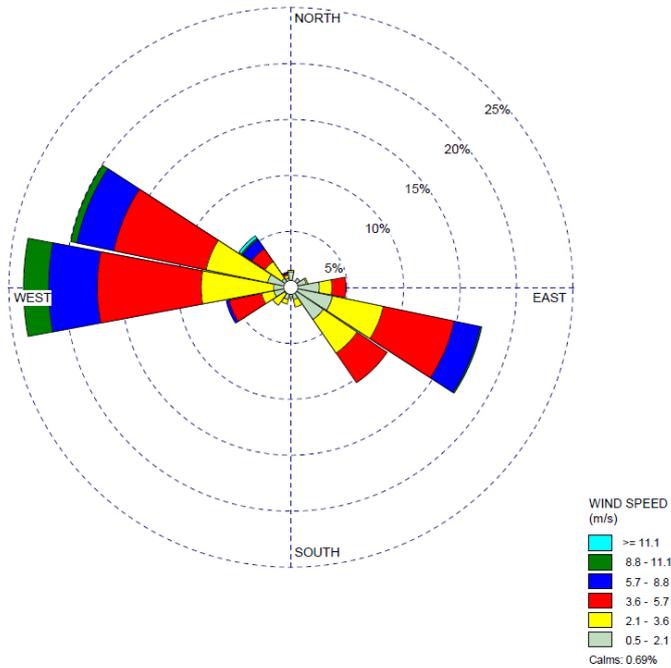


Figure 2: HVO Corporate Wind Rose – November 2019

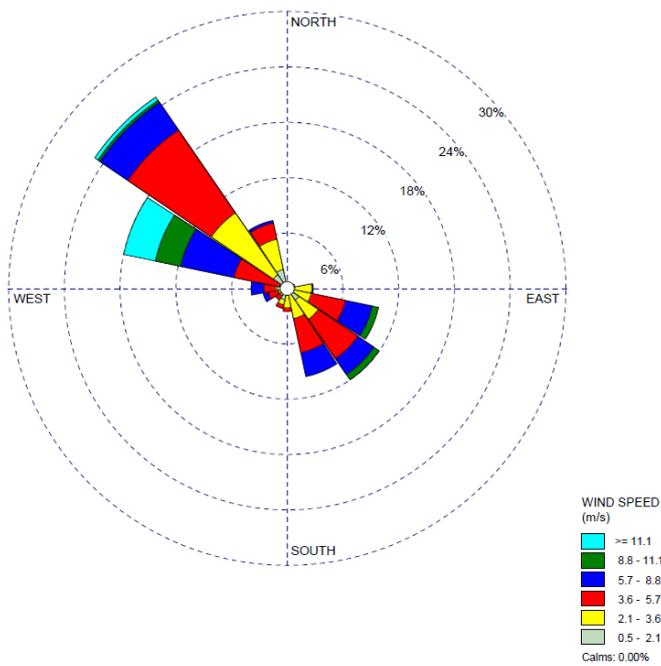


Figure 3: HVO Cheshunt Wind Rose – November 2019

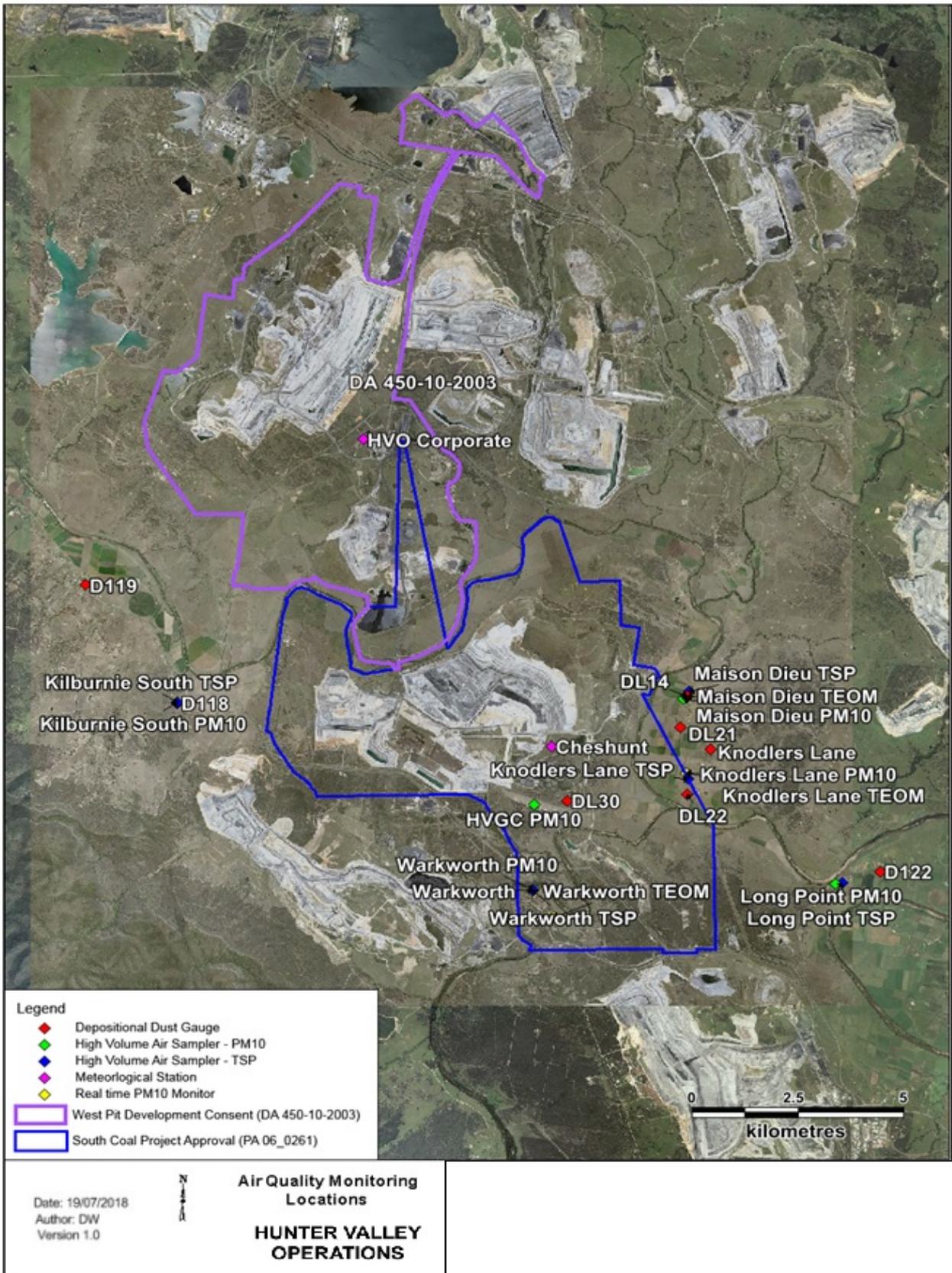


Figure 4: Air Quality Monitoring Location Plan

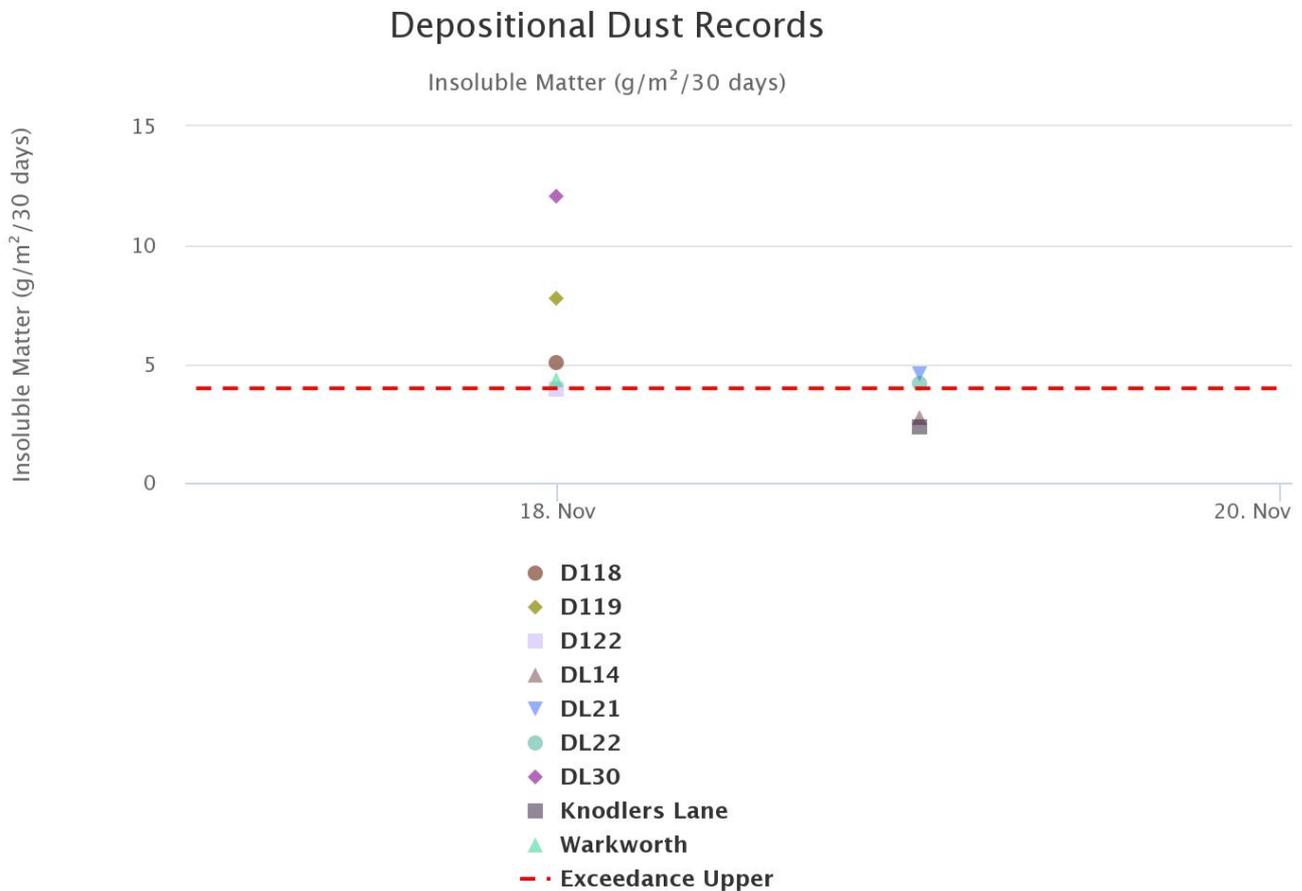
## 2.2 Depositional Dust

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 the DL21, DL22, DL30, D118, D119 and Warkworth monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m<sup>2</sup> per month.

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 – November 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>. During the reporting period the all monitors recorded an exceedance above the short term impact assessment criteria of 50 µg/m<sup>3</sup>. An internal investigation found that the Cheshunt East and Kilburnie South monitors were non-compliant on 16/11, 22/11 and 28/11, however these days were considered to be an extraordinary event due to bushfire smoke and are therefore compliant.

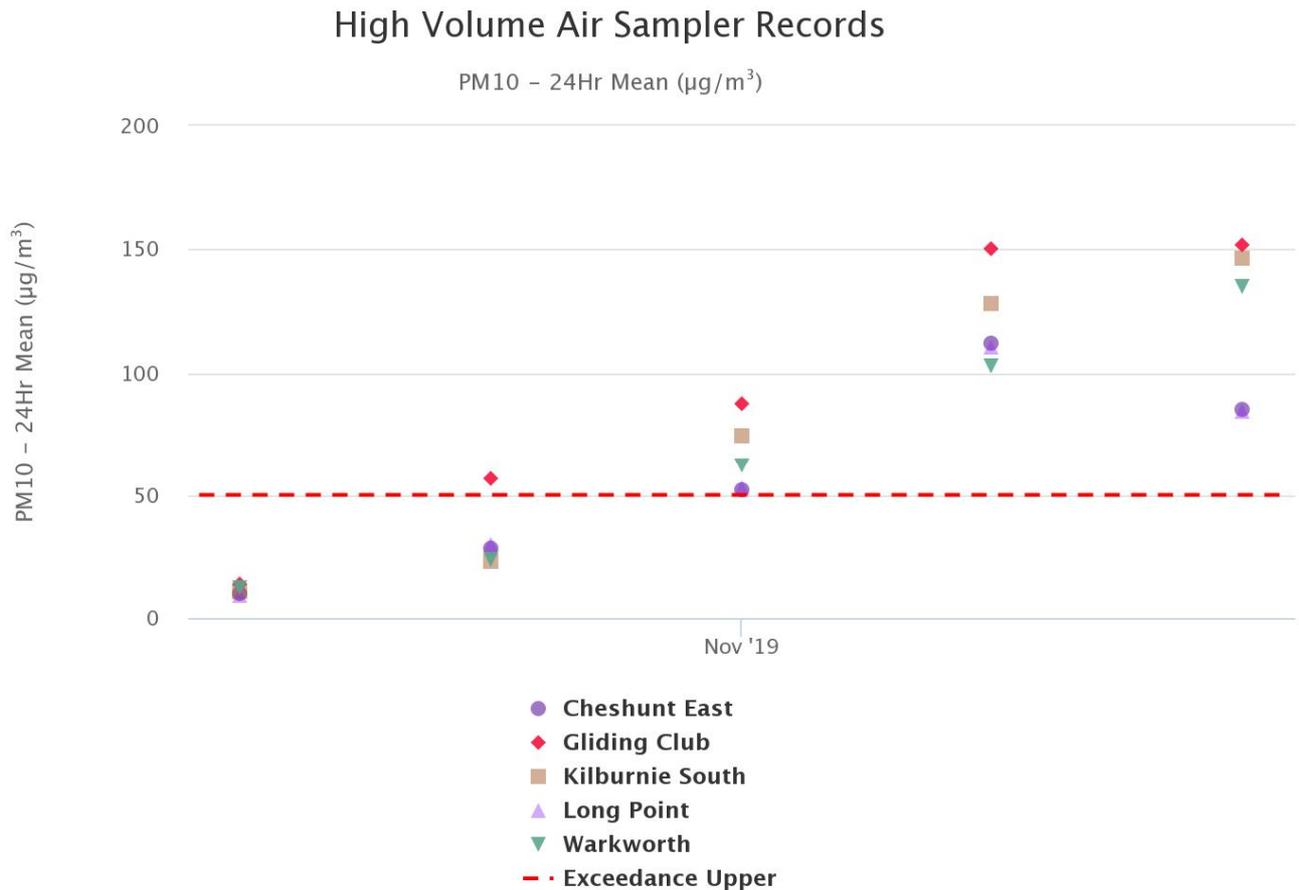
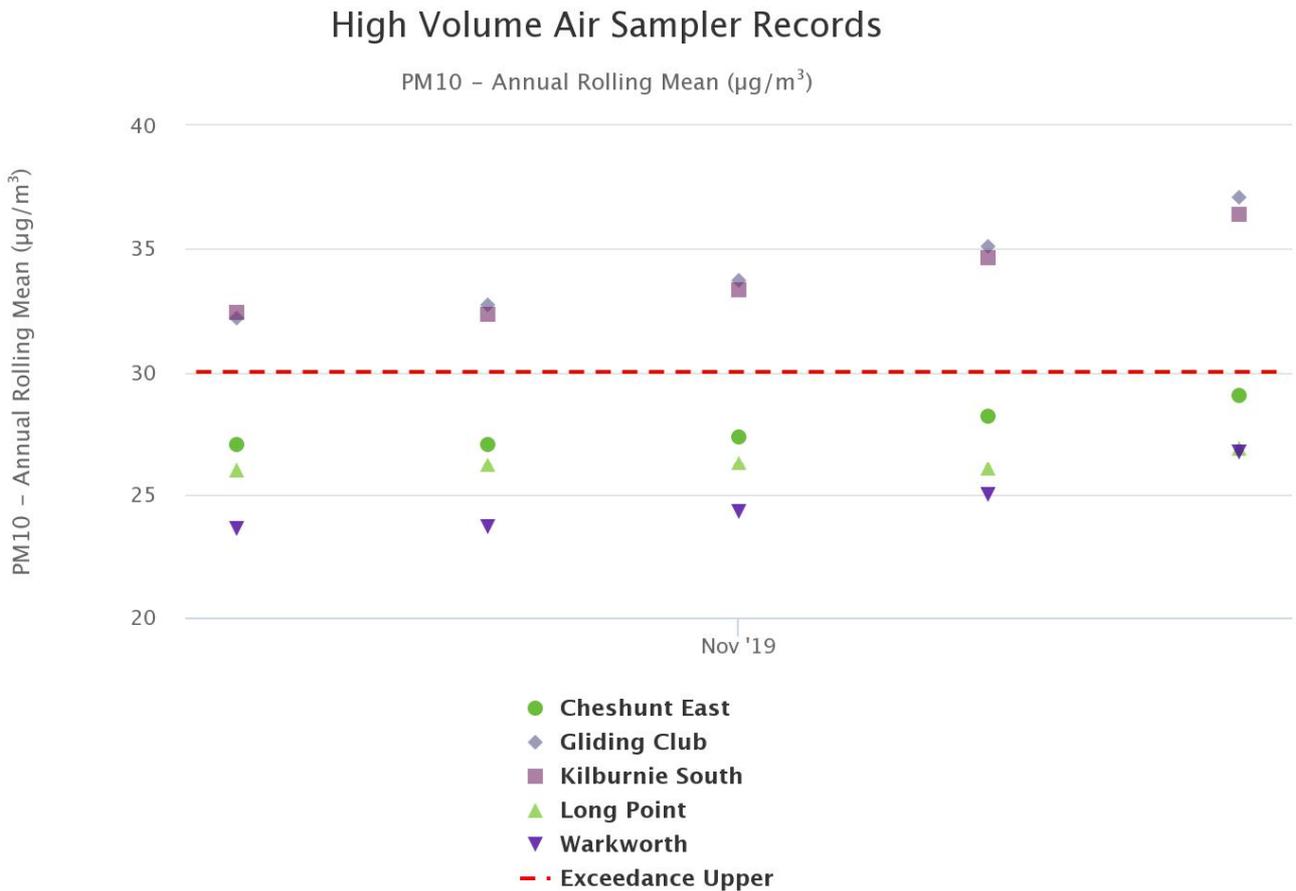


Figure 6: Individual PM<sub>10</sub> Results – November 2019

Figure 7 shows the year to date annual average PM10 results. During the reporting period, the Kilburnie South and Gliding Club monitors recorded an exceedance above the PM10 Annual Rolling Mean of 30µg/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.

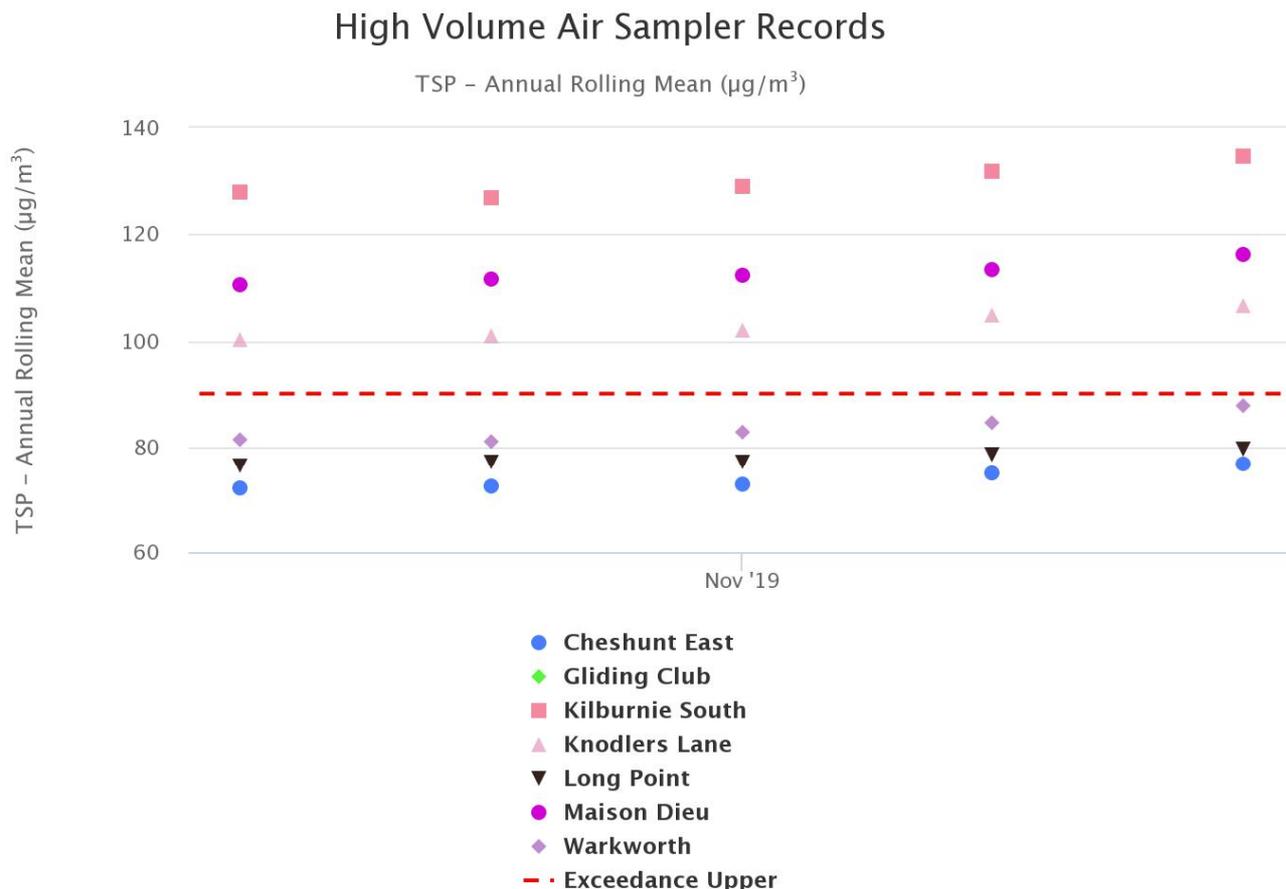


**Figure 7: Year to Date Average PM<sub>10</sub> – as at end of November 2019**

### 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>. During the reporting period, the Kilburnie South, Knodlers Lane and Maison Dieu monitors recorded an exceedance above 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 November 2019**

### 2.3.3 Real Time PM10 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.

During the reporting period, the Maison Dieu, Knodlers Lane, Jerrys Plain and Warkworth monitors exceeded the daily 24 hour average PM<sub>10</sub> result (50µg/m<sup>3</sup>).

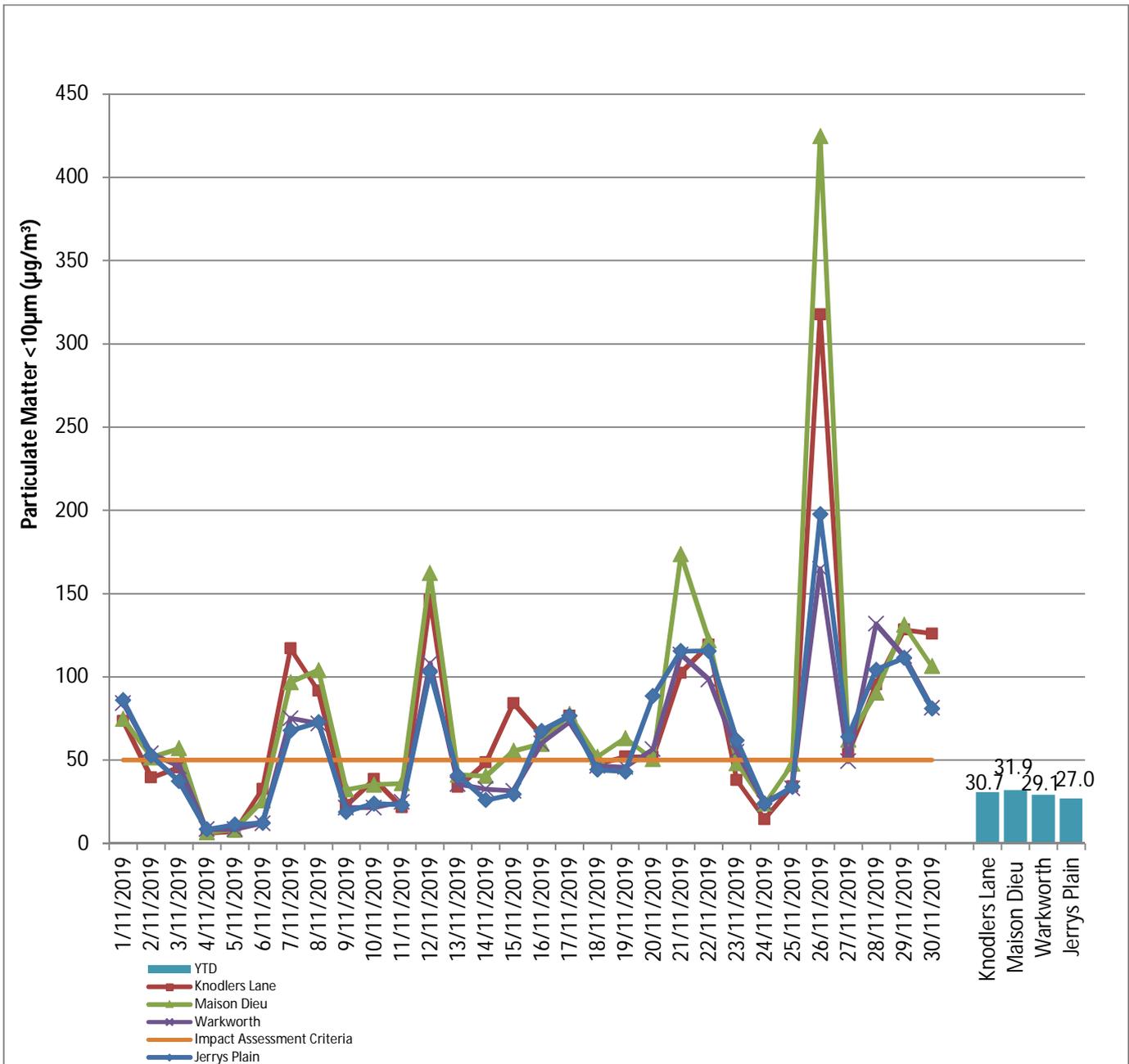


Figure 9: Real Time  $PM_{10}$  24hr average and YTD average – November 2019

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

Date	Site	Total Measured Result ( $\mu\text{g}/\text{m}^3$ )	Estimated contribution from HVO ( $\mu\text{g}/\text{m}^3$ )	Discussion
01/11/2019	Warkworth	84	8.1	An internal investigation determined HVO maximum potential contribution to be in the order of 8.1 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
01/11/2019	Maison Dieu	74.8	4.4	An internal investigation determined HVO maximum potential contribution to be in the order of 4.4 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
01/11/2019	Knodlers Lane	73.5	6.5	An internal investigation determined HVO maximum potential contribution to be in the order of 6.5 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
01/11/2019	Jerrys Plain South	86.0	30.0	An internal investigation determined HVO maximum potential contribution to be in the order of 30.0 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
01/11/2019	Jerrys Plain North	86.0	27.4	An internal investigation determined HVO maximum potential contribution to be in the order of 27.4 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions. 1 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
02/11/2019	Warkworth	54.0	14.6	An internal investigation determined HVO maximum potential contribution to be in the order of 14.6 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
02/11/2019	Maison Dieu	51.6	10.1	An internal investigation determined HVO maximum potential contribution to be in the order of 10.1 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
02/11/2019	Jerrys Plain South	52.6	3.5	An internal investigation determined HVO maximum potential contribution to be in the order of 3.5 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
02/11/2019	Jerrys Plain North	52.6	4.6	An internal investigation determined HVO maximum potential contribution to be in the order of 4.6 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions. 2 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
03/11/2019	Maison Dieu	57.0	32.0	An internal investigation determined HVO maximum potential contribution to be in the order of 32.0 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.
07/11/2019	Warkworth	75.1	3.9	An internal investigation determined HVO maximum potential contribution to be in the order of 3.9 $\mu\text{g}/\text{m}^3$ based on prevailing wind conditions.

07/11/2019	Maison Dieu	96.7	20.2	An internal investigation determined HVO maximum potential contribution to be in the order of 20.2ug/m <sup>3</sup> based on prevailing wind conditions.
07/11/2019	Knodlers Lane	117.0	42.2	An internal investigation determined HVO maximum potential contribution to be in the order of 42.2ug/m <sup>3</sup> based on prevailing wind conditions.
07/11/2019	Jerrys Plain South	67.8	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
07/11/2019	Jerrys Plain North	67.8	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
08/11/2019	Warkworth	72.0	14.3	An internal investigation determined HVO maximum potential contribution to be in the order of 14.3ug/m <sup>3</sup> based on prevailing wind conditions.
08/11/2019	Maison Dieu	81.1	8.4	An internal investigation determined HVO maximum potential contribution to be in the order of 8.4ug/m <sup>3</sup> based on prevailing wind conditions.
08/11/2019	Knodlers Lane	102.6	29.8	An internal investigation determined HVO maximum potential contribution to be in the order of 29.8ug/m <sup>3</sup> based on prevailing wind conditions.
08/11/2019	Jerrys Plain South	72.8	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
08/11/2019	Jerrys Plain North	72.8	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
12/11/2019	Warkworth	108.1	14.6	An internal investigation determined HVO maximum potential contribution to be in the order of 14.6ug/m <sup>3</sup> based on prevailing wind conditions.
12/11/2019	Maison Dieu	162.2	49.4	An internal investigation determined HVO maximum potential contribution to be in the order of 49.4ug/m <sup>3</sup> based on prevailing wind conditions.
12/11/2019	Knodlers Lane	146.3	33.5	An internal investigation determined HVO maximum potential contribution to be in the order of 33.5ug/m <sup>3</sup> based on prevailing wind conditions.
12/11/2019	Jerrys Plain South	102.8	0.3	An internal investigation determined HVO maximum potential contribution to be in the order of 0.3ug/m <sup>3</sup> based on prevailing wind conditions.
12/11/2019	Jerrys Plain North	102.8	0.1	An internal investigation determined HVO maximum potential contribution to be in the order of 0.1ug/m <sup>3</sup> based on prevailing wind conditions. 12 November appeared to be

				affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
15/11/2019	Maison Dieu	55.5	32.6	An internal investigation determined HVO maximum potential contribution to be in the order of 32.6ug/m3 based on prevailing wind conditions.
16/11/2019	Warkworth	60.1	8.2	An internal investigation determined HVO maximum potential contribution to be in the order of 8.2ug/m3 based on prevailing wind conditions.
16/11/2019	Maison Dieu	59.7	2.8	An internal investigation determined HVO maximum potential contribution to be in the order of 2.8ug/m3 based on prevailing wind conditions.
16/11/2019	Knodlers Lane	65.2	11.7	An internal investigation determined HVO maximum potential contribution to be in the order of 11.7ug/m3 based on prevailing wind conditions.
16/11/2019	Jerrys Plain South	67.5	21.0	An internal investigation determined HVO maximum potential contribution to be in the order of 21.0ug/m3 based on prevailing wind conditions.
16/11/2019	Jerrys Plain North	67.5	8.9	An internal investigation determined HVO maximum potential contribution to be in the order of 8.9ug/m3 based on prevailing wind conditions. 16 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
17/11/2019	Warkworth	72.6	24.8	An internal investigation determined HVO maximum potential contribution to be in the order of 24.8ug/m3 based on prevailing wind conditions.
17/11/2019	Maison Dieu	77.7	23.1	An internal investigation determined HVO maximum potential contribution to be in the order of 23.1ug/m3 based on prevailing wind conditions.
17/11/2019	Knodlers Lane	76.5	31.2	An internal investigation determined HVO maximum potential contribution to be in the order of 31.2ug/m3 based on prevailing wind conditions.
17/11/2019	Jerrys Plain South	76.5	4.0	An internal investigation determined HVO maximum potential contribution to be in the order of 4.0ug/m3 based on prevailing wind conditions.
17/11/2019	Jerrys Plain North	76.5	2.2	An internal investigation determined HVO maximum potential contribution to be in the order of 2.2ug/m3 based on prevailing wind conditions. 17 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
18/11/2019	Maison Dieu	51.9	14.9	An internal investigation determined HVO maximum potential contribution to be in the order of 14.9ug/m3 based on prevailing wind conditions.

19/11/2019	Maison Dieu	63.2	2.8	An internal investigation determined HVO maximum potential contribution to be in the order of 2.8ug/m <sup>3</sup> based on prevailing wind conditions.
19/11/2019	Knodlers Lane	52.0	21.6	An internal investigation determined HVO maximum potential contribution to be in the order of 21.6ug/m <sup>3</sup> based on prevailing wind conditions.
20/11/2019	Warkworth	56.6	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
20/11/2019	Maison Dieu	50.5	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
20/11/2019	Knodlers Lane	51.9	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.
20/11/2019	Jerrys Plain South	88.4	24.2	An internal investigation determined HVO maximum potential contribution to be in the order of 24.2ug/m <sup>3</sup> based on prevailing wind conditions.
20/11/2019	Jerrys Plain North	88.4	10.0	An internal investigation determined HVO maximum potential contribution to be in the order of 10.0ug/m <sup>3</sup> based on prevailing wind conditions. 20 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
21/11/2019	Warkworth	113.4	41.0	An internal investigation determined HVO maximum potential contribution to be in the order of 41.0ug/m <sup>3</sup> based on prevailing wind conditions.
21/11/2019	Maison Dieu	173.5	12.7	An internal investigation determined HVO maximum potential contribution to be in the order of 12.7ug/m <sup>3</sup> based on prevailing wind conditions.
21/11/2019	Knodlers Lane	102.3	31.6	An internal investigation determined HVO maximum potential contribution to be in the order of 31.6ug/m <sup>3</sup> based on prevailing wind conditions.
21/11/2019	Jerrys Plain South	115.4	5.3	An internal investigation determined HVO maximum potential contribution to be in the order of 5.3ug/m <sup>3</sup> based on prevailing wind conditions.
21/11/2019	Jerrys Plain North	115.4	7.3	An internal investigation determined HVO maximum potential contribution to be in the order of 7.3ug/m <sup>3</sup> based on prevailing wind conditions. 21 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
22/11/2019	Warkworth	98.4	41.7	An internal investigation determined HVO maximum potential contribution to be in the order of 41.7ug/m <sup>3</sup> based on prevailing wind conditions.

22/11/2019	Maison Dieu	121.9	41.8	An internal investigation determined HVO maximum potential contribution to be in the order of 41.8ug/m3 based on prevailing wind conditions.
22/11/2019	Knodlers Lane	119.1	7.2	An internal investigation determined HVO maximum potential contribution to be in the order of 7.2ug/m3 based on prevailing wind conditions.
22/11/2019	Jerrys Plain South	115.7	3.3	An internal investigation determined HVO maximum potential contribution to be in the order of 3.3ug/m3 based on prevailing wind conditions.
22/11/2019	Jerrys Plain North	115.7	11.1	An internal investigation determined HVO maximum potential contribution to be in the order of 11.1ug/m3 based on prevailing wind conditions. 22 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
23/11/2019	Warkworth	55.0	0.3	An internal investigation determined HVO maximum potential contribution to be in the order of 0.3ug/m3 based on prevailing wind conditions.
23/11/2019	Jerrys Plain South	61.9	28.7	An internal investigation determined HVO maximum potential contribution to be in the order of 28.7ug/m3 based on prevailing wind conditions.
23/11/2019	Jerrys Plain North	61.9	18.9	An internal investigation determined HVO maximum potential contribution to be in the order of 18.9ug/m3 based on prevailing wind conditions. 23 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
26/11/2019	Warkworth	164.9	27.9	An internal investigation determined HVO maximum potential contribution to be in the order of 27.9ug/m3 based on prevailing wind conditions.
26/11/2019	Maison Dieu	424.8	181.3	An internal investigation determined HVO maximum potential contribution to be in the order of 424.8ug/m3 based on prevailing wind conditions. 26 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
26/11/2019	Knodlers Lane	317.7	238.0	An internal investigation determined HVO maximum potential contribution to be in the order of 238.0ug/m3 based on prevailing wind conditions. 26 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
26/11/2019	Jerrys Plain South	197.7	0.1	An internal investigation determined HVO maximum potential contribution to be in the order of 0.1ug/m3 based on prevailing wind conditions.
26/11/2019	Jerrys Plain North	197.7	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.

27/11/2019	Maison Dieu	62.1	16.1	An internal investigation determined HVO maximum potential contribution to be in the order of 16.1ug/m3 based on prevailing wind conditions.
27/11/2019	Knodlers Lane	53.8	6.6	An internal investigation determined HVO maximum potential contribution to be in the order of 6.6ug/m3 based on prevailing wind conditions.
27/11/2019	Jerrys Plain South	64.1	8.4	An internal investigation determined HVO maximum potential contribution to be in the order of 8.4ug/m3 based on prevailing wind conditions.
27/11/2019	Jerrys Plain North	64.1	5.6	An internal investigation determined HVO maximum potential contribution to be in the order of 5.6ug/m3 based on prevailing wind conditions. 27 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
28/11/2019	Warkworth	133.8	11.3	An internal investigation determined HVO maximum potential contribution to be in the order of 11.3ug/m3 based on prevailing wind conditions.
28/11/2019	Maison Dieu	90.5	11.2	An internal investigation determined HVO maximum potential contribution to be in the order of 11.2ug/m3 based on prevailing wind conditions.
28/11/2019	Knodlers Lane	95.3	17.5	An internal investigation determined HVO maximum potential contribution to be in the order of 17.5ug/m3 based on prevailing wind conditions.
28/11/2019	Jerrys Plain South	104.2	6.1	An internal investigation determined HVO maximum potential contribution to be in the order of 6.1ug/m3 based on prevailing wind conditions.
28/11/2019	Jerrys Plain North	104.2	11.3	An internal investigation determined HVO maximum potential contribution to be in the order of 11.3ug/m3 based on prevailing wind conditions. 28 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
29/11/2019	Warkworth	113.3	32.8	An internal investigation determined HVO maximum potential contribution to be in the order of 32.8ug/m3 based on prevailing wind conditions.
29/11/2019	Maison Dieu	128.7	19.9	An internal investigation determined HVO maximum potential contribution to be in the order of 19.9ug/m3 based on prevailing wind conditions.
29/11/2019	Knodlers Lane	128.3	19.4	An internal investigation determined HVO maximum potential contribution to be in the order of 19.4ug/m3 based on prevailing wind conditions.
29/11/2019	Jerrys Plain South	109.1	0	HVO was not a significant contributor given that wind direction during the 24 hour period was not within the arc of influence.

29/11/2019	Jerrys Plain North	109.1	13.1	An internal investigation determined HVO maximum potential contribution to be in the order of 13.1ug/m <sup>3</sup> based on prevailing wind conditions. 29 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
30/11/2019	Warkworth	82.9	33.5	An internal investigation determined HVO maximum potential contribution to be in the order of 33.5ug/m <sup>3</sup> based on prevailing wind conditions.
30/11/2019	Maison Dieu	107.9	34.8	An internal investigation determined HVO maximum potential contribution to be in the order of 34.8ug/m <sup>3</sup> based on prevailing wind conditions.
30/11/2019	Knodlers Lane	136.5	54.3	An internal investigation determined HVO maximum potential contribution to be in the order of 54.3ug/m <sup>3</sup> based on prevailing wind conditions. 30 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.
30/11/2019	Jerrys Plain South	84.6	11.4	An internal investigation determined HVO maximum potential contribution to be in the order of 11.4ug/m <sup>3</sup> based on prevailing wind conditions.
30/11/2019	Jerrys Plain North	84.6	8.1	An internal investigation determined HVO maximum potential contribution to be in the order of 8.1ug/m <sup>3</sup> based on prevailing wind conditions. 30 November appeared to be affected by regional bushfire smoke, the results are deemed affected by an extraordinary event.

### 2.3.4 Real Time Alarms for Air Quality

During November the real time monitoring system generated 604 automated air quality related alarms. 272 alarms were related to adverse weather conditions and 333 alarms relating to PM<sub>10</sub>.

## 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 December 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 500.3 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 December 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**

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

#### 4.1 Blast Monitoring Results

During November, there were 18 blasts fired from HVO. Figure 10 and Figure 11 show the blast monitoring results for the reporting period against the impact assessment criteria. During November, there was an exceedance of the 115 dB criteria at Maison Dieu, Knodlers Lane and Jerrys Plains, which are currently being investigated by a specialist to determine if they are exceedances of the 115 dB criteria.



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



Figure 11: Ground Vibration Blast Monitoring Results – November 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 11/12 and 25/26 November 2019 with no non-compliances recorded. Monitoring results are detailed in Table 4 to Table 8.

**Table 4:  $L_{Aeq, 15 \text{ minute}}$  HVO South - Impact Assessment Criteria – November 2019**

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO South $L_{Aeq}$ dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
Knodlers Lane	11/11/2019 21:49	2.1	F	39	Yes	39	Nil
Maison Dieu	11/11/2019 21:23	2.3	E	39	No	30	Nil
Shearers Lane	11/11/2019 21:00	1.8	E	41	Yes	35	Nil
Kilburnie South	12/11/2019 0:34	0.9	E	39	Yes	IA	Nil
Jerrys Plains Village	11/11/2019 22:51	2.6	E	35	Yes	IA	Nil
Jerrys Plains East	11/11/2019 22:12	2.9	D	35	Yes	IA	Nil
Long Point Road	11/11/2019 21:01	1.9	F	35	Yes	IA	Nil
HVGC	12/11/2019 1:32	1.6	F	55	Yes	NM	NA

Notes:

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 3 metres per second (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values. Refer to Sections 2.3 and 3.3 for more information;
3. Site-only  $L_{Aeq, 15 \text{ minute}}$  attributed to HVO South Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of criterion; and
5. NA in exceedance column means atmospheric conditions outside specified in approval, therefore criterion was not applicable.

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

Location	Date Time and	Wind Speed (m/s) <sup>1</sup>	Stability Class	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO South LA1, 1min dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
<i>Knodlers Lane</i>	<i>11/11/2019 21:49</i>	<i>2.1</i>	<i>F</i>	<i>45</i>	<i>Yes</i>	<i>45</i>	<i>Nil</i>
<i>Maison Dieu</i>	<i>11/11/2019 21:23</i>	<i>2.3</i>	<i>E</i>	<i>45</i>	<i>Yes</i>	<i>37</i>	<i>Nil</i>
<i>Shearers Lane</i>	<i>11/11/2019 21:00</i>	<i>1.8</i>	<i>E</i>	<i>45</i>	<i>Yes</i>	<i>45</i>	<i>Nil</i>
<i>Kilburnie South</i>	<i>12/11/2019 0:34</i>	<i>0.9</i>	<i>E</i>	<i>45</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Jerrys Plains Village</i>	<i>11/11/2019 22:51</i>	<i>2.6</i>	<i>E</i>	<i>45</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Jerrys Plains East</i>	<i>11/11/2019 22:12</i>	<i>2.9</i>	<i>D</i>	<i>45</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Long Point Road</i>	<i>11/11/2019 21:01</i>	<i>1.9</i>	<i>F</i>	<i>45</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>HVGC</i>	<i>12/11/2019 1:32</i>	<i>1.6</i>	<i>F</i>	<i>NA</i>	<i>NA</i>	<i>NM</i>	<i>NA</i>

Notes:

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 3 metres per second (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values. Refer to Sections 2.3 and 3.3 for more information;;
3. Site-only LA1,1minute attributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of criterion; and
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 was not applicable.

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

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class <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	11/11/2019 21:49	0.7	F	41	Yes	IA	Nil
Maison Dieu	11/11/2019 21:23	0.8	F	41	Yes	IA	Nil
Shearers Lane	11/11/2019 21:00	1	E	41	Yes	IA	Nil
Kilburnie South	12/11/2019 0:34	0.8	F	41	Yes	IA	Nil
Jerrys Plains Village	11/11/2019 22:51	1.2	F	41	Yes	IA	Nil
Jerrys Plains East	11/11/2019 22:12	0.6	F	41	Yes	IA	Nil
Long Point Road	11/11/2019 21:01	1.9	F	41	Yes	IA	Nil
HVGC	12/11/2019 1:32	1	E	NA	NA	38	NA

Notes:

1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria 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 stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LAeq, 15minute attributed to HVO North Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of criterion; and
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 was not applicable.

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

Location	Date and Time	Wind Speed (m/s) <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB (A)	Criterion Applies? <sup>2</sup>	HVO North L <sub>Aeq</sub> dB <sup>3,4</sup>	Exceedance <sup>4,5</sup>
<i>Knodlers Lane</i>	<i>11/11/2019 21:49</i>	<i>0.7</i>	<i>F</i>	<i>41</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Maison Dieu</i>	<i>11/11/2019 21:23</i>	<i>0.8</i>	<i>F</i>	<i>41</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Shearers Lane</i>	<i>11/11/2019 21:00</i>	<i>1</i>	<i>E</i>	<i>41</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Kilburnie South</i>	<i>12/11/2019 0:34</i>	<i>0.8</i>	<i>F</i>	<i>41</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Jerrys Plains Village</i>	<i>11/11/2019 22:51</i>	<i>1.2</i>	<i>F</i>	<i>41</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Jerrys Plains East</i>	<i>11/11/2019 22:12</i>	<i>0.6</i>	<i>F</i>	<i>41</i>	<i>Yes</i>	<i>IA</i>	<i>Nil</i>
<i>Long Point Road</i>	<i>11/11/2019 21:01</i>	<i>1.9</i>	<i>F</i>	<i>41</i>	<i>Yes</i>	<i>38</i>	<i>Nil</i>
<i>HVGC</i>	<i>12/11/2019 1:32</i>	<i>1</i>	<i>E</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>

Notes:

1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria 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 stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LAeq,15minute attributed to HVO North Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of criterion; and
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 was not applicable.

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

<b>Location</b>	<b>Date and Time</b>	<b>Wind Speed (m/s)<sup>1</sup></b>	<b>Stability Class<sup>1</sup></b>	<b>Criterion dB (A)</b>	<b>Criterion Applies?<sup>2</sup></b>	<b>HVO North LA1, 1min dB<sup>3,4</sup></b>	<b>Exceedance<sup>4,5</sup></b>
Knodlers Lane	11/11/2019 21:49	0.7	F	46	Yes	IA	Nil
Maison Dieu	11/11/2019 21:23	0.8	F	46	Yes	IA	Nil
Shearers Lane	11/11/2019 21:00	1	E	46	Yes	IA	Nil
Kilburnie South	12/11/2019 0:34	0.8	F	46	Yes	IA	Nil
Jerrys Plains Village	11/11/2019 22:51	1.2	F	46	Yes	IA	Nil
Jerrys Plains East	11/11/2019 22:12	0.6	F	46	Yes	IA	Nil
Long Point Road	11/11/2019 21:01	1.9	F	46	Yes	IA	Nil
HVGC	12/11/2019 1:32	1	E	NA	NA	38	NA

Notes:

1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria 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 stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LA1,1minute attributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criterion; and
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 was 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 November 2019 no penalties were applied. The assessment for low frequency noise is shown in Table 9.

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

<b>Location</b>	<b>Date and Time</b>	<b>Measured Site Only LA<sub>eq</sub> dB (Sth/Nth)</b>	<b>Site Only LC<sub>eq</sub> dB<sup>1</sup> (Sth/Nth)</b>	<b>Site-Only LC<sub>eq</sub> – LA<sub>eq</sub> dB<sup>2</sup> (Sth/Nth)</b>	<b>Result Max exceedance of ref spectrum dB<sup>3</sup> (Sth/Nth)</b>	<b>Penalty dB(A)<sup>4</sup> (Sth/Nth)</b>
Knodlers Lane	11/11/2019 21:49	IA/37	NA/NA	NA/NA	NA/NA	NA/NA
Maison Dieu	11/11/2019 21:23	IA/30	NA/NA	NA/NA	NA/NA	NA/NA
Shearers Lane	11/11/2019 21:00	IA/35	NA/NA	NA/NA	NA/NA	NA/NA
Kilburnie South	12/11/2019 0:34	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains Village	11/11/2019 22:51	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains East	11/11/2019 22:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Long Point Road	11/11/2019 21:01	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
HVGC	12/11/2019 1:32	38/NM	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, or where site-only contributions were more than 5 dB less than the relevant LA<sub>eq</sub> criterion this is noted as NA (not available) and no further assessment has been undertaken;
2. As per NPfI, if LC<sub>eq</sub> – LA<sub>eq</sub> ≥ 15 dB further assessment of low-frequency noise required as detailed in Sections 2.4 and 3.4 of this 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; and
4. Bold results indicate that NPfI low-frequency modifying factor has been triggered and application of correction is required.

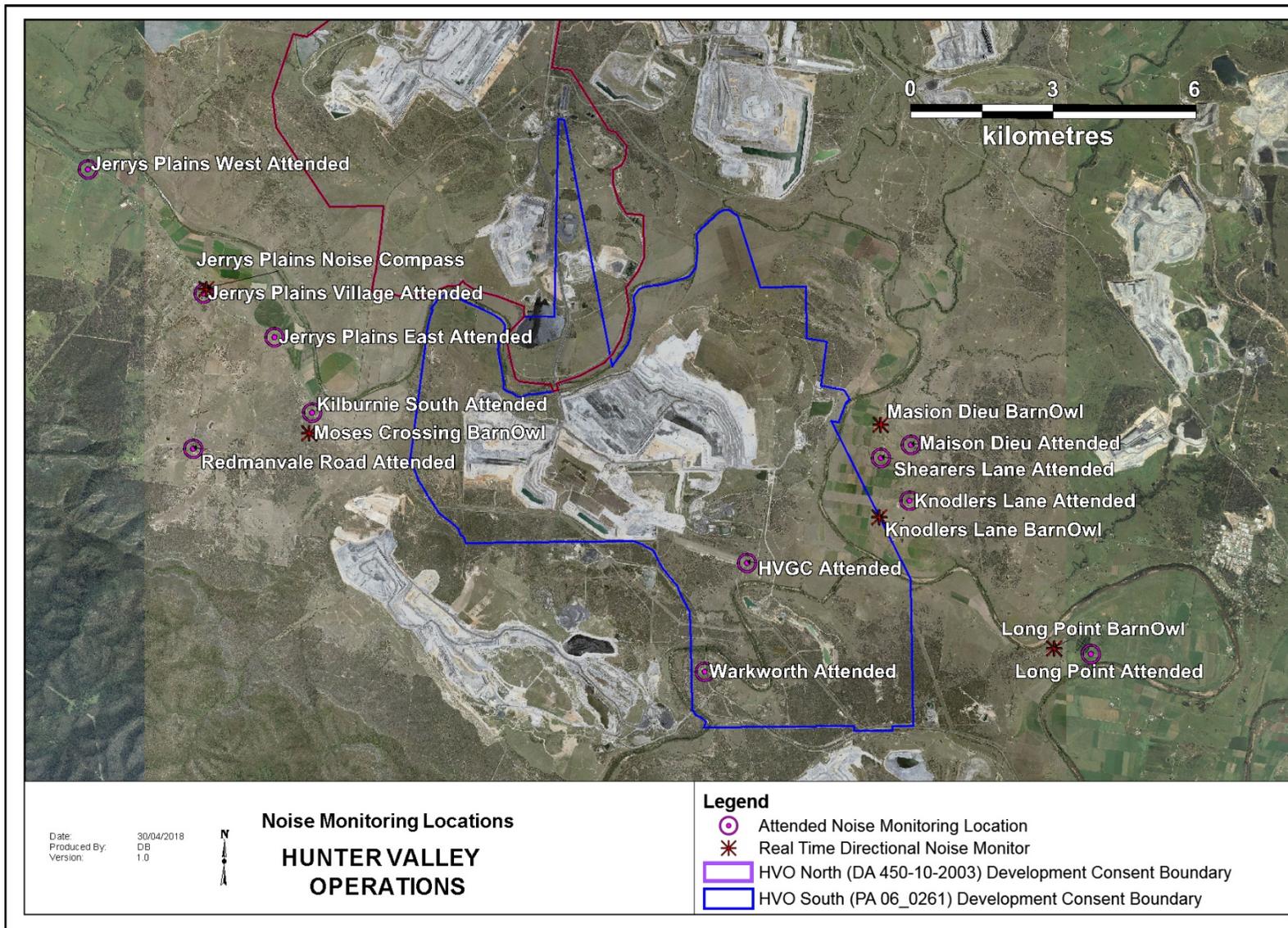


Figure 13: Noise Monitoring Location Plan

### 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 November, a total of 1540 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.

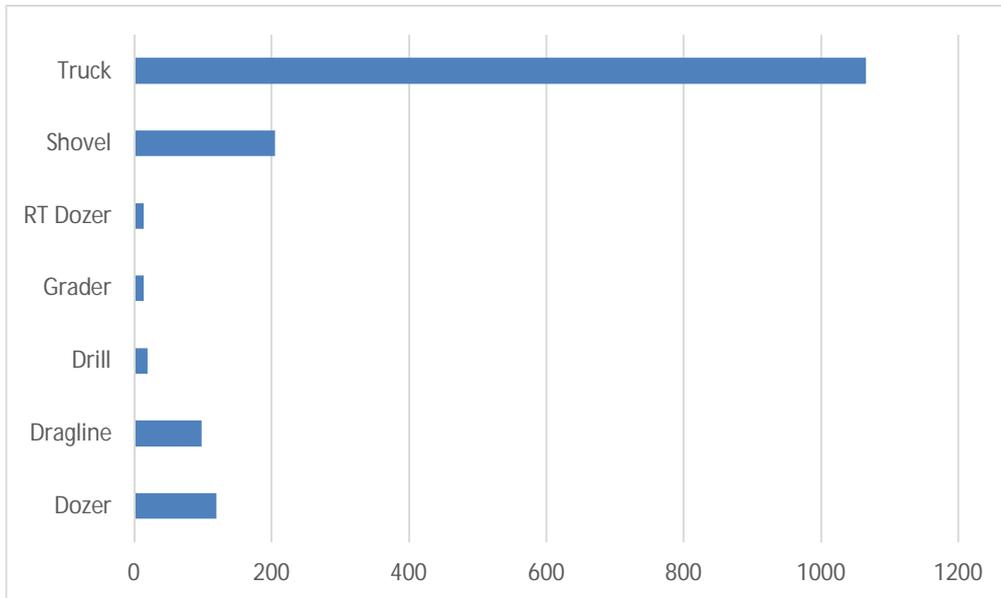


Figure 14: Operational Downtime by Equipment Type – November 2019

### 7.0 REHABILITATION

During November, 2.12 Ha of land was released, 7.59 Ha of land was bulk shaped and 16.66 Ha of land was rehabilitated. Year to date progress can be viewed in Figure 15.

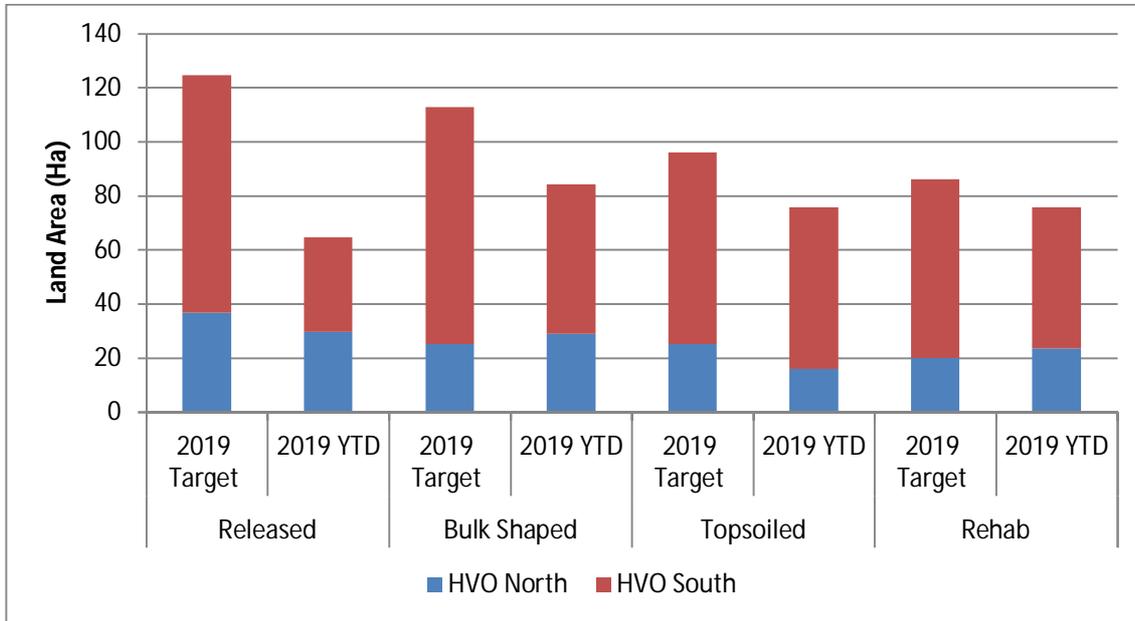


Figure 15: Rehabilitation YTD – November 2019

### 8.0 COMPLAINTS

No complaints were received during November 2019. Details of complaints received YTD are shown in Table 10 below.

**Table 10: Complaints Summary YTD 2019**

<b>Month</b>	<b>Noise</b>	<b>Dust</b>	<b>Blast</b>	<b>Lighting</b>	<b>Other</b>	<b>Total</b>
<i>January</i>	-	-	-	-	-	-
<i>February</i>	-	-	-	-	-	-
<i>March</i>	-	1	-	-	-	1
<i>April</i>	-	1	-	-	-	1
<i>May</i>	-	2	-	-	-	2
<i>June</i>	-	1	-	-	1	2
<i>July</i>	-	-	-	-	-	-
<i>August</i>	-	-	-	-	1	1
<i>September</i>	-	-	-	-	-	-
<i>October</i>	-	1	1	-	-	2
<i>November</i>	-	-	-	-	-	-
<i>December</i>						
<i>Total</i>	0	6	1	0	2	9

**9.0 ENVIRONMENTAL INCIDENT**

During the reporting period there were no reportable environmental incidents.

**APPENDIX A: METEOROLOGICAL DATA**

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

Date	Air Temp Max (°C)	Air Temp Min (°C) *	Relative Humidity Max (%)	Relative Humidity Min (%) *	Solar Radiation Maximum (W/Sq. M)	Wind Dir. Avg (°)	Wind Speed Avg (m/sec)	Rainfall (mm)
1/11/2019	33.9	-	75.2	-	1073	205.4	3.4	0
2/11/2019	32.7	-	100	-	269.7	129.3	1.9	0
3/11/2019	33.3	-	92	-	286.1	198.5	2.2	0
4/11/2019	31.6	-	111.6	-	507.3	248.2	3.7	12.8
5/11/2019	27.0	-	111.4	-	612.2	264	3.8	1.6
6/11/2019	21.8	-	100	-	364.1	187.6	3.2	1.4
7/11/2019	27.6	-	98.4	-	312.6	275.6	3.6	0
8/11/2019	30.6	-	37.4	-	166.4	275.8	6.4	0
9/11/2019	29.4	-	42.5	-	196	268.8	6.3	0
10/11/2019	22.1	-	59.0	-	165.2	255.2	4.5	0
11/11/2019	28.0	-	74.7	-	189.6	236	4.3	0
12/11/2019	28.7	-	96.3	-	227.1	211.6	2.2	0
13/11/2019	34.6	-	56.0	-	207.1	270.1	5.5	0
14/11/2019	26.3	-	92.3	-	223.2	217.8	3.4	0
15/11/2019	28.8	-	60.5	-	174.1	263.3	3.1	0
16/11/2019	31.1	-	44.1	-	225	283.6	4.8	0
17/11/2019	28.6	-	87.5	-	246.9	144.7	3.6	0
18/11/2019	27.5	-	89.3	-	252.3	181.9	3.6	0
19/11/2019	29.5	-	95.3	-	332.9	203.4	2.7	0
20/11/2019	35.9	-	66.1	-	333.5	239.7	3.0	0
21/11/2019	27.8	-	86.5	-	243.2	114.1	4.5	0
22/11/2019	35.3	-	100	-	382.5	181.2	1.9	0
23/11/2019	37.6	-	90.7	-	471.7	229.5	3.9	0
24/11/2019	25.8	-	95.2	-	460.6	116.8	4.0	0
25/11/2019	21.3	-	99	-	481.6	118.8	3.5	0
26/11/2019	30.5	-	99.5	-	490.4	222.4	2.9	0
27/11/2019	33.0	-	85	-	384.8	261.4	5.3	0
28/11/2019	25.5	-	71.0	-	485.4	126.8	3.0	0
29/11/2019	29.9	-	87.6	-	227.3	130.6	2.2	0
30/11/2019	33.2	-	92.9	-	390.9	210.5	2.6	0

\* Data not available