



Grounded in Quality

A proud member of the Hunter Construction Group

Karuah Hard Rock Quarry

Environmental Monitoring Report:

August 2021



Table of Contents

1	Introduction	3
2	Air Quality Monitoring	4
2.1	Deposited Dust Monitoring	4
2.2	High Volume Air Sampling	5
3	Blast Monitoring	7
4	Noise Monitoring	8
4.1	Attended Monitoring	8
4.2	Unattended Noise Monitoring	8
5	Surface Water Monitoring	10
6	Weather Monitoring	10
7	Reporting.....	13
7.1	Incident	13
7.2	Non-Compliance	13
7.3	Complaints	13

Table 1	Environmental Protection Licence 11569 information	3
Table 2	Development Consent 265-10-2004 information	3
Table 3	DA 265-10-2004 Long Term Assessment Criteria for Deposited Dust	4
Table 4	DA 265-10-2004 Long Term Impact Assessment Criteria for Particulate Matter	4
Table 5	DA 265-10-2004 Short Term impact Assessment Criterion for Particulate Matter	4
Table 6	Air quality monitoring locations.....	4
Table 7	Deposited dust monitoring results.....	5
Table 8	High Volume Air Sampling ($\mu\text{g}/\text{m}^3$) results.....	5
Table 9	Blast monitoring results	7
Table 10	Noise impact assessment criteria.....	8
Table 11	Noise monitoring locations	8
Table 12	Attended noise monitoring results	8
Table 13	NM1 - Unattended noise monitoring results	9
Table 14	NM2 - Unattended noise monitoring results	9
Table 15	EPL 11569 - Pollutant concentration limits.....	10

Appendix 1

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

A summary of the environmental monitoring data for August 2021 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 August 2021 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	DDG 5
01/09/2020	01/10/2020	0.6	0.5	0.4	1.0	1.0
01/10/2020	02/11/2020	0.2	<0.1	1.3	0.7	0.6
02/11/2020	03/12/2020	3.2	2.3	0.8	0.7	4.7
03/12/2020	04/01/2021	0.3	0.5	<0.1	0.4	1.5
04/01/2021	04/02/2021	1.5	0.9	0.7	0.3	1.2
04/02/2021	05/03/2021	0.4	0.4	0.7	0.2	1.6
05/03/2021	06/04/2021	0.8	1.3	0.5	0.7	0.7
06/04/2021	06/05/2021	0.7	1.4	2.2	3.7	1.9
06/05/2021	03/06/2021	0.3	0.3	0.3	0.4	0.6
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	0.2
05/08/2021	06/09/2021	2.3	0.8	1.4	0.6	1.2
YTD average		0.9	0.8	0.8	0.8	1.4

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 5 August 2021 to 6 September 2021 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 August 2021, 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/m ³)	HVAS PM ₁₀ (µg/m ³)
1/08/2021	15	8
7/08/2021	9	4
13/08/2021	15	9
19/08/2021	25	12
25/08/2021	6	2
31/08/2021	40	24
24hr Average Criteria¹	N/A	50
Annual Average Criteria¹	90	30
Progressive Annual Average²	20.9	11.6

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

² The progressive annual average is from 01/01/2020 to 31/08/2021, this is not a measure of compliance.

All HVAS monitoring results, to the end of August 2021 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).

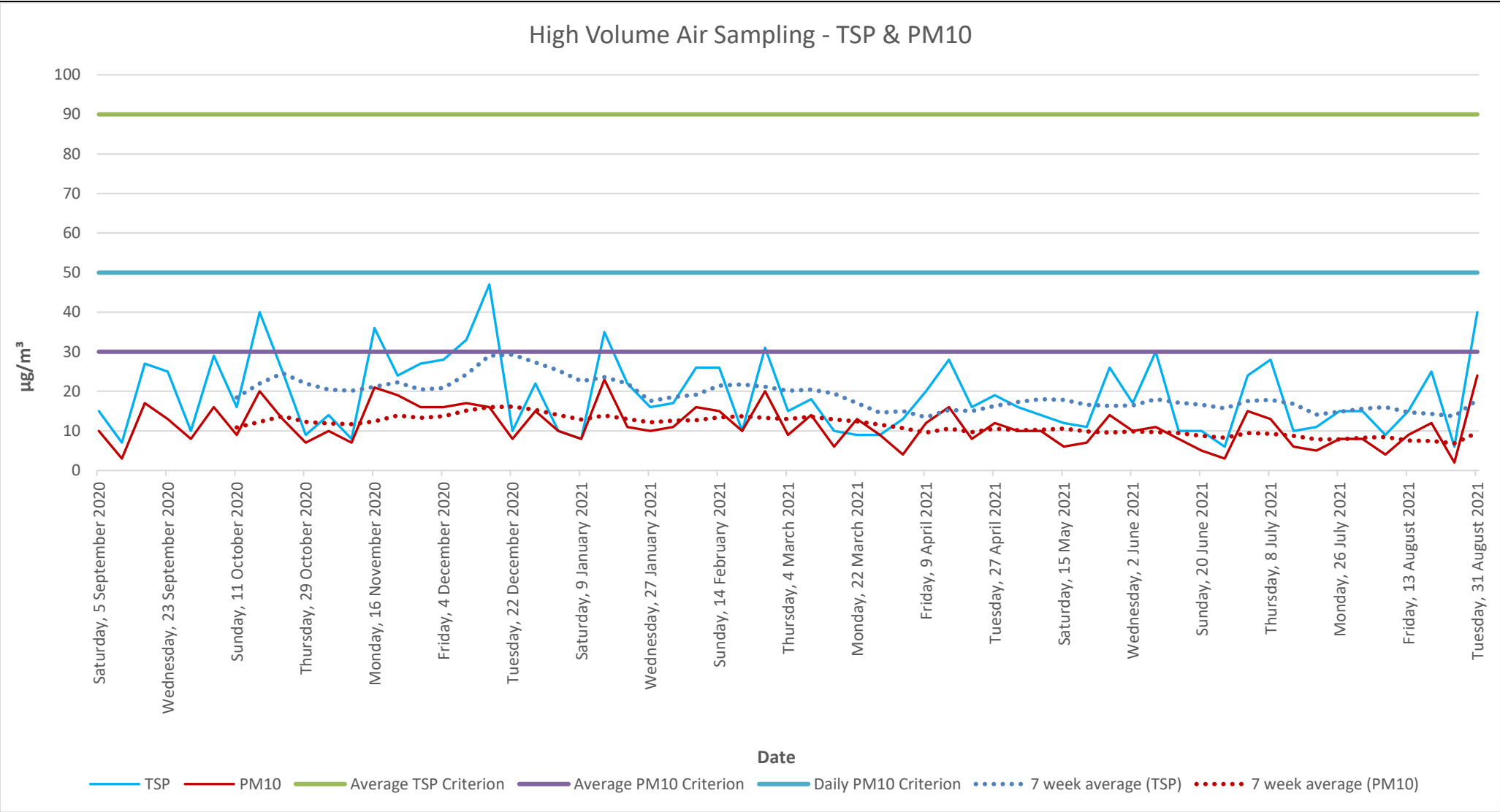


Figure 1 High Volume Air Sampling: Year-to-date results

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 was one blast conducted in August 2021, see Table 10 for monitoring results.

Table 10 Blast monitoring results

Date	Time	Overpressure (dB(L))	Vibration (mm/s)
Friday 27 August 2021	12:59	Nil Trigger	Nil Trigger

The monitoring results demonstrate compliance with conditions of the EPL.

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 residence (NM1 and NM2) biannually.

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

Table 13 Attended noise monitoring results

Location	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		LA _{max}	LA1	LA10	LA90	LA _{eq}	
NM1	06/05/2022 2:30 PM Wind 20 kph	91	72	67	59	65	Pacific Highway 60-65 Karuah Quarry Inaudible
NM2	06/05/2021 3:05 PM Wind 20 kph	87	71	67	60	64	Pacific Highway 55 - 65 Birds 40-45 Karuah Quarry Inaudible

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 residence (NM1 and NM2) biannually.

The most recent unattended noise monitoring was undertaken during April, see monitoring results for NM1 in Table 14 and NM2 in Table 15.

Table 14 NM1 - Unattended noise monitoring results

INP Period	L _{A1}	L _{A10}	L _{A90}	L _{AEQ}
Day	73	69	56	63
Evening	72	68	59	63
All other times	73	70	60	61

Table 15 NM2 - Unattended noise monitoring results

INP Period	L _{A1}	L _{A10}	L _{A90}	L _{AEQ}
Day	72	67	53	65
Evening	74	69	59	64
All other times	74	70	59	64

The attended noise monitoring conducted during April 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 16.

Table 16 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 August 2021.

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 August 2021. 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 August 2021.

Monthly Weather Summary



Site: **Karuah Quarry**
Month: **August 2021**

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/m ²	W/m ²	
1	Sun	28.1	6.4	15.9	26.6	8.1	16.7	34.3	3.3	189	685.0	94.0	
2	Mon	20.6	7.7	14.9	18.4	8.7	15.3	27.2	4.4	138	671.6	102.0	1.4
3	Tue	21.2	11.1	14.5	20.1	12.6	14.7	46.1	11.0	269	658.3	97.0	1.0
4	Wed	16.1	10.4	11.8	15.0	10.8	11.9	55.6	11.6	272	517.4	131.4	
5	Thu	20.5	8.0	11.0	19.1	9.3	12.4	40.2	4.6	215	500.0	127.4	
6	Fri	19.7	3.7	9.7	18.3	6.5	10.4	20.1	3.1	236	511.7	133.2	
7	Sat	18.7	2.8	10.9	17.3	4.1	11.4	22.5	3.8	223	512.5	131.3	
8	Sun	16.3	5.4	11.8	15.7	6.2	11.9	22.5	2.6	172	643.3	67.8	
9	Mon	19.3	8.7	12.8	18.0	9.2	13.4	18.9	3.2	159	625.8	102.6	3.0
10	Tue	23.7	8.5	13.9	21.7	9.3	14.9	14.2	2.8	174	644.1	119.0	
11	Wed	24.2	7.9	14.4	23.2	9.8	15.5	21.3	2.6	147	550.8	128.4	
12	Thu	21.0	8.6	11.0	19.1	10.3	11.6	17.8	2.2	173	593.3	82.9	
13	Fri	20.9	4.4	11.0	17.8	5.3	11.1	16.6	2.7	212	649.1	119.4	
14	Sat	22.6	5.3	11.6	18.9	5.5	11.8	22.5	2.4	164	689.9	127.5	
15	Sun	22.8	4.6	11.8	21.4	5.2	13.2	22.5	3.7	227	554.2	146.3	0.2
16	Mon	22.0	3.9	14.0	20.6	6.7	14.7	35.5	6.7	252	555.0	148.0	
17	Tue	20.6	4.2	10.6	17.8	6.4	10.5	22.5	3.4	215	553.3	141.4	
18	Wed	20.9	4.8	10.4	17.7	5.8	10.6	22.5	2.4	160	804.9	119.9	0.6
19	Thu	22.6	4.7	13.1	20.0	5.6	13.5	16.6	2.6	172	633.3	133.2	
20	Fri	24.5	7.2	14.3	22.9	8.1	15.1	20.1	3.1	172	630.8	123.2	
21	Sat	19.4	8.0	11.7	19.5	9.4	12.8	11.8	1.5	178	325.8	64.5	
22	Sun	27.3	6.4	18.3	25.4	7.9	19.1	18.9	3.6	167	571.7	146.4	
23	Mon	24.0	13.1	17.6	22.8	14.6	17.5	46.1	5.0	152	576.7	70.5	
24	Tue	12.8	9.9	9.8	12.6	9.9	10.0	43.8	12.8	272	681.6	54.8	23.0
25	Wed	16.6	8.2	11.8	16.0	8.4	12.4	37.9	6.4	254	729.1	109.1	16.2
26	Thu	20.0	4.7	10.5	16.9	6.3	10.5	24.9	3.6	206	713.3	153.3	
27	Fri	20.0	4.0	11.9	18.0	5.3	12.7	34.3	6.7	248	843.3	122.2	
28	Sat	18.7	3.1	9.7	17.3	5.2	10.2	34.3	3.6	201	872.4	125.9	
29	Sun	22.4	2.2	11.8	20.4	3.4	12.8	29.6	3.4	190	823.2	138.3	
30	Mon	21.2	3.3	12.1	18.9	4.2	12.5	20.1	2.5	176	740.8	141.0	
31	Tue	24.1	5.5	13.3	22.5	6.6	13.9	17.8	3.0	184	616.7	166.4	
Ave or Total		21.1	6.3	12.5	19.4	7.6	13.1	27.1	4.3	198.9	634.8	118.3	45.4
High		28.1	13.1	18.3	26.6	14.6	19.1	55.6	12.8		872.4	166.4	23.0
Low		12.8	2.2	9.7	12.6	3.4	10.0	11.8	1.5		325.8	54.8	
Notes: 1. Values are for the 24 hour period from 9am to 9am next day.												No. rain days >1mm:	4
2. Values are for the 24 hours to 9am.													

Figure 2 Weather Summary September 2021

Wind Rose Report for: Karuah East - 15 Min Data

VWDIR Vector Wind Dir and VWSP Vector Wind Spd in km/h

Period: 2021-08-01 00:00 to 2021-08-31 23:59

Direction the Wind is Blowing To

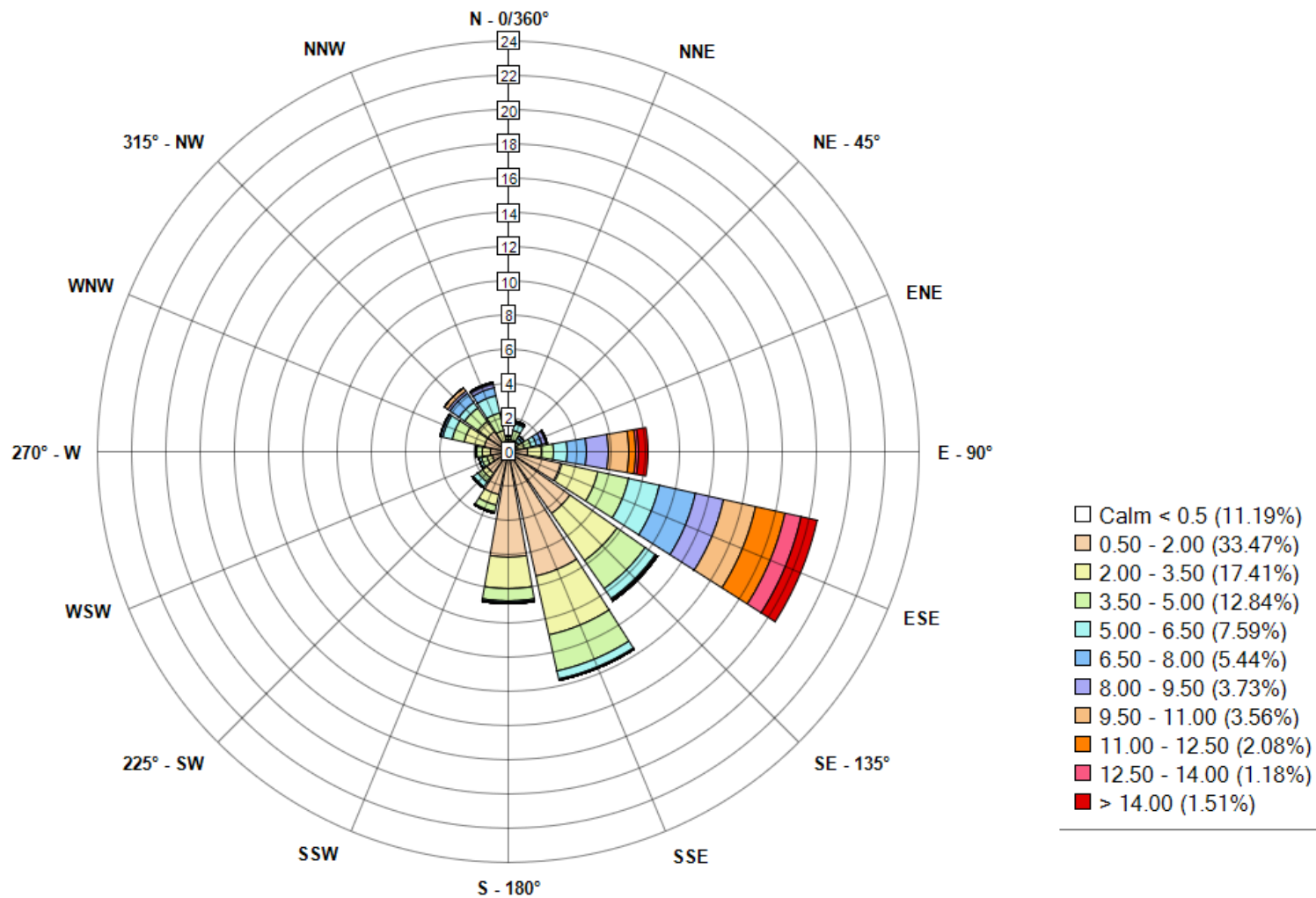


Figure 3 Wind rose September 2021

7 REPORTING

7.1 INCIDENT

There were nil environmental incidents during August 2021 to report.

7.2 NON-COMPLIANCE

There were nil non-compliance events during August 2021 to report.

7.3 COMPLAINTS

There were nil complaints received during August 2021.

Appendix 1 – Monitoring Locations

\\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\630303036_EMP_Monitoring_01.mxd



LEGEND

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

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

Source: Nearmap (June 2020)

Sheet Size : A4