

Hunter Valley Operations

Monthly Environmental Report April 2017

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Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Graduate	Draft	25/05/2017
1.0	Environmental Specialist	Final	1/06/2017

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Hunter Valley Operations (HVO). This report includes all monitoring data collected for the period 1st April to 30th April 2017.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

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

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the 2017 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
April	40.4	293.8

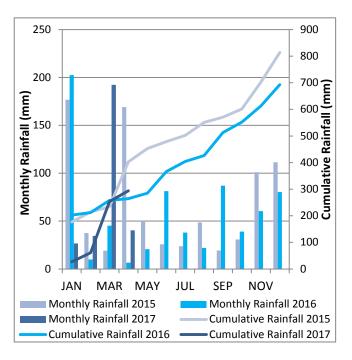


Figure 1: Year to Date Rainfall Summary 2017

2.1.2 Wind Speed and Direction

South-Easterly and North-Westerly winds were dominant during April as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

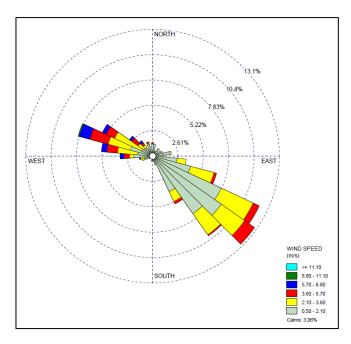


Figure 2: HVO Corporate Wind Rose - April 2017

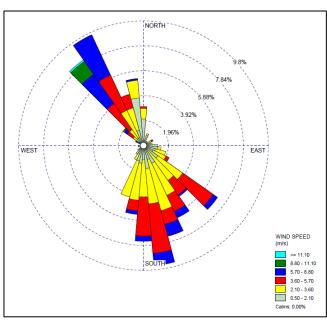


Figure 3: HVO Cheshunt Wind Rose – April 2017

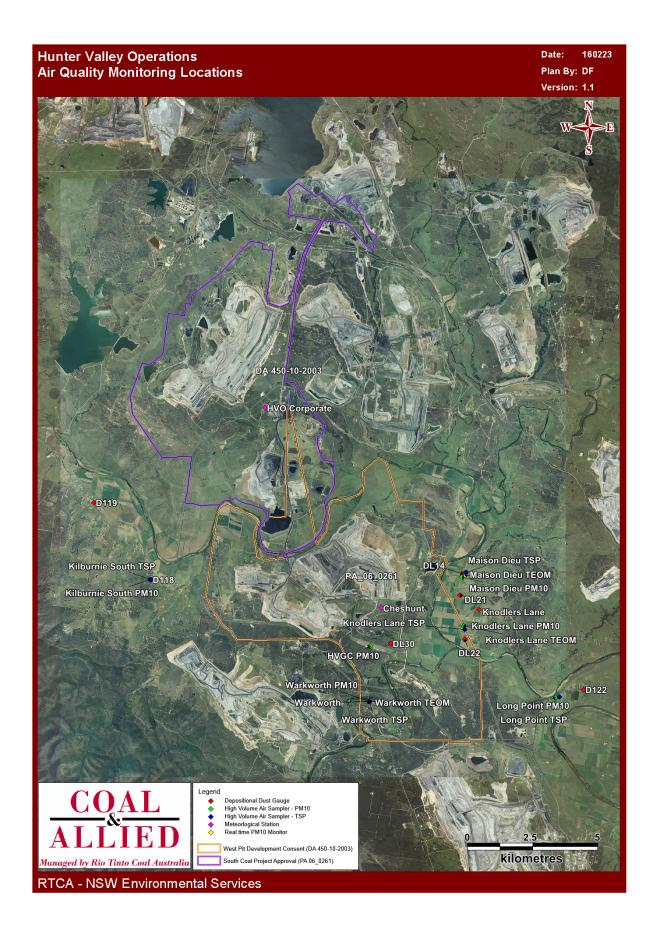


Figure 4: Air Quality Monitoring Location Plan

2.2 Depositional Dust

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

Figure 5 displays insoluble solids results from depositional dust gauges during the reporting period compared against the year-to-date average and the annual impact assessment criteria.

During the reporting period the DL21 and DL22 monitors recorded monthly results above the long term impact assessment criteria of $4.0~g/m^2$ per month. The field notes associated with the DL22 results confirm the presence of insects and bird droppings. As such the results are considered contaminated and will be excluded from calculation of the annual average. There is no evidence to suggest that the DL21 result is contaminated. Accordingly, this result will be included in the annual average calculation.

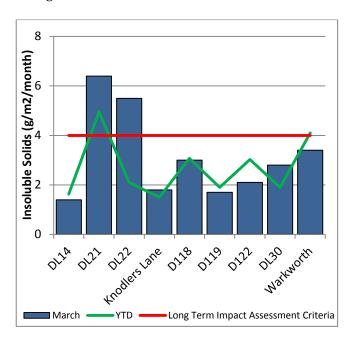


Figure 5: Depositional Dust Results - April 2017

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 <10 μ m (PM₁₀). The location of these monitors can be found in Figure 4. Each HVAS was run for 24 hours on a six-day cycle in accordance with EPA requirements.

2.3.1 HVAS PM₁₀ Results

Figure 6 shows individual PM_{10} results at each monitoring station against the short term impact assessment criteria of $50\mu g/m^3$.

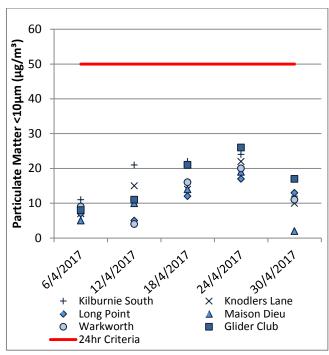


Figure 6: Individual PM₁₀ Results - April 2017

Figure 7 shows the annual average PM_{10} results.

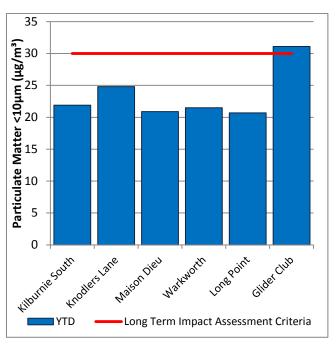


Figure 7: Year To Date Average PM₁₀ - April 2017

2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of $90\mu g/m^3$.

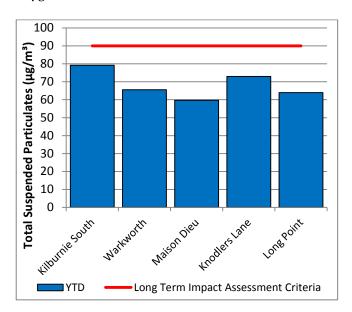


Figure 8: Year To Date Average Total Suspended Particulates - April 2017

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 ensure compliance with the relevant conditions of the project approval.

Results for real time dust sampling are shown in Figure 9, including the daily 24 hour average PM_{10} result and the 24 hour YTD PM_{10} average. There were no results recorded which exceeded the short term (24hr) criteria in the approvals.

2.3.4 Real Time Alarms for Air Quality

During April, the real time monitoring system generated 21 automated air quality related alarms. 9 alarms were related to adverse weather conditions and 12 alarms related to PM_{10} .

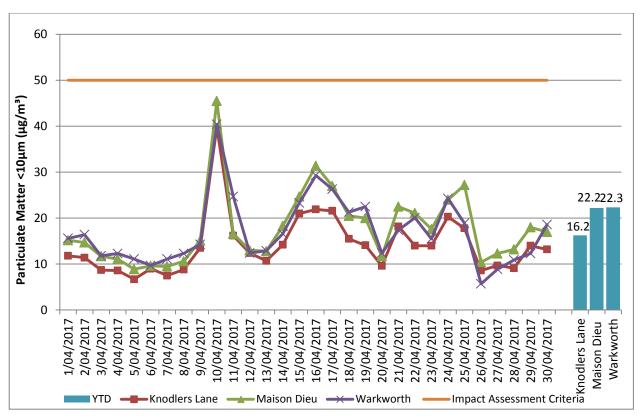


Figure 9: Real Time PM₁₀ 24hr average and YTD Average - April 2017

3.0 WATER QUALITY

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

3.1.1 Surface Water

Surface water courses are sampled on a quarterly sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS).

Results of monitoring on Site Dams and the Hunter River as well as other natural tributaries are provided on a quarterly basis, results will appear in the June 2017 report.

3.1.2 Site Water Use

Under water allocation licences issued by the NSW Office Of Water, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO did not extract any water from the Hunter River.

3.1.3 HRSTS Discharge

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing discharge from licensed discharge points Dam 11N (to Farrell's Creek), Lake James (to the Hunter River) and Parnell's Dam (to Parnell's Creek). Discharges can only take place subject to HRSTS regulations.

During the reporting period no water was discharged under the HRSTS.

3.2.1 Groundwater Monitoring Results

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Results of groundwater monitoring are reported quarterly and as such will be reported in the June 2017 monthly report.

4.0 BLAST MONITORING

HVO have a network of five blast monitoring units. These are located at nearby privately owned residences and function as regulatory compliance monitors. The location of these monitors can be found in Figure 15.

During April, 22 blasts were initiated at HVO. Figure 10 through to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

Table 2: Blasting Limits

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

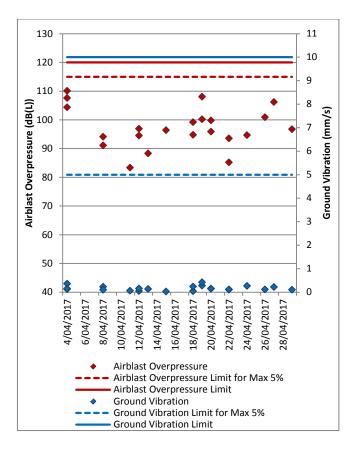


Figure 10: Moses Crossing Blast Monitoring Results – April 2017

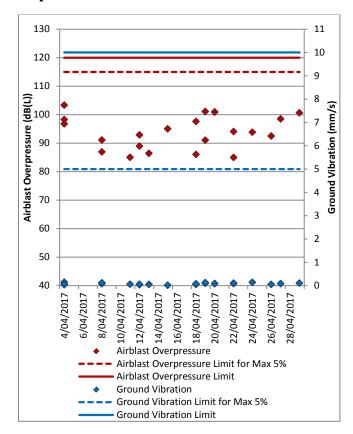


Figure 11: Jerrys Plains Blast Monitoring Results – April 2017

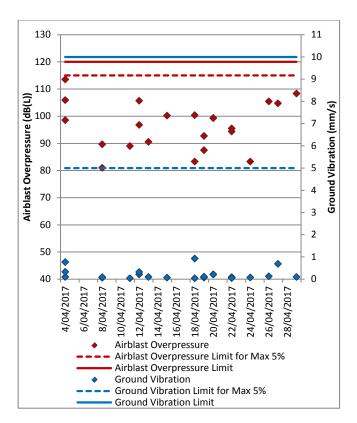


Figure 12: Maison Dieu Blast Monitoring Results – April 2017

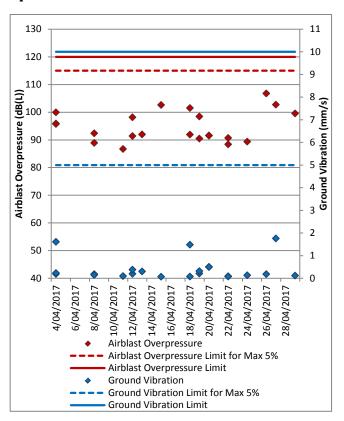


Figure 13: Warkworth Blast Monitoring Results - April 2017

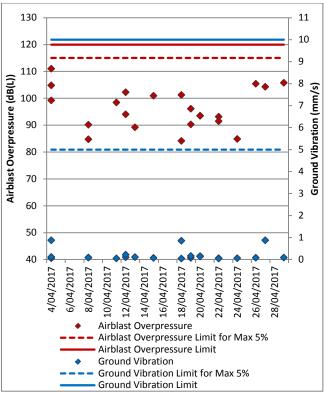


Figure 14: Knodlers Lane Blast Monitoring Results – April 2017



Figure 15: Blast Monitoring Location Plan

5.0 NOISE

Routine attended noise monitoring is carried out at defined locations around HVO as described in the HVO Noise Monitoring Programme. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Unattended monitoring (real time noise monitoring) also occurs at five sites surrounding HVO. The attended noise monitoring locations are displayed in Figure 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the nights of 12^{th} and 18^{th} of April 2017. Monitoring results are detailed in Table 3 to Table 8.

Table 3: LAeq, 15 minute HVO South - Impact Assessment Criteria - April 2017

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB	Criterion Applies? ^{1,6}	HVO South L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	18/04/2017 21:00	1.1	0.5	37	Yes	IA	Nil
Maison Dieu	18/04/2017 21:20	1.1	0.5	37	Yes	IA	Nil
Shearers Lane	18/04/2017 21:42	1.5	0.5	41	Yes	IA	Nil
Kilburnie South	18/04/2017 23:00	0.6	0.5	36	Yes	NM	Nil
Jerrys Plains Village	18/04/2017 21:58	1.3	0.5	35	Yes	NM	Nil
Jerrys Plains East	18/04/2017 21:34	1.3	0.5	35	Yes	31	Nil
Long Point Road	12/04/2017 21:00	2.4	-1	35	Yes	IA	Nil
HVGC	18/04/2017 21:03	1.1	0.5	55	Yes	IA	Nil

Table 4: LAeq, 15 minute HVO South - Land Acquisition Criteria - April 2017

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB	Criterion Applies? ^{1,6}	HVO South L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	18/04/2017 21:00	1.1	0.5	41	Yes	IA	Nil
Maison Dieu	18/04/2017 21:20	1.1	0.5	41	Yes	IA	Nil
Shearers Lane	18/04/2017 21:42	1.5	0.5	41	Yes	IA	Nil
Kilburnie South	18/04/2017 23:00	0.6	0.5	41	Yes	NM	Nil
Jerrys Plains Village	18/04/2017 21:58	1.3	0.5	40	Yes	NM	Nil
Jerrys Plains East	18/04/2017 21:34	1.3	0.5	40	Yes	31	Nil
Long Point Road	12/04/2017 21:00	2.4	-1	40	Yes	IA	Nil
HVGC	18/04/2017 21:03	1.1	0.5	NA	No	IA	NA

Table 5: LA1, 1minute HVO South - Impact Assessment Criteria - April 2017

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB	Criterion Applies? ^{1,6}	HVO South L _{A1, 1min} dB ^{2,4}	Exceedance ³
Knodlers Lane	18/04/2017 21:00	1.1	0.5	45	Yes	IA	Nil
Maison Dieu	18/04/2017 21:20	1.1	0.5	45	Yes	IA	Nil
Shearers Lane	18/04/2017 21:42	1.5	0.5	45	Yes	IA	Nil
Kilburnie South	18/04/2017 23:00	0.6	0.5	45	Yes	NM	Nil
Jerrys Plains Village	18/04/2017 21:58	1.3	0.5	45	Yes	NM	Nil
Jerrys Plains East	18/04/2017 21:34	1.3	0.5	45	Yes	35	Nil
Long Point Road	12/04/2017 21:00	2.4	-1	45	Yes	IA	Nil
HVGC	18/04/2017 21:03	1.1	0.5	NA	No	IA	NA

Notes

Table 6: LAeq, 15minute HVO North - Impact Assessment Criteria - April 2017

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB	Criterion Applies? ^{1,6}	HVO North L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	18/04/2017 21:00	1.1	0.5	35	Yes	IA	Nil
Maison Dieu	18/04/2017 21:20	1.1	0.5	35	Yes	IA	Nil
Shearers Lane	18/04/2017 21:42	1.5	0.5	35	Yes	IA	Nil
Kilburnie South	18/04/2017 23:00	0.6	0.5	39	Yes	IA	Nil
Jerrys Plains Village	18/04/2017 21:58	1.3	0.5	36	Yes	35	Nil
Jerrys Plains East	18/04/2017 21:34	1.3	0.5	39	Yes	31	Nil
Long Point Road	12/04/2017 21:00	2.4	-1	35	Yes	IA	Nil
HVGC	18/04/2017 21:03	1.1	0.5	NA	No	IA	NA

Table 7: LAeq,15minute HVO North - Land Acquisition Criteria - April 2017

Location	Location Date and Time		VTG ⁵	Criterion dB	Criterion Applies? ^{1,6}	HVO North L _{Aeq} dB ^{2,4}	Exceedance ³
Knodlers Lane	18/04/2017 21:00	1.1	0.5	41	Yes	IA	Nil
Maison Dieu	18/04/2017 21:20	1.1	0.5	41	Yes	IA	Nil
Shearers Lane	18/04/2017 21:42	1.5	0.5	41	Yes	IA	Nil
Kilburnie South	18/04/2017 23:00	0.6	0.5	41	Yes	IA	Nil
Jerrys Plains Village	18/04/2017 21:58	1.3	0.5	41	Yes	35	Nil
Jerrys Plains East	18/04/2017 21:34	1.3	0.5	41	Yes	31	Nil
Long Point Road	12/04/2017 21:00	2.4	-1	41	Yes	IA	Nil
HVGC	18/04/2017 21:03	1.1	0.5	NA	No	IA	NA

^{1.} Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);

neight of 10m);
2. Estimated or measured L_{Aeq,15minute} dB attributed to HVO South Pit Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values

Table 8: L_{A1, 1Minute} HVO North - Impact Assessment Criteria – April 2017

Location	Date and Time	Wind Speed (m/s) ⁵	VTG ⁵	Criterion dB	Criterion Applies? ^{1,6}	HVO North L _{A1, 1min} dB ^{2,4}	Exceedance ³
Knodlers Lane	18/04/2017 21:00	1.1	0.5	46	Yes	IA	Nil
Maison Dieu	18/04/2017 21:20	1.1	0.5	46	Yes	IA	Nil
Shearers Lane	18/04/2017 21:42	1.5	0.5	46	Yes	IA	Nil
Kilburnie South	18/04/2017 23:00	0.6	0.5	46	Yes	IA	Nil
Jerrys Plains Village	18/04/2017 21:58	1.3	0.5	46	Yes	43	Nil
Jerrys Plains East	18/04/2017 21:34	1.3	0.5	46	Yes	33	Nil
Long Point Road	12/04/2017 21:00	2.4	-1	46	Yes	IA	Nil
HVGC	18/04/2017 21:03	1.1	0.5	NA	No	IA	NA

Notes

1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);

2. Estimated or measured L_{Aeq.15mirute} dB attributed to HVO North Area;

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

4. Bolded results in red indicate exceedance of criteria;

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

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

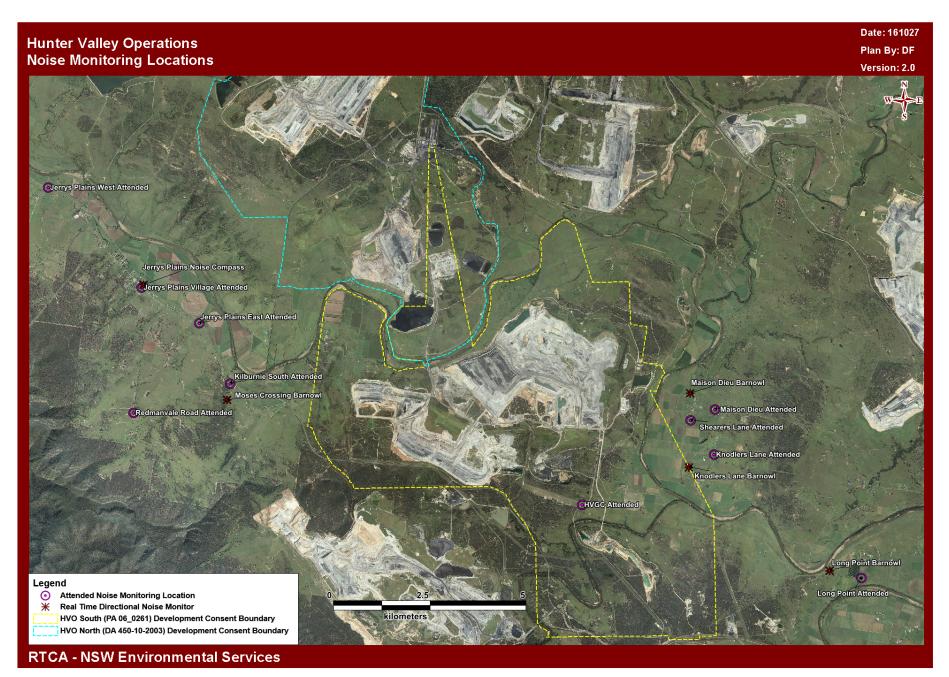


Figure 16: Noise Monitoring Location Plan

5.2 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.

HVO's Planning approvals stipulate noise criteria which must be met during the life of the development(s). The approvals however do not stipulate requirements or give guidance on noise affectation, or the frequency of any elevated noise event which would constitute noise affectation. Page 6 of the NSW Industrial Noise Policy (INP) comments that criteria "seek to restrict the risk of people being highly annoyed to less than 10 percent, and to meet this for at least 90 percent of the time".

For the purposes of assessing the effectiveness of the noise management system, HVO applies a similar approach with regard to the frequency of any elevated noise event. It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in Section 6.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

6.0 OPERATIONAL DOWNTIME

During April, a total of 59.0 hours of equipment downtime was logged in response to real time monitoring and visual inspections for environmental reasons such as dust, noise and meteorological conditions. Operational downtime by equipment type is shown in Figure 17.

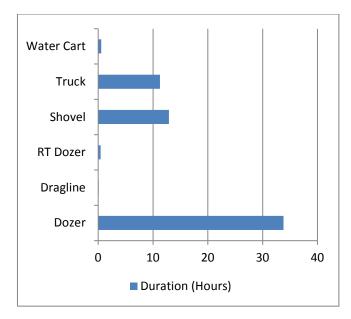


Figure 17: Operational Downtime by Equipment Type – April 2017

7.0 REHABILITATION

During April, 0.36 Ha of land was released and 5.25 Ha of land was bulk shaped. Year to date progress can be viewed in Figure 86.

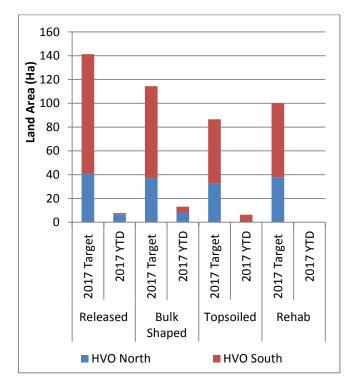


Figure 18: Rehabilitation YTD - April 2017

8.0 COMPLAINTS

One complaint was received during the reporting period. Details of complaints received YTD are shown in Figure 19 below.

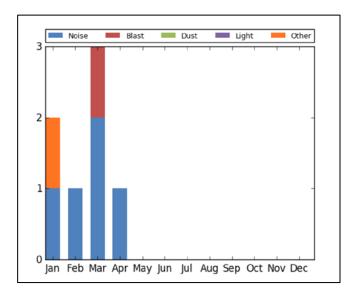


Figure 19: Complaints Graph – April 2017

9.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

Appendix A: Meteorological Data

Table 9: Meteorological Data - HVO Corporate Meteorological Station – April 2017

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/04/2017	24.9	12.4	100.0	38.1	1211	172.8	1.3	0.0
2/04/2017	21.3	13.1	100.0	51.5	1140	133.2	2.9	2.8
3/04/2017	21.4	10.6	100.0	38.4	1251	134.2	2.7	0.8
4/04/2017	22.2	10.6	98.5	43.0	1146	129.2	2.4	0.8
5/04/2017	21.2	9.3	100.0	56.2	1221	129.8	1.8	13.8
6/04/2017	21.0	10.4	100.0	61.2	1209	127.6	1.4	3.8
7/04/2017	22.3	10.3	100.0	52.2	1207	120.3	1.9	0.2
8/04/2017	24.1	8.9	100.0	37.2	799	158.2	1.2	0.0
9/04/2017	26.4	10.7	100.0	32.5	819	-	3.1	6.6
10/04/2017	17.1	6.7	75.0	42.7	1091	291.9	5.5	0.6
11/04/2017	24.0	10.5	76.8	40.3	1039	193.2	2.6	0.0
12/04/2017	22.9	12.5	92.4	47.7	1189	137.5	1.7	0.0
13/04/2017	23.4	11.1	100.0	39.3	1137	131.9	1.1	0.0
14/04/2017	24.4	11.1	100.0	37.2	897	174.5	1.0	0.0
15/04/2017	25.8	8.0	100.0	26.8	719	196.9	1.7	0.0
16/04/2017	26.0	11.5	100.0	27.6	711	209.9	1.8	0.0
17/04/2017	24.0	10.7	89.8	45.6	806	147.8	1.5	0.0
18/04/2017	24.4	10.2	100.0	43.2	732	132.8	1.3	0.0
19/04/2017	24.5	11.2	97.6	44.4	947	136.4	1.4	0.0
20/04/2017	24.6	10.1	100.0	33.4	817	121.9	1.8	0.0
21/04/2017	23.1	8.0	100.0	43.5	813	152.1	1.1	0.0
22/04/2017	20.3	12.1	100.0	70.0	761	208.4	0.9	0.0
23/04/2017	24.8	8.9	100.0	40.7	782	207.8	1.4	0.2
24/04/2017	24.4	9.7	100.0	43.4	666	147.1	1.0	0.0
25/04/2017	27.2	12.1	100.0	36.5	794	260.2	2.7	4.4
26/04/2017	22.1	6.3	100.0	32.8	910	282.1	4.5	6.2
27/04/2017	18.4	5.9	90.6	41.6	953	283.8	2.8	0.2
28/04/2017	20.2	7.6	86.3	33.9	669	168.3	1.2	0.0
29/04/2017	22.5	5.4	91.5	34.8	669	245.1	2.2	0.0
30/04/2017	21.9	7.3	100.0	47.3	817	159.9	1.3	0.0

[&]quot;-" Indicates that data was not available due to technical issues.