HUNTER VALLEY
OPERATIONS

# Monthly Environmental Monitoring Report

# October 2019

## CONTENTS



### FIGURES

## TABLES

## 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 October to 31 October 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 - October 2019**

| 2019 | Monthly Rainfall (mm) | Cumulative Rainfall (mm) |
|---|---|---|
| *October* | *2.0* | *320.8* |

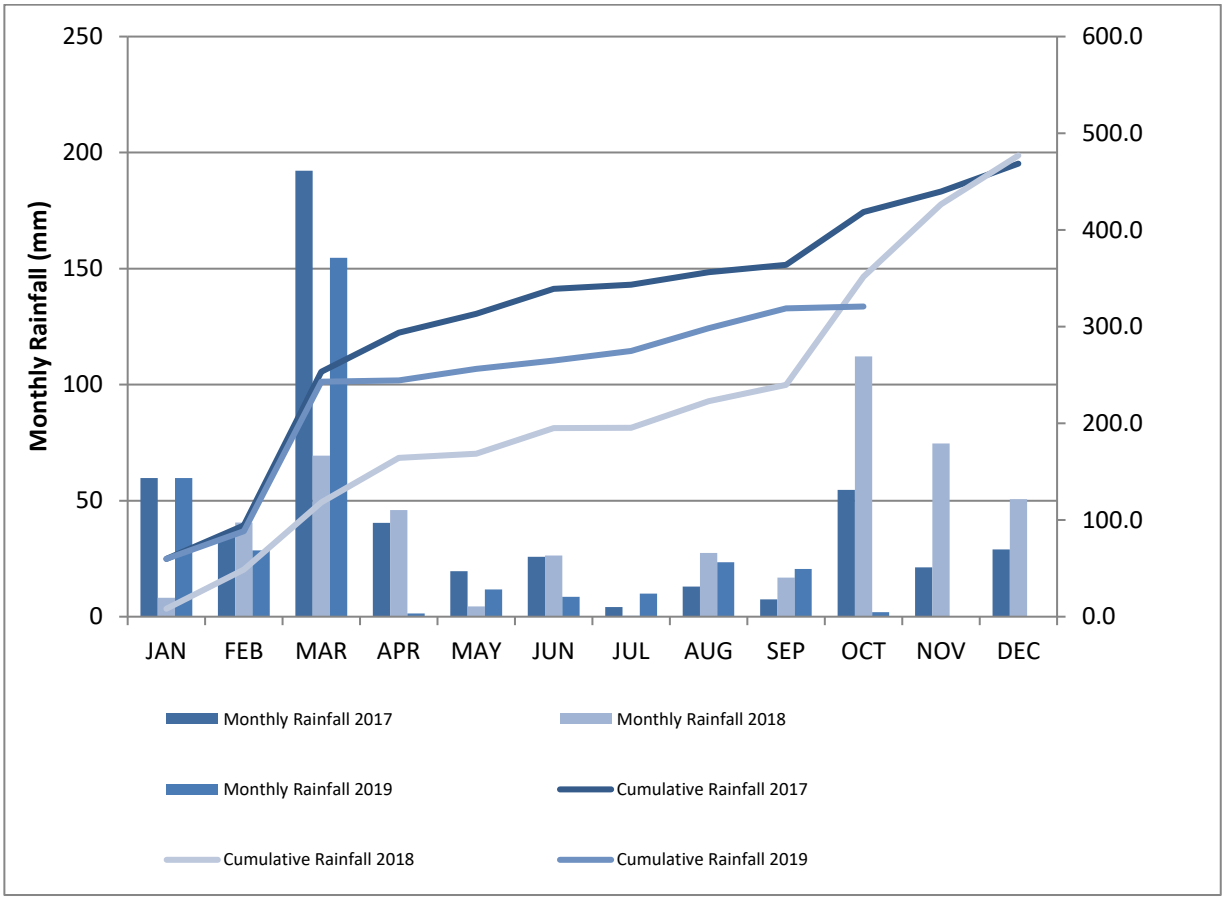


**Figure 1: Rainfall Summary 2019**

### 2.1.2 Wind Speed and Direction

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

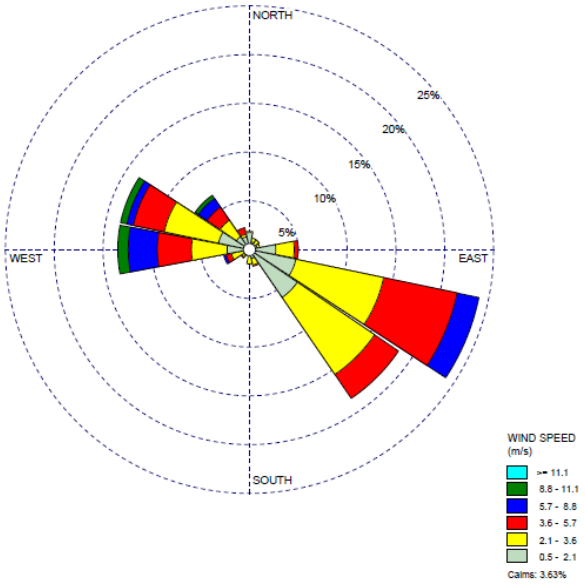


**Figure 2: HVO Corporate Wind Rose – October 2019**

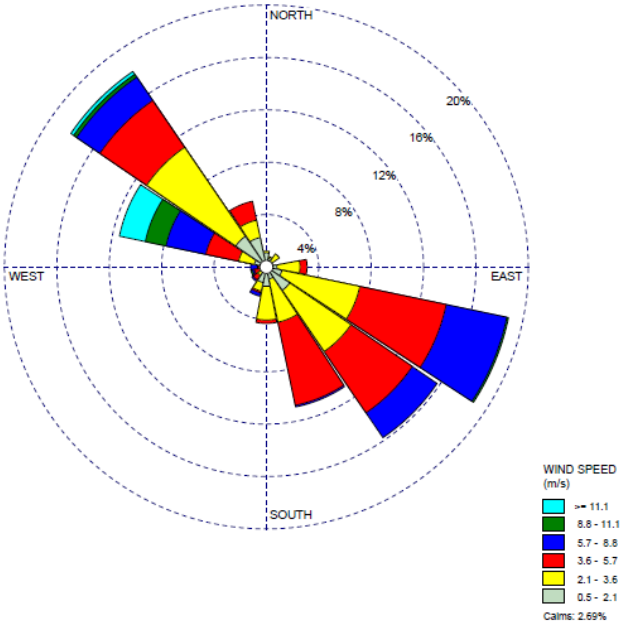


**Figure 3: HVO Cheshunt Wind Rose – October 2019**

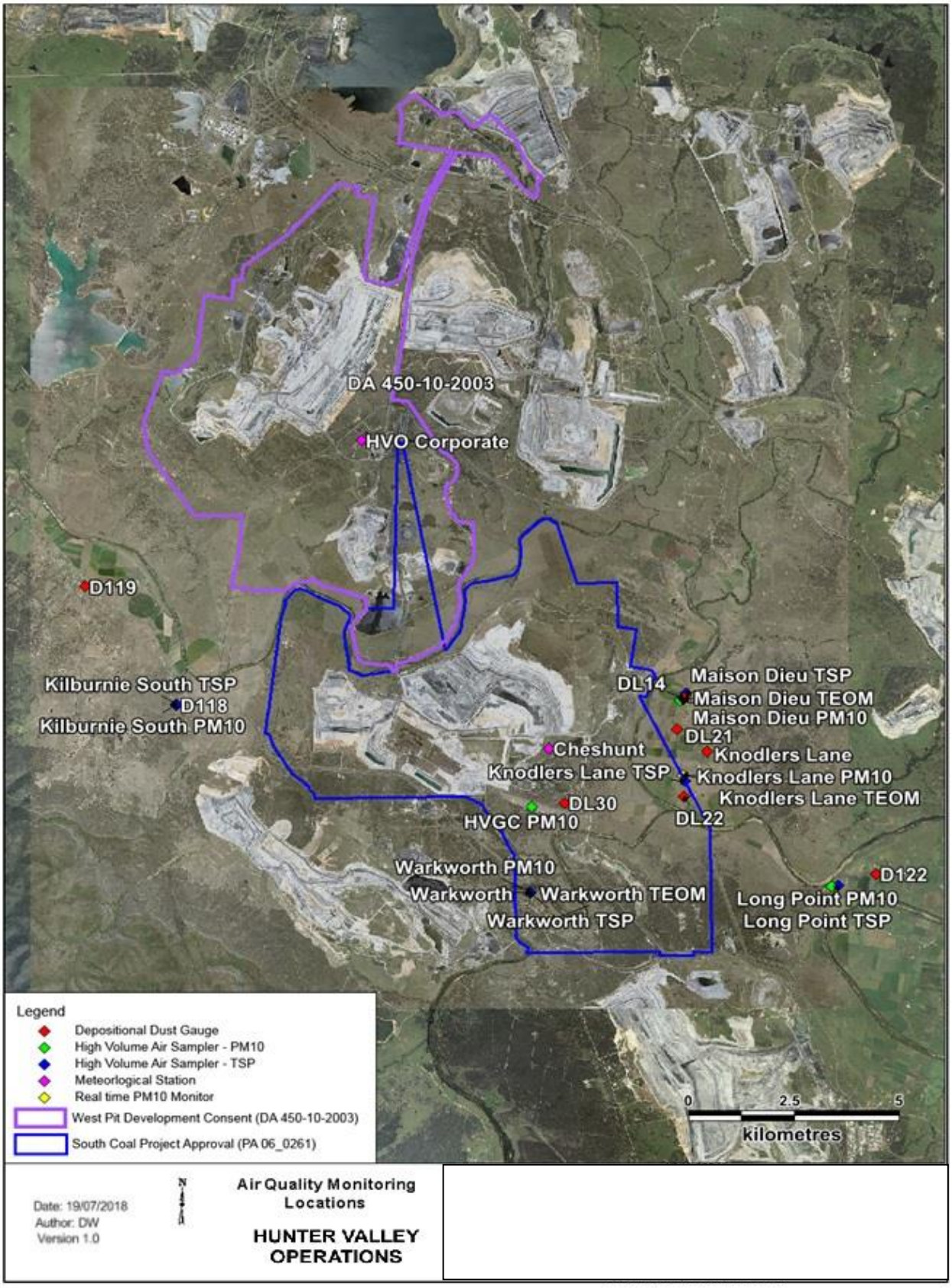


**Figure 4: Air Quality Monitoring Location Plan**

## 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 D122, DL30 and Warkworth monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m$^2$ per month.

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

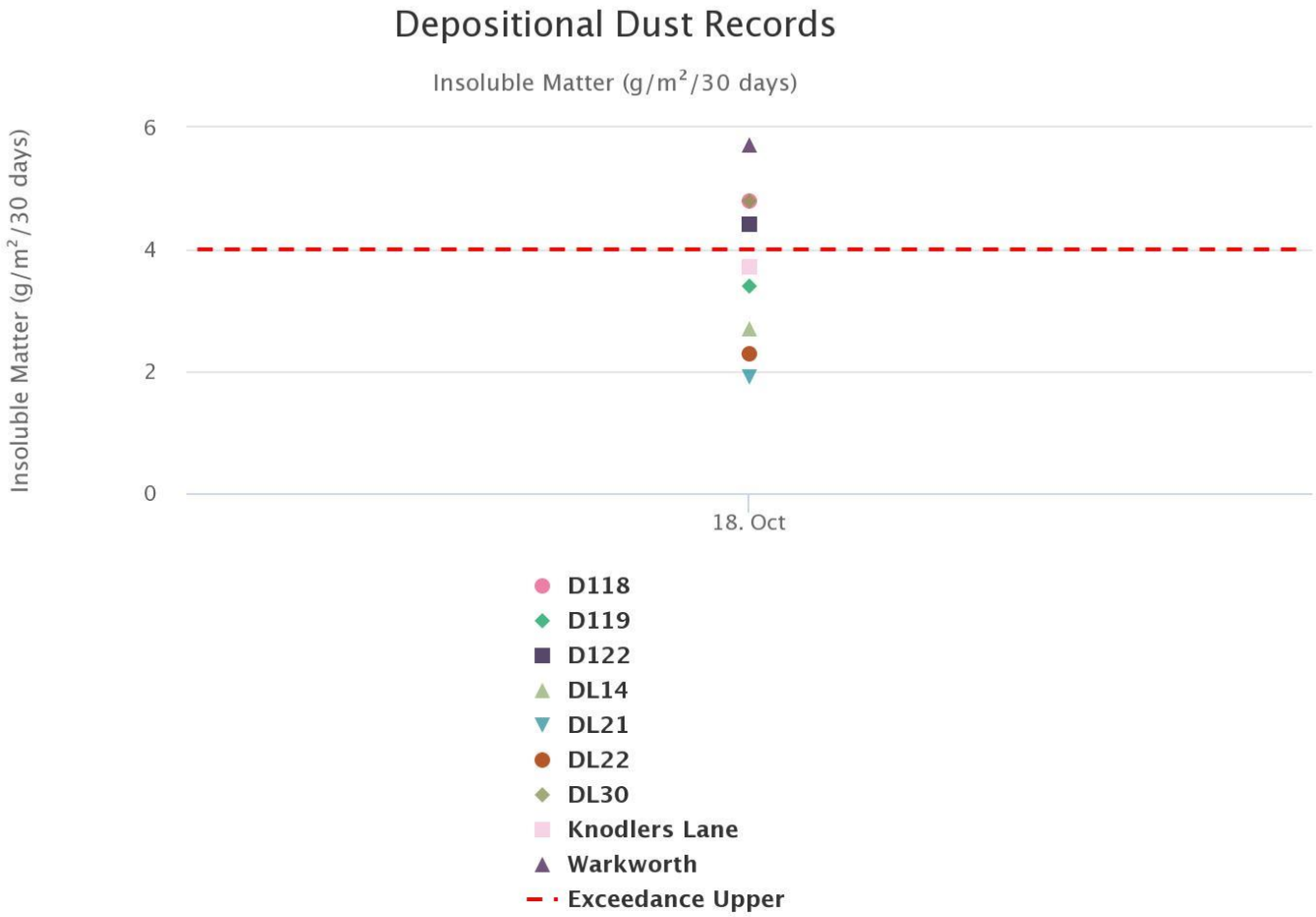


**Figure 5: Depositional Dust Results – October 2019**

## 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 ($PM_{10}$). 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 $PM_{10}$ Results

Figure 6 shows individual $PM_{10}$ results at each monitoring station against the short term impact assessment criteria of 50 µg/m$^3$. During the reporting period the Gliding Club, Kilburnie South, Cheshunt East and Warkworth monitors recorded an exceedance above the short term impact assessment criteria of 50 µg/m$^3$.

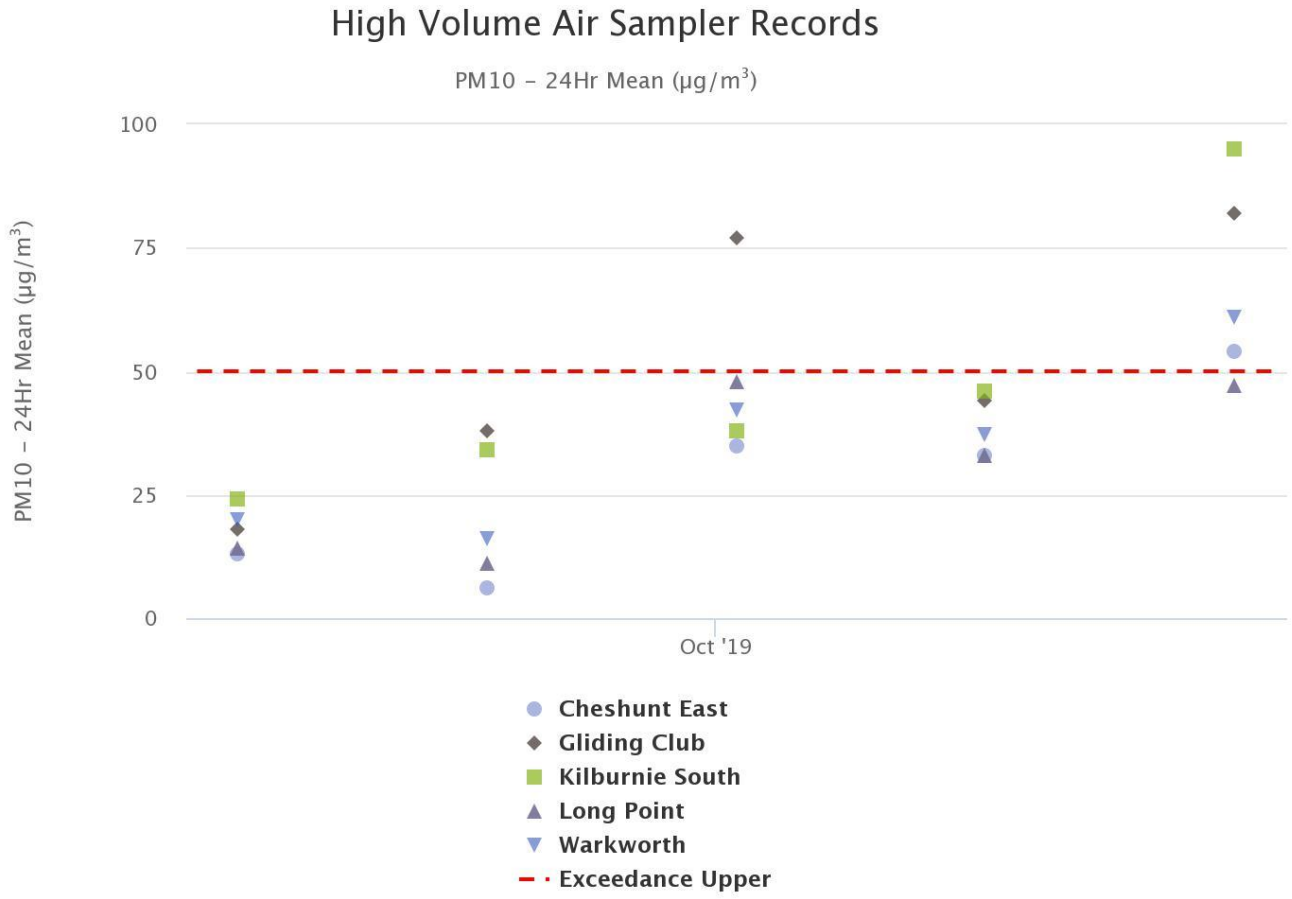


**Figure 6: Individual $PM_{10}$ Results – October 2019**

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$^3$. An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

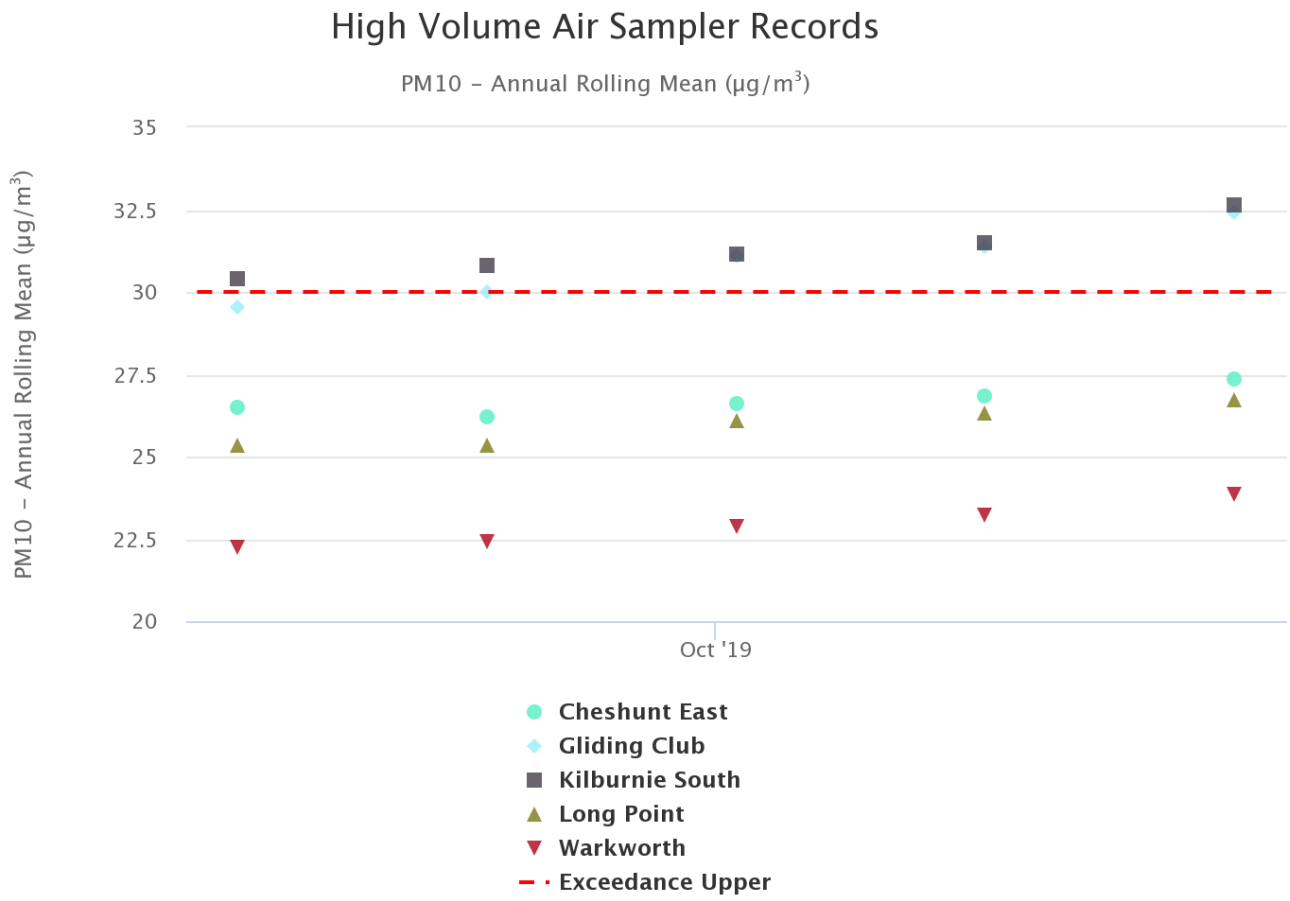


**Figure 7: Year to Date Average $PM_{10}$ – as at end of October 2019**

### 2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³. 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/m³.

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

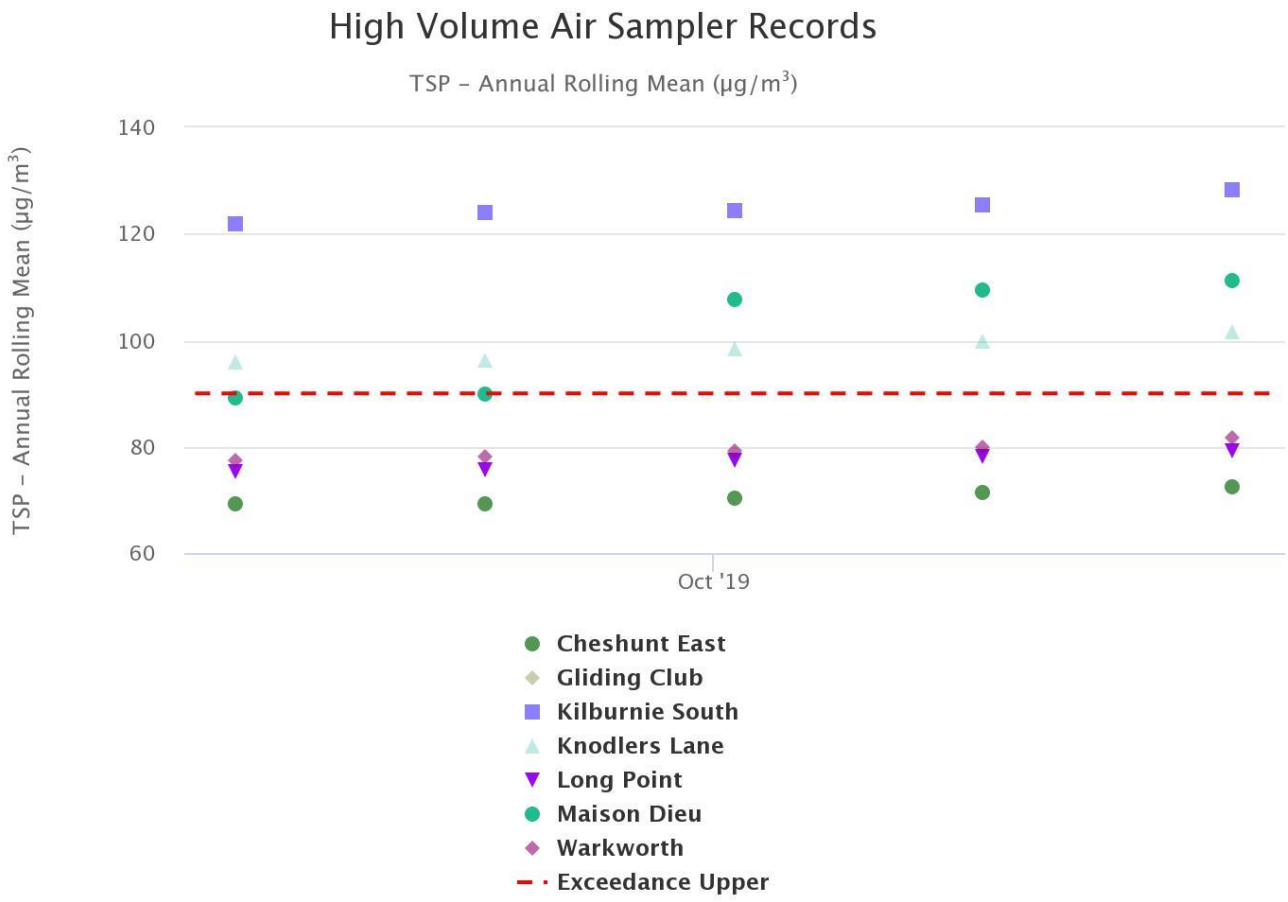


**Figure 8: Year to Date Average Total Suspended Particulates – as at end of October 2019**

### 2.3.3 Real Time PM10 Results

Hunter Valley Operations maintains a network of real time $PM_{10}$ 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 $PM_{10}$ 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 PM10 result and the year to date 24 hour $PM_{10}$ annual average.

During the reporting period, the Maison Dieu, Knodlers Lane, Jerrys Plain and Warkworth monitors exceeded the daily 24 hour average PM10 result (50µg/m³).

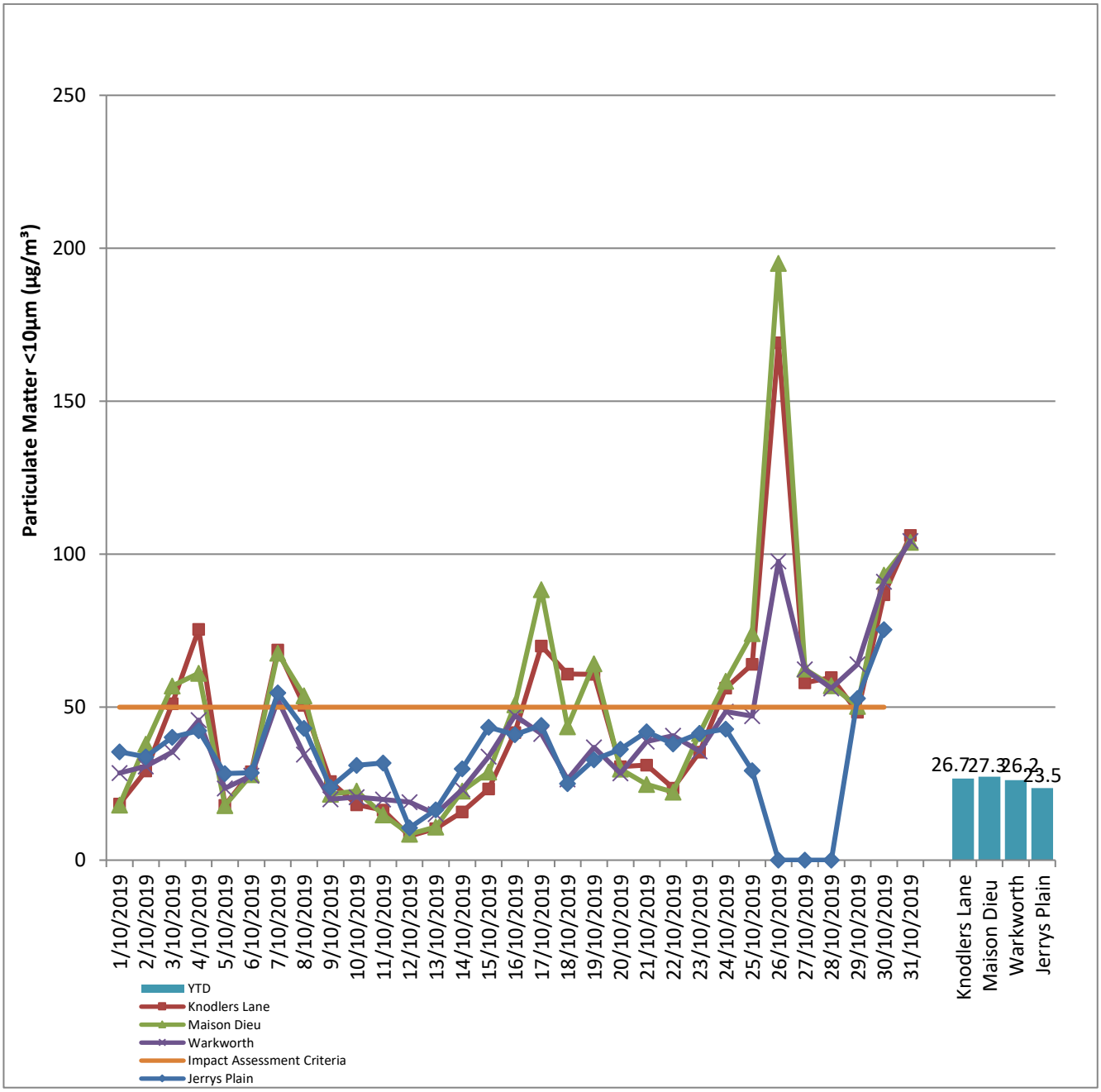


**Figure 9: Real Time $PM_{10}$ 24hr average and YTD average – October 2019**

## Table 2: Real-time PM10 Investigation Results

| Date | Site | Total Measured Result (µg/m3) | Estimated contribution from HVO (µg/m3) | Discussion |
|---|---|---|---|---|
| 03/10/2019 | Maison Dieu TEOM | 57.0 | 0.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 0.5ug/m3 based on prevailing wind conditions. |
| 03/10/2019 | Knodlers Lane TEOM | 51.1 | 36 | An internal investigation determined HVO maximum potential contribution to be in the order of 36.0ug/m3 based on prevailing wind conditions. |
| 04/10/2019 | Maison Dieu TEOM | 61.1 | 14.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 14.5ug/m3 based on prevailing wind conditions. |
| 04/10/2019 | Knodlers Lane TEOM | 75.5 | 30.4 | An internal investigation determined HVO maximum potential contribution to be in the order of 30.4ug/m3 based on prevailing wind conditions. |
| 07/10/2019 | Jerrys Plain South TEOM | 64.2 | 8.4 | An internal investigation determined HVO maximum potential contribution to be in the order of 8.4ug/m3 based on prevailing wind conditions. |
| 07/10/2019 | Jerrys Plain North TEOM | 54.7 | 0 | HVO North could not have been a contributor as wind direction was from HVO for only 0% of the day. |
| 07/10/2019 | Maison Dieu TEOM | 67.6 | 21.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 21.5ug/m3 based on prevailing wind conditions. |
| 07/10/2019 | Knodlers Lane TEOM | 66.7 | 43.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 43.5ug/m3 based on prevailing wind conditions. |
| 07/10/2019 | Warkworth TEOM | 52.4 | 39.6 | An internal investigation determined HVO maximum potential contribution to be in the order of 39.6ug/m3 based on prevailing wind conditions. |
| 08/10/2019 | Maison Dieu TEOM | 53.7 | 24.8 | An internal investigation determined HVO maximum potential contribution to be in the order of 24.8ug/m3 based on prevailing wind conditions. |
| 08/10/2019 | Knodlers Lane TEOM | 50.6 | 32.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 32.5ug/m3 based on prevailing wind conditions. |
| 16/10/2019 | Maison Dieu TEOM | 41.0 | 24.8 | An internal investigation determined HVO maximum potential contribution to be in the order of 24.8ug/m3 based on prevailing wind conditions. |

| | | | | |
|---|---|---|---|---|
| 17/10/2019 | Knodlers Lane TEOM | 70.0 | 38.3 | An internal investigation determined HVO maximum potential contribution to be in the order of 38.3ug/m3 based on prevailing wind conditions. |
| 17/10/2019 | Maison Dieu TEOM | 88.4 | 42.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 42.5ug/m3 based on prevailing wind conditions. |
| 18/10/2019 | Maison Dieu TEOM | 60.8 | 28.8 | An internal investigation determined HVO maximum potential contribution to be in the order of 28.8ug/m3 based on prevailing wind conditions. |
| 19/10/2019 | Knodlers Lane TEOM | 60.8 | 29.4 | An internal investigation determined HVO maximum potential contribution to be in the order of 29.4ug/m3 based on prevailing wind conditions. |
| 19/10/2019 | Maison Dieu TEOM | 64.2 | 16.1 | An internal investigation determined HVO maximum potential contribution to be in the order of 16.1ug/m3 based on prevailing wind conditions. |
| 24/10/2019 | Maison Dieu TEOM | 58.5 | 16.3 | An internal investigation determined HVO maximum potential contribution to be in the order of 16.3ug/m3 based on prevailing wind conditions. |
| 24/10/2019 | Knodlers Lane TEOM | 56.2 | 16.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 16.5ug/m3 based on prevailing wind conditions. |
| 25/10/2019 | Maison Dieu TEOM | 74.1 | 32.1 | An internal investigation determined HVO maximum potential contribution to be in the order of 32.1ug/m3 based on prevailing wind conditions. |
| 25/10/2019 | Knodlers Lane TEOM | 64.0 | 32.4 | An internal investigation determined HVO maximum potential contribution to be in the order of 32.4ug/m3 based on prevailing wind conditions. |
| 26/10/2019 | Knodlers Lane TEOM | 169.2 | 86.7 | An internal investigation determined HVO maximum potential contribution to be in the order of 33.4ug/m3 based on prevailing wind conditions. |
| 26/10/2019 | Maison Dieu TEOM | 195.1 | 112.6 | An internal investigation determined HVO maximum potential contribution to be in the order of 33.7ug/m3 based on prevailing wind conditions. |
| 26/10/2019 | Warkworth TEOM | 97.7 | 40.4 | An internal investigation determined HVO maximum potential contribution to be in the order of 40.4ug/m3 based on prevailing wind conditions. |
| 27/10/2019 | Knodlers Lane TEOM | 58.0 | 5.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 5.5ug/m3 based on prevailing wind conditions. |
| 27/10/2019 | Maison Dieu TEOM | 62.5 | 12.2 | An internal investigation determined HVO maximum potential contribution to be in the order of 12.2ug/m3 based on prevailing wind conditions. |

| | | | | |
|---|---|---|---|---|
| 27/10/2019 | Warkworth TEOM | 62.4 | 11.4 | An internal investigation determined HVO maximum potential contribution to be in the order of 11.4ug/m3 based on prevailing wind conditions. |
| 28/10/2019 | Knodlers Lane TEOM | 59.7 | 2.3 | An internal investigation determined HVO maximum potential contribution to be in the order of 2.3ug/m3 based on prevailing wind conditions. |
| 28/10/2019 | Maison Dieu TEOM | 57.1 | 0.6 | An internal investigation determined HVO maximum potential contribution to be in the order of 0.6ug/m3 based on prevailing wind conditions. |
| 28/10/2019 | Warkworth TEOM | 56.2 | 4.8 | An internal investigation determined HVO maximum potential contribution to be in the order of 4.8ug/m3 based on prevailing wind conditions. |
| 29/10/2019 | Maison Dieu TEOM | 50.3 | 1.6 | An internal investigation determined HVO maximum potential contribution to be in the order of 1.6ug/m3 based on prevailing wind conditions. |
| 29/10/2019 | Warkworth TEOM | 64.0 | 10.1 | An internal investigation determined HVO maximum potential contribution to be in the order of 10.0ug/m3 based on prevailing wind conditions. |
| 29/10/2019 | Jerrys Plain South TEOM | 52.8 | 10.2 | An internal investigation determined HVO maximum potential contribution to be in the order of 10.2ug/m3 based on prevailing wind conditions. |
| 29/10/2019 | Jerrys Plain North TEOM | 52.8 | 5.6 | An internal investigation determined HVO maximum potential contribution to be in the order of 5.6ug/m3 based on prevailing wind conditions. This was considered an extraordinary event due to bushfire smoke and not considered a non-compliance. |
| 30/10/2019 | Knodlers Lane TEOM | 86.8 | 34.3 | An internal investigation determined HVO maximum potential contribution to be in the order of 34.3ug/m3 based on prevailing wind conditions. |
| 30/10/2019 | Maison Dieu TEOM | 93.2 | 23.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 23.5ug/m3 based on prevailing wind conditions. |
| 30/10/2019 | Warkworth TEOM | 91.1 | 24.7 | An internal investigation determined HVO maximum potential contribution to be in the order of 24.7ug/m3 based on prevailing wind conditions. |
| 30/10/2019 | Jerrys Plain South TEOM | 75.3 | 5.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 5.5ug/m3 based on prevailing wind conditions. |
| 30/10/2019 | Jerrys Plain North TEOM | 75.3 | 6.3 | An internal investigation determined HVO maximum potential contribution to be in the order of 6.3ug/m3 based on prevailing wind conditions. This was considered an extraordinary event due to bushfire smoke and not considered a non-compliance. |

| | | | | |
|---|---|---|---|---|
| 31/10/2019 | Knodlers Lane TEOM | 106.1 | 34.2 | An internal investigation determined HVO maximum potential contribution to be in the order of 34.2ug/m3 based on prevailing wind conditions. |
| 31/10/2019 | Maison Dieu TEOM | 103.9 | 12.9 | An internal investigation determined HVO maximum potential contribution to be in the order of 12.9ug/m3 based on prevailing wind conditions. |
| 31/10/2019 | Warkworth TEOM | 104.3 | 33.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 33.5ug/m3 based on prevailing wind conditions. |
| 31/10/2019 | Jerrys Plain South TEOM | 85.3 | 20.2 | An internal investigation determined HVO maximum potential contribution to be in the order of 20.2ug/m3 based on prevailing wind conditions. |
| 31/10/2019 | Jerrys Plain North TEOM | 85.3 | 7.5 | An internal investigation determined HVO maximum potential contribution to be in the order of 7.5ug/m3 based on prevailing wind conditions. This was considered an extraordinary event due to bushfire smoke and not considered a non-compliance. |

### 2.3.4 Real Time Alarms for Air Quality

During October the real time monitoring system generated 437 automated air quality related alarms. 139 alarms were related to adverse weather conditions and 298 alarms relating to $PM_{10}$.

## 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 429.9 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**

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

### 4.1 Blast Monitoring Results

During October, there were 23 blasts fired from HVO. Figure 10 and Figure 11 show the blast monitoring results for the reporting period against the impact assessment criteria.

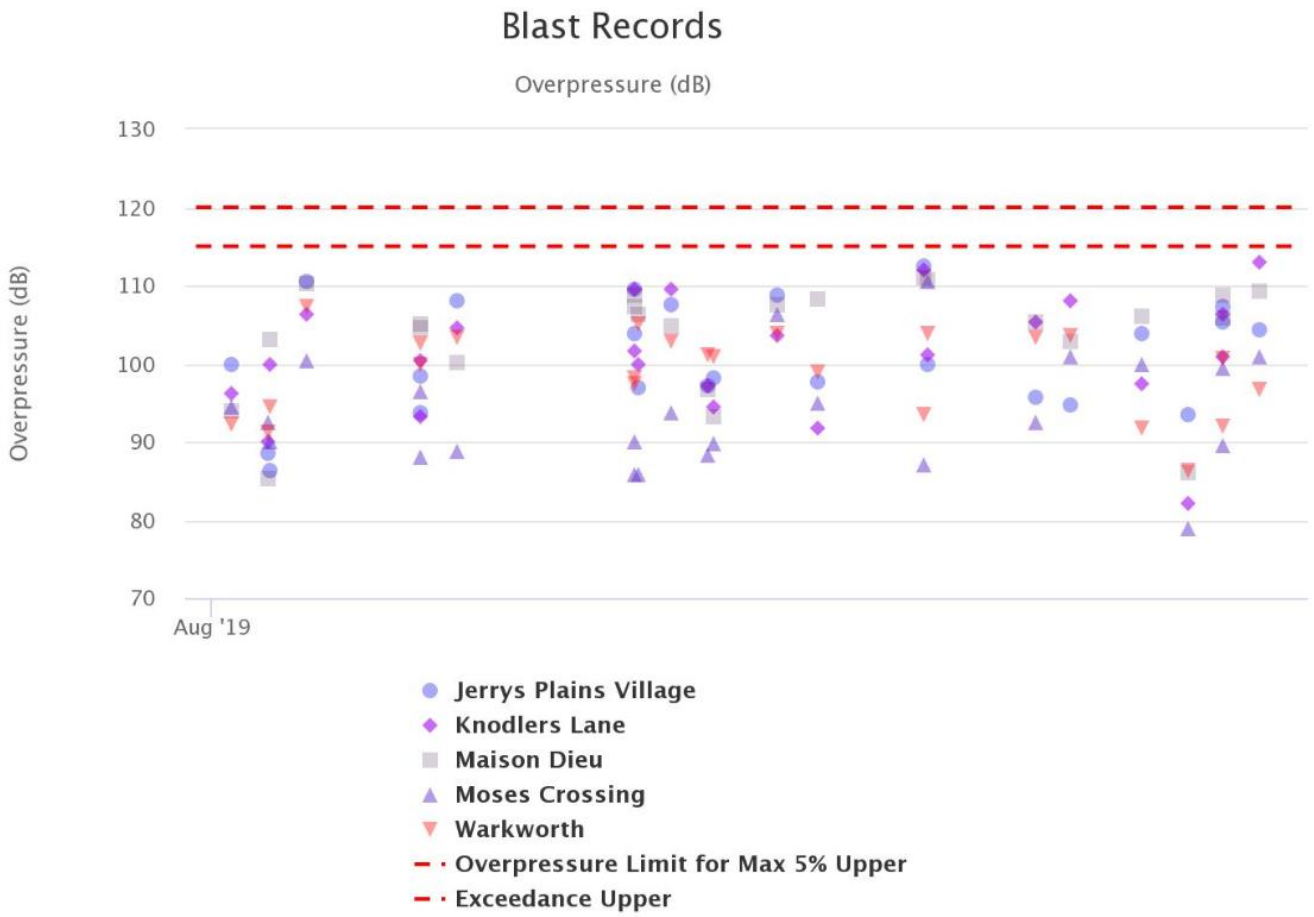


**Figure 10: Overpressure Blast Monitoring Results – October 2019**


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

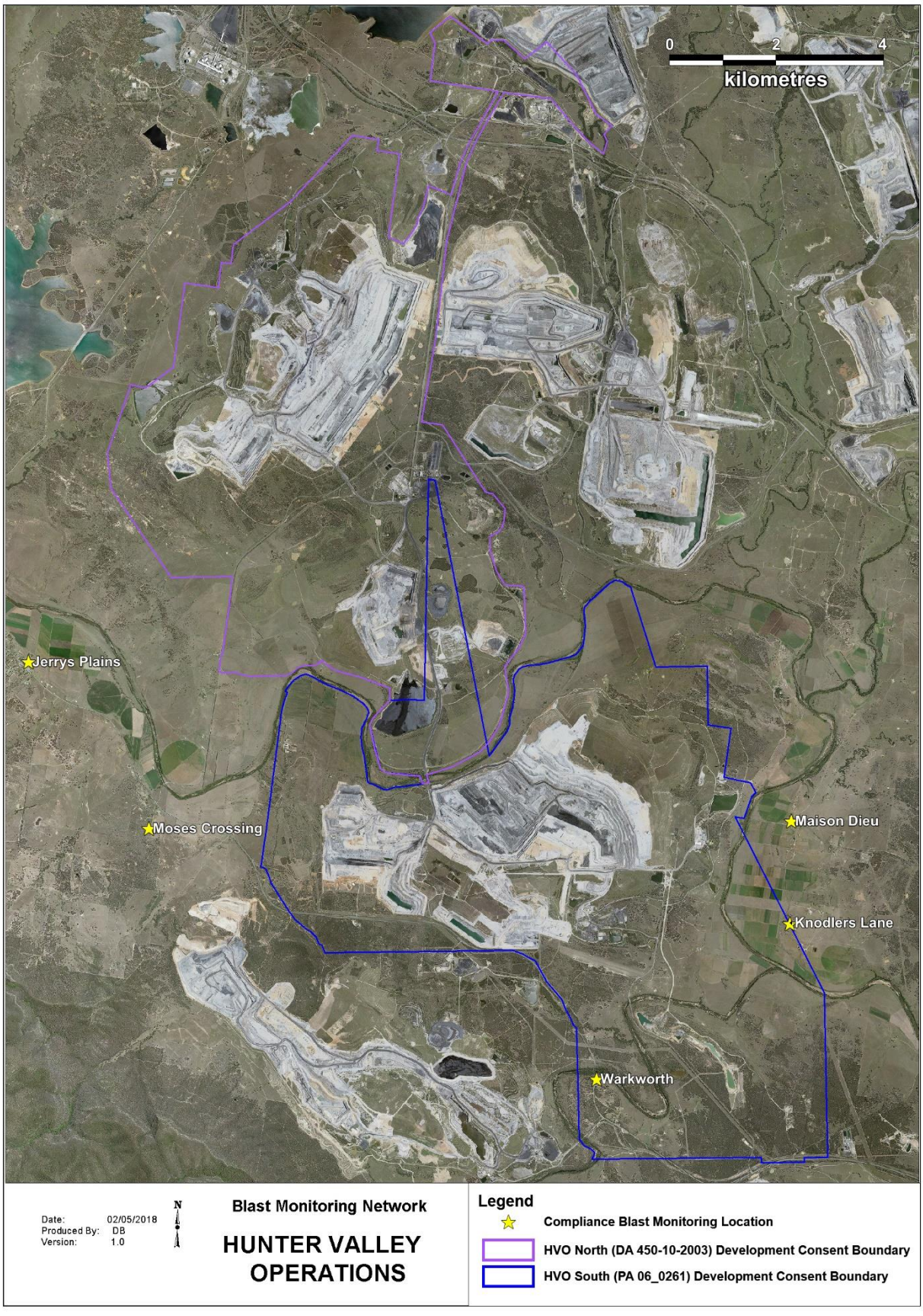


**Figure 12: Blast Monitoring Location Plan**

## 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 15 and 16 October 2019 with no non-compliances recorded. Monitoring results are detailed in Table 4 to Table 8.

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

| Location | Date and Time | Wind Speed (m/s)[1] | Stability Class[1] | Criterion dB (A) | Criterion Applies?[2] | HVO South $L_{Aeq}$ dB[3,4] | Exceedance[4,5] |
|---|---|---|---|---|---|---|---|
| *Knodlers Lane* | *15/10/2019 21:42* | *3.7* | *E* | *39* | *No* | *<30* | *NA* |
| *Maison Dieu* | *15/10/2019 21:23* | *3.4* | *E* | *39* | *No* | *IA* | *NA* |
| *Shearers Lane* | *15/10/2019 21:02* | *3.6* | *E* | *41* | *No* | *IA* | *NA* |
| *Kilburnie South* | *15/10/2019 23:04* | *2.6* | *D* | *39* | *Yes* | *IA* | *Nil* |
| *Jerrys Plains Village* | *15/10/2019 21:33* | *3.4* | *E* | *35* | *No* | *IA* | *NA* |
| *Jerrys Plains East* | *15/10/2019 21:10* | *3.7* | *E* | *35* | *No* | *IA* | *NA* |
| *Long Point Road* | *15/10/2019 21:01* | *1.6* | *F* | *35* | *Yes* | *IA* | *Nil* |
| *HVGC* | *15/10/2019 23:40* | *NR[6]* | *NR[6]* | *55* | *Yes* | *<25* | *NA* |

*Notes:*
*1. Atmospheric data is sourced from the HVO Cheshunt weather station (MTW Charlton Ridge for Long Point) using logged meteorological data;*
*2. Assumed noise emission limits apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m);*
*3. Estimated or measured LAeq,15minute attributed to HVO South Pit Area;*
*4. Bold results in red indicate exceedance of criteria; and*
*5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable.*
*6. NR means met data was not recorded for this time period. It has been assumed the relevant criterion applies.*

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

| Location | Date and Time | Wind Speed (m/s)[1] | Stability Class | Criterion dB (A) | Criterion Applies?[2] | HVO South $L_{A1,\ 1min}$ dB[3,4] | Exceedance[4,5] |
|---|---|---|---|---|---|---|---|
| *Knodlers Lane* | *15/10/2019 21:42* | *3.7* | *E* | *45* | *No* | *40* | *NA* |
| *Maison Dieu* | *15/10/2019 21:23* | *3.4* | *E* | *45* | *No* | *IA* | *NA* |
| *Shearers Lane* | *15/10/2019 21:02* | *3.6* | *E* | *45* | *No* | *IA* | *NA* |
| *Kilburnie South* | *15/10/2019 23:04* | *2.6* | *D* | *45* | *Yes* | *IA* | *Nil* |
| *Jerrys Plains Village* | *15/10/2019 21:33* | *3.4* | *E* | *45* | *No* | *IA* | *NA* |
| *Jerrys Plains East* | *15/10/2019 21:10* | *3.7* | *E* | *45* | *No* | *IA* | *NA* |
| *Long Point Road* | *15/10/2019 21:01* | *1.6* | *F* | *45* | *Yes* | *IA* | *Nil* |
| *HVGC* | *15/10/2019 23:40* | *NR[6]* | *NR[6]* | *NA* | *NA* | *NA* | *NA* |

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

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

| Location | Date and Time | Wind Speed (m/s)[1] | Stability Class[1] | Criterion dB (A) | Criterion Applies?[2] | HVO North $L_{Aeq}$ dB[3,4] | Exceedance[4,5] |
|---|---|---|---|---|---|---|---|
| *Knodlers Lane* | *15/10/2019 21:42* | *0.8* | *E* | *35* | *Yes* | *IA* | *Nil* |
| *Maison Dieu* | *15/10/2019 21:23* | *1.2* | *F* | *35* | *Yes* | *IA* | *Nil* |
| *Shearers Lane* | *15/10/2019 21:02* | *2.0* | *E* | *35* | *Yes* | *IA* | *Nil* |
| *Kilburnie South* | *15/10/2019 23:04* | *1.1* | *F* | *39* | *Yes* | *IA* | *Nil* |
| *Jerrys Plains Village* | *15/10/2019 21:33* | *1.2* | *F* | *36* | *Yes* | *32* | *Nil* |
| *Jerrys Plains East* | *15/10/2019 21:10* | *1.7* | *E* | *39* | *Yes* | *32* | *Nil* |
| *Long Point Road* | *15/10/2019 21:01* | *1.6* | *F* | *35* | *Yes* | *IA* | *Nil* |
| *HVGC* | *15/10/2019 23:40* | *0.3* | *F* | *NA* | *NA* | *NA* | *NA* |

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

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

| Location | Date and Time | Wind Speed (m/s)[1] | Stability Class[1] | Criterion dB (A) | Criterion Applies?[2] | HVO North $L_{Aeq}$ dB[3,4] | Exceedance[4,5] |
|---|---|---|---|---|---|---|---|
| *Knodlers Lane* | *15/10/2019 21:42* | *0.8* | *E* | *41* | *Yes* | *IA* | *Nil* |
| *Maison Dieu* | *15/10/2019 21:23* | *1.2* | *F* | *41* | *Yes* | *IA* | *Nil* |
| *Shearers Lane* | *15/10/2019 21:02* | *2.0* | *E* | *41* | *Yes* | *IA* | *Nil* |
| *Kilburnie South* | *15/10/2019 23:04* | *1.1* | *F* | *41* | *Yes* | *IA* | *Nil* |
| *Jerrys Plains Village* | *15/10/2019 21:33* | *1.2* | *F* | *41* | *Yes* | *32* | *Nil* |
| *Jerrys Plains East* | *15/10/2019 21:10* | *1.7* | *E* | *41* | *Yes* | *32* | *Nil* |
| *Long Point Road* | *15/10/2019 21:01* | *1.6* | *F* | *41* | *Yes* | *IA* | *Nil* |
| *HVGC* | *15/10/2019 23:40* | *0.3* | *F* | *NA* | *NA* | *NA* | *NA* |

*Notes:*

*1. Atmospheric data is sourced from the HVO Corp. weather station (or MTW Charlton Ridge for Long Point) using logged meteorological data;*

*2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m;*

*3. Estimated or measured LAeq,15minute attributed to HVO North Pit Area;*

*4. Bold results in red indicate exceedance of criteria; and*

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

.

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

| *Location* | *Date and Time* | *Wind Speed (m/s)[1]* | *Stability Class[1]* | *Criterion dB (A)* | *Criterion Applies?[2]* | *HVO North $L_{A1, 1min}$ dB[3,4]* | *Exceedance[4,5]* |
|---|---|---|---|---|---|---|---|
| *Knodlers Lane* | *15/10/2019 21:42* | *0.8* | *E* | *46* | *Yes* | *IA* | *Nil* |
| *Maison Dieu* | *15/10/2019 21:23* | *1.2* | *F* | *46* | *Yes* | *IA* | *Nil* |
| *Shearers Lane* | *15/10/2019 21:02* | *2.0* | *E* | *46* | *Yes* | *IA* | *Nil* |
| *Kilburnie South* | *15/10/2019 23:04* | *1.1* | *F* | *46* | *Yes* | *IA* | *Nil* |
| *Jerrys Plains Village* | *15/10/2019 21:33* | *1.2* | *F* | *46* | *Yes* | *35* | *Nil* |
| *Jerrys Plains East* | *15/10/2019 21:10* | *1.7* | *E* | *46* | *Yes* | *42* | *Nil* |
| *Long Point Road* | *15/10/2019 21:01* | *1.6* | *F* | *46* | *Yes* | *IA* | *Nil* |
| *HVGC* | *15/10/2019 23:40* | *0.3* | *F* | *NA* | *NA* | *NA* | *NA* |

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

.

## 5.2 NPfI Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. During October 2019 no penalties were applied. The assessment for low frequency noise is shown in Table 9.

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

| *Location* | *Date and Time* | *Measured Site Only $LA_{eq}$ dB (Sth/Nth)* | *Site Only $LC_{eq}$ dB[1] (Sth/Nth)* | *Site-Only LCeq – LAeq dB[1,2] (Sth/Nth)* | *Result Max exceedance of ref spectrum dB[1,3] (Sth/Nth)* | *Penalty dB(A) [4] (Sth/Nth)* |
|---|---|---|---|---|---|---|
| *Knodlers Lane* | *15/10/2019 21:42* | *IA/<30* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *Maison Dieu* | *15/10/2019 21:23* | *IA/IA* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *Shearers Lane* | *15/10/2019 21:02* | *IA/IA* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *Kilburnie South* | *15/10/2019 23:04* | *IA/IA* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *Jerrys Plains Village* | *15/10/2019 21:33* | *32/IA* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *Jerrys Plains East* | *15/10/2019 21:10* | *32/IA* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *Long Point Road* | *15/10/2019 21:01* | *IA/IA* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |
| *HVGC* | *15/10/2019 23:40* | *NA/<25* | *NA/NA* | *NA/NA* | *NA/NA* | *NA/NA* |

*Notes:*

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

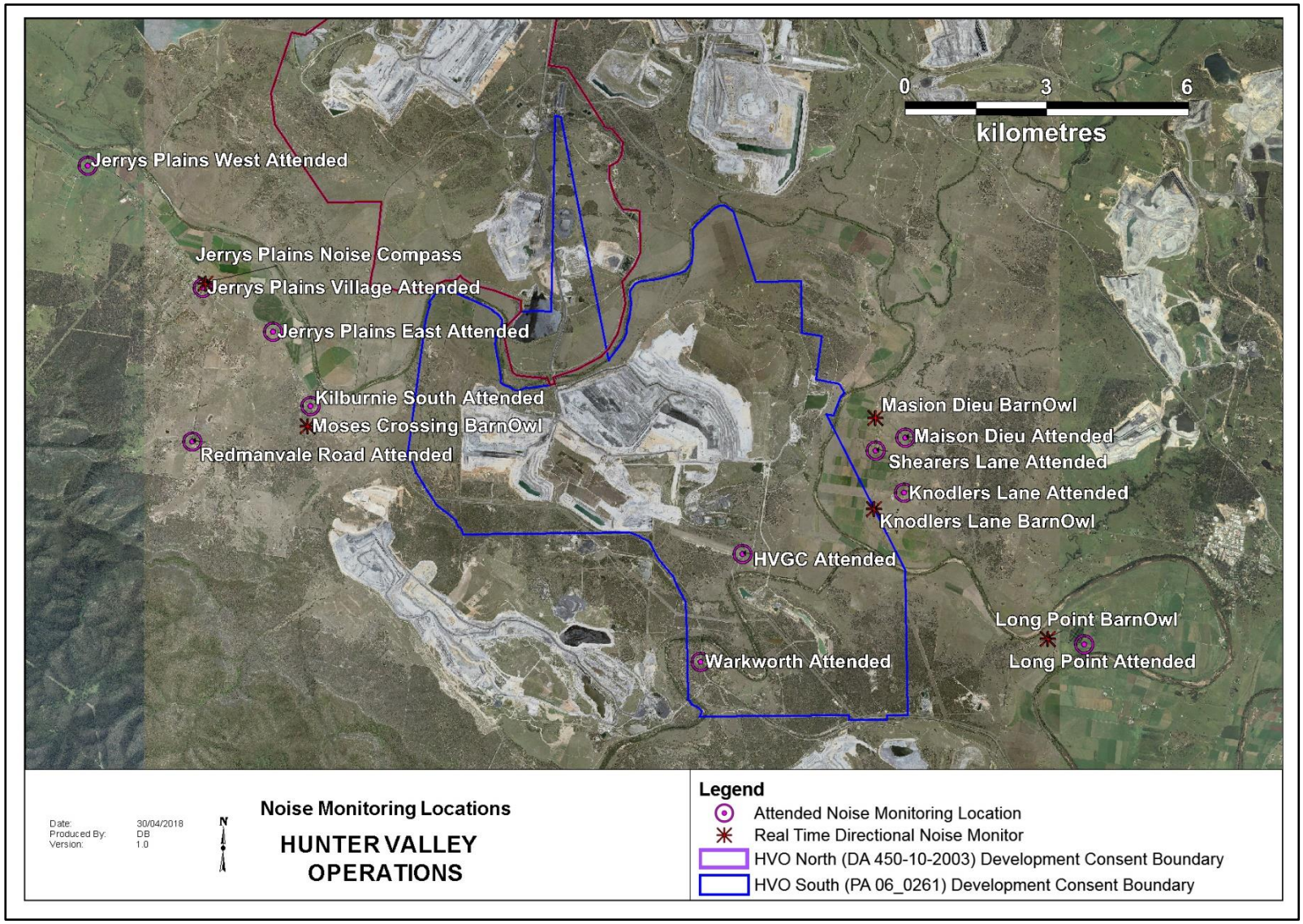


**Figure 13: Noise Monitoring Location Plan**

### 5.2.1 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis. Noise alarms are in place at five monitoring locations (Knodlers Lane, Maison Dieu, Jerrys Plains, Moses Crossing, and Long Point), which alert HVO staff to elevated noise levels likely to be attributable to HVO. Noise alarms are investigated and responded to with the appropriate level of operational modification. Changes in response to a noise alarm can include replacing equipment with quieter (noise attenuated) units, changing or relocating tasks, and shutting down equipment. It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in Section 5.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

## 6.0 OPERATIONAL DOWNTIME

During October, a total of 796 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.

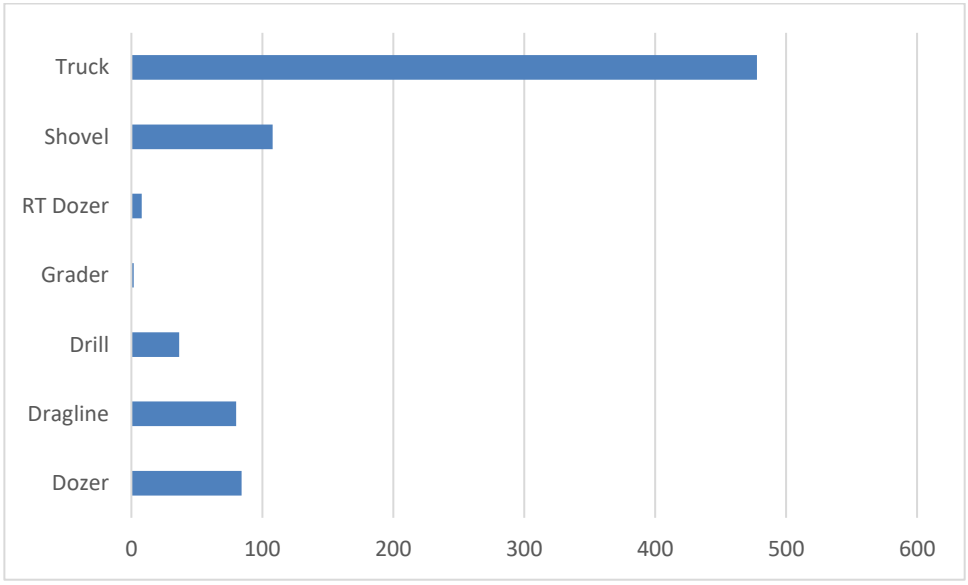


**Figure 14: Operational Downtime by Equipment Type – October 2019**

## 7.0 REHABILITATION

During October 3.99 Ha of land was released, 15.01 Ha of land was bulk shaped and 11.08 Ha of land was rehabilitated. Year to date progress can be viewed in Figure 15.

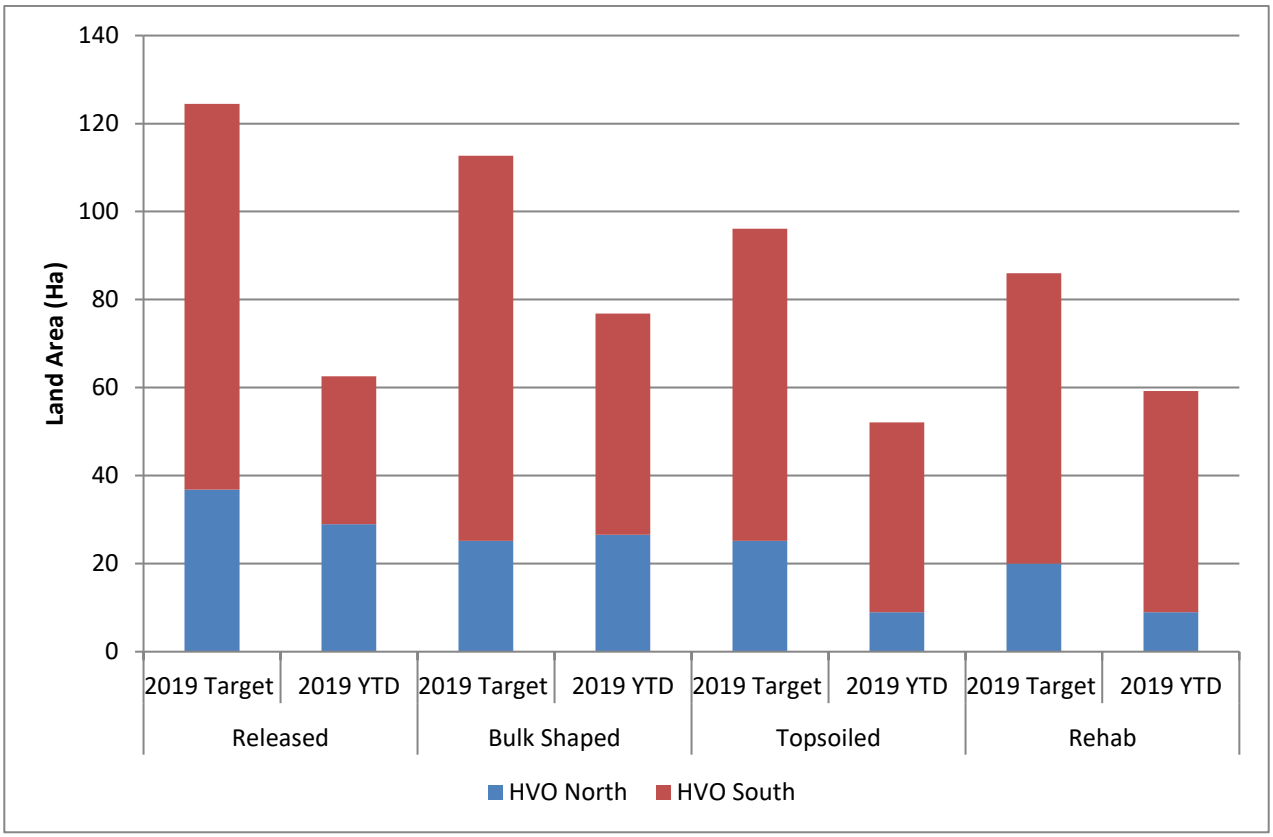


**Figure 15: Rehabilitation YTD – October 2019**

## 8.0 COMPLAINTS

Two complaints were received during October 2019. Details of complaints received YTD are shown in Table 10 below.

**Table 10: Complaints Summary YTD 2019**

| Month | Noise | Dust | Blast | Lighting | Other | Total |
|---|---|---|---|---|---|---|
| *January* | - | - | - | - | - | - |
| *February* | - | - | - | - | - | - |
| *March* | - | *1* | - | - | - | *1* |
| *April* | - | *1* | - | - | - | *1* |
| *May* | - | *2* | - | - | - | *2* |
| *June* | - | *1* | - | - | *1* | *2* |
| *July* | - | - | - | - | - | - |
| *August* | - | - | - | - | *1* | *1* |
| *September* | - | - | - | - | - | - |
| *October* | | *1* | *1* | | | *2* |
| *November* | | | | | | |
| *December* | | | | | | |
| *Total* | *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 – October 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) |
|---|---|---|---|---|---|---|---|---|
| 1/10/2019 | 20.1 | 7.7 | 94.5 | 5.5 | 1178 | 124 | 3.0 | 0.0 |
| 2/10/2019 | 24.9 | 5.6 | 100 | -5.7 | 847 | 221 | 1.9 | 0.0 |
| 3/10/2019 | 27.3 | 11.1 | 61.6 | -10.0 | 844 | 215 | 2.4 | 0.0 |
| 4/10/2019 | 30.7 | 12.9 | 86.7 | -14.7 | 845 | 239 | 4.6 | 0.0 |
| 5/10/2019 | 19.5 | 9.9 | 99.1 | 33.2 | 1304 | 113 | 3.5 | 0.0 |
| 6/10/2019 | 30.2 | 8.6 | 100 | 0.8 | 1164 | 202 | 1.8 | 0.0 |
| 7/10/2019 | 34.3 | 13.3 | 96.1 | -17.9 | 937 | 228 | 3.5 | 0.0 |
| 8/10/2019 | 23.4 | 9.1 | 99.1 | -7.2 | 1350 | 265 | 5.2 | 0.0 |
| 9/10/2019 | 18.3 | 4.8 | 81.6 | 1.3 | 1151 | 167 | 2.9 | 0.0 |
| 10/10/2019 | 19.0 | 5.2 | 91.3 | 5.0 | 1179 | 132 | 2.7 | 0.0 |
| 11/10/2019 | 18.4 | 7.6 | 100 | 16.0 | 1173 | 117 | 3.5 | 1.8 |
| 12/10/2019 | 12.5 | 7.5 | 100 | 47.2 | 419.5 | 117 | 3.6 | 0.2 |
| 13/10/2019 | 18.1 | 4.8 | 100 | 15.1 | 1343 | 117 | 2.3 | 0.0 |
| 14/10/2019 | 25.2 | 5.6 | 100 | -4.9 | 1126 | 171 | 1.8 | 0.0 |
| 15/10/2019 | 30.5 | 8.1 | 97.8 | -8.6 | 915 | 127 | 1.7 | 0.0 |
| 16/10/2019 | 34.7 | 11.9 | 98.9 | 4.0 | 1078 | 199 | 2.1 | 0.0 |
| 17/10/2019 | 24.6 | 14.9 | 26.2 | 10.7 | 422.6 | 275 | 5.7 | 0.0 |
| 18/10/2019 | 28.1 | 11.3 | 42.8 | 3.8 | 996 | 289 | 3.7 | 0.0 |
| 19/10/2019 | 20.4 | 12.5 | 38.5 | 32.7 | -5.732 | 176 | 3.5 | 0.0 |
| 20/10/2019 | 23.6 | 11.5 | 79.1 | 13.2 | 990 | 131 | 2.5 | 0.0 |
| 21/10/2019 | 26.0 | 9.8 | 100 | 24.0 | 947 | 121 | 2.5 | 0.0 |
| 22/10/2019 | 29.1 | 11.3 | 100 | 10.5 | 961 | 120 | 2.0 | 0.0 |
| 23/10/2019 | 32.6 | 14.0 | 97.4 | 10.0 | 942 | 194 | 2.2 | 0.0 |
| 24/10/2019 | 32.8 | 18.9 | 33.6 | 11.5 | 453.5 | 170 | 1.6 | 0.0 |
| 25/10/2019 | 35.8 | 19.6 | 46.1 | 7.8 | 937 | 281 | 4.2 | 0.0 |
| 26/10/2019 | 32.5 | 19.5 | 44 | 9.2 | 1225 | 293 | 7.4 | 0.0 |
| 27/10/2019 | 27.8 | 14.4 | 56.7 | 5.1 | 1044 | 204 | 3.0 | 0.0 |
| 28/10/2019 | 26.1 | 11.9 | 92.2 | 32.7 | 1107 | 123 | 4.6 | 0.0 |
| 29/10/2019 | 30.0 | 11.9 | 111.2 | 14.2 | 1004 | 140 | 2.1 | 0.0 |
| 30/10/2019 | NAN | NAN | 48.7 | -196.6 | 543.3 | 236 | 2.5 | 0.0 |
| 31/10/2019 | 33.2 | NAN | 78.6 | -212.6 | 223.5 | 145 | 3.4 | 0.0 |

*NAN – data not available