



Karuah Hard Rock Quarry

Summary of Environmental Monitoring Data



For the Period: December 2016

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* (October 2013). This report summarises the required monitoring data under Environmental Protection Licence (EPL) 11569 for the Karuah Hard Rock Quarry (Karuah Quarry). This report also includes some monitoring requirements under Development Consent (DA 265-10-2004).

A summary of the environmental monitoring data for December 2016 is covered in this report.

A summary of the licence information is provided in the tables in the report.

Table 1 – Licence Information

Environmental Protection Licence Number	11569
Licensee's Name	Hunter Quarries Pty Ltd
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	EPL 11569

2. Dust Monitoring Results

There are no specific dust criteria listed in the EPL, but the following dust criteria (**Table 2**) are listed in Schedule 3 Condition 14 of DA 265-10-2004.

Table 2 - DA 265-10-2004 Dust Deposition Criteria for the Karuah Quarry

Averaging Period	Maximum Increase in Deposited Dust Level¹	Maximum Total Deposited Dust Level¹
Annual	2 g/m ² /month	4 g/m ² /month

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

SLR Consulting Australia Pty Ltd (SLR) undertakes depositional dust monitoring at Karuah Quarry. Monitoring is completed at the locations listed in **Table 3** below.

Table 3 – Air Quality Monitoring Locations for the Karuah Quarry

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

Site ID	Location	Address	GPS Coordinates
	Quarry	North Arm Cove NSW 2324	152°01'10.18"E

Appendix 1 Illustrates the air quality monitoring locations at Karuah Quarry.

Air quality monitoring was undertaken during the period 23 November 2016 to 21 December 2016 at the locations detailed in **Table 4**. Depositional dust gauge (g/m²/month) results for this month and the year to date are shown in **Table 4**.

Table 4 – Insoluble Solids (g/m²/month) for the Year to Date

EPL		11569		
Date Sampled		21 December 2016		
Date	DDG 1	DDG 2	DDG 3	DDG 4
18/9/2013 to 17/10/2013	1.9	1.4	1.5	2.1
17/10/2013 to 18/11/2013	0.5	1.8	0.7	9.5
18/11/2013 to 16/12/2013	1.1	0.7	2.6	1.6
16/12/2013 to 13/1/2014	1.2	0.7	0.7	1.7
13/1/2014 to 14/2/2014	1.4	0.9	1.2	1.7
14/2/2014 to 18/3/2014	1.0	1.2	1.4	1.2
18/3/2014 to 16/4/2014	0.7	0.4	0.3	1.3
16/4/2014 to 15/5/2014	1.8	0.5	1.1	1.2
15/5/2014 to 1/7/2014	1.1	0.6	0.4	0.3
1/7/2014 to 31/7/2014	0.5	0.5	0.5	0.5
31/7/2014 to 29/8/2014	1.2	0.9	0.5	0.5
29/8/2014 to 25/9/2014	0.6	0.6	0.5	7.1
25/9/2014 to 24/10/2014	1.2	1.0	0.8	0.6
24/10/2014 to 22/11/2014	1.3	1.2	1.1	1.1
22/11/2014 to 22/12/2014	2.2	2.2	0.5	2.9
22/12/2014 to 20/1/2015	0.9	1.2	0.7	0.6
20/1/2015 to 17/2/2015	0.6	0.7	0.1	1.1
17/2/2015 to 18/3/2015	0.8	2.5	0.6	1.2
18/3/2015 to 15/4/2015	1.0	3.0	0.8	1.1
15/4/2015 to 14/5/2015	1.7	3.7	1.1	1.2
14/5/2015 to 12/6/2015	0.3	1.0	0.4	0.8
12/6/2015 to 10/7/2015	0.5	0.3	0.2	0.3
10/7/2015 to 7/8/2015	1.6	0.9	0.7	0.7
7/8/2015 to 7/9/2015	1.4	0.4	0.6	2.1
7/9/2015 to 8/10/2015	0.8	0.4	0.3	0.3
8/10/2015 to 6/11/2015	1.3	1.2	0.6	0.5
6/11/2015 to 8/12/2015	2.1	0.8	2.8	4.1
8/12/2015 to 8/1/2016	6.4	0.9	0.6	1.2
8/1/2016 to 8/2/2016	1.4	0.9	1.1	1.2
8/2/2016 to 3/3/2016	4.0	0.7	0.6	0.9
3/3/2016 to 4/4/2016	3.1	0.3	1.0	2.0
4/4/2016 to 6/5/2016	1.5	1.1	0.4	3.2
6/5/2016 to 3/6/2016	1.0	0.9	0.7	0.4
3/6/2016 to 4/7/2016	0.4	1.6	0.5	0.3
4/7/2016 to 1/8/2016	1.4	0.7	0.3	0.5

1/8/2016 to 31/8/2016	2.7	3.0	0.8	0.7
31/8/2016 to 28/9/2016	2.1	1.6	0.8	0.8
28/9/2016 to 26/10/2016	0.8	0.6	0.8	0.5
26/10/2016 to 23/11/2016	0.7	1.0	1.3	2.3
23/11/2016 to 21/12/2016	1.3	0.5	0.9	1.0
Rolling Annual Average	1.9	1.0	0.8	1.2

Monitoring results indicate that for the period 23 November 2016 to 21 December 2016 the insoluble solid levels recorded at DDG1 to 4 monitoring locations were at or below the project criterion of 4 g/m²/month.

3. Blast Monitoring Results

The following conditions in EPL 11569 refer to blast management.

M6.1 The licensee must monitor all blasts carried out in or on the premises at or near the nearest residence or noise sensitive location (such as a school or hospital) that is likely to be most affected by the blast and that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee relating to alternative blasting limits.

L4.1 Blasting in or on the premises must only be carried out between 0900 hours and 1500 hours, Monday to Friday. Blasting in or on the premises must not take place on weekends or Public Holidays without the prior approval of the EPA.

L4.2 The overpressure level from blasting operations carried out in or on the premises must not:

- a) exceed 115 dB(L) for more than 5% of the total number of blasts carried out on the premises within the 12 months annual reporting period; and*
- b) exceed 120 dB(L) at any time at any residence or noise sensitive location (such as a school or hospital) that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative overpressure level.*

L4.3 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not:

- a) exceed 5mm/second for more than 5% of the total number of blasts carried out on the premises within the 12 months annual reporting period; and*
- b) exceed 10mm/second at any time at any residence or noise sensitive location (such as a school or hospital) that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative ground vibration level.*

Table 5 summarises the December 2016 blasting results.

Table 5: December 2016 Blast Monitoring Results

Date and time	Overpressure and Vibration	Monitor 1 (Weighbridge)	Monitor 2 (Nearest Resident)
09/12/2016 12:28 pm	Overpressure dB(L)	111.8	Below detection limits
	Vibration(mm/s)	0.646	Below detection limits

As shown in **Table 5**, one blast was undertaken on 9 December 2016. The monitoring results recorded were below the overpressure and ground vibration EPL criteria. The blast was below the set minimum trigger levels at Monitor 2. Blast monitoring trigger levels at Karuah Quarry are set at 88 dB(L) for overpressure and 0.5 mm/s for vibration.

4. Noise Monitoring Results

Schedule 3 Condition 1 of the Development Consent requires Hunter Quarries to ensure noise generated by the development does not exceed criteria outlined in **Table 6** at any residence, or any noise sensitive receptor on privately owned land.

Table 6 – Development Consent Noise Impact Criteria – Karuah Quarry

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 7 illustrates the operator attended and unattended noise monitoring locations at Karuah Quarry.

Table 7 – Development Consent Noise Impact Criteria – Karuah Quarry

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
NM3	Lot 22 DP 1024341	370 metres South West of the Karuah Quarry

4.1 Operator Attended Monitoring Results

The results of the operator attended noise surveys are presented in **Table 8**. Ambient noise levels given in the tables include all noise sources such as traffic, insects, birds and quarry operations.

Table 8 – Operator Attended Noise Survey Results

Location	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 μ Pa)					Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
NM1 Lot 3 DP785172	12/12/2016 15:30 Wind: 3m/s E Temp 32°C	77	73	69	58	66	Pacific Highway ~ 65-77 Insects ~44 Quarry inaudible
		Contribution not measurable above background noise.					
NM2 Lot 3 DP785172	12/12/2016 15:11 Wind: 2.5m/s E Temp 32°C	70	68	63	56	60	Pacific Highway ~ 61-70 Insects ~55 Birds ~57 Quarry barely audible in lulls Dumping 45-46
		Estimated Karuah Quarry Operations L _{Aeq} <46 dBA					
NM3 Lot 22 DP102431	12/12/2016 15:49 Wind: 3m/s E Temp 32°C	76	66	63	57	61	Pacific Highway ~ 58-76 Insects 45-50 Birds 65 Quarry audible in lulls Screening/Crushing to 47 Dumping to 55
		Estimated Karuah Quarry Operations L _{Aeq} 47 dBA					

4.2 Unattended Continuous Noise Monitoring

Unattended noise monitoring results for locations NM1 and NM2 are presented in **Table 9**. Noise monitoring results could not be obtained for location NM2 due to an unknown logger error.

Table 9 – Unattended Continuous Monitoring Ambient Noise Levels

INP Period	LA1	LA10	LA90	LAeq
NM1				
Daytime during Operational Hours ¹	73	69	57	66
Daytime outside Operational Hours ²	74	69	57	66
Evening ³	76	69	53	66
Night ⁴	75	68	44	64
NM3				
Daytime during Operational Hours ¹	66	62	53	60
Daytime outside Operational Hours ²	65	61	53	59
Evening ³	65	62	51	59
Night ⁴	66	63	50	61

Note:

1. Daytime - 7.00 am to 5.00 pm Monday to Friday, 8.00 am to 12.00 pm Saturday, not operational on Sunday
2. Daytime - 5.00 pm to 6.00 pm Monday to Friday, 12.00 pm to 6.00 pm Saturday, 8.00 am to 6.00 pm Sunday
3. Evening - 6.00 pm to 10.00 pm
4. Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

4.3 Noise Results Summary

Operator attended and unattended noise monitoring was conducted at the three nearest residences to determine noise levels produced by Karuah Quarry operations. Unattended noise monitoring results could not be obtained for NM2 due to equipment failure.

The noise contribution of Karuah Quarry operations remained lower than that from the road traffic on the Pacific Highway during all attended noise surveys. The Karuah Quarry contribution [LAeq(15minute)] was not measurable above background noise at NM1 and estimated to be below 46 dBA and 47 dBA at NM2 and NM3 respectively. Therefore the noise emission levels from the Karuah Quarry were in compliance with the consent criteria of 48 dBA LAeq(15minute) at all monitoring locations.

Results from the ambient unattended measurements at locations NM1 and NM3 also indicated that Karuah Quarry is not a major contributor to ambient noise levels at each of these locations.

5. Surface Water Monitoring Results

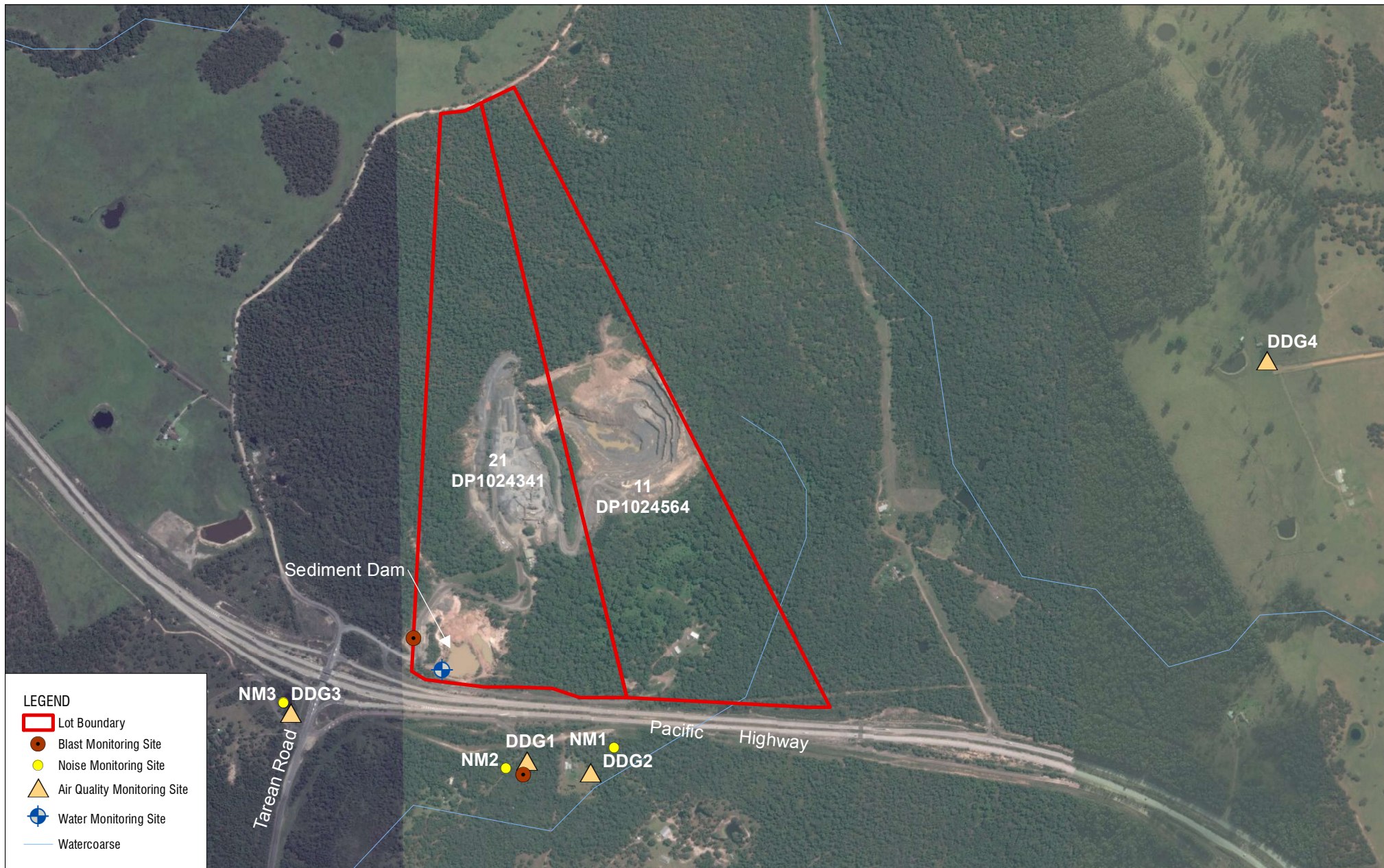
Condition L2 of the EPL outlines the requirement to monitor surface water discharges from the Karuah Quarry via the licensed discharge point (LDP001).

Table 10 summarises discharge monitoring at Karuah Quarry. There were no surface water discharges in December 2016.

Table 10 - Surface Water Discharge Monitoring Results

Sampling Point	Monitoring Frequency	Pollutant	Measurement	EPL Limit
LDP001	During Discharge	pH	<i>No discharge during December 2016</i>	6.5 – 8.5
		TSS		50

Appendix 1 – Monitoring Locations



LEGEND

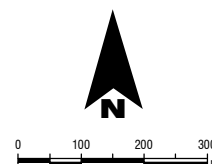
- Lot Boundary
- Blast Monitoring Site
- Noise Monitoring Site
- ▲ Air Quality Monitoring Site
- ⊕ Water Monitoring Site
- Watercourse

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Project No.:	633.HQP00.0030
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Environmental Services and Support

**Karuah Hard Rock Quarry
Environmental Monitoring Locations**

FIGURE 1