



Grounded in Quality

A proud member of the Hunter Construction Group

Karuah Hard Rock Quarry

Environmental Monitoring Report:

September 2022



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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 September 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/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 September 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
06/10/2021	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
05/04/2022	05/05/2022	0.1	0.2	0.1	0.1
05/05/2022	03/06/2022	0.4	0.6	0.4	0.3
03/06/2022	05/07/2022	0.3	0.2	0.2	0.2
05/07/2022	03/08/2022	0.3	0.3	0.4	0.7
03/08/2022	02/09/2022	0.9	0.9	0.6	1.0
02/09/2022	04/10/2022	0.5	0.2	0.6	0.3
YTD average		0.9	0.7	0.5	0.4

Monitoring results indicate that for the period 2 September 2022 to 4 October 2022 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 September 2022, the report average and a rolling annual average are shown in are shown in Table 8.

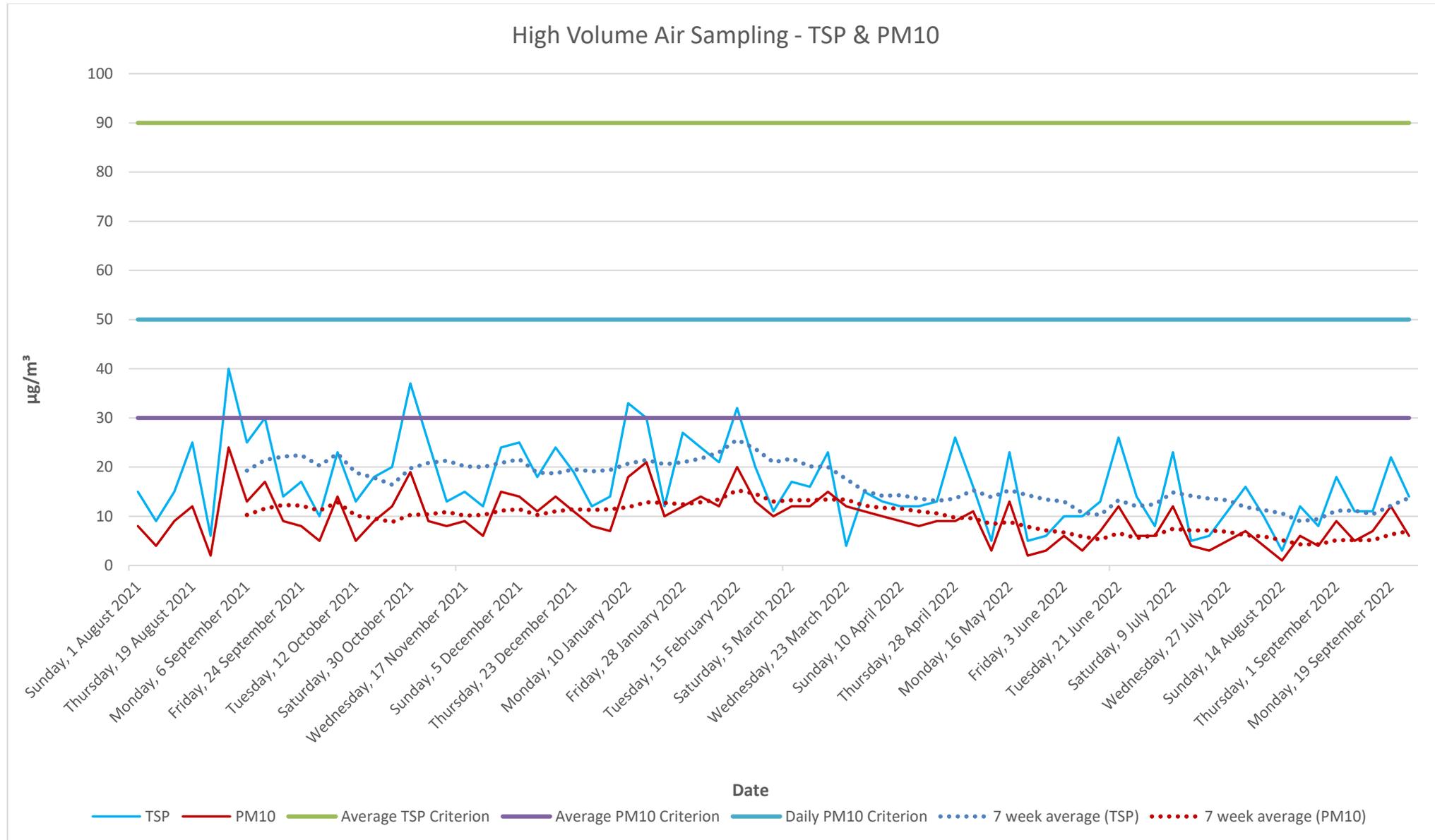


Figure 1 illustrates the year-to-date results for HVAS monitoring.

Table 8 High Volume Air Sampling ($\mu\text{g}/\text{m}^3$) results

Run Date	HVAS TSP ($\mu\text{g}/\text{m}^3$)	HVAS PM ₁₀ ($\mu\text{g}/\text{m}^3$)
01/09/2022	18	9
07/09/2022	11	5
13/09/2022	11	7
19/09/2022	22	12
25/09/2022	14	6
24hr Average Criteria¹	N/A	50
Annual Average Criteria¹	90	30
Progressive Annual Average²	15.1	8.9

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

² The progressive annual average is from 01/01/2022 to 25/09/2022, this is not a measure of compliance.

All HVAS monitoring results, to the end of September 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).

High Volume Air Sampling - TSP & PM10

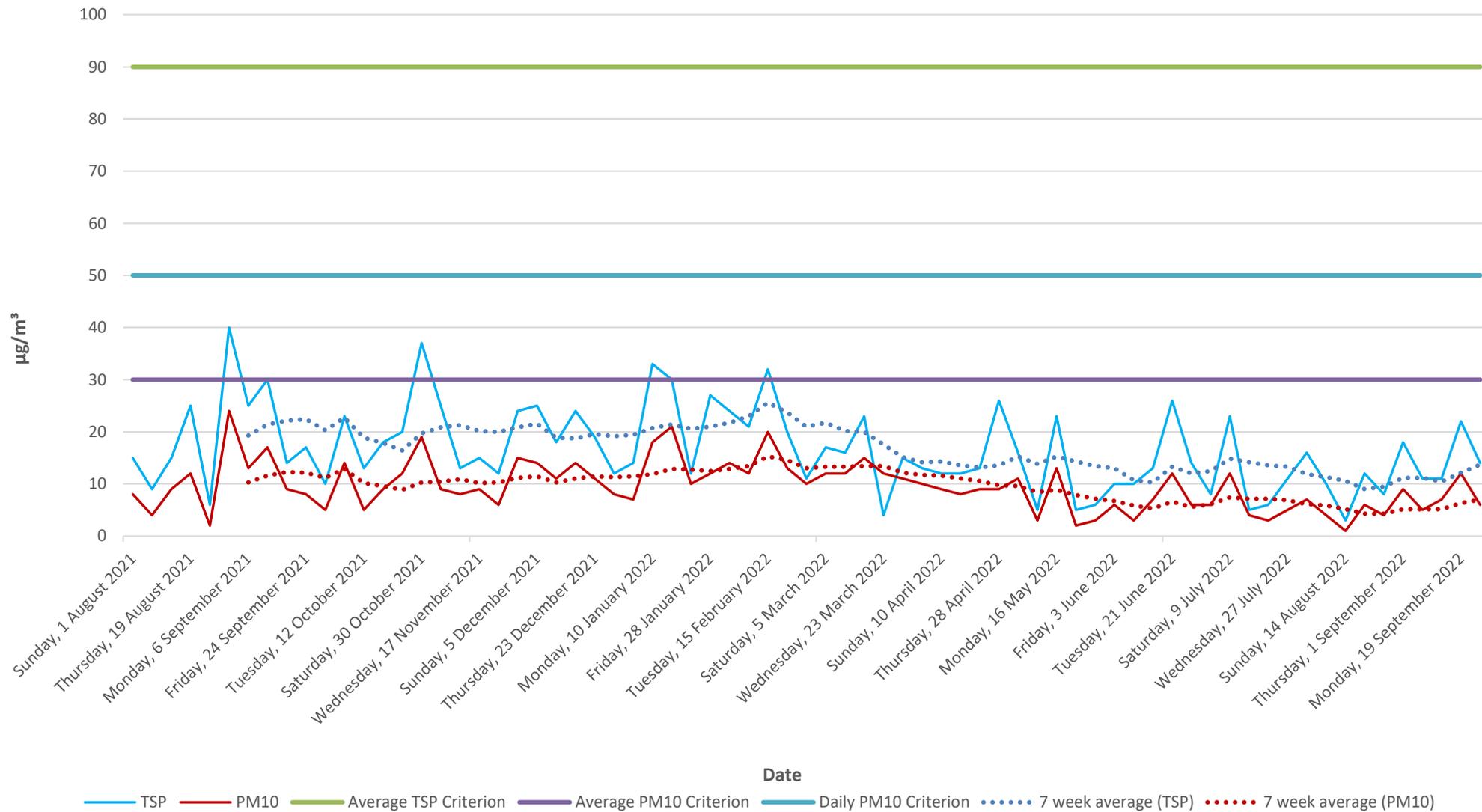


Figure 1 High Volume Air Sampling: Year-to-date results

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 September 2022, for results see Table 10.

Table 10 Blast monitoring results

Date	Time	Location	Overpressure (dB(L))	Vibration (mm/s)
Tuesday, 13 September 2022	11:27am	RL 86	105.7	1.72

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 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 June, see monitoring results in **Error! Reference source not found.**

Table 13 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	16/6	08:16	47	51	54	56	58	69	67	Nil	IA	48	0.3 m/s @ 297° A stability class Y	Nil	Karuah Quarry inaudible. Traffic on the Pacific Highway, consistently audible. Bird noise and a dog barking occasionally audible.		
NM2	16/6	08:38	52	59	63	66	69	71	71	Nil	IA	48	0.3 m/s @ 307° A stability class Y	Nil	Karuah Quarry inaudible. Traffic on the Pacific Highway, consistently audible. Bird noise and resident noise occasionally 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 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 June, see monitoring results for NM1 and NM2 in table 13.

Table 14 - Unattended noise monitoring results

Location	Period	Measured noise levels, dB	
		L _{A90}	L _{Aeq,period}
NM1 16-28 June 2022	Day	51	69
	Evening	49	55
	Night	-	-
NM2 16-28 June 2022	Day	Results were not available due to vandalism of the unattended noise monitor located at NM2	
	Evening		
	Night		

The attended noise monitoring conducted during June 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 14.

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 September 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 September 2022. 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 September 2022.

Monthly Weather Summary



Site: **Karuah Quarry**

Month: **September 2022**

Date	Day	Temperature @ 2m			Temperature @ 10m			Winds			Solar Radiation		Rain ² mm
		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	Thu	22.5	10.9	15.7	20.6	10.8	15.9	22.5	3.8	153	789.9	145.7	15.6
2	Fri	16.2	11.9	13.6	16.1	12.3	13.9	37.9	6.1	193	325.0	47.2	1.6
3	Sat	15.1	11.8	13.4	15.7	11.9	14.1	45.0	9.9	155	464.9	40.8	37.6
4	Sun	18.7	11.9	12.0	17.3	12.0	12.4	46.1	5.9	189	966.6	131.3	16.4
5	Mon	18.9	8.1	11.7	16.7	8.9	11.9	37.9	4.4	192	895.7	133.4	3.6
6	Tue	15.5	7.9	10.1	15.1	8.6	10.4	15.4	2.0	194	700.7	92.9	1.2
7	Wed	20.8	5.3	13.8	18.5	5.9	14.3	23.7	5.6	126	913.2	154.5	0.8
8	Thu	21.9	9.9	16.9	20.6	11.1	16.9	29.6	6.5	111	721.6	154.0	0.2
9	Fri	21.8	13.6	13.6	21.0	13.7	14.2	28.4	2.6	155	845.0	131.6	4.6
10	Sat	22.6	8.3	16.2	20.6	9.3	16.2	40.2	9.2	266	979.2	185.9	1.4
11	Sun	22.0	11.4	12.6	20.3	12.2	13.7	28.4	4.2	225	731.6	206.4	
12	Mon	21.7	5.4	13.2	19.6	7.5	13.3	26.0	3.8	206	735.8	203.6	
13	Tue	17.7	8.0	11.7	16.1	8.9	11.6	31.9	5.6	198	945.7	163.1	
14	Wed	19.4	5.4	13.5	16.8	6.1	13.6	26.0	4.2	147	984.9	142.6	2.0
15	Thu	18.3	10.5	14.1	17.8	11.6	14.3	24.9	3.9	152	859.1	84.1	0.4
16	Fri	24.5	10.6	15.3	22.8	11.2	16.1	34.3	4.8	203	874.9	209.2	11.8
17	Sat	25.2	10.0	17.9	23.9	11.0	18.4	39.0	7.4	258	1001.6	184.7	0.2
18	Sun	22.4	11.0	14.4	21.6	13.6	15.2	42.6	5.4	224	864.9	189.1	
19	Mon	23.2	7.3	14.8	21.9	8.0	15.1	37.9	4.9	236	846.7	198.3	
20	Tue	22.5	8.4	16.7	19.9	9.2	16.6	29.6	5.9	122	1024.9	177.3	
21	Wed	21.9	12.8	17.4	20.6	14.0	17.5	27.2	5.1	142	760.0	93.9	
22	Thu	17.9	14.7	14.7	17.3	14.8	14.7	27.2	3.0	158	805.8	75.8	11.0
23	Fri	20.9	13.5	16.9	20.3	13.5	17.0	27.2	3.4	144	620.8	113.2	8.4
24	Sat	22.8	14.3	14.3	21.8	14.7	14.7	31.9	3.7	216	1001.7	126.8	1.0
25	Sun	23.5	8.5	14.5	22.0	9.4	14.6	22.5	3.4	181	948.3	220.2	13.0
26	Mon	21.3	7.9	15.1	19.6	8.9	15.2	15.4	2.5	146	992.5	143.9	0.2
27	Tue	23.6	10.3	16.3	21.9	11.2	16.5	23.7	3.7	169	1000.0	133.3	
28	Wed	25.2	11.9	16.2	23.1	13.1	16.3	23.7	4.3	212	996.6	222.5	4.0
29	Thu	21.9	9.6	16.4	19.3	10.8	16.1	42.6	9.5	191	1070.0	164.7	
30	Fri	20.8	13.1	15.8	18.8	13.2	16.2	42.6	10.4	154	1066.7	169.6	14.0
Ave or Total		21.0	10.1	14.6	19.6	10.9	14.9	31.0	5.2	180.5	857.8	148.0	149.0
High		25.2	14.7	17.9	23.9	14.8	18.4	46.1	10.4	212	1070.0	222.5	37.6
Low		15.1	5.3	10.1	15.1	5.9	10.4	15.4	2.0	111	325.0	40.8	0.2

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

No. rain days >1mm: **15**

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

Figure 2 Weather Summary August 2022

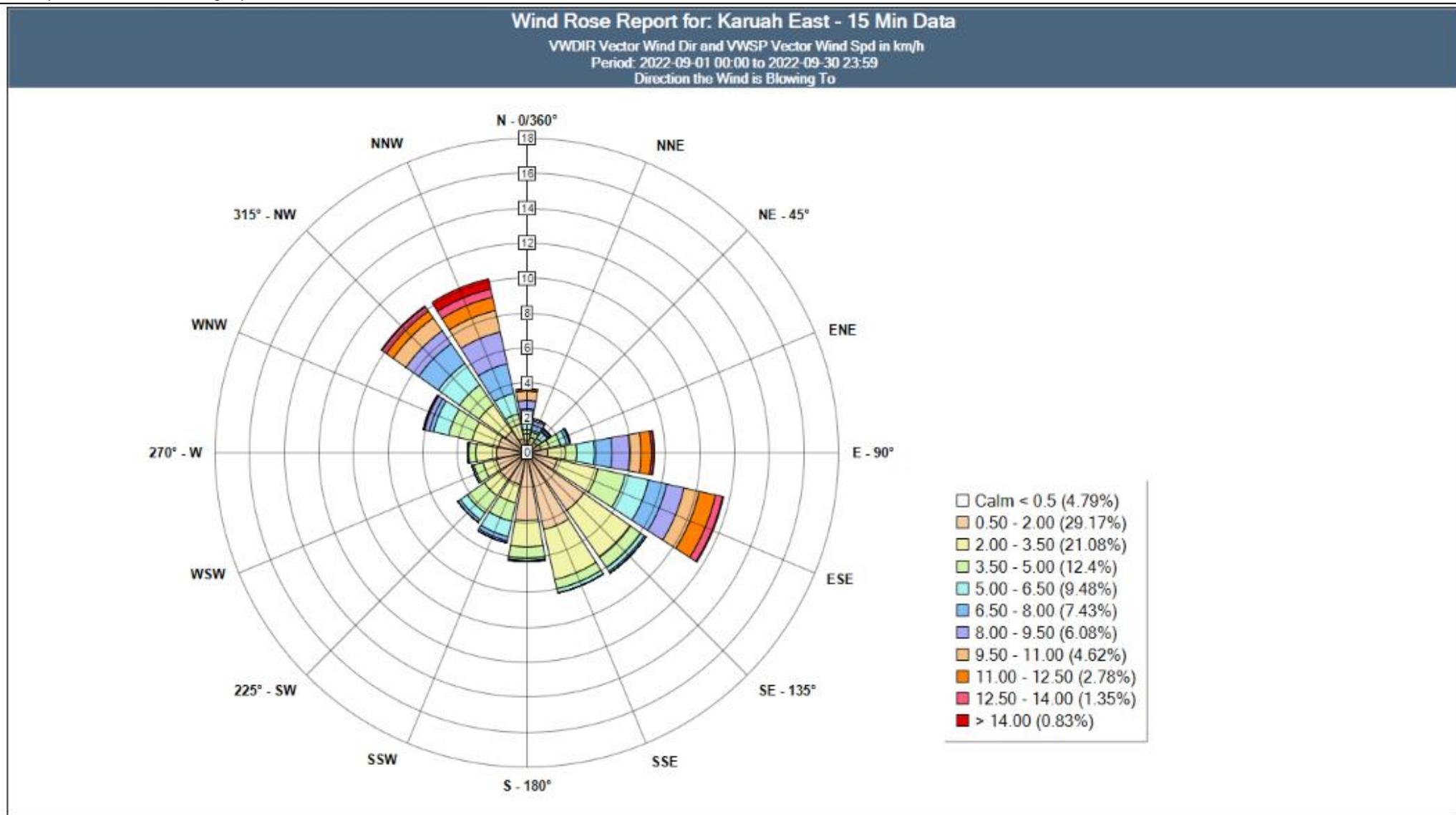


Figure 3 Wind Rose August 2022

7 REPORTING

7.1 INCIDENT

There were nil environmental incidents during September 2022 to report.

7.2 NON-COMPLIANCE

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

7.3 COMPLAINTS

There were nil complaints received during September 2022.

Appendix 1 – Monitoring Location

\\slr\slr\local\Corporate\Projects-SLR\630-Sv\NTL\630-NTL\630-30036\00000 Karuah Quarry EMS 2020 Review\06 SLR Data\01 CAD\GIS\GIS\SLR\630-30036_EIMP_Monitoring_01.mxd

406000

407000

408000

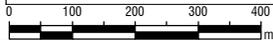
639 0000

639 0000



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

05-Aug-2020
630.30036

Source: Nearmap (June 2020)