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Karuah Hard Rock Quarry

Environmental Monitoring Report:

March 2022

bsi
ISO 9001 Quality Management Systems CERTIFIED FS 678980
ISO 14001 Environmental Management CERTIFIED EMS 739657
ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 739660

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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	https://mpweb.planningportal.nsw.gov.au/major-projects/project/27181

A summary of the environmental monitoring data for March 2022 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/PM_{10} 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 2022 and the year to date (YTD) from the Consent anniversary (16 January) are shown in Table 7.

Table 7 Deposited dust monitoring results

Date On	Date Off	DDG 1	DDG 2	DDG 3	DDG 4
06/04/2021	06/05/2021	0.7	1.4	2.2	3.7
06/05/2021	03/06/2021	0.3	0.3	0.3	0.4
03/06/2021	05/07/2021	0.2	0.4	0.2	0.2
05/07/2021	05/08/2021	0.5	0.4	0.5	1.0
05/08/2021	06/09/2021	2.3	0.8	1.4	0.6
06/09/2021	06/10/2021	0.7	0.4	0.5	0.4
06/10/2021	03/11/2021	3.6	0.1	0.5	0.1
03/11/2021	03/12/2021	0.5	0.2	0.4	0.2
03/12/2021	04/01/2022	1.3	0.3	0.2	1.0
04/01/2022	03/02/2022	0.9	0.7	0.3	0.4
03/02/2022	07/03/2022	1.4	0.8	1.2	0.1
07/03/2022	05/04/2022	0.8	3.6	0.8	0.4
YTD average		1.0	1.7	0.8	0.4

Note [1]: DDG4 was not able to be analysed for period 03/06/2021 to 05/07/2021 due to sample jar breaking during collection and transportation to the laboratory.

Monitoring results indicate that for the period 7th of March 2022 to 5th of April 2022 the insoluble solid levels recorded at DDG 1 to DDG 4 monitoring locations were below the project criterion of 4 g/m^2/month.

2.2 HIGH VOLUME AIR SAMPLING

The TSP and PM_{10} results for March 2022, the report average and a rolling annual average are shown in are shown in Table 8.

Figure 1 illustrates the year-to-date results for HVAS monitoring.

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

Run Date	HVAS TSP (µg/m³)	HVAS PM_{10} (µg/m³)
5/03/2022	17	12
11/03/2022	16	12
17/03/2022	23	15
23/03/2022	4	12
29/03/2022	15	11
24hr Average Criteria[1]	**N/A**	**50**
Annual Average Criteria[1]	**90**	**30**
Progressive Annual Average[2]	19.9	13.3

Note: [1] Criteria as specified in DA 265-10-2004.
[2] The progressive annual average is from 01/01/2022 to 29/03/2022, this is not a measure of compliance.

All HVAS monitoring results, to the end of March 2022 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).

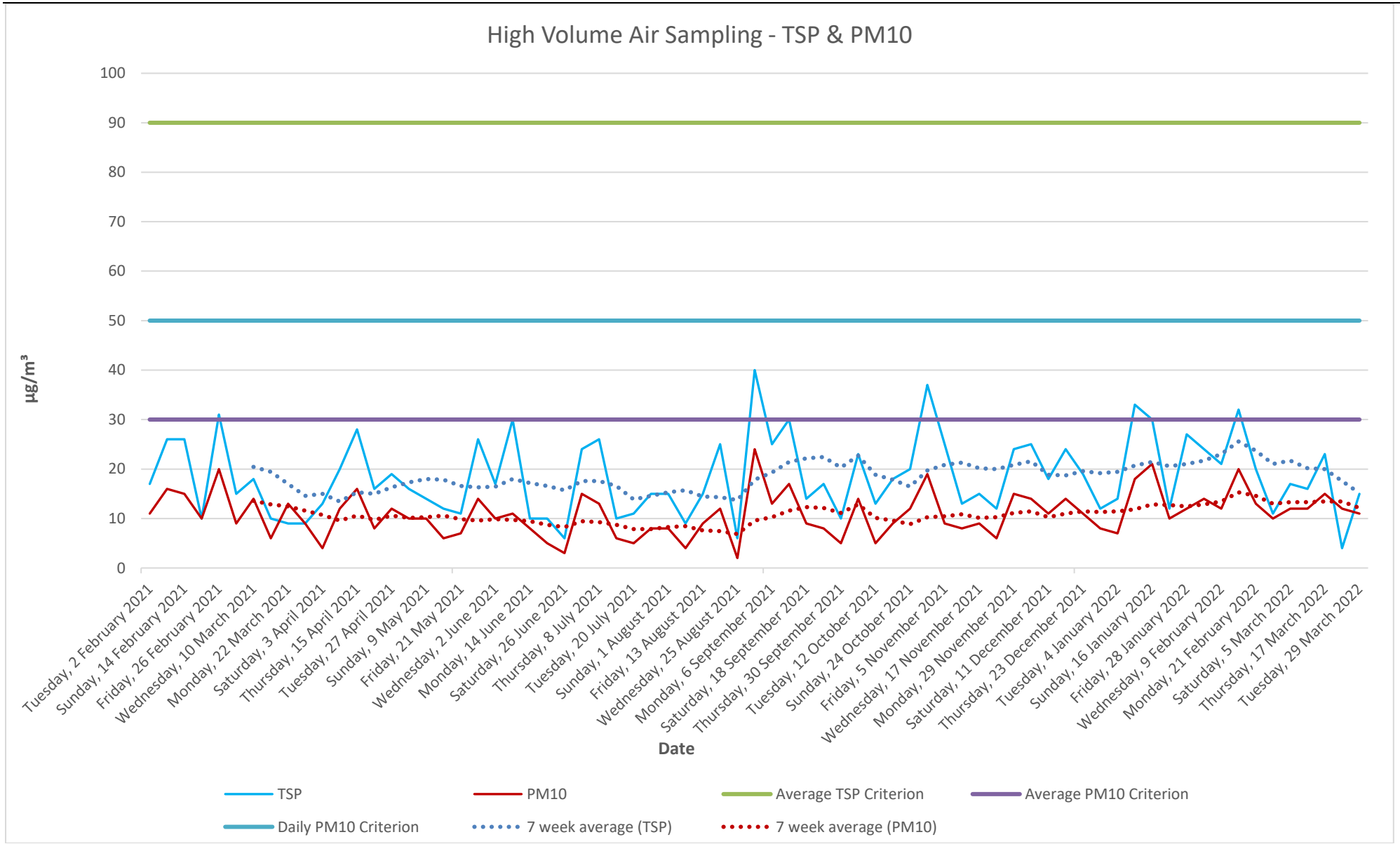

Figure 1 High Volume Air Sampling: Year-to-date results

3 BLAST MONITORING

Blasting must only be carried out between the hours of 9:00 AM and 4:00 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.

KEQ 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 **Error! Reference source not found.**).

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 were no blasts conducted in March 2022.

4 NOISE MONITORING

Noise generated by the Quarry operation must not exceed the criteria specified in *Schedule 3, Condition 14* of the Consent (see **Error! Reference source not found.**) at the locations identified in 10.

Table 10 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 11 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, see monitoring results in **Error! Reference source not found.**.

Table 12 Attended noise monitoring results

Location	Date	Start time (Period)	Total noise levels, dB							Site contribution, 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}			
NM1	19/11	10:44	45	48	66	53	81	96	70	Nil	IA	48	0.5 m/s @ 213° A stability class Y	Nil	**Karuah Quarry inaudible.** Traffic on the Pacific Highway, insects, frogs and bird noise consistently audible. Resident noise and a dog barking frequently audible.
NM2	19/11	11:19	56	59	63	65	68	69	70	Nil	IA	48	0.8 m/s @ 219° A stability class Y	Nil	**Karuah Quarry inaudible.** Traffic on the Pacific Highway and bird noise consistently audible.

Notes: *1. Modifying factor correction for LFN in accordance with Fact sheet C of the NPfI.*
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 12) 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 13.

Table 13 NM1 - Unattended noise monitoring results

Location	Period	Measured noise levels, dB	
		L_{A90}	$L_{Aeq,period}$
NM1 19 November – 1 December 2021	Day	44	50
	Evening	45	53
	Night	39	50
NM2 19 November – 1 December 2021	Day	55	63
	Evening	50	62
	Night	41	60

The attended noise monitoring conducted during November 2021 identified that the Quarry was not audible at location NM1 or NM2.

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 14.

Table 14 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 2022.

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 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 2022.

Monthly Weather Summary

Site: **Karuah Quarry**
Month: **March 2022**

Date	Day	Temperature @ 2m			Temperature @ 10m			Winds			Solar Radiation		Rain[2]
		Max[1]	Min[2]	Ave[1]	Max[1]	Min[2]	Ave[1]	Max Gust[1]	Ave Speed[1]	Dir Ave[1]	Max[1]	Ave[1]	
		°C	°C	°C	°C	°C	°C	km/h	km/h	deg	W/m²	W/m²	mm
1	Tue	21.8	19.1	20.3	21.7	19.0	20.3	10.6	1.5	158	212.5	59.0	10.8
2	Wed	24.4	19.3	21.2	23.2	19.4	21.0	15.4	2.9	165	490.8	87.4	14.0
3	Thu	22.6	19.6	21.8	23.2	19.5	22.0	21.3	6.3	163	202.5	28.5	20.6
4	Fri	29.5	20.0	22.5	26.8	20.2	22.3	18.9	3.0	178	588.3	100.2	63.4
5	Sat	29.9	19.3	24.3	27.5	19.1	23.9	20.1	4.6	135	395.8	81.7	1.4
6	Sun	29.6	20.4	23.6	26.8	20.4	23.3	27.2	4.3	168	432.5	74.2	6.2
7	Mon	28.7	20.9	23.0	27.1	20.8	22.9	22.5	3.8	151	504.2	76.9	0.8
8	Tue	30.2	19.9	21.4	27.2	20.1	20.8	28.4	5.6	228	543.3	100.5	2.0
9	Wed	23.4	17.8	19.7	22.7	17.6	19.8	40.2	6.4	212	273.3	82.9	10.0
10	Thu	26.2	16.3	19.2	22.7	16.7	18.3	28.4	5.2	209	394.2	107.9	9.2
11	Fri	27.6	14.2	18.6	23.8	14.5	18.1	24.9	3.8	168	494.9	120.2	0.6
12	Sat	26.0	13.4	17.7	23.4	13.6	17.5	20.1	3.3	176	586.6	76.8	0.2
13	Sun	27.1	12.8	18.6	24.5	13.1	18.5	16.6	2.3	188	469.1	87.1	1.0
14	Mon	24.7	13.1	17.5	23.6	13.7	18.0	18.9	2.4	199	191.7	22.5	
15	Tue	26.5	14.3	19.6	24.2	15.0	19.4	29.6	4.6	184	316.6	69.4	2.4
16	Wed	28.5	15.5	20.8	25.7	16.0	20.5	23.7	3.9	177	461.7	102.1	1.2
17	Thu	30.0	15.6	22.1	26.1	16.3	21.9	20.1	3.5	157	391.7	85.4	
18	Fri	30.4	17.6	20.9	26.7	18.4	20.5	23.7	3.8	186	414.1	97.8	
19	Sat	26.7	15.9	18.9	23.7	16.2	19.0	37.9	6.0	185	575.0	85.9	5.6
20	Sun	27.7	14.3	19.3	24.1	15.0	18.9	24.9	4.2	179	448.3	92.8	1.8
21	Mon	27.8	14.1	18.6	24.2	14.7	18.2	26.0	3.9	209	417.5	104.5	
22	Tue	30.2	12.3	21.1	28.0	13.0	21.1	17.8	3.2	147	350.8	110.3	
23	Wed	29.7	15.8	21.9	26.9	16.8	21.4	35.5	5.5	174	422.4	97.2	
24	Thu	18.7	17.4	16.4	18.7	17.4	16.7	24.9	3.2	175	200.0	47.7	28.2
25	Fri	24.6	13.5	19.5	23.1	13.8	19.4	28.4	4.4	174	352.4	77.8	34.6
26	Sat	22.9	16.9	18.3	22.4	16.7	18.2	26.0	2.2	196	451.6	60.4	27.2
27	Sun	22.9	15.9	19.8	22.5	16.2	19.7	10.6	2.1	169	398.3	65.3	10.2
28	Mon	25.4	17.7	21.4	24.3	17.6	21.1	14.2	2.6	171	285.0	99.7	1.2
29	Tue	24.7	19.4	20.0	23.7	19.5	20.3	27.2	3.1	146	257.4	74.5	3.0
30	Wed	22.4	17.3	20.2	22.5	18.0	20.7	40.2	10.1	161	253.3	73.1	10.2
31	Thu	20.3	17.8	17.3	21.8	17.7	17.6	52.1	10.1	191	296.7	40.9	77.0
Ave or Total		**26.2**	**16.7**	**20.2**	**24.3**	**17.0**	**20.0**	**25.0**	**4.3**	**176.7**	**389.4**	**80.3**	**342.8**
High		**30.4**	**20.9**	**24.3**	**28.0**	**20.8**	**23.9**	**52.1**	**10.1**		**588.3**	**120.2**	**77.0**
Low		**18.7**	**12.3**	**16.4**	**18.7**	**13.0**	**16.7**	**10.6**	**1.5**		**191.7**	**22.5**	
												No. rain days >1mm:	**21**

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

Figure 2 Weather Summary March 2022

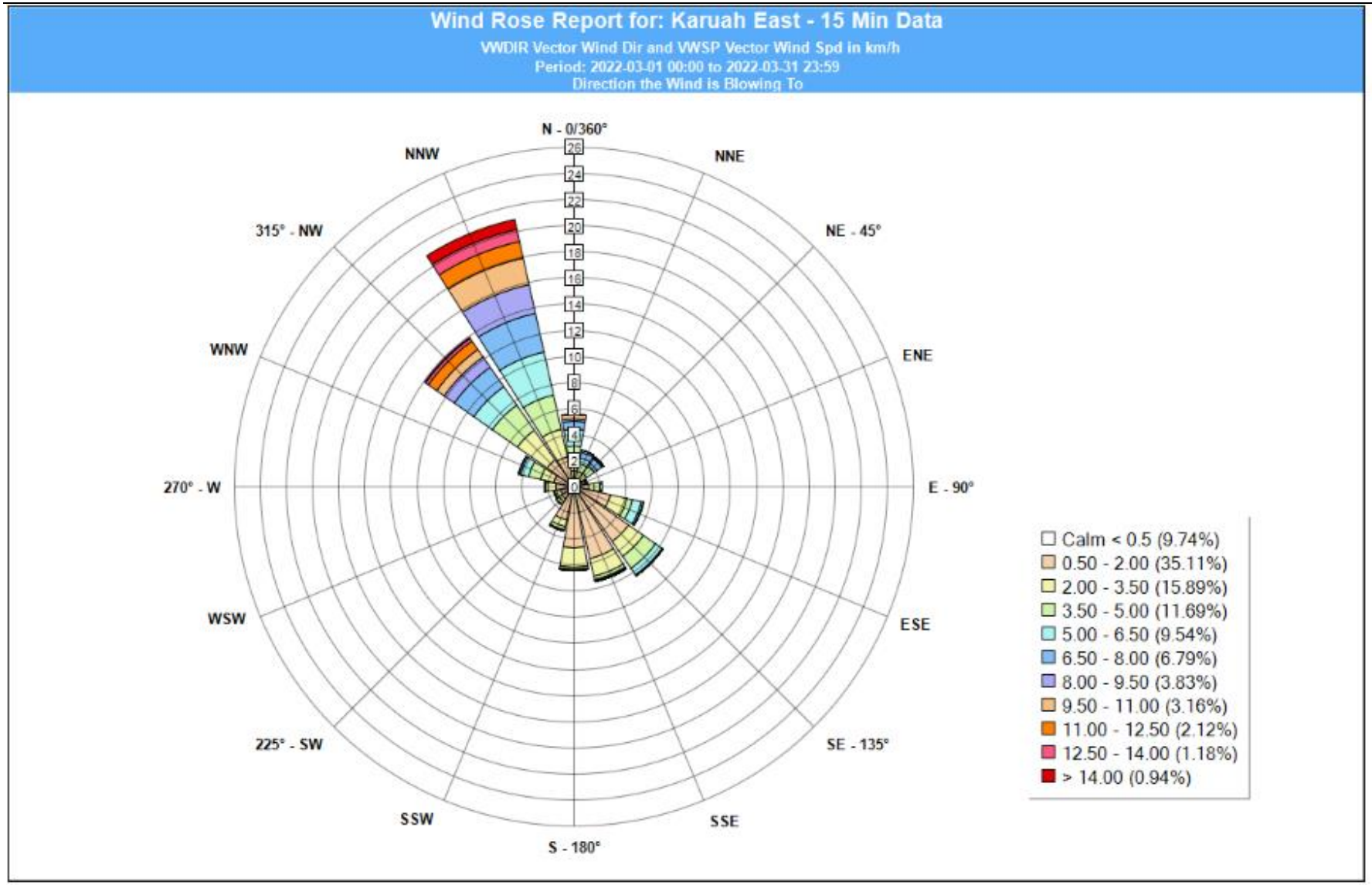

Figure 3 Wind rose March 2022

7 REPORTING

7.1 INCIDENT

There were nil environmental incidents during March 2022 to report.

7.2 NON-COMPLIANCE

There were nil non-compliance events during March 2022 to report.

7.3 COMPLAINTS

There were nil complaints received during March 2022.

Appendix 1 – Monitoring Locations

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

05-Aug-2020
630.30036

Source: Nearmap (June 2020)

Sheet Size : A4

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Karuah Hard Rock Quarry
Environmental Monitoring Locations

APPENDIX B