



Grounded in Quality

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Karuah Hard Rock Quarry

Environmental Monitoring Report:

March 2023

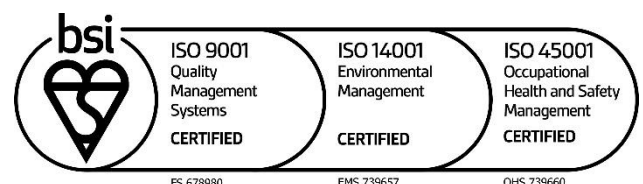


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Monitoring Locations

1 INTRODUCTION

This report has been completed to meet the requirements of Section 66(6) of the *Protection of the Environment Operations Act 1997* and the NSW Environmental Protection Authority's (EPA) *Requirements for Publishing Pollution Monitoring Data* (EPA, 2013). This report summarises the required monitoring data under *Environmental Protection Licence 11569* (the EPL) (see Table 1) and *Development Consent 265-10-2004* (the Consent) (see Table 2) for the Karuah Hard Rock Quarry (the Quarry).

Table 1 Environmental Protection Licence 11569 information

Environmental Protection Licence Number	11569
Licensee's Name	Hunter Quarries Pty Limited
Licensee's Address	Licensee Postal Address: PO Box 3284 Thornton NSW 2322. Premises Address: Karuah Quarry, Corner of Andesite Road and The Branch Lane, Karuah NSW 2324.
Link to Full Licence on the EPA Website	https://apps.epa.nsw.gov.au/prpoeoapp/

Table 2 Development Consent 265-10-2004 information

Development Application	DA 265-10-2004
Applicant	Hunter Quarries Pty Limited
Consent Authority	Minister for Infrastructure, Planning and Natural Resources
Land	Lot 21 DP 1024341, Lot 11 DP 1024564 & Lot 12 DP 1024564.

A summary of the environmental monitoring data for March 2023 is covered in this report.

Tables throughout this report provide key monitoring information from the EPL and the Consent, such as:

- location of monitoring;
- pollutant;
- unit of measurement; and
- monitoring frequency required.

Monitoring locations are identified in in **Appendix 1**.

2 AIR QUALITY MONITORING

Dust emissions generated by the Quarry operation must not cause additional exceedances of ambient air quality criterion outlined in *Schedule 3, Condition 14* of the Consent (see Table 3, Table 4 and Table 5). Deposited dust and TSP/PM₁₀ monitoring is undertaken at the locations listed in Table 6.

Table 3 DA 265-10-2004 Long Term Assessment Criteria for Deposited Dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level ¹	Maximum Total Deposited Dust Level ¹
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Note 1: Deposited dust is assessed as insoluble solids as defined by AS 3580.10.1-2003.

Table 4 DA 265-10-2004 Long Term Impact Assessment Criteria for Particulate Matter

Pollutant	Average period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter <10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 5 DA 265-10-2004 Short Term impact Assessment Criterion for Particulate Matter

Pollutant	Averaging period	Criterion
Particulate matter <10 µm (PM ₁₀)	24 hour	50 µg/m ³

Table 6 Air Quality Monitoring Locations

Site ID	Location	Address	GPS Coordinates
DDG 1 (South)	South of the Karuah Quarry	5760 Pacific Hwy, Karuah NSW 2324	32°38'04"S 151°59'58"E
DDG 2 (South-East)	South of the Karuah Quarry	5770 Pacific Hwy, Karuah NSW 2324	32°38'02"S 152°00'09"E
DDG 3 (South-West)	South-West of the Karuah Quarry	DP 1024341, Karuah	32°37'57"S 151°59'41"E
DDG 4 (East)	East of the Karuah Quarry	21 Halloran Rd North Arm Cove NSW 2324	32° 37' 30.87"S 152°01'10.18"E

All dust monitoring is undertaken in accordance with the *Approved Methods of Sampling and Analysis of Air Pollutants in NSW* (EPA, 2007).

2.1 DEPOSITED DUST MONITORING

Deposited dust results for March 2023 and the year to date (YTD) from the Consent anniversary (16 March) are shown in Table 7.

Table 7 Deposited dust monitoring results

Date On	Date Off	DDG 1	DDG 2	DDG 3	DDG 4
5/04/2022	5/05/2022	0.1	0.3	0.1	0.2
5/05/2022	3/06/2022	0.4	0.6	0.4	0.3
3/06/2022	5/07/2022	0.3	0.2	0.2	0.2
5/07/2022	3/08/2022	0.3	0.3	0.4	0.7
3/08/2022	2/09/2022	0.9	0.9	0.6	1.0
2/09/2022	4/10/2022	0.5	0.2	0.6	0.3
4/10/2022	3/11/2022	0.2	0.5	0.5	0.3
3/11/2022	5/12/2022	0.8	0.8	0.7	1.2
5/12/2022	5/01/2023	0.7	0.7	0.3	0.6
5/01/2023	3/02/2023	0.2	0.4	0.8	0.1
3/02/2023	6/03/2023	0.9	0.7	0.2	0.3
5/03/2023	5/04/2023	1.1	1.5	1.1	1.1
YTD average		0.5	0.6	0.5	0.5

Monitoring results indicate that for the period from 5 March 2023 to 5 April 2023, the insoluble solid levels recorded at DDG 1 to DDG 4 monitoring locations were below the project criterion of 4 g/m²/month.

2.2 HIGH VOLUME AIR SAMPLING

The TSP and PM₁₀ results for March 2023, the report average and a rolling annual average are shown in are shown in Table 8.

Table 8 High Volume Air Sampling (µg/m³) results

Run Date	HVAS TSP (µg/m ³)	HVAS PM ₁₀ (µg/m ³)
6/03/2023	40	23
12/03/2023	22	14
18/03/2023	32	22
24/03/2023	16	11
30/03/2023	16	11
24hr Average Criteria¹	N/A	50
Annual Average Criteria¹	90	30
Progressive Annual Average²	20.5	12.5

Note: ¹ Criteria as specified in DA 265-10-2004.

² The progressive annual average is from 01/01/2023 to 30/03/2023, this is not a measure of compliance.

All HVAS monitoring results, to the end of March 2023 were compliant with the long term and short term impact assessment criteria outlined in *Schedule 3 Condition 13* of the Consent (see Table 3, Table 4 and Table 5).

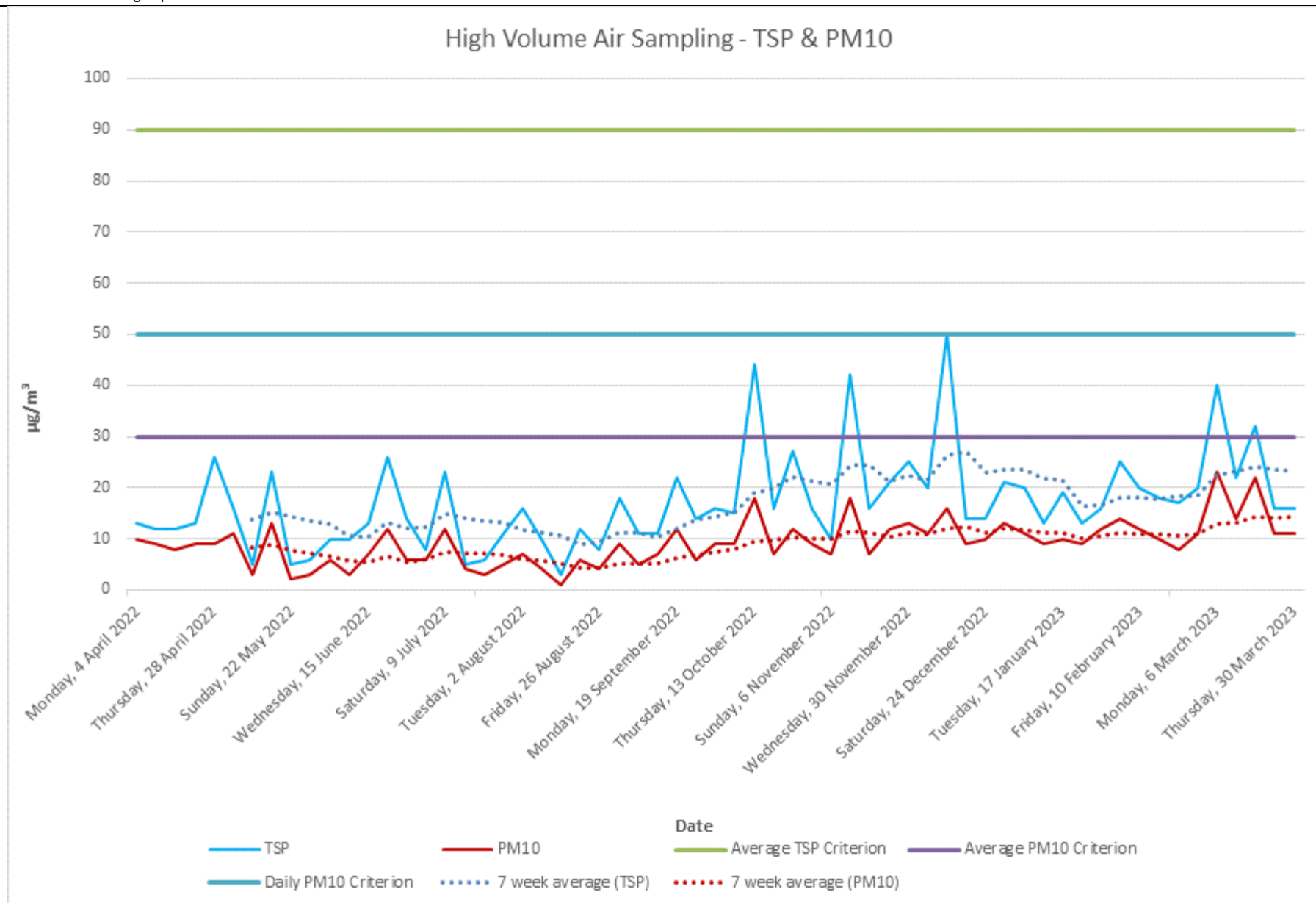


Figure 1 High Volume Air Sampling 2022/2023

3 BLAST MONITORING

Blasting must only be carried out between the hours of 9:00 AM and 3:00 PM Monday to Friday. No blasting is permitted on Saturday, Sundays or Public Holidays. Blasting outside of the hours specified by the EPL/Consent, can only take place with the written approval of relevant regulatory authorities.

KQ conduct monitoring at the nearest residential location (EPL 11569 EPA identification no. 11) to ensure that airblast overpressure level and ground vibration peak particle velocity do not exceed the EPL and Consent criteria (see Table 9).

Table 9 EPL 11569 Condition M7.1 Blasting

Parameter	Units of Measure	Frequency	Sampling Method
Airblast Overpressure	Decibels (Linear Peak)	All blasts	Australian Standard AS 2187.2-2006
Ground Vibration Peak Particle Velocity	Millimetres/second	All blasts	Australian Standard AS 2187.2-2006

There was one blast conducted in March 2023, results in Table 10 below.

Table 10 Blast Results

Date	Time	Location	Airblast Overpressure (dB(L))	Ground Vibration (mm/s)
26/03/2023	11:27am	32.628191482 S, 152.004497155 E	110.4	1.93

4 NOISE MONITORING

Noise generated by the Quarry operation must not exceed the criteria specified in *Schedule 3, Condition 14* of the Consent (see Table 11) at the locations identified in Table 12.

Table 11 Noise impact assessment criteria

Time Period	Noise Limit (dBA) LAeq(15minute)
Day 7:00am to 6:00pm Monday to Friday 7:00am to 1:00pm Saturday	48
Evening 6:00pm to 10:00pm Monday to Friday	47
At All Other Times	46

Table 12 Noise monitoring locations

Noise Monitoring Location	Property Name	Distance from Karuah Quarry
NM1	Lot 3 DP785172 5772 Pacific Hwy, Karuah	317 metres South of the Karuah Quarry
NM2	Lot 2 DP 785172 5760 Pacific Hwy, Karuah	200 metres South of the Karuah Quarry

4.1 ATTENDED MONITORING

Attended noise monitoring is required to be undertaken at the two nearest residences (NM1 and NM2) biannually.

The most recent attended noise monitoring was undertaken during November 2022, see monitoring results in Table 13.

Table 13 Attended noise monitoring results.

Location	Date	Start time (period)	Total noise levels, dB							Site noise level, dB		EPL/PA Limits, dB	Meteorological conditions ² EPL limits apply (Y/N)	Exceedance, dB	Comments
			L _{Amin}	L _{A90}	L _{Aeq}	L _{A10}	L _{A1}	L _{Amax}	L _{Ceq}	LFN mod. Factor ¹	L _{Aeq}	L _{Aeq}			
A	23/11	07:07	43	50	54	57	59	62	65	Nil	IA	48	0.9 m/s @ 301° A stability class Y	N/A	Karuah Quarry inaudible. Traffic on the Pacific Highway, insects and birds consistently audible. A dog barking occasionally audible.
B	23/11	07:50	50	57	64	67	72	78	73	Nil	IA	48	1.9 m/s @ 284° A stability class Y	N/A	Karuah Quarry inaudible. Traffic on the Pacific Highway, insects and birds consistently audible.

Notes: 1. Modifying factor correction for LFN in accordance with Fact sheet C of the NPfl.
2. Meteorological data were taken as an average over 15 minutes from the Karuah Quarry on-site weather station (Refer to Section 5.1).
3. IA = inaudible.
4. N/A = not applicable.

The results of the attended monitoring (Table 13) show ambient noise levels include noise sources such as traffic from the nearby Pacific Highway and wildlife such as birds. The Quarry operation was inaudible at location NM1 and NM2.

4.2 UNATTENDED NOISE MONITORING

Unattended noise monitoring is required to be undertaken at the two nearest residences (NM1 and NM2) biannually.

The most recent unattended noise monitoring was undertaken during November, see monitoring results for NM1 and NM2 in Table 14.

Table 14 - Unattended noise monitoring results

Location	Period	Measured noise levels, dB	
		L _{A90}	L _{Aeq,period}
NM1 23 November- 1 December 2022	Day	45	52
	Evening	46	55
	Night	43	51
NM2 23 November- 1 December 2022	Day	56	64
	Evening	49	63
	Night	39	62

The attended noise monitoring conducted during November 2022 identified that the Quarry was not audible at location NM1 or NM2. At the end of the monitoring period, the equipment located at NM2 was found to be vandalised and as such, the results from this location were not viable.

5 SURFACE WATER MONITORING

Condition L2 of the EPL outlines the requirement to monitor surface water discharges from the Quarry via the licensed discharge point (LDP001), see Table 15.

Table 15 EPL 11569 - Pollutant concentration limits

Pollutant	Units of Measure	Concentration Limit
Oil and Grease	Visible	5 &/or non-visible
pH	pH units	6.5 – 8.5
Total suspended solids	Milligrams per litre	50

There were no controlled discharges from LDP001 during the month of March 2023.

6 WEATHER MONITORING

Karuah Quarry has a permanent meteorological station to monitor various weather parameters. Figure 2 shows the recorded results for the local weather during March 2023. Weather data is significant from an environmental perspective, especially when regarding the total rainfall in the area as this effects multiple variables particularly erosion and sediment control as well as water quality management.

A wind rose is a graphic tool used to depict the average direction and speed of the wind over a recorded period. Figure 3 shows the wind rose generated from data gathered during March 2023.

Monthly Weather Summary



Site: Karuah Quarry
Month: March 2023

Date	Day	Temperature @ 2m			Temperature @ 10m			Winds			Solar Radiation		Rain ² mm
		Max ¹ °C	Min ¹ °C	Ave ¹ °C	Max ¹ °C	Min ¹ °C	Ave ¹ °C	Max Gust ¹ km/h	Ave Speed ¹ km/h	Dir Ave ¹ deg	Max ¹ W/m ²	Ave ¹ W/m ²	
1	Wed	34.3	19.4	24.3	31.1	19.9	23.5	37.9	6.3	198	933.3	246.8	
2	Thu	29.0	17.6	22.1	26.0	18.2	21.8	28.4	5.2	147	1072.4	234.9	
3	Fri	29.8	15.9	22.5	26.6	16.8	21.8	27.2	4.9	190	1023.3	231.8	
4	Sat	28.9	17.2	21.2	26.1	17.2	20.6	26.0	4.4	160	1035.8	238.7	
5	Sun	33.8	14.5	24.4	30.9	14.9	24.1	27.2	5.1	136	846.6	251.8	
6	Mon	39.1	18.2	28.3	37.6	19.4	28.9	35.5	4.1	154	852.5	249.0	
7	Tue	38.3	19.1	24.2	37.9	20.9	27.1	48.0	4.5	156	853.2	166.0	
8	Wed	29.9	15.9	23.7	29.2	15.9	23.8	35.0	5.1	145	922.1	271.0	
9	Thu	31.3	1.9	22.3	29.2	-20.0	21.9	28.4	4.7	188	862.5	250.9	0.4
10	Fri	29.6	16.1	23.5	27.3	16.9	23.2	35.5	6.0	124	985.0	208.9	
11	Sat	34.3	16.8	25.3	31.4	17.6	24.9	26.0	4.2	165	1045.0	190.8	
12	Sun	31.6	19.3	24.0	27.9	19.8	23.4	43.8	10.1	164	941.7	165.6	
13	Mon	23.7	19.9	20.6	22.9	20.1	20.6	39.0	7.0	177	455.8	74.8	12.4
14	Tue	25.8	18.3	21.1	24.8	18.6	21.0	24.9	2.7	195	1007.4	107.4	2.2
15	Wed	30.8	18.3	22.0	28.3	18.2	21.9	17.8	2.8	189	1045.7	180.3	2.0
16	Thu	36.6	16.7	24.8	35.5	17.4	25.9	26.0	3.4	212	804.1	231.1	
17	Fri	33.8	15.5	24.1	31.4	17.2	23.9	37.9	5.7	159	829.2	239.1	
18	Sat	33.9	17.1	24.6	39.7	17.8	24.6	22.5	4.1	160	796.7	229.9	
19	Sun	40.3	17.2	27.6	37.3	18.5	27.5	26.0	4.7	167	805.7	226.7	
20	Mon	25.5	18.8	22.3	24.9	20.0	22.1	45.0	10.5	155	216.7	32.1	
21	Tue	24.7	19.9	20.2	22.9	19.8	19.9	26.0	4.4	186	740.7	92.6	
22	Wed	27.8	16.2	22.3	26.4	16.9	22.0	28.4	4.5	155	1055.0	169.0	
23	Thu	32.3	18.3	21.3	29.0	18.6	21.0	23.7	3.8	193	982.5	126.2	
24	Fri	28.4	16.9	22.3	25.2	17.3	21.8	28.4	4.3	177	909.9	179.0	22.2
25	Sat	22.9	18.4	19.2	23.3	18.4	19.2	18.9	2.3	183	722.4	62.6	5.4
26	Sun	25.8	17.0	21.1	24.5	17.4	21.2	22.5	3.6	133	895.8	129.3	6.2
27	Mon	21.1	17.3	19.0	21.1	18.0	19.3	20.1	2.5	243	320.0	42.2	
28	Tue	29.4	17.0	21.1	28.0	17.7	21.0	34.3	3.7	216	927.5	120.1	19.2
29	Wed	29.5	18.1	18.9	28.1	18.1	19.5	33.1	3.2	248	896.6	142.3	12.0
30	Thu	25.6	13.1	16.6	24.0	14.3	18.0	30.8	4.6	246	920.7	184.9	10.6
31	Fri	25.3	9.1	16.8	23.9	10.6	17.1	27.2	3.9	204	749.2	204.5	
Ave or Total		30.1	16.6	22.3	28.5	16.5	22.3	30.0	4.7	178.2	853.4	176.8	92.6
High		40.3	19.9	28.3	39.7	20.9	28.9	48.0	10.5		1072.4	271.0	22.2
Low		21.1	1.9	16.6	21.1	-20.0	17.1	17.8	2.3		216.7	32.1	

Notes: 1. Values are for the 24 hour period from 9am to 9am next day.

2. Values are for the 24 hours to 9am.

No. rain days >1mm: 9

Figure 2 Weather Summary March 2023

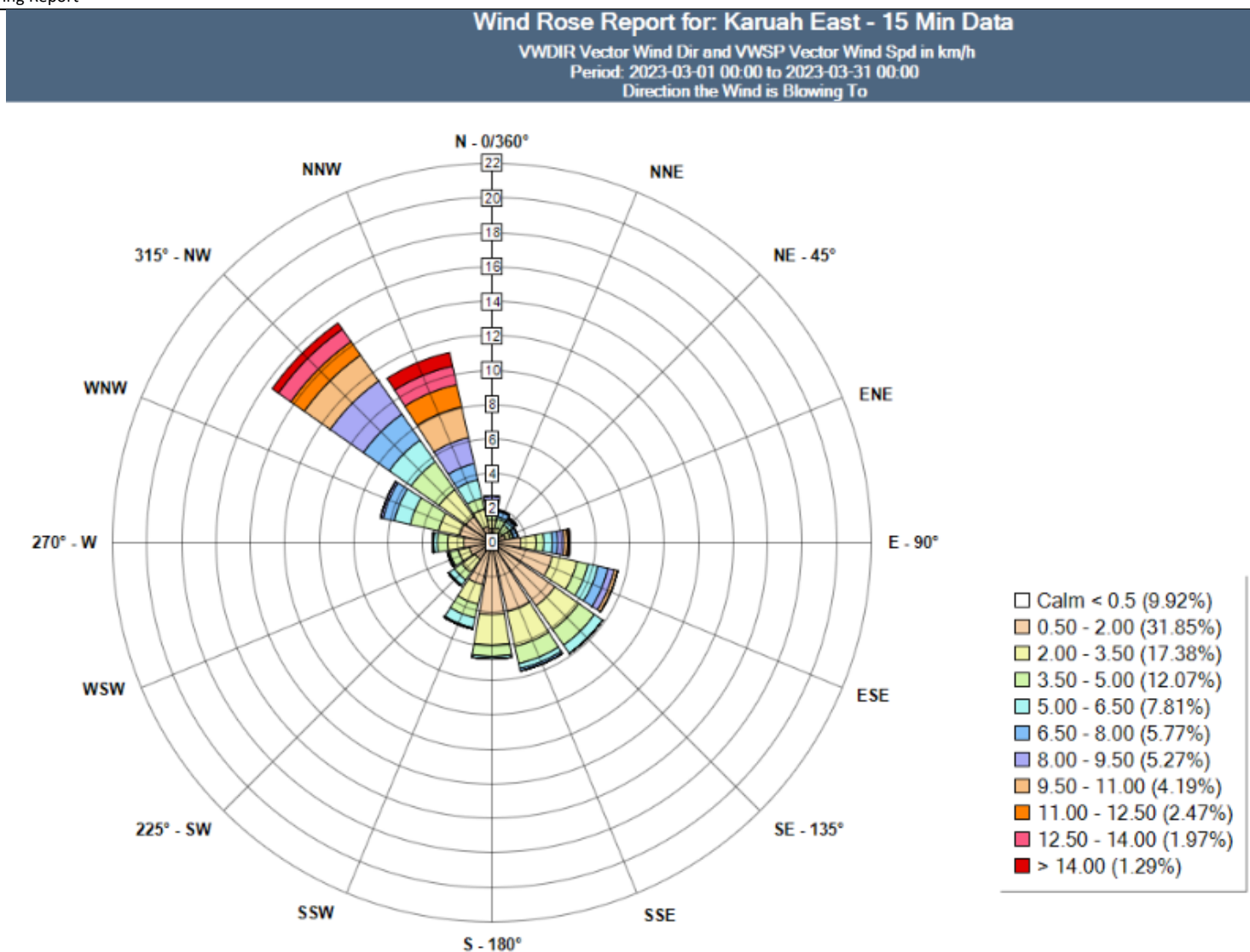


Figure 3 Wind Rose March 2023

7 REPORTING

7.1 INCIDENT

There were nil environmental incidents during March 2023 to report.

7.2 NON-COMPLIANCE

There were nil non-compliance events during March 2023 to report.

7.3 COMPLAINTS

There were nil complaints received during March 2023.

Appendix 1 – Monitoring Location

\\slr.local\Corporate\Projects\SLR\630-Sv\NTL\630-NTL\630.30036.00000 Karuah Quarry EMS 2020 Review\06 SLR Data\01 CAD\GIS\SLR\630.30036_EMP_Monitoring_01.mxd



LEGEND

- Blast Monitoring Site
- Air Quality Monitoring Site
- Noise Monitoring Site
- Water Monitoring Site
- Watercourse
- Lot Boundary

0 100 200 300 400
m

Scale: 1:12,000
GDA 1994 MGA Zone 56

05-Aug-2020
630.30036

Source: Nearmap (June 2020)

Sheet Size : A4