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## **Karuah East Quarry**

### **Environmental Monitoring Report:**

**May 2023**



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## Appendix 1

## Monitoring Locations

# 1 INTRODUCTION

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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 20611* (the EPL) (see Table 1) and *Project Approval 09\_0175* (the Consent) (see Table 2) for Karuah East Quarry (the Quarry).

**Table 1 Environmental Protection Licence 20611 information**

<b>Environmental Protection Licence Number</b>	20611
<b>Licensee's Name</b>	Karuah East Quarry Pty Limited
<b>Licensee's Address</b>	Licensee Postal Address: PO Box 3284 Thornton NSW 2322.  Premises Address: Karuah East Quarry, Blue Rock Close, Karuah NSW 2324.
<b>Link to Full Licence on the EPA Website</b>	<a href="https://apps.epa.nsw.gov.au/prpoeoapp/">https://apps.epa.nsw.gov.au/prpoeoapp/</a>

**Table 2 Project Approval 09\_0175 information**

<b>Development Application</b>	PA 09_0175
<b>Applicant</b>	Karuah East Quarry Pty Limited
<b>Approval Authority</b>	Minister for Planning
<b>Link to Full Development Approval on Major Projects Planning Portal</b>	<a href="https://www.planningportal.nsw.gov.au/major-projects/project/15026">https://www.planningportal.nsw.gov.au/major-projects/project/15026</a>

A summary of the environmental monitoring data for May 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 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 13* of the Consent (see Table 3, Table 4 and Table 5). Deposited dust and TSP/PM<sub>10</sub> monitoring is undertaken at the locations listed in Table 6.

**Table 3 PA 09\_0175 Long Term Assessment Criteria for Deposited Dust**

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

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

**Table 4 PA 09\_0175 Long Term Impact Assessment Criteria for Particulate Matter**

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

**Table 5 PA 09\_0175 Short Term impact Assessment Criterion for Particulate Matter**

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

**Table 6 Air quality monitoring locations**

Site ID	EPL ID	Location	Address	GPS Coordinates
DDG 1	MP 4	South-West of Karuah East Quarry	5760 Pacific Hwy, Karuah NSW 2324	32°38'04"S 151°59'58"E
DDG 2	MP 5	South-West of Karuah East Quarry	5770 Pacific Hwy, Karuah NSW 2324	32°38'02"S 152°00'09"E
DDG 3	MP 6	South-West of Karuah East Quarry	DP 1024341, Karuah	32°37'57"S 151°59'41"E
DDG 4	MP 7	East of Karuah East Quarry	21 Halloran Rd North Arm Cove NSW 2324	32° 37' 30.87"S 152°01'10.18"E
DDG 5	MP 8	South-West of Karuah East Quarry	Lot 21 DP 1024341 Karuah NSW 2324	32° 37' 55.33"S 152°00'2.74"E
HVAS (TSP/PM <sub>10</sub> )	MP 9	South-West of Karuah East Quarry	5770 Pacific Hwy, Karuah NSW 2324	32°38'03"S 152°00'09"E

All dust monitoring is undertaken in accordance with the *Approved Methods of Sampling and Analysis of Air Pollutants in NSW* (EPA, 2022).

## 2.1 DEPOSITED DUST MONITORING

Deposited dust results for the twelve months prior to and including May 2023 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
3/06/2022	5/07/2022	0.3	0.2	0.2	0.2	0.3
5/07/2022	3/08/2022	0.3	0.3	0.4	0.7	0.4
3/08/2022	2/09/2022	0.9	0.9	0.6	1.0	0.9
2/09/2022	4/10/2022	0.5	0.2	0.6	0.3	0.8
4/10/2022	3/11/2022	0.2	0.5	0.5	0.3	0.3
3/11/2022	5/12/2022	0.8	0.8	0.7	1.2	2
5/12/2022	5/01/2023	0.7	0.7	0.3	0.6	0.1
5/01/2023	3/02/2023	0.2	0.4	0.8	0.1	0.4
3/02/2023	5/03/2023	0.9	0.7	0.2	0.3	0.8
5/03/2023	5/04/2023	1.1	1.5	1.1	1.1	1.1
5/04/2023	4/05/2023	0.3	0.5	0.3	0.2	1.2
4/05/2023	5/06/2023	0.2	0.3	0.3	0.4	0.4
<b>YTD average</b>		0.5	0.6	0.5	0.5	0.7

Monitoring results indicate that for the period from 4 May 2023 to 5 June 2023 the insoluble solid levels recorded at DDG 1 to DDG 5 monitoring locations were below the project criterion of 4 g/m<sup>2</sup>/month over an annual averaging period.

## 2.2 HIGH VOLUME AIR SAMPLING

The TSP and PM10 results for May 2023, and a progressive annual average are shown in Table 8.

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

**Table 8 High Volume Air Sampling (µg/m<sup>3</sup>) results**

Run Date	HVAS TSP (µg/m <sup>3</sup> )	HVAS PM <sub>10</sub> (µg/m <sup>3</sup> )
5/05/2023	53	28
11/05/2023	72	41
17/05/2023	11	6
23/05/2023	82	49
29/05/2023	11	4
<b>24hr Average Criteria<sup>1</sup></b>	<b>N/A</b>	<b>50</b>
<b>Annual Average Criteria<sup>1</sup></b>	<b>90</b>	<b>30</b>
<b>Progressive Annual Average<sup>2</sup></b>	24.5	14.4

Note: <sup>1</sup> Criteria as specified in PA 09\_0175.

<sup>2</sup> The progressive annual average is from 01/01/2023 to 29/05/2023, this is not a measure of compliance.

All HVAS monitoring results for May 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).

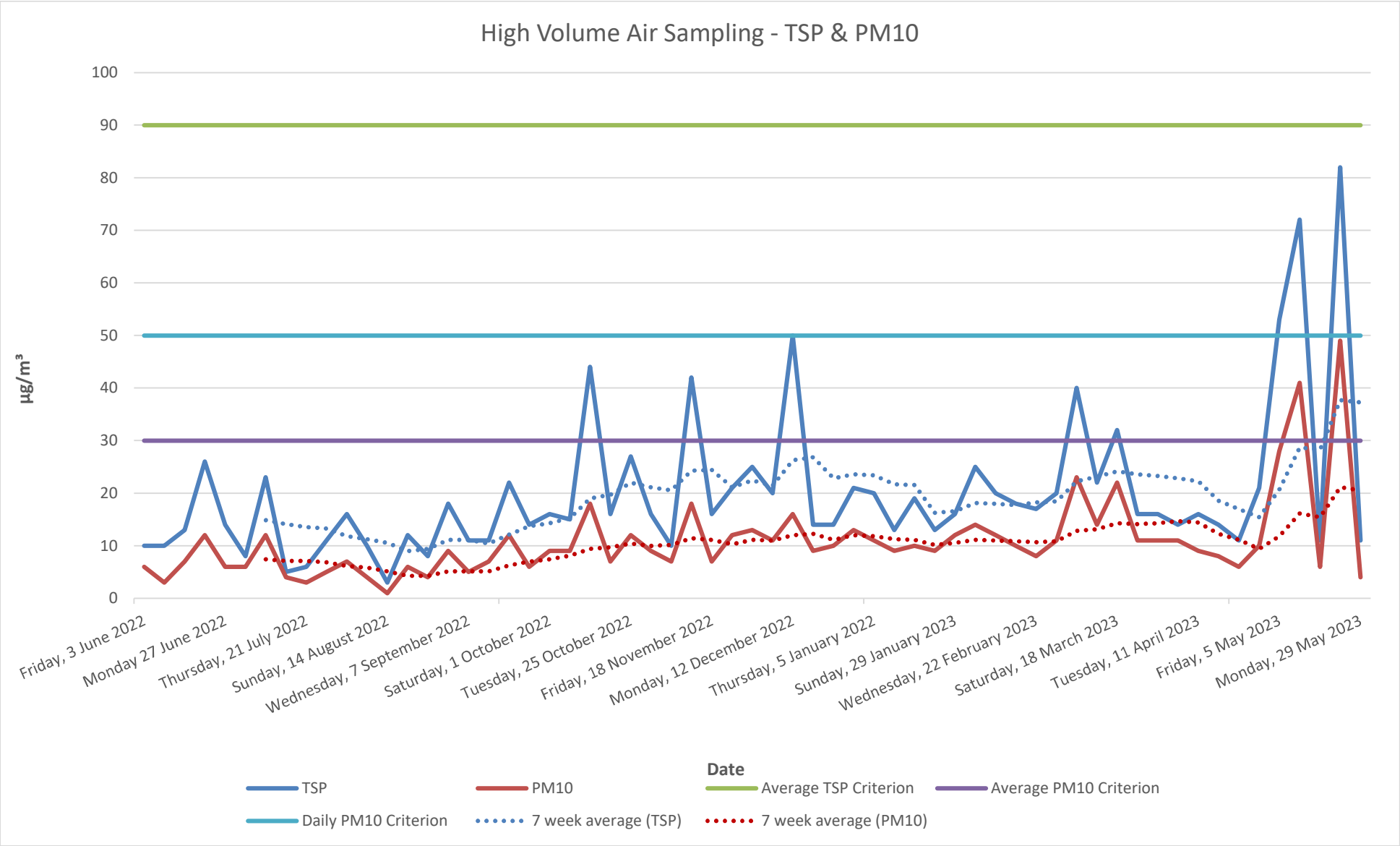


Figure 1 HVAS Sampling Long-term Trends

### 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 20611 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 Blasting criteria**

Location	Airblast Overpressure (Decibels (Linear Peak))	Ground Vibration Peak Particle Velocity (Millimetres/second)	Allowable exceedance
Private residence (Location B)	120	10	0%
	115	5	5% of total blasts over 12 months

There were three blasts conducted in May 2023, see Table 10 for monitoring results.

**Table 10 Blast monitoring results**

Date	Time	Location	Overpressure (dB(L))	Vibration (mm/s)
Monday, 12 May 2023	2:33pm	RL 105	112	0.92
Thursday, 22 May 2023	12:30pm	RL 128	Nil Trigger	Nil Trigger
Thursday, 29 May 2023	12:33pm	RL 135	Nil Trigger	Nil Trigger

The monitoring results demonstrate compliance with blasting criteria of the Consent and the EPL.



## 4 NOISE MONITORING

Noise monitoring is undertaken in accordance with the approved *Noise Management Plan* (April, 2022).

As the Quarry is operational with no construction activities being completed, construction noise is not being considered. Table 11 summarises the operational noise criteria.

Noise generated by the Quarry operation must not exceed the criteria specified in *Schedule 3, Condition 3* of the Consent at each location outlined in Table 11.

**Table 11 Operational Noise Criteria (dB(A)  $L_{Aeq(15min)}/L_{A(max)}$ )**

Monitoring Location ID	Description	Easting (MGA)	Northing (MGA)	Applicable noise limit, dB		
				Morning Shoulder $L_{Aeq(15\text{ minute})}/L_{Amax}$	Day $L_{Aeq(15\text{ minute})}$	Evening $L_{Aeq(15\text{ minute})}$
A	Mill Hill Close West	406623	6388704	35/52	42	40
B	Mill Hill Close West	406405	6388859	35/52	40	40
F	The Branch Lane West	405639	6389782	35/52	40	35
G	Halloran Road South	408154	6389523	35/52	43	39
H	Halloran Road West	407795	6389868	35/52	44	46

In accordance with the Consent, a noise monitoring program has been implemented. A summary of this monitoring program is outlined in Table 12.

**Table 12 Noise monitoring locations**

Monitoring Method	Location	Frequency	Criteria
Attended noise monitoring	A, B, F, G, H	Quarterly	Refer to Table 11

### 4.1 ATTENDED MONITORING

The most recent results for attended monitoring, undertaken 19 April and 24 April 2023 (see Table 13), show ambient noise levels include noise sources such as traffic from the nearby Pacific Highway and wildlife such as insects and birds. The Quarry operations were audible at location G and H during day and evening period. Monitoring for all locations across all periods was compliant with the criteria.

### 4.2 UNATTENDED NOISE MONITORING

A review of the historical unattended noise monitoring data by expert noise consultants (EMM) found no evident trends associated with Karuah East Quarry operations. As a result of this review, Karuah East Quarry has decided to cease the unattended noise monitoring component of the quarterly compliance noise monitoring program.

**Table 13 Attended Noise Monitoring (EMM, April 2023)**

Location	Start Date and Time (Period)	Wind		Stability Class	Limits apply? <sup>1</sup>	Limit, dB		Site level, dB <sup>2</sup>		Exceedance, dB	
		Speed m/s	Direction <sup>4</sup>			L <sub>Aeq,15minute</sub>	L <sub>Amax</sub>	L <sub>Aeq,15minute</sub>	L <sub>Amax</sub>	L <sub>Aeq,15minute</sub>	L <sub>Amax</sub>
H	19/04/2023 15:35 (D)	2.4	136	A	Y	44	N/A	IA	N/A	No	N/A
G	19/04/2023 15:54 (D)	2.0	128	A	Y	43	N/A	IA	N/A	No	N/A
F	19/04/2023 16:20 (D)	1.7	131	A	Y	40	N/A	IA	N/A	No	N/A
B	19/04/2023 16:54 (D)	0.9	137	A	Y	40	N/A	IA	N/A	No	N/A
A	19/04/2023 17:15 (D)	1.2	128	A	Y	42	N/A	IA	N/A	No	N/A
H	19/04/2023 18:00 (E)	0.7	130	F	Y	46	N/A	IA	N/A	No	N/A
G	19/04/2023 18:17 (E)	0.8	136	F	Y	39	N/A	IA	N/A	No	N/A
F	19/04/2023 18:42 (E)	0.9	135	F	Y	35	N/A	IA	N/A	No	N/A
B	19/04/2023 19:02 (E)	0.9	141	F	Y	40	N/A	IA	N/A	No	N/A
A	19/04/2023 19:19 (E)	1.0	141	E	Y	40	N/A	IA	N/A	No	N/A

Location	Start Date and Time (Period)	Wind		Stability Class	Limits apply? <sup>1</sup>	Limit, dB		Site level, dB <sup>2</sup>		Exceedance, dB	
		Speed m/s	Direction <sup>4</sup>			L <sub>Aeq,15minute</sub>	L <sub>Amax</sub>	L <sub>Aeq,15minute</sub>	L <sub>Amax</sub>	L <sub>Aeq,15minute</sub>	L <sub>Amax</sub>
H	24/04/2023 5:06 (MS)	0.4	333	F	Y	35	52	IA	IA	No	No
G	24/04/2023 5:24 (MS)	0.4	322	F	Y	35	52	IA	IA	No	No
F	24/04/2023 6:06 (MS)	0.1	336	F	Y	35	52	IA	IA	No	No
B	24/04/2023 6:25 (MS)	0.3	321	F	Y	35	52	IA	IA	No	No
A	24/04/2023 6:43 (MS)	0.1	331	F	Y	35	52	IA	IA	No	No

## 5 SURFACE WATER MONITORING

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### 5.1 MONTHLY SURFACE WATER MONITORING PROGRAM

Monthly water monitoring was undertaken on 5 May 2023 in accordance with the *Surface Water Monitoring Program* outlined in the *KEQ Water Management Plan (2015)*. Results are displayed in Table 14 along with the EPL discharge criterion and ANZECC (2000) Guidelines. These results do not determine compliance, they are used to analyse trends and assist with water management.

**Table 14 Water monitoring results**

Parameter	Units of measure	EPL 20611 concentration limit during discharge	Dam 1	Dam 2	Dam 3	SW 2	SW 3
Oil and grease	Milligrams per litre	5 and/or non-visible	<5	<5	<5	<5	<5
pH	pH	6.5 – 8.5	7.21	7.84	7.83	6.77	6.54
Total suspended solids	Milligrams per litre	40	2040	8	18	957	114
		<b>ANZECC Guidelines<sup>1</sup></b>					
Conductivity	µS/cm	125 – 2200	395	393	535	449	296
Total dissolved solids	mg/L	--	2050	552	314	430	1010
Total phosphorus	mg/L	0.025	1.37	0.08	0.06	0.17	0.69
Ammonia	mg/L	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrogen (Nitrate)	mg/L	0.350	6.4	0.01	0.02	0.07	0.06
Total hardness (as CaCO <sub>3</sub> )	mg/L	--	11	257	102	48	20
Arsenic	mg/L	0.024	0.002	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Calcium	mg/L	--	2	88	31	6	3
Chromium	mg/L	0.001	0.008	<0.001	<0.001	0.001	0.004
Copper	mg/L	0.0014	0.041	<0.001	0.001	0.004	0.019
Lead	mg/L	0.0034	0.024	<0.001	<0.001	0.003	0.013
Magnesium	mg/L	--	2	9	6	8	3
Manganese	mg/L	1.9	0.641	0.103	0.039	0.087	0.251
Nickel	mg/L	0.011	0.011	<0.001	<0.001	0.001	0.006

Potassium	mg/L	--	1	1	<1	2	1
Sodium	mg/L	--	73	48	59	66	44
Vanadium	mg/L	--	0.05	<0.01	<0.01	<0.01	0.02
Zinc	mg/L	0.0312	0.139	<0.005	0.006	0.017	0.086

Note 1 – Key default trigger values presented in ANZECC 2000 for slightly disturbed upland rivers in NSW. Heavy metals based on hard water (120-179 mg CaCO<sup>3</sup>/L).

## 5.2 DISCHARGE MONITORING

Condition L2 of the EPL outlines the requirement to monitor water discharges from the Quarry via the licensed discharge points (LDP1, LDP2 and LDP3), see Table 15.

**Table 15 EPL20611 - Pollutant concentration limits**

Pollutant	Units of Measure	Concentration Limit
Oil and Grease	Visible	5 &/or none visible
pH	pH units	6.5 – 8.5
Total suspended solids	Milligrams per litre	40

### 5.2.1 Dam 1 (LDP1)

Dam 1 had zero days of discharge during the month of May (see Table 16).

**Table 16 Discharge monitoring – LDP1**

Date	pH	Total suspended solids	Oil and grease	Controlled
-	-	-	-	-

### 5.2.2 Dam 2 (LDP2)

Dam 2 had zero days of discharge during the month of May (see Table 17).

**Table 17 Discharge monitoring – LDP2**

Date	pH	Total suspended solids	Oil and grease	Controlled
-	-	-	-	-

### 5.2.3 Dam 3 (LDP3)

Dam 3 had zero days of discharge during the month of May (see Table 18).

**Table 18 Discharge monitoring – LDP3**

Date	pH	Total suspended solids	Oil and grease	Controlled
-	-	-	-	-

## 6 WEATHER MONITORING

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Karuah East Quarry has a permanent meteorological station to monitor various weather parameters including temperature, wind speed/direction, solar radiation, and rainfall. Figure 2 shows the recorded results for the local weather during May 2023.

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 May 2023.



## Monthly Weather Summary



Site: Karuah Quarry

Month: May 2023

Date	Day	Temperature @ 2m			Temperature @ 10m			Winds			Solar Radiation		Rain <sup>2</sup>
		Max <sup>1</sup>	Min <sup>2</sup>	Ave <sup>1</sup>	Max <sup>1</sup>	Min <sup>2</sup>	Ave <sup>1</sup>	Max Gust <sup>1</sup>	Ave Speed <sup>1</sup>	Dir Ave <sup>1</sup>	Max <sup>1</sup>	Ave <sup>1</sup>	
		°C	°C	°C	°C	°C	°C	km/h	km/h	deg	W/m <sup>2</sup>	W/m <sup>2</sup>	mm
1	Mon	22.1	10.5	15.1	20.8	12.2	15.8	17.2	4.3	270	749.9	135.1	0.0
2	Tue	21.0	9.5	14.6	19.4	12.0	15.1	19.3	6.2	295	633.3	137.6	0.0
3	Wed	22.6	8.9	15.0	21.4	10.0	15.8	18.6	3.8	227	547.5	137.0	0.0
4	Thu	24.8	8.8	17.8	23.7	11.4	18.5	26.4	7.3	264	628.3	138.3	0.0
5	Fri	20.9	6.8	12.6	18.8	7.6	12.8	16.1	3.1	241	546.7	138.6	0.0
6	Sat	22.1	7.1	13.8	20.8	8.6	14.5	11.8	2.6	206	704.1	121.5	0.0
7	Sun	23.0	6.9	13.1	22.0	8.0	13.9	12.0	2.5	207	552.5	137.9	0.0
8	Mon	18.8	7.5	12.0	17.2	7.9	12.2	25.4	10.2	285	655.8	106.9	2.0
9	Tue	18.8	8.3	13.2	17.3	9.5	13.2	26.4	7.9	279	631.6	129.7	0.0
10	Wed	20.4	6.1	12.8	18.5	6.9	13.4	20.4	4.8	218	703.2	122.2	0.0
11	Thu	21.2	7.3	12.3	19.0	8.1	12.6	15.9	3.8	245	575.8	126.2	0.0
12	Fri	22.5	8.3	13.5	20.1	9.7	14.1	11.7	2.4	194	539.1	119.0	0.0
13	Sat	23.3	7.6	14.1	21.6	7.9	14.5	10.4	2.6	183	501.6	120.7	0.0
14	Sun	22.0	8.8	13.0	20.8	8.9	13.2	10.1	2.1	215	659.2	82.6	0.0
15	Mon	22.0	9.2	13.9	19.9	9.8	13.8	11.2	2.2	206	712.4	89.1	0.6
16	Tue	21.3	10.3	13.7	19.6	10.8	13.9	16.1	2.4	216	705.0	81.0	0.0
17	Wed	21.1	9.0	14.2	19.8	10.2	14.5	16.1	3.9	194	500.0	91.5	25.0
18	Thu	15.5	9.6	11.8	15.2	9.7	11.9	17.7	4.8	240	617.4	49.1	31.8
19	Fri	17.3	8.5	11.7	16.3	8.8	11.9	20.3	4.3	245	619.9	74.7	4.2
20	Sat	18.4	2.8	9.1	17.2	4.2	10.0	15.1	3.0	233	469.2	108.0	0.0
21	Sun	17.8	6.6	12.1	16.8	8.9	13.3	19.9	5.4	296	470.0	114.0	0.0
22	Mon	19.1	7.7	13.5	18.4	9.6	14.0	27.6	8.3	297	535.0	108.6	0.0
23	Tue	19.7	3.1	9.6	18.6	4.3	10.2	13.6	2.6	244	464.1	115.2	0.0
24	Wed	20.5	3.5	9.6	19.5	4.6	10.3	9.1	2.3	219	468.3	115.1	0.0
25	Thu	21.7	4.2	10.7	21.3	5.5	11.8	7.3	2.1	207	480.8	116.3	0.0
26	Fri	23.1	6.9	13.0	21.9	9.0	14.3	6.9	1.8	170	524.2	109.6	0.0
27	Sat	21.7	4.5	10.6	20.2	5.4	11.4	27.2	5.0	250	608.3	54.3	36.8
28	Sun	17.6	1.7	8.5	16.5	2.9	9.7	14.7	3.1	231	446.7	109.3	0.0
29	Mon	16.4	4.1	9.3	15.5	5.8	11.0	18.7	4.1	265	495.0	104.5	0.0
30	Tue	20.2	5.2	11.5	19.4	7.4	13.8	21.9	4.8	269	562.5	105.2	0.0
31	Wed	20.1	5.6	11.1	19.6	7.0	12.0	17.8	2.9	230	440.0	102.7	0.0
Ave or Total		20.5	6.9	12.5	19.3	8.1	13.1	16.9	4.1	236.7	572.5	109.7	100.4
High		24.8	10.5	17.8	23.7	12.2	18.5	27.6	10.2		749.9	138.6	36.8
Low		15.5	1.7	8.5	15.2	2.9	9.7	6.9	1.8		440.0	49.1	

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: 5

Figure 2 Weather Summary - May 2023

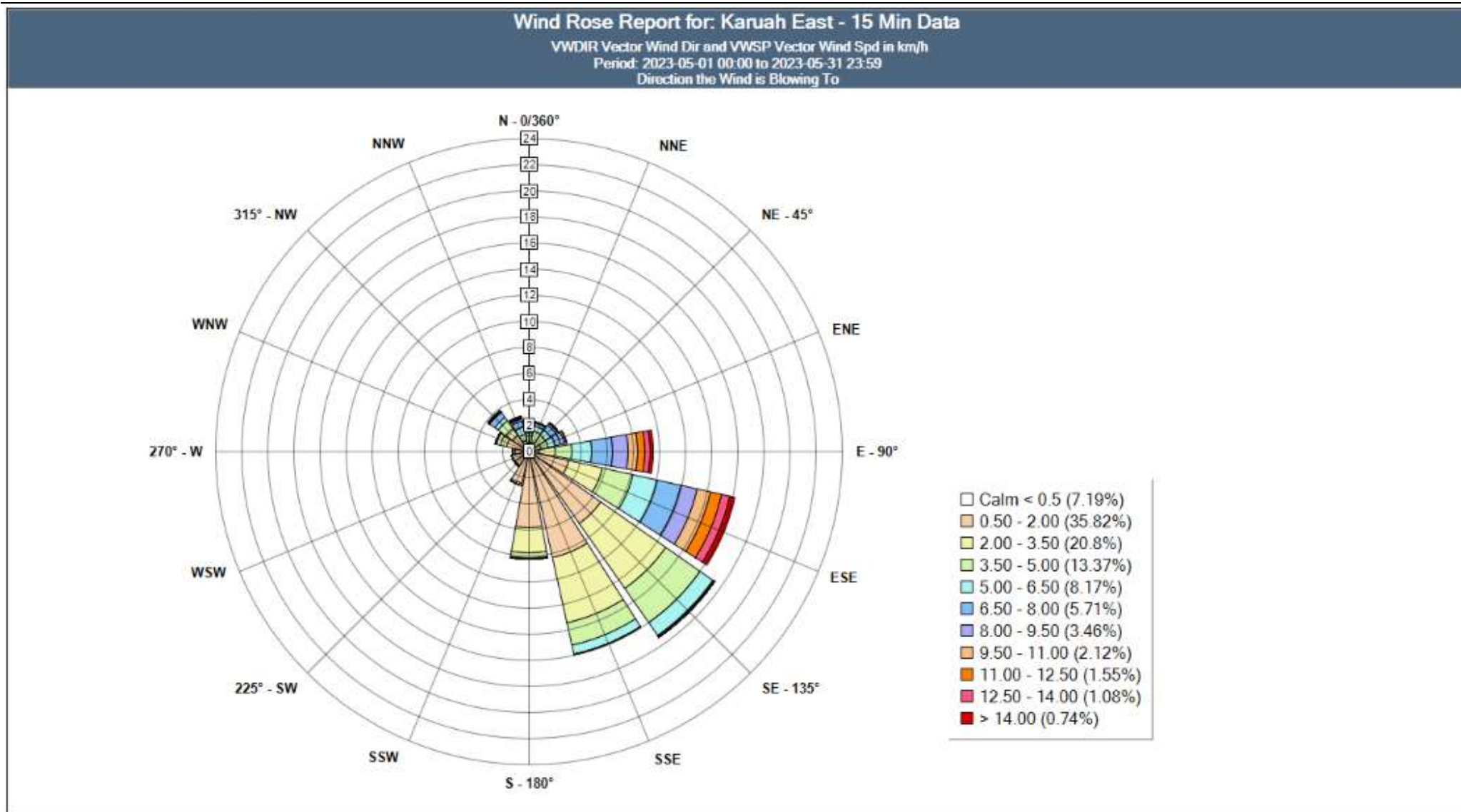


Figure 3 Wind Rose - May 2023

## 7 REPORTING

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### 7.1 COMMUNITY CONSULTATIVE COMMITTEE

The purpose of a Community Consultative Committee (CCC) is to provide a forum for discussion between a proponent (KEQPL) and representatives of the community, stakeholder groups and the local council on issues directly relating to a specific State Significant Project (KEQ).

The KEQ CCC generally meets biannually (twice a year). Meeting minutes can be found at Hunter Quarries website <<https://hunterquarries.com.au/>>.

On 19 March, the first KEQ CCC meeting for 2023 was held, below are the key details:

- A site inspection was undertaken with three KEQPL representatives and five community representative.
- The meeting was facilitated at the Karuah RSL with one chairperson, five community representatives and three KEQPL representatives.
- The next CCC meeting is scheduled for September 2023.

### 7.2 PRODUCTION

For the month of May 95,428 tonnes of various quarry products were produced.

### 7.3 NON-COMPLIANCE

There were nil non-compliance events during May 2023 to report (see Table 19).

**Table 19 Non-compliance Register**

Date	Nature of Incident	Action
May 2023	Nil complaints received	Nil action required

### 7.4 COMPLAINTS

There were nil complaints received during May 2023 (see Table 20).

**Table 20 Complaints Register**

Date	Nature of Complaint	Action
May 2023	Nil complaints received	Nil action required

# Appendix 1 – Monitoring Locations



# Karuah East Quarry

Monitoring Locations

## Legend

- Attended Noise
- Dust Deposition
- Groundwater
- High Volume Air Samplers
- Surface Water
- Unattended Noise



Google Earth

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