

HUNTER VALLEY OPERATIONS



Monthly Environmental Monitoring Report - January 2022

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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 1st to 31st January 2022 (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 2020, 2021 and 2022 trends are shown in **Figure 1**.

Table 1 - Rainfall data for the reporting period

Month	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January 2022	60.6	60.6

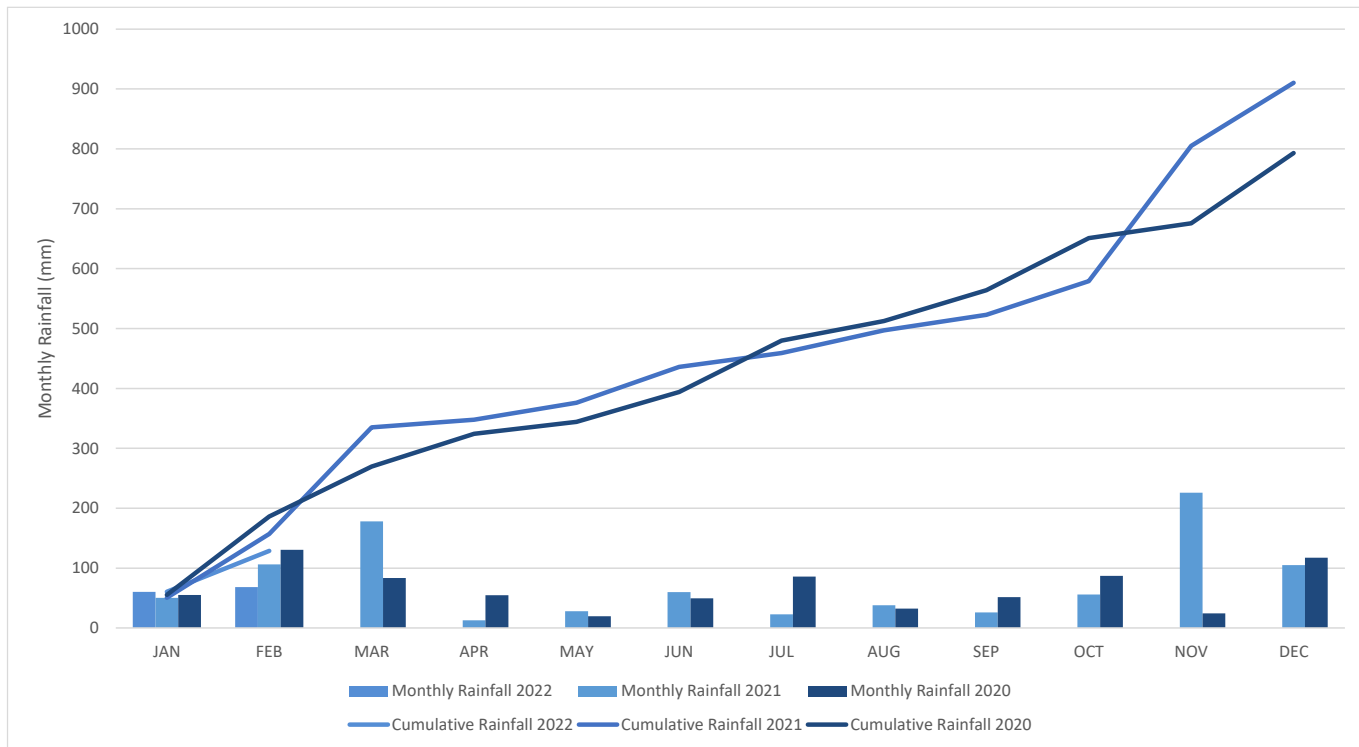


Figure 1 - Rainfall Summary 2022

2.1.2 Wind Speed and Direction

South easterly winds were prevailing during the reporting period, as shown in **Figure 2** and **Figure 3**.

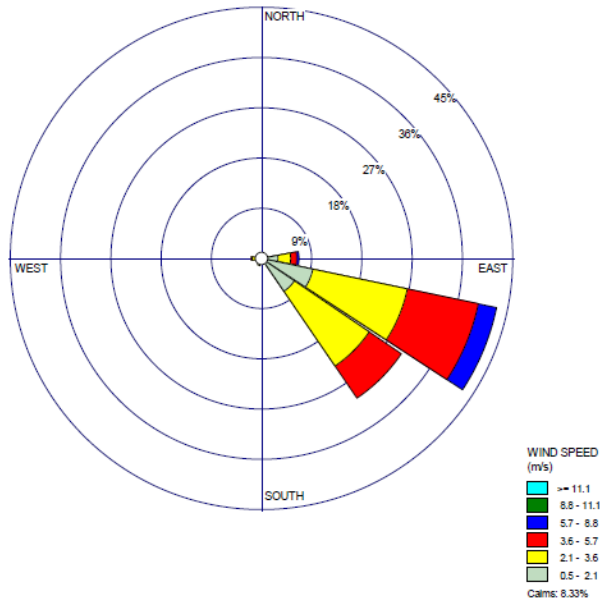


Figure 2 - HVO Corporate Wind Rose for the Reporting Period

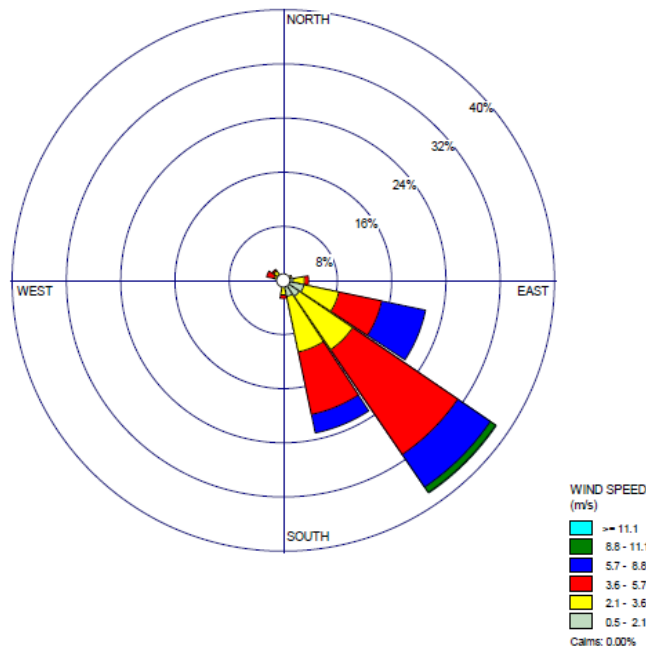


Figure 3 - HVO Cheshunt Wind Rose for the Reporting Period

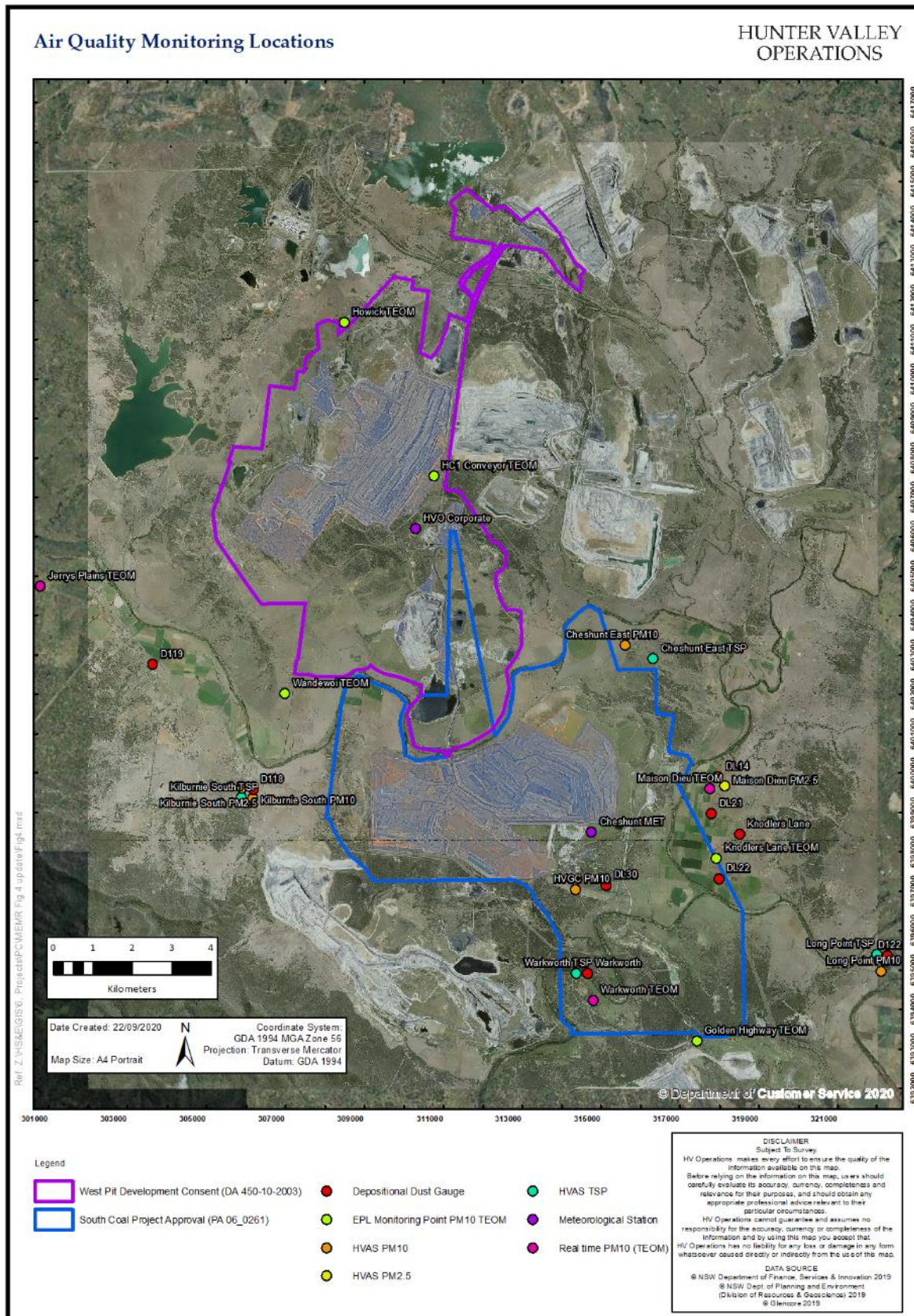


Figure 4 - Air Quality Monitoring Location Plan

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 2022 Annual Review.

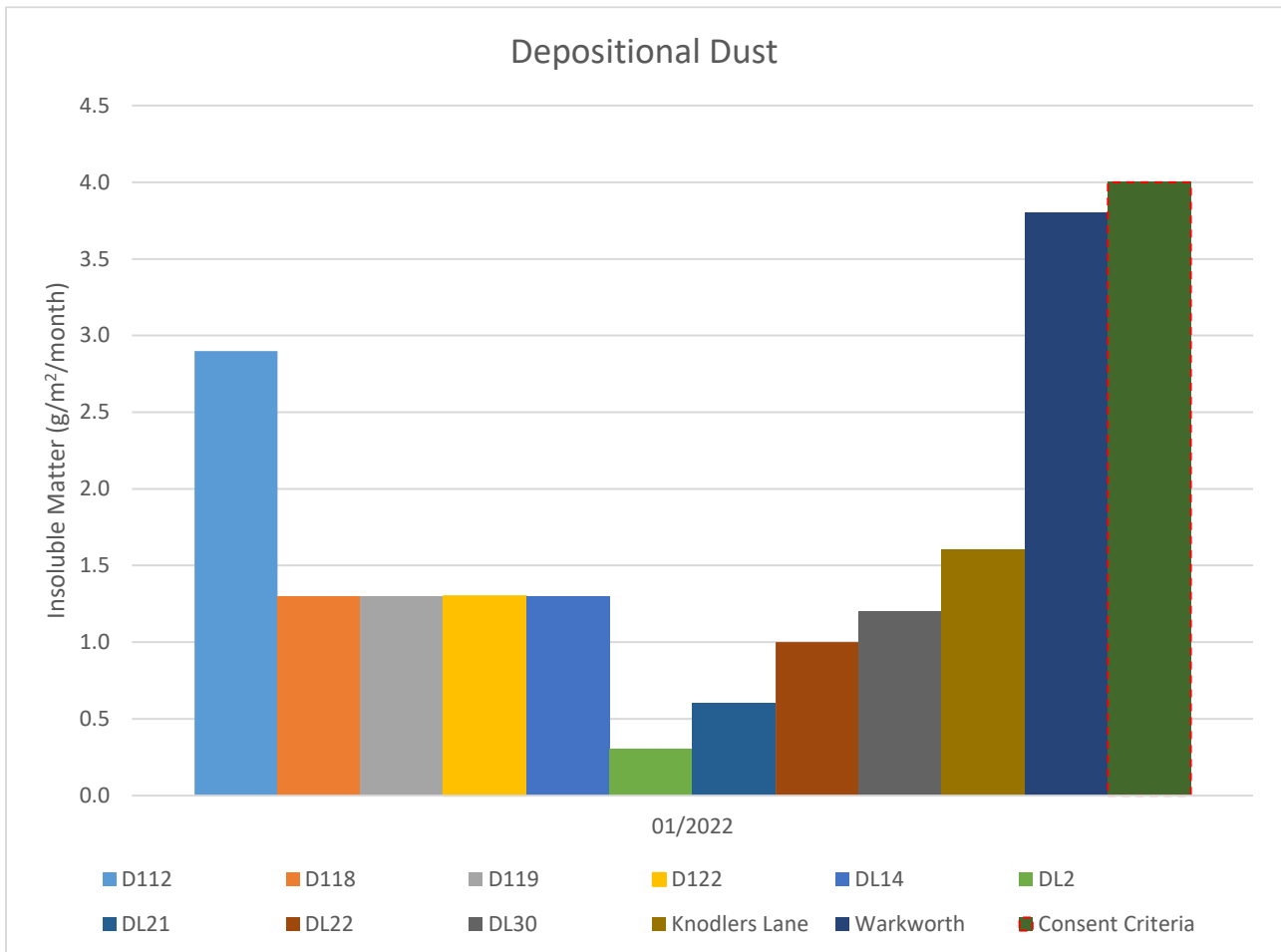


Figure 5 - Depositional Dust Results for the Reporting Period

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 (PM₁₀). The Kilburnie South and Maison Dieu HVAS also monitor Particulate Matter <2.5µm (PM_{2.5}). 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 PM₁₀ Results

2.3.1.1 Performance against short term impact assessment criteria

Figure 6 shows individual PM₁₀ results at each monitoring station against the short-term impact assessment criteria of 50µg/m³. No exceedances were recorded.

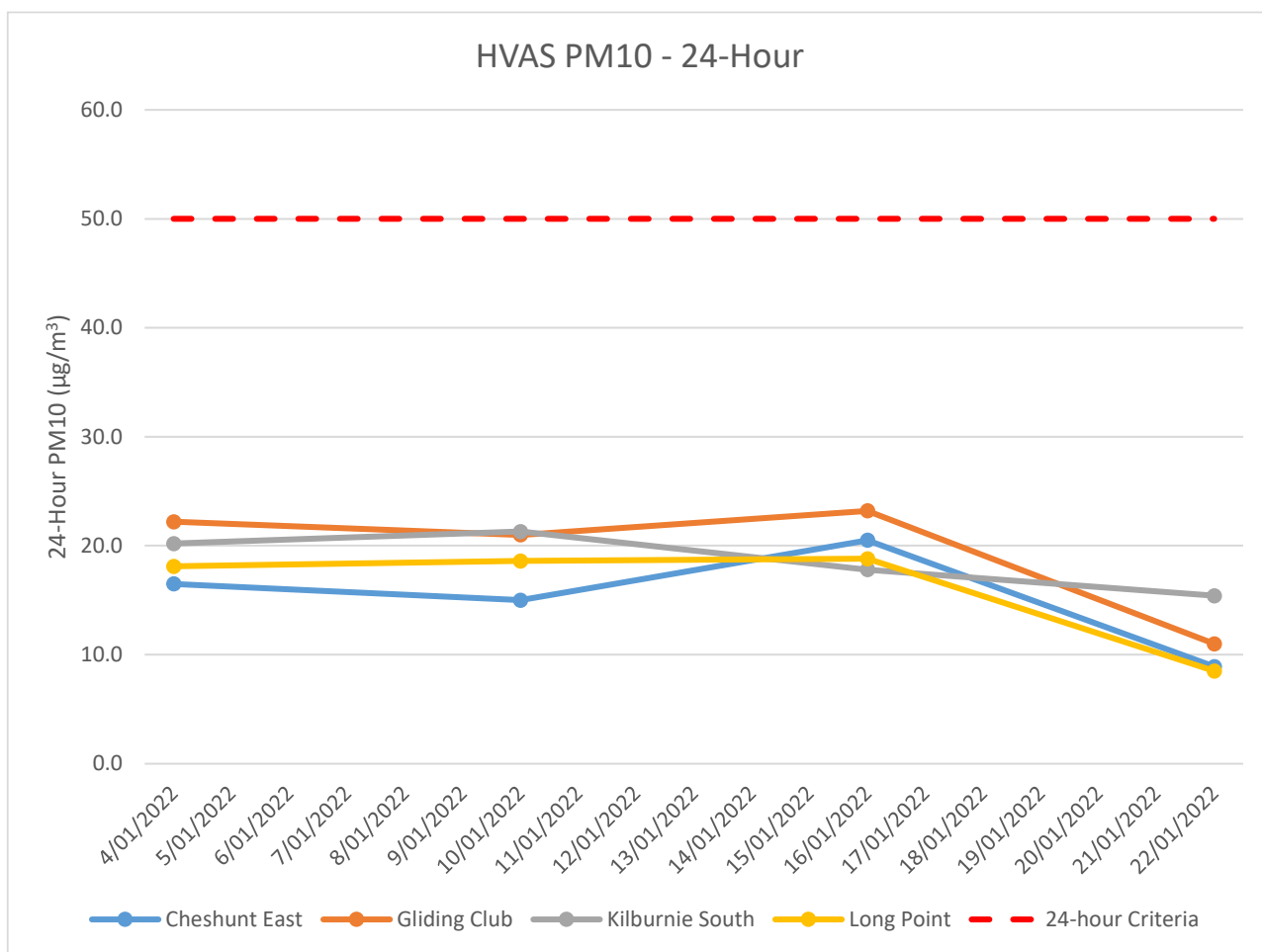


Figure 6 - Individual PM₁₀ Results for the Reporting Period

2.3.1.2 Performance against long term impact assessment criteria

Figure 7 shows the year to date annual average PM₁₀ 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 2022 Annual Review.

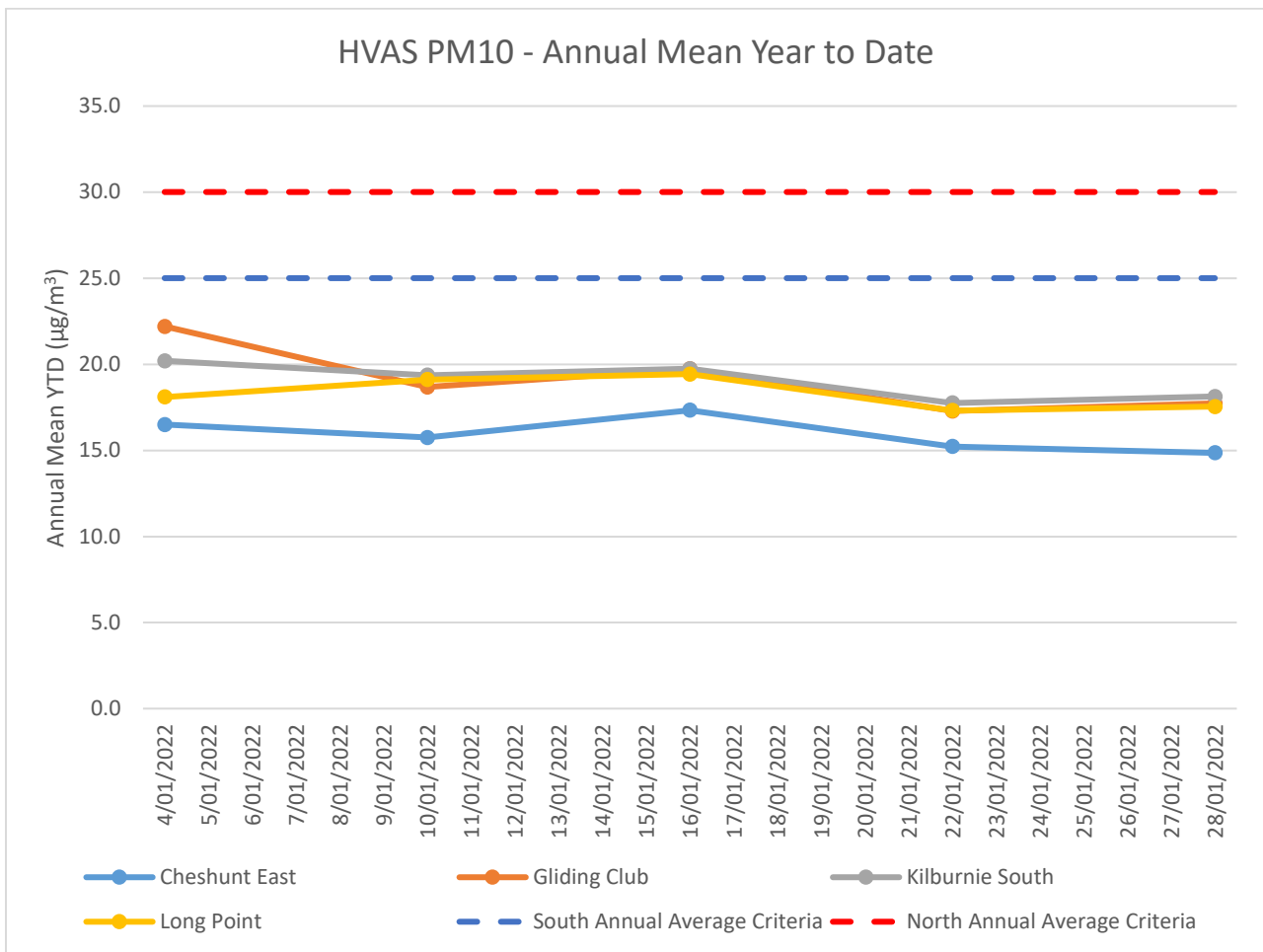


Figure 7 - Year to Date Average PM₁₀ as at end of the Reporting Period

2.3.2 HVAS PM_{2.5} Results

HVO monitors PM_{2.5} 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_{2.5} results at each monitoring station against the HVO South short-term impact assessment criteria of 25µg/m³.

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

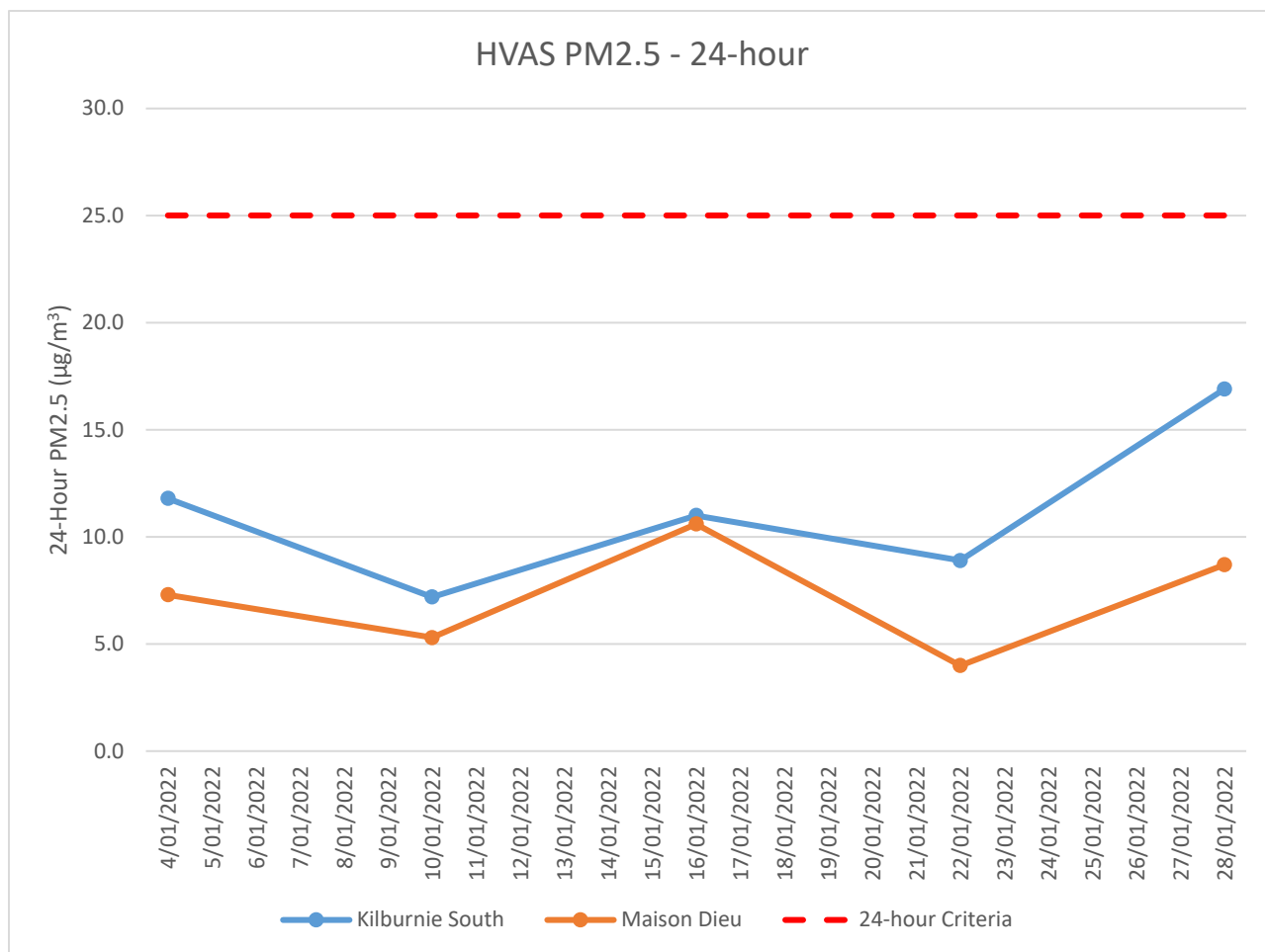


Figure 8 - Individual PM_{2.5} Results for the Reporting Period

2.3.2.2 Performance against long term impact assessment criteria

Figure 9 shows the year to date annual average PM_{2.5} results. During the reporting period, the Maison Dieu monitor and Kilburnie South monitor annual average year to date was above the PM_{2.5} Annual Rolling Mean criteria of 8µg/m³.

An assessment of HVO’s contribution against the long term impact assessment criteria will be provided in the 2022 Annual Review.

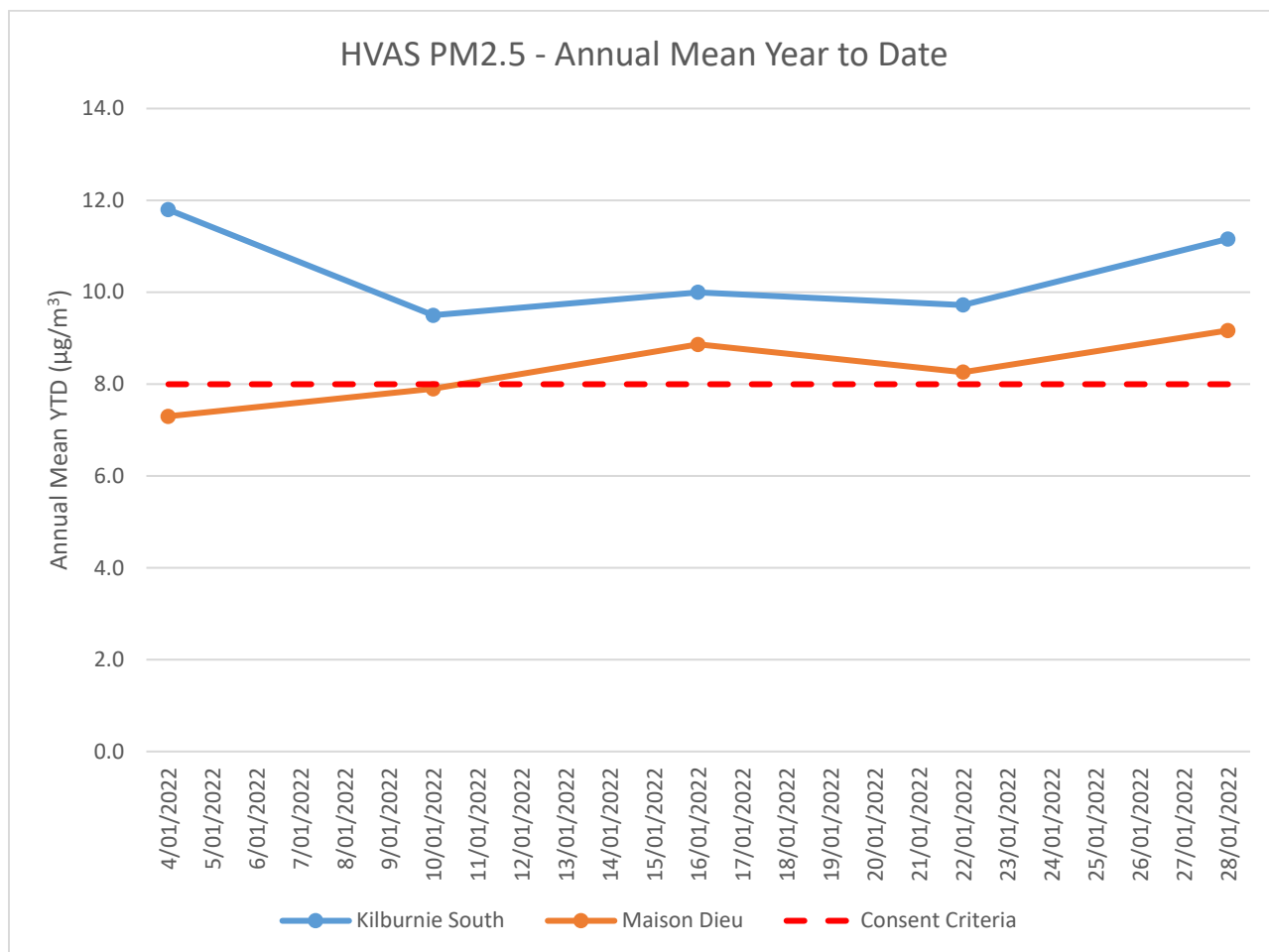


Figure 9 - Year to Date Average PM_{2.5} as at end of the Reporting Period

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/m³.

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 2022 Annual Review.

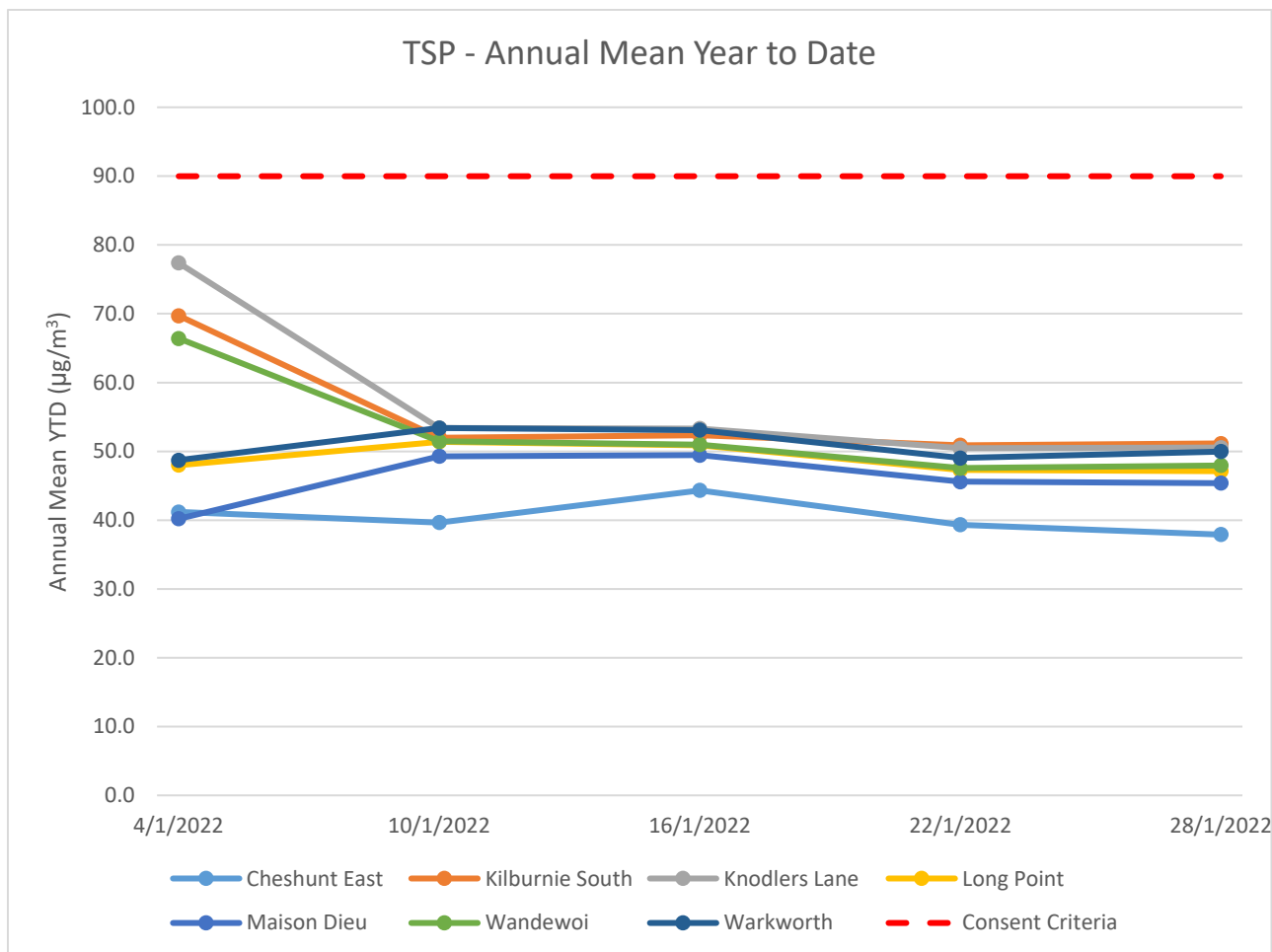


Figure 10 - Year to Date Average Total Suspended Particulates as at end of the Reporting Period

2.3.4 Real Time PM₁₀ Results

HVO maintains a network of real time PM₁₀ 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 PM₁₀ 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 PM₁₀ result from the real time monitoring sites which shows no exceedances reported for the period.

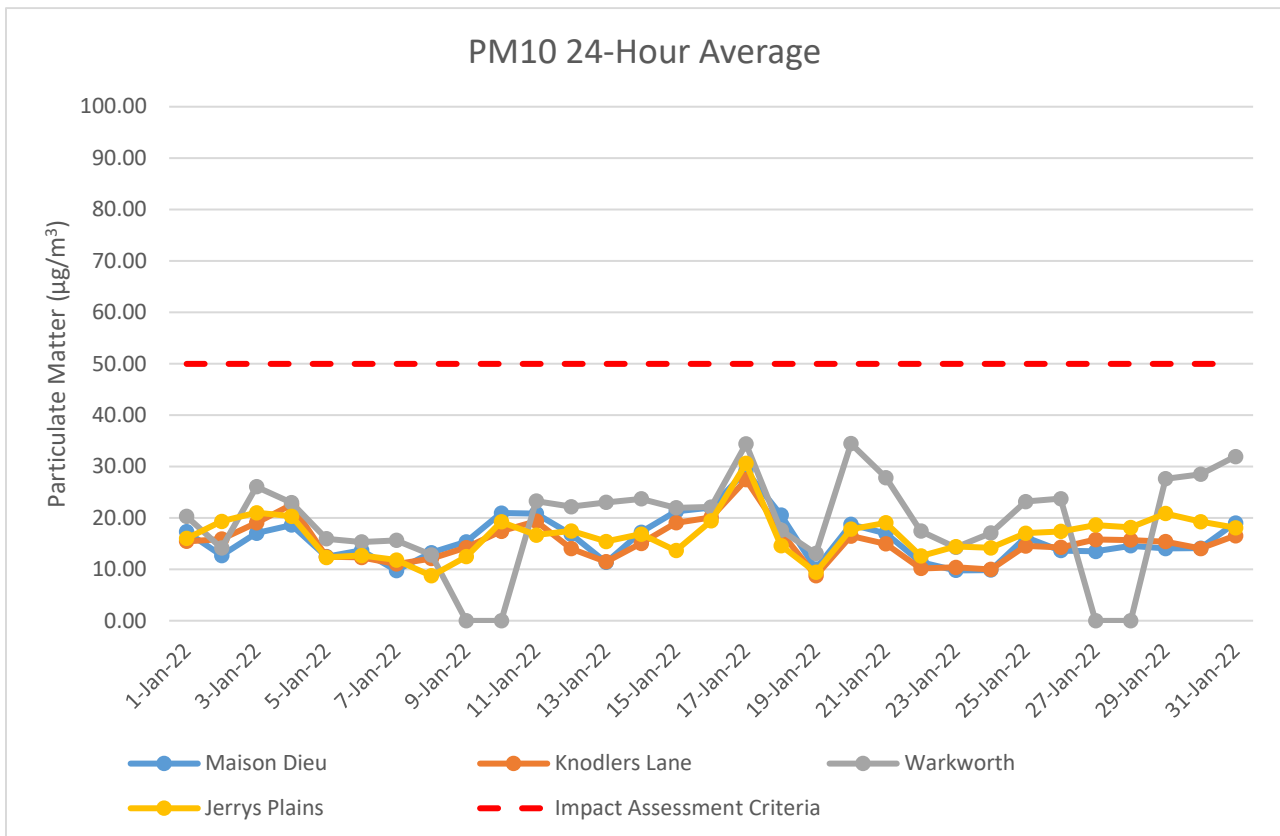


Figure 11 - Real Time PM₁₀ 24hr for the Reporting Period

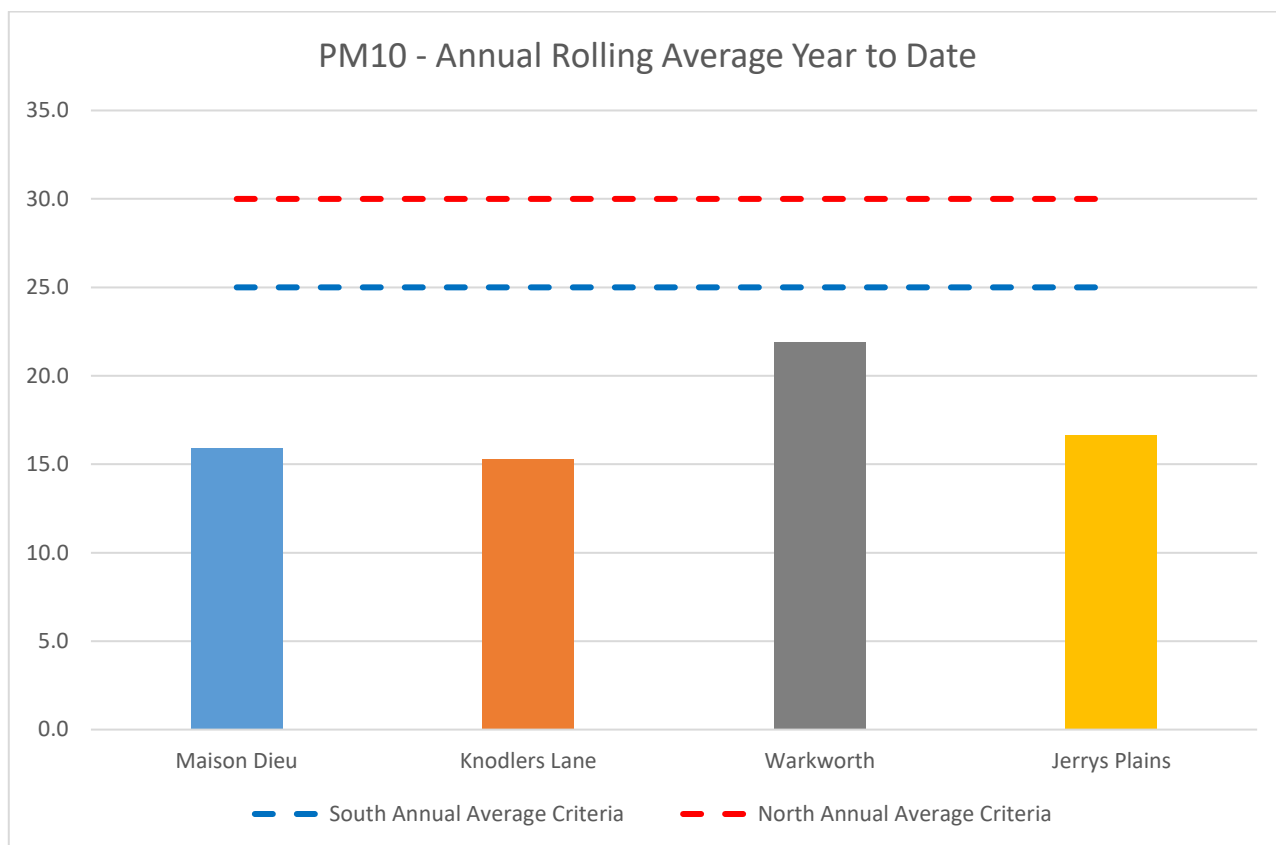


Figure 12 - Real Time PM₁₀ Annual Average January 2022

2.3.5 Real Time Alarms for Air Quality

The real time monitoring system generated 33 automated air quality related alarms during the reporting period. 32 alarms related to adverse weather conditions and 1 alarm 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 March 2022 Monthly Environmental Monitoring Report.

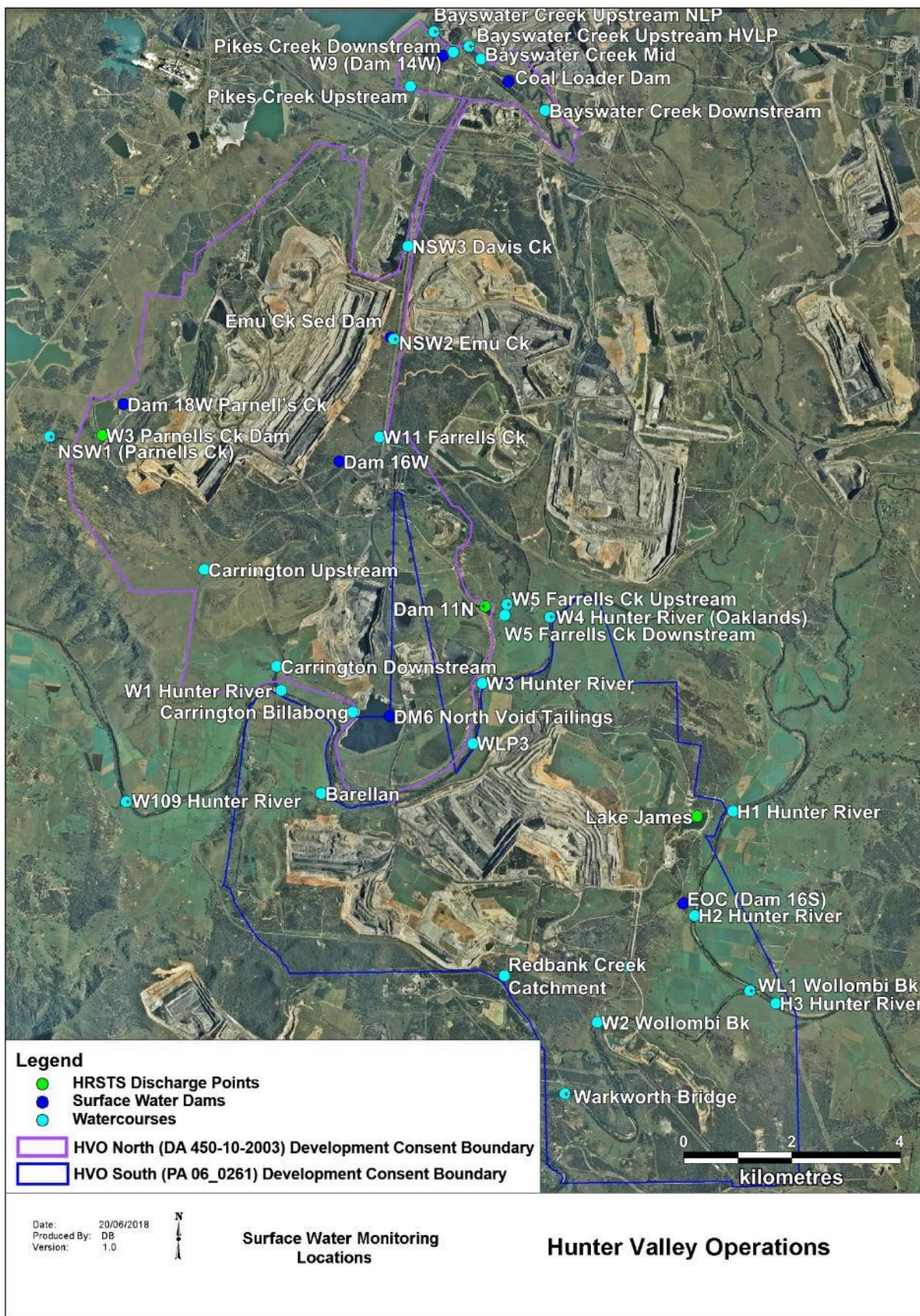


Figure 13 - HVO Surface Water Monitoring Locations

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 December 2022 report.

3.2 Site Water Use

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

HVO did not extract water from the Hunter River during the reporting period.

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.

HVO discharged 106 ML under the HRSTS during the reporting period.

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 March 2022 Monthly Environmental Monitoring Report.

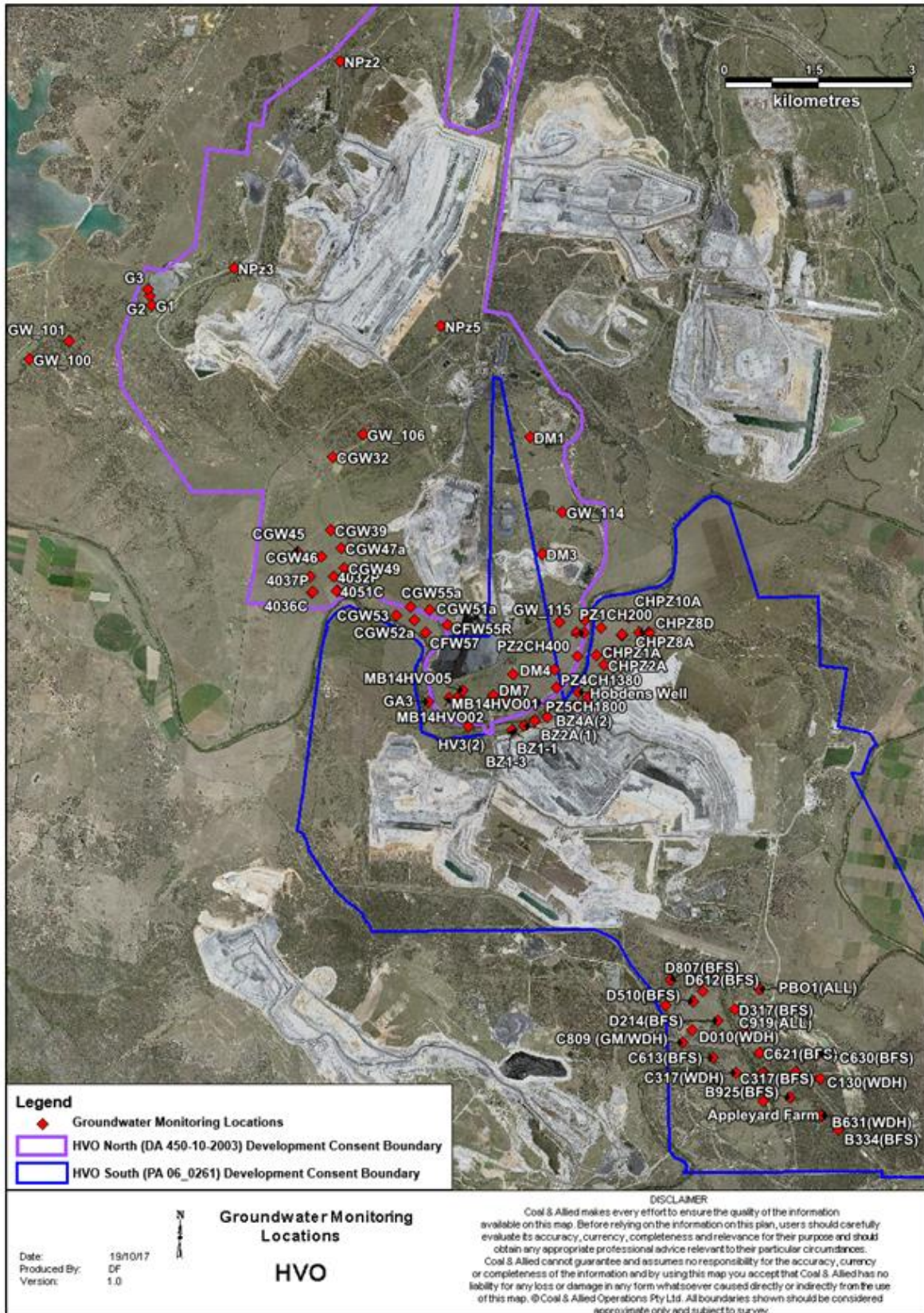


Figure 14 Groundwater monitoring Locations at HVO

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 March 2022 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 (dBL)	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 (dBL)	Jerrys Plains Village (dBL)	Maison Dieu (dBL)	Warkworth (dBL)	Knodlers Lane (dBL)
04/01/2022 13:38	103.57	90.25	98.01	84.18	92.94
04/01/2022 13:39	106.39	97.43	102.72	87.61	103.13
05/01/2022 13:06	106.35	108.39	92.53	89.19	92.86
06/01/2022 12:56	97.76	107.79	103.09	101.07	109.58
08/01/2022 13:02	90.91	91.66	94.25	94.23	95.37
10/01/2022 13:06	84.10	85.61	81.27	80.68	82.69
13/01/2022 12:58	92.38	101.36	84.99	85.94	94.90
14/01/2022 13:31	86.14	85.25	96.48	94.44	95.03
17/01/2022 12:10	87.96	86.03	87.03	86.22	87.31
17/01/2022 12:11	87.18	83.51	92.05	93.35	89.75
17/01/2022 13:32	83.80	85.92	86.01	89.61	88.15
18/01/2022 13:01	79.99	87.07	81.77	82.04	77.83
19/01/2022 9:19	92.60	91.20	101.68	83.27	104.92
21/01/2022 15:24	104.79	103.92	107.62	93.74	100.05
25/01/2022 8:20	89.83	89.46	83.54	83.53	85.69
25/01/2022 9:35	97.23	93.35	86.41	83.78	87.31
27/01/2022 13:10	96.81	98.34	94.82	94.18	98.75
27/01/2022 15:08	81.09	80.44	93.76	96.44	102.14
28/01/2022 13:01	85.50	90.59	87.01	91.91	92.23
29/01/2022 13:05	99.20	91.08	87.58	91.87	89.07
29/01/2022 13:06	94.11	88.46	88.72	95.59	96.65
31/01/2022 13:27	93.65	93.71	93.13	97.35	93.89
31/01/2022 13:28	90.49	84.49	93.95	101.80	91.57
31/01/2022 13:30	89.77	85.62	99.35	95.71	97.69

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)
04/01/2022 13:38	0.17	0.26	0.08	0.19	0.09
04/01/2022 13:39	0.11	0.06	0.05	0.20	0.09
05/01/2022 13:06	0.15	0.04	0.04	0.12	0.08
06/01/2022 12:56	0.18	0.08	0.09	0.16	0.10
08/01/2022 13:02	0.13	0.04	0.48	0.47	0.59
10/01/2022 13:06	0.19	0.29	0.12	0.13	0.11
13/01/2022 12:58	0.09	0.02	0.04	0.37	0.09
14/01/2022 13:31	0.16	0.05	0.38	0.83	0.40
17/01/2022 12:10	0.12	0.03	0.18	0.29	0.16
17/01/2022 12:11	0.10	0.02	0.04	0.79	0.08
17/01/2022 13:32	0.11	0.04	0.04	0.13	0.08
18/01/2022 13:01	0.15	0.12	0.08	0.10	0.08
19/01/2022 9:19	0.14	0.03	0.07	0.14	0.08
21/01/2022 15:24	0.11	0.03	0.06	0.21	0.08
25/01/2022 8:20	0.09	0.02	0.05	0.07	0.08
25/01/2022 9:35	0.11	0.03	0.05	0.23	0.08
27/01/2022 13:10	0.10	0.03	0.04	0.95	0.08
27/01/2022 15:08	0.10	0.02	0.05	0.23	0.09
28/01/2022 13:01	0.11	0.02	0.03	0.11	0.07
29/01/2022 13:05	0.17	0.06	0.09	0.29	0.13
29/01/2022 13:06	0.10	0.03	0.04	0.26	0.09
31/01/2022 13:27	0.11	0.04	0.17	0.67	0.24
31/01/2022 13:28	0.10	0.02	0.04	0.64	0.09
31/01/2022 13:30	0.17	0.05	0.38	0.63	0.32

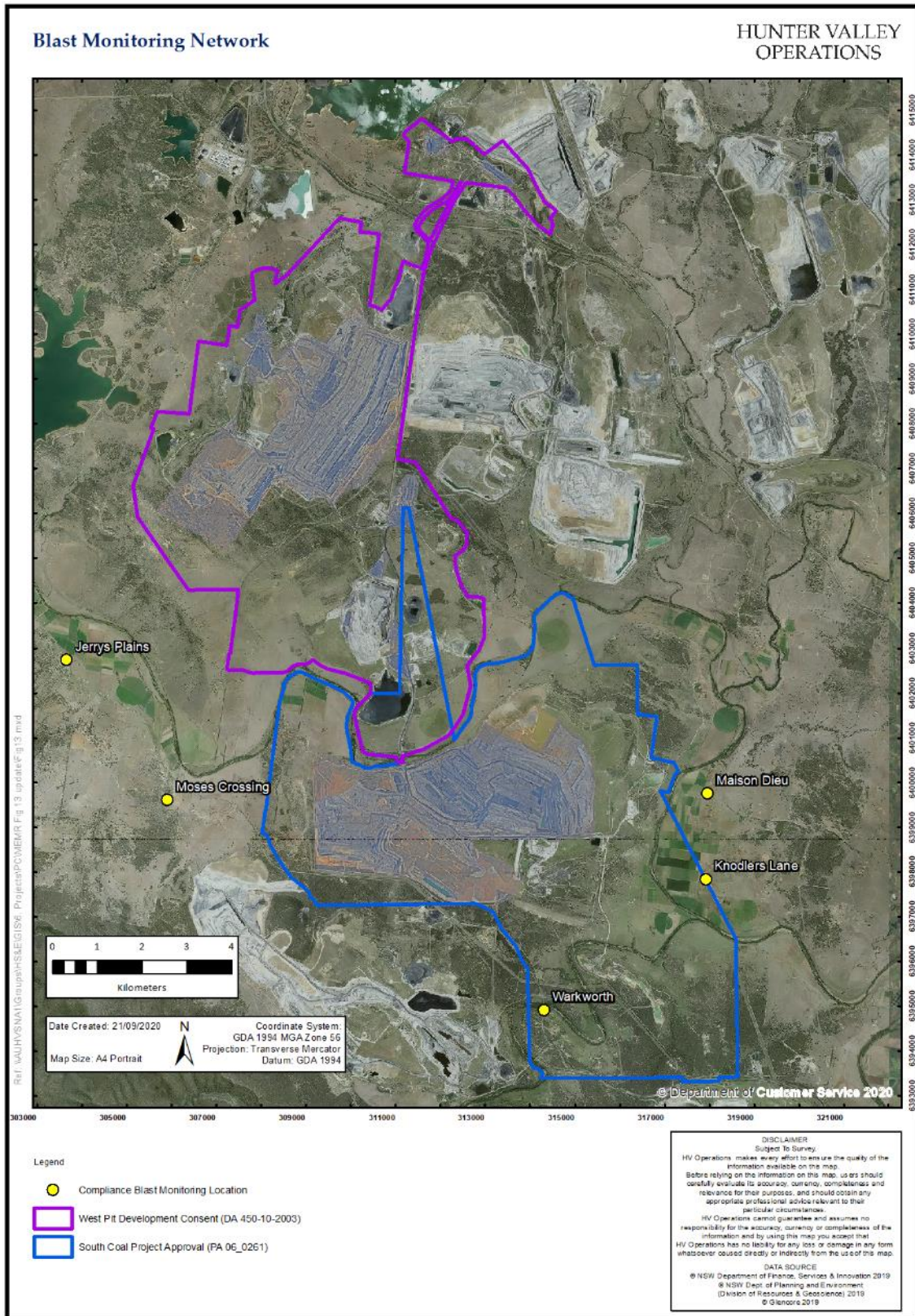


Figure 15 - Blast Monitoring Location Plan

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 during the night period of 17 January 2022

Monitoring results are detailed in **Table 5** to **Table 9**.

Table 5 - LAeq,15minute HVO North Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO North LAeq ^{3,4,5,6}	Exceedance ^{4,5}
Shearers Lane	17/01/2022 21:00	2.8	D	35	Yes	IA	Nil
Knodlers Lane	17/01/2022 22:26	0.1	E	35	Yes	IA	Nil
Maison Dieu	17/01/2022 21:27	1.6	E	35	Yes	IA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	0.1	E	35	Yes	IA	Nil
Kilburnie South	17/01/2022 23:30	0.1	D	39	Yes	IA	Nil
Jerrys Plains East	17/01/2022 23:06	0.9	E	39	Yes	IA	Nil
Jerrys Plains Village	17/01/2022 21:44	0.6	F	40	Yes	<30	Nil
Jerrys Plains West	17/01/2022 21:01	2.8	D	40	Yes	IA	Nil
HVGC	17/01/2022 23:58	0.1	E	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Corporate AWS using logged meteorological data;
2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, or temperature inversion conditions greater than 3°C/100m (G stability class);
3. Site-only LAeq 15 minute attributed to HVO North Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of criterion;
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.

Table 6 - LAeq,15minute HVO North Against Land Acquisition Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO North LAeq ^{3,4,6}	Exceedance ^{4,5}
Shearers Lane	17/01/2022 21:00	2.8	D	41	Yes	IA	Nil
Knodlers Lane	17/01/2022 22:26	0.1	E	41	Yes	IA	Nil
Maison Dieu	17/01/2022 21:27	1.6	E	41	Yes	IA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	0.1	E	41	Yes	IA	Nil
Kilburnie South	17/01/2022 23:30	0.1	D	41	Yes	IA	Nil
Jerrys Plains East	17/01/2022 23:06	0.9	E	41	Yes	IA	Nil
Jerrys Plains Village	17/01/2022 21:44	0.6	F	41	Yes	<30	Nil
Jerrys Plains West	17/01/2022 21:01	2.8	D	41	Yes	IA	Nil
HVGC	17/01/2022 23:58	0.1	E	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Corporate AWS using logged meteorological data;
2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, or temperature inversion conditions greater than 3°C/100m (G stability class);
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 - LA1,1minute HVO North Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO North L _{Aeq} ^{3,4,6}	Exceedance ^{4,5}
Shearers Lane	17/01/2022 21:00	2.8	D	46	Yes	IA	Nil
Knodlers Lane	17/01/2022 22:26	0.1	E	46	Yes	IA	Nil
Maison Dieu	17/01/2022 21:27	1.6	E	46	Yes	IA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	0.1	E	46	Yes	IA	Nil
Kilburnie South	17/01/2022 23:30	0.1	D	46	Yes	IA	Nil
Jerrys Plains East	17/01/2022 23:06	0.9	E	46	Yes	IA	Nil
Jerrys Plains Village	17/01/2022 21:44	0.6	F	46	Yes	35	Nil
Jerrys Plains West	17/01/2022 21:01	2.8	D	46	Yes	IA	Nil
HVGC	17/01/2022 23:58	0.1	E	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Corporate AWS using logged meteorological data;
2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, or temperature inversion conditions greater than 3°C/100m (G stability class);
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.

Table 8 - LAeq,15minute HVO South Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO South LAeq ^{3,4,6}	Exceedance ^{4,5}
Shearers Lane	17/01/2022 21:00	3	E	41	No	IA	NA
Knodlers Lane	17/01/2022 22:26	0.5	D	40	Yes	<25	Nil
Maison Dieu	17/01/2022 21:27	2.3	E	39	Yes	IA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	1.1	F	37	Yes	IA	Nil
Kilburnie South	17/01/2022 23:30	1.3	E	39	Yes	<30	Nil
Jerrys Plains East	17/01/2022 23:06	0.5	E	38	Yes	26	Nil
Jerrys Plains Village	17/01/2022 21:44	1.9	E	35	Yes	IA	Nil
Jerrys Plains West	17/01/2022 21:01	3	E	35	No	IA	NA
HVGC	17/01/2022 23:58	1.1	F	55	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt AWS using logged meteorological data;
2. Noise criteria apply under meteorological conditions of wind speeds up to 3 m/s measured at 10 metres above ground level and temperature inversion conditions of up to 3°C/100m (G stability class);
3. Site-only LAeq,15minute attributed to HVO South 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 9 - LA1,1minute HVO South Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO South L _{Aeq} ^{3,4,6,7}	Exceedance ^{4,5}
Shearers Lane	17/01/2022 21:00	3	E	45	No	IA	NA
Knodlers Lane	17/01/2022 22:26	0.5	D	45	Yes	37	Nil
Maison Dieu	17/01/2022 21:27	2.3	E	45	Yes	IA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	1.1	F	45	Yes	IA	Nil
Kilburnie South	17/01/2022 23:30	1.3	E	45	Yes	<30	Nil
Jerrys Plains East	17/01/2022 23:06	0.5	E	45	Yes	30	Nil
Jerrys Plains Village	17/01/2022 21:44	1.9	E	45	Yes	IA	Nil
Jerrys Plains West	17/01/2022 21:01	3	E	45	No	IA	NA
HVGC	17/01/2022 23:58	1.1	F	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt AWS using logged meteorological data;
2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, stability category F conditions and wind speeds greater than 2 m/s measured at 10m above ground level, or stability category G conditions;
3. Site-only LA1,1minute attributed to HVO;
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 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}	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality ¹	Low-frequency Modifying Factor?	Maximum Exceedance of NPfI Reference Spectrum ^{1,2}	Total Penalty ²
Shearers Lane	17/01/2022 21:00	IA	Yes	No	No	NA	NA	NA	Nil
Knodlers Lane	17/01/2022 22:26	IA	Yes	No	No	NA	NA	NA	Nil
Maison Dieu	17/01/2022 21:27	IA	Yes	No	No	NA	NA	NA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	IA	Yes	No	No	NA	NA	NA	Nil
Kilburnie South	17/01/2022 23:30	IA	Yes	No	No	NA	NA	NA	Nil
Jerrys Plains East	17/01/2022 23:06	IA	Yes	No	No	NA	NA	NA	Nil
Jerrys Plains Village	17/01/2022 21:44	<30	Yes	No	No	NA	NA	NA	Nil
Jerrys Plains West	17/01/2022 21:01	IA	Yes	No	No	NA	NA	NA	Nil
HVGC	17/01/2022 23:58	IA	Yes	No	No	NA	NA	NA	Nil

1. NA denotes ‘not applicable’; and

2. Bold results indicate that application of NPfI modifying factor/s is required

Table 11 - Modifying Factor Assessment HVO South for the Reporting Period

Location	Date and Time	Measured HVO South L_{Aeq}	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality ¹	Low-frequency Modifying Factor?	Maximum Exceedance of NPfl Reference Spectrum ^{1,2}	Total Penalty ²
Shearers Lane	17/01/2022 21:00	IA	No	No	No	NA	NA	NA	Nil
Knodlers Lane	17/01/2022 22:26	<25	Yes	No	No	NA	NA	NA	Nil
Maison Dieu	17/01/2022 21:27	IA	Yes	No	No	NA	NA	NA	Nil
Long Point (Dights Crossing)	17/01/2022 23:59	IA	Yes	No	No	NA	NA	NA	Nil
Kilburnie South	17/01/2022 23:30	<30	Yes	No	No	NA	NA	NA	Nil
Jerrys Plains East	17/01/2022 23:06	26	Yes	No	No	NA	NA	NA	Nil
Jerrys Plains Village	17/01/2022 21:44	IA	Yes	No	No	NA	NA	NA	Nil
Jerrys Plains West	17/01/2022 21:01	IA	No	No	No	NA	NA	NA	Nil
HVGC	17/01/2022 23:58	IA	Yes	No	No	NA	NA	NA	Nil

1. NA denotes 'not applicable'; and

2. Bold results indicate that application of NPfl modifying factor/s is required

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.

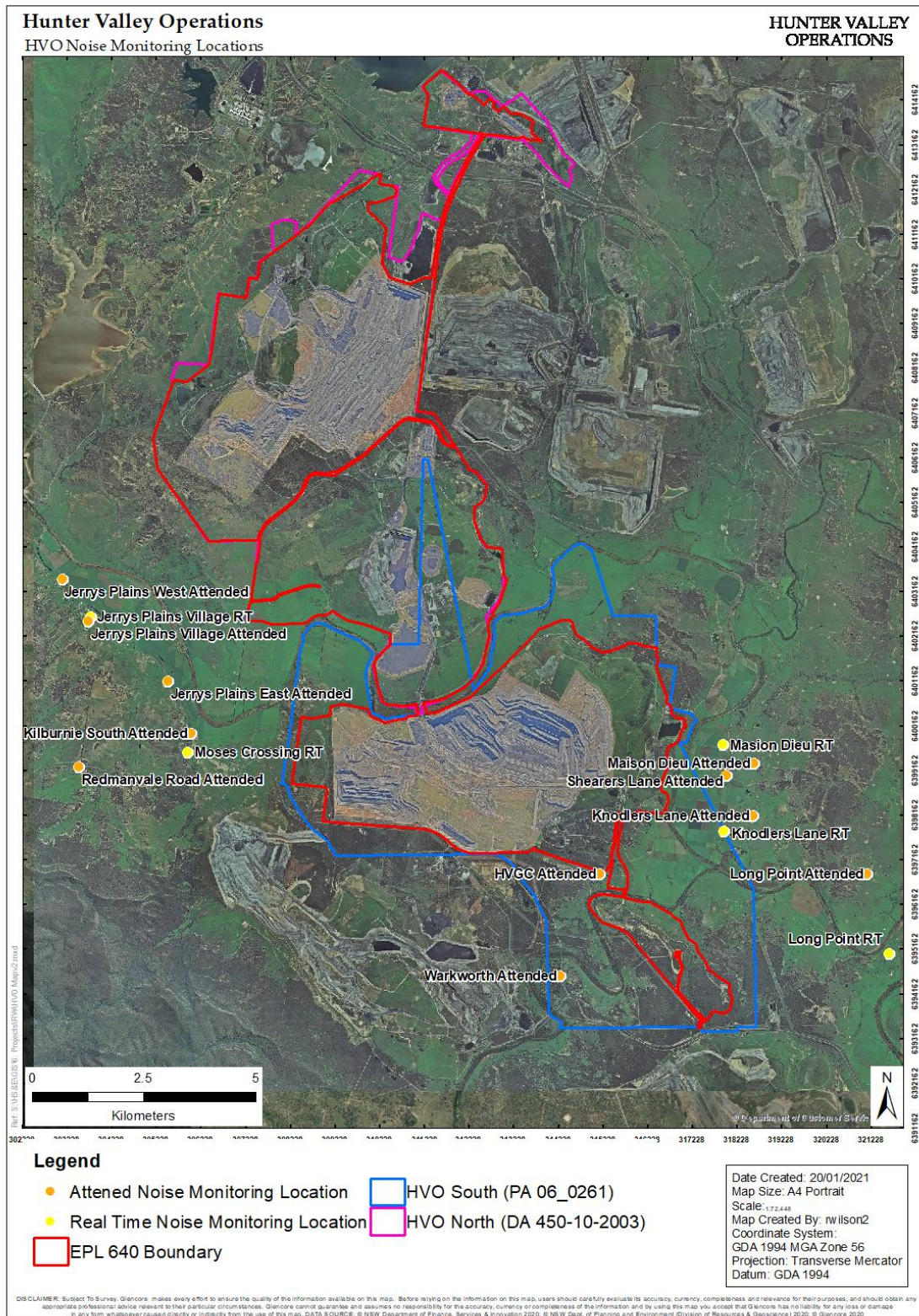


Figure 16 - Noise Monitoring Location Plan

6 Operational Downtime

A total of 90.1 hours of equipment downtime was 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).

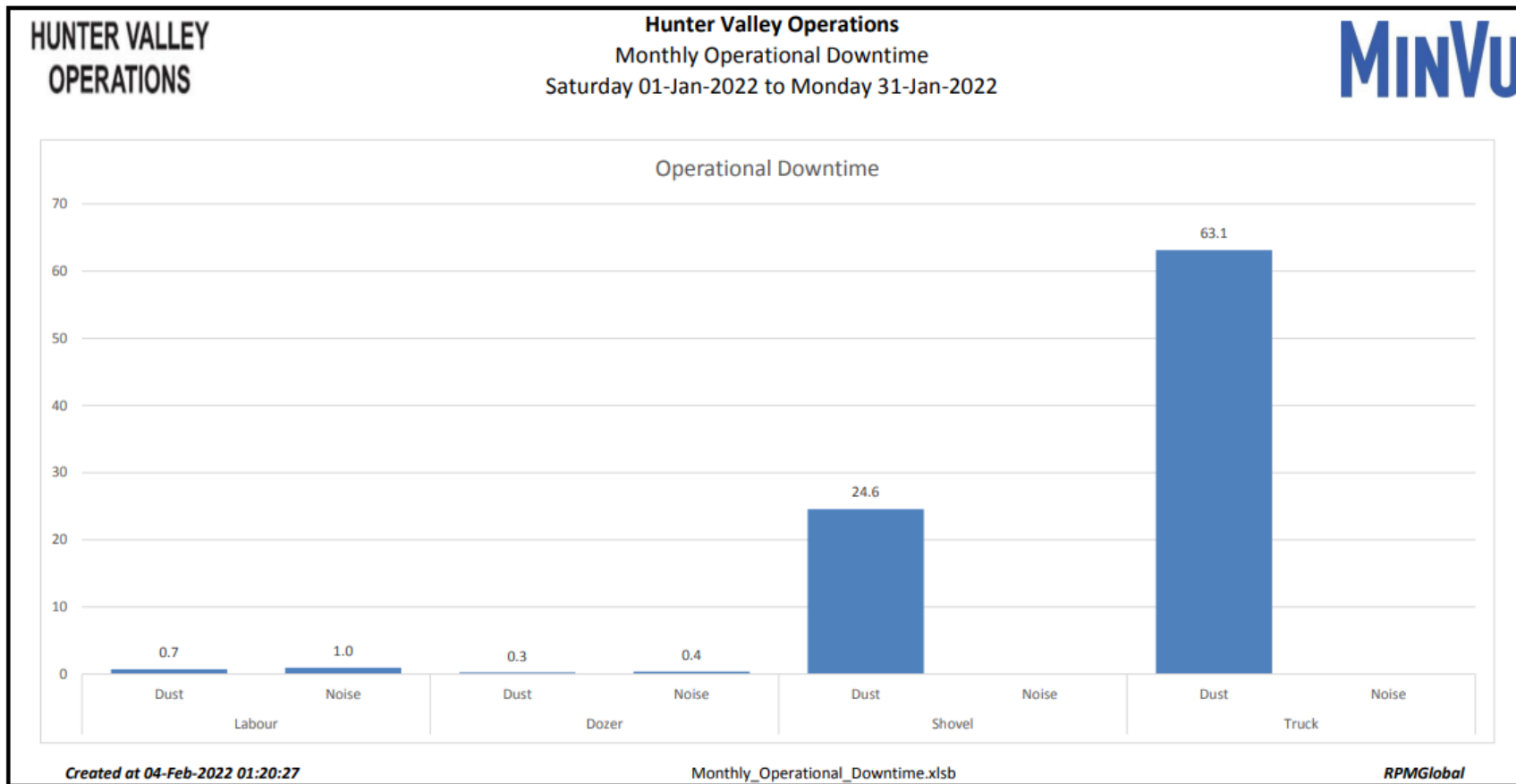


Figure 17 - Operational Downtime by Equipment Type for the reporting period

7 Rehabilitation

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

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

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

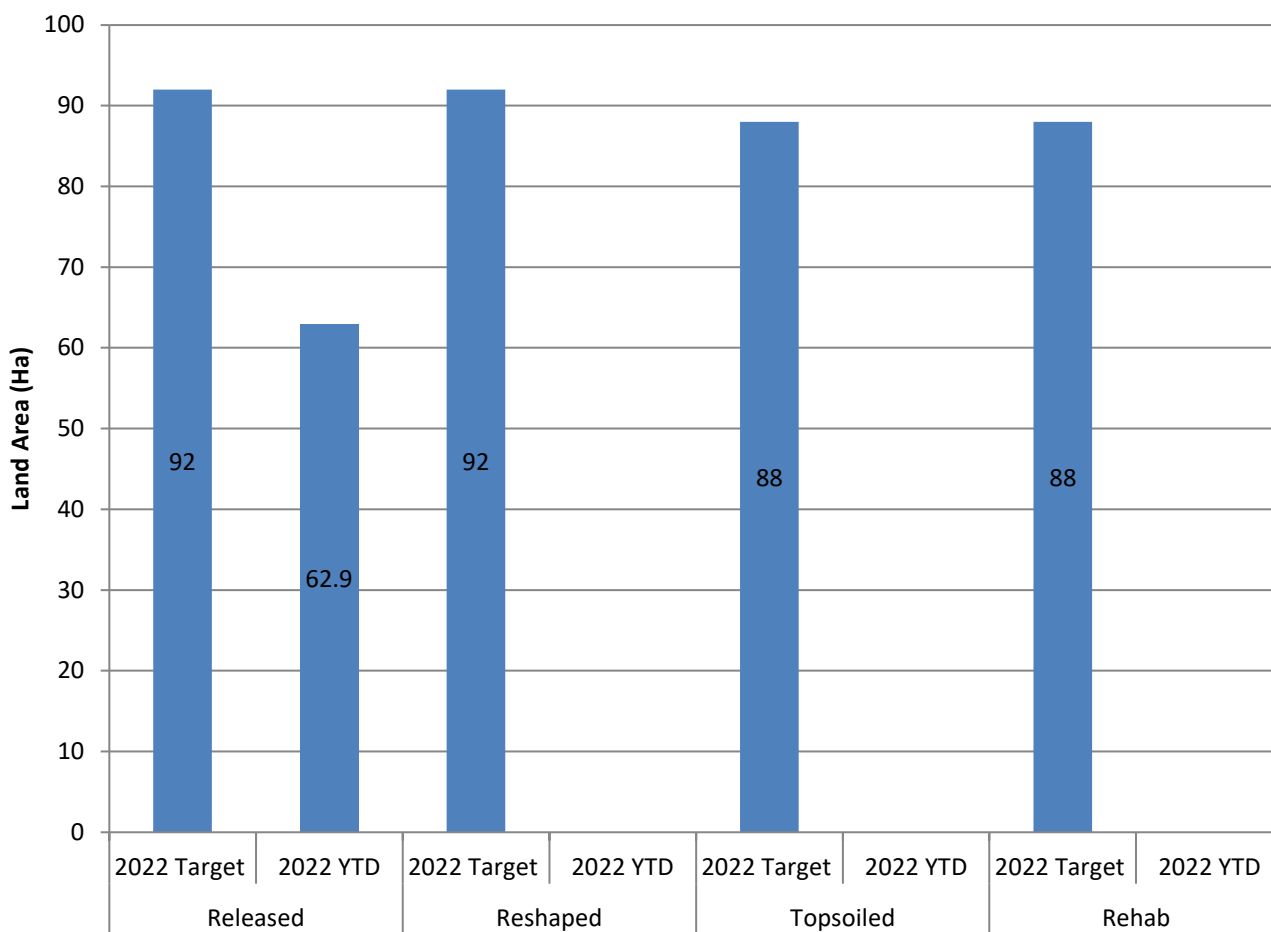


Figure 18 - Rehabilitation YTD January 2022

8 Complaints

One complaint was received during the reporting period relating to blasting. Details of complaints received are shown in **Table 12**.

Table 12 - Complaints Summary 2022

Month	Noise	Dust	Blast	Lighting	Other	Total
January			1			1
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Total						1

9 Environmental Incidents

There were five reportable environmental incidents during the reporting period, three of which relate to exceedances for the 2021 reporting period:

- **1/1/2022 - Exceedance of annual criteria - depositional dust, Warkworth**

The 2022 annual average depositional dust at the Warkworth dust gauge was 6.95 g/m²/month which exceeded the consent criteria of 4 g/m²/month.

The exceedance was reported to Department of Planning & Environment (DPE) and will be investigated as part of the 2022 Annual Review including an assessment of HVO contribution.

- **1/1/2022 - Exceedance of annual criteria - TSP, Warkworth**

The 2022 annual average level at the Warkworth TSP monitor was 94.59 µg/m³ which exceeded the consent criteria of 90µg/m³.

The exceedance was reported to DPE and will be investigated as part of the 2022 Annual Review including an assessment of HVO contribution.

- **1/1/2022 - Exceedance of annual criteria – PM2.5, Maison Dieu**

The 2022 annual average PM2.5 level at the Maison Dieu HVAS was 9.57 µg/m³ which exceeded the consent criteria of 8 µg/m³.

The exceedance was reported to the DPE and will be investigated as part of the 2022 Annual Review including an assessment of HVO contribution.

- **09/1/2022 – Warkworth TEOM Miscapture – 9 and 10 January**

Whilst completing the daily checks on 10th January, it was noted that the Warkworth TEOM data capture rate for the 9th January was 42.4% which is less than the minimum 75% data requirement. The daily checks on the 11th January also showed that the TEOM had only recorded 70.8% data capture rate and confirmed that there had been a data logger lockup from 10.10am on the 9th January. A notification was provided to DPE for the data loss.

- **27/1/2022 – Warkworth TEOM Miscapture – 27 and 28 January**

During the daily checks on 28 January, it was identified that the Warkworth TEOM had recorded 63% data for 27 January and subsequent checks on 31 January, showed that only 67% data was recorded for 28 January. The minimum data requirement for PM10 monitors is 75%. DPE (monitoring services) maintain the monitor. The data miscapture is believed to be due to a data logger lockup and was recorded in the TEOM database. HVO are currently in discussion with DPE.

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)
01/01/2022	28.7	9.3	98.3	43.9	1674	109.8	1.9	0
02/01/2022	31.7	9.3	100	27.8	1212	119.1	2.1	0
03/01/2022	29.2	9.7	100	36.5	1364	114.5	3.9	0
04/01/2022	28.2	11.6	100	46.0	1644	117.4	3.8	0.4
05/01/2022	25.7	11.3	109.1	75.6	1675	126.9	3.2	11.4
06/01/2022	29.8	12.9	100	57.5	1683	117.9	4.4	0
07/1/2022	31.6	13.7	100	48.3	1667	126.4	3.3	0
08/1/2022	32.0	10.7	111	44.0	1698	201	2.6	27.8
09/1/2022	28.3	12.7	100	59.3	1641	118.6	3.2	0
10/1/2022	27.1	14.5	100	70.2	1163	136.7	1.9	0
11/01/2022	29.3	13.4	100	61.8	1444	146.5	1.8	2.4
12/01/2022	27.0	12.3	109.2	57.9	1533	123.4	2.5	0.4
13/01/2022	29.4	10.4	108.2	42.7	1430	109.2	3.1	0
14/01/2022	28.2	12.0	100	53.6	1068	118.7	1.1	0
15/01/2022	32.6	10.8	100	41.5	1430	201.8	1.3	0
16/01/2022	30.8	11.7	100	52.1	1215	172.5	2.7	0
17/01/2022	33.5	13.5	100	31.1	1451	141.3	1.1	0.8
18/01/2022	25.9	12.7	108.7	72.4	498.2	139	1.3	1.6
19/01/2022	21.0	10.3	109.1	73.8	342	126.1	3.5	15.2
20/01/2022	24.5	9.4	100	43.4	1745	123.6	5.2	0.2
21/01/2022	25.7	8.0	100	37.4	1766	114.5	4.3	0.2
22/01/2022	26.0	9.3	100	39.7	1519	116.2	2.4	0
23/01/2022	26.6	7.8	100	47.7	1496	114.4	2.3	0
24/01/2022	27.4	9.4	109.6	50.1	1694	115.1	2.5	0.4
25/01/2022	27.2	8.3	100	54.2	1223	138.8	1.6	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)
26/01/2022	25.9	10.2	91.6	53.1	1183	110.8	3.2	0
27/01/2022	29.7	8.7	95	40.0	1606	115.5	2.6	0
28/01/2022	31.6	11.3	97.5	42.6	1143	121.7	2.0	0
29/01/2022	32.5	10.9	100	39.1	1098	113.2	1.8	0
30/01/2022	30.7	12.8	99.4	42.6	1590	118.1	3.2	0
31/01/2022	33.4	11.5	100	39.2	1475	142.1	1.5	0