ACOUSTICS AND AIR

CALGA SAND QUARRY

ATTENDED COMPLIANCE NOISE MONITORING
1 OCTOBER 2015

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AAAC

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Wilkinson Murray is an independent firm established in 1962, originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. 2010 saw the introduction of our Queensland office and 2011 the introduction of our Orange office to service a growing client base in these regions. From these offices, Wilkinson Murray services the entire Asia-Pacific region.

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

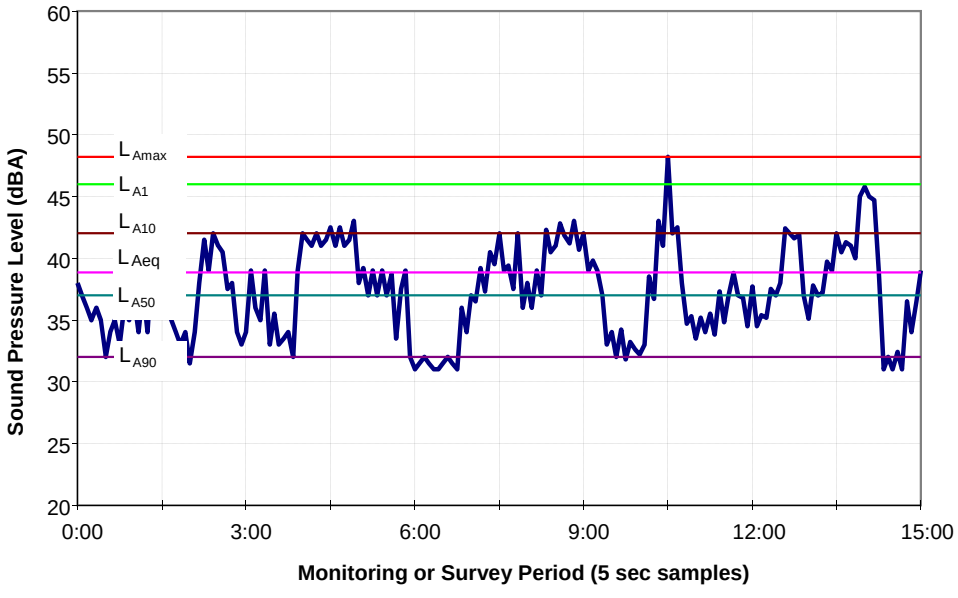
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

This report summarises the results of the quarterly attended noise monitoring conducted on 1 October 2015 and carried out in accordance with Condition 3(7) of Development Consent DA 94-4-2004.

The Noise Monitoring Program (NMP) prepared by R.W. Corkery & Co. Pty Ltd summarises all relevant criteria, monitoring locations, and frequency / timing of monitoring.

2 SITE DESCRIPTION

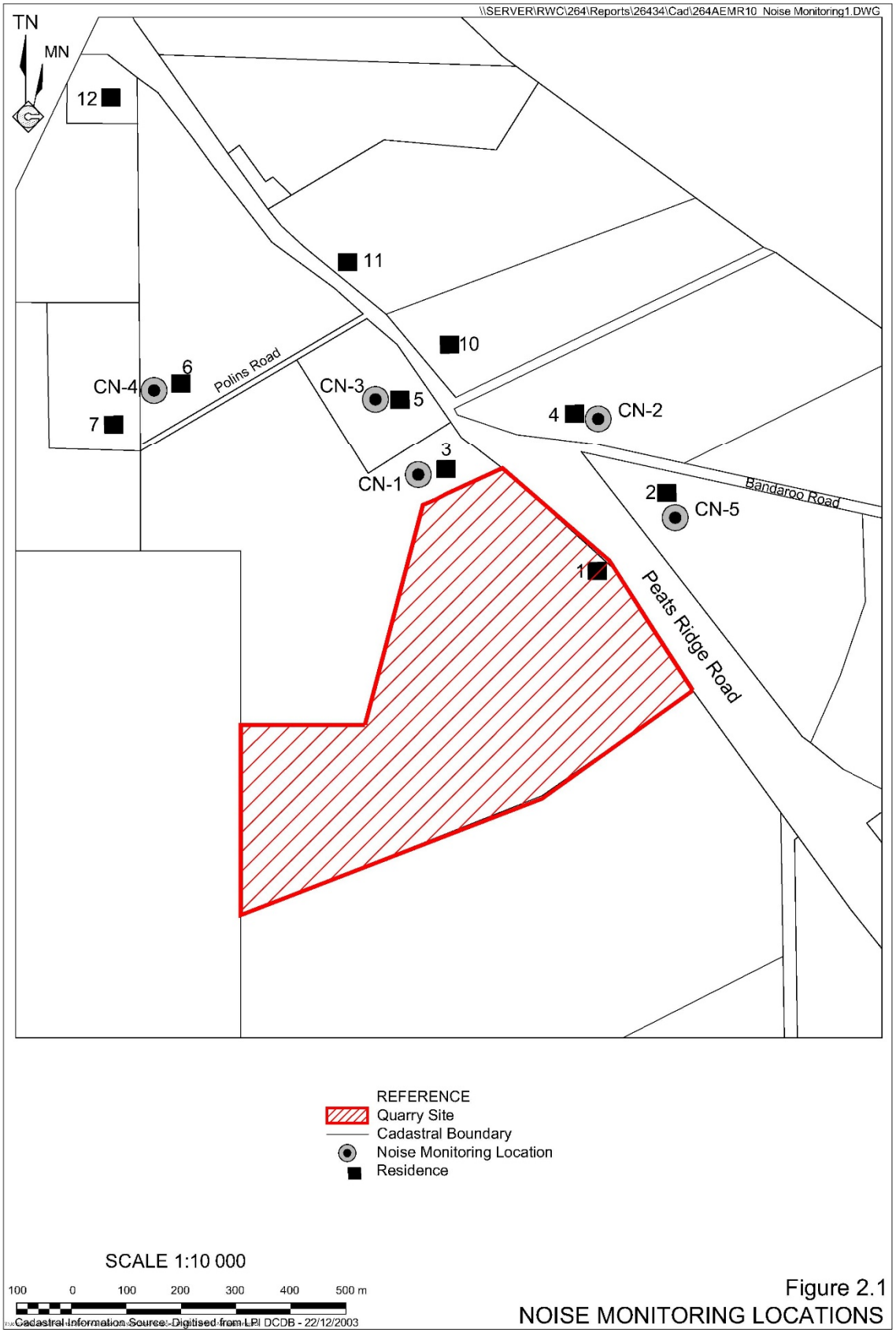
Attended noise monitoring was conducted on Thursday, 1 October 2015. Measurements were made at each of the following locations (shown in Figure 2-1):

- CN-1 Gazzana Residence;
- CN-2 King Residence;
- CN-3 Kashouli Residence; and
- CN-4 Townsend Residence.

All measurements were conducted using a Bruel and Kjaer Type 2236 Sound Level Meter. This sound level meter conforms to Australian Standard 1259 *Acoustics – Sound Level Meters* as a Type 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The A-Weighting filter of the meter was selected and the time weighting was set to "Fast". The calibration of the meter was checked before and after the measurements with a Bruel and Kjaer Type 4230 sound level calibrator and no significant drift was noted.

The Bruel and Kjaer Type 2236 and Type 4230 have been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures.

Figure 2-1 Noise Monitoring Locations



3 OPERATIONAL NOISE CRITERIA

The Noise Monitoring Program presents noise criteria for the operation of plant or equipment on the premises as required by the Environment Protection Authority (EPA) licence (EPL 11295). It states that noise levels emanating from the premises must not exceed the relevant criteria when measured within 30m of the residences or noise sensitive areas.

Daytime operational noise is assessed as an $L_{Aeq,15min}$ noise level. The L_{Aeq} level is the Equivalent Continuous Sound Level and represents the level of a continuous sound with the same average sound energy over the sampling period as the actual noise environment with its fluctuating sound levels.

Table 3-1 summarises the daytime noise criteria.

Table 3-1 Operational Daytime Noise Criteria *

Location	Daytime Criteria $L_{Aeq,15min}$ (dBA)
CN-1	41
CN-2	40
CN-3	39
CN-4	35

* Source: EPL 11295

4 METEOROLOGICAL DATA

Based on site observations, weather conditions were appropriate for conducting environmental noise measurements during the day of survey. This was confirmed by meteorological data obtained from the site's weather station.

Table 4-1 summarises meteorological conditions during the noise survey obtained from the site's weather station.

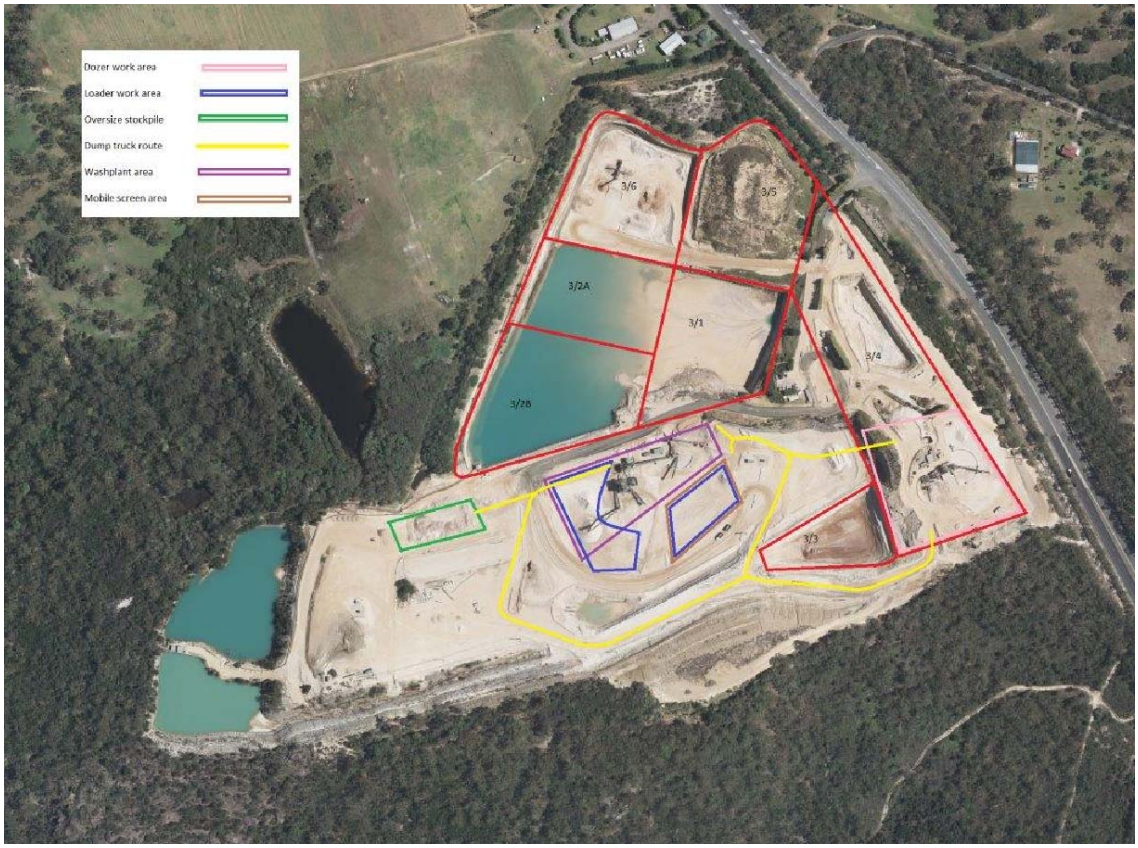
Table 4-1 Meteorological Conditions during Noise Survey (Thursday, 1 October 2015)

Time Period	Wind Speed (m/s)	Wind Direction	Rain (mm)
11.00am – 11.15am	1.8	NNW	0
11.15am – 11.30am	0.9	NW	0
11.30am – 11.45am	0.4	NNW	0
11.45am – 12.00pm	0.9	W	0
12.00pm – 12.15pm	0.4	N	0
12.15pm – 12.30pm	0.9	NE	0

5 DESCRIPTION OF SITE OPERATIONS

Figure 5-1 presents an aerial of the quarry site with the works generally taking place during the monitoring survey.

Figure 5-1 Quarry Site Layout and Operational Areas



The following mobile plant and equipment were in operation during the time of the monitoring.

- Dozer ripping and pushing sandstone in Stage 3/4.
- Excavator loading dump truck with raw feed from Stage 3/4 to washplant.
- Dump truck taking raw feed from Stage 3/4 to washplant stockpile.
- Front end loader producing brickies sand, loading sales trucks and loading dump truck with oversize to be taken to oversize stockpile.
- Water truck was in operation to suppress dust on designated haul road.
- Dry screening plant was in full production.
- Washplant was in full production.

6 ASSESSMENT OF NOISE LEVELS

Table 6-1 summarises the measurement results and compares them against the relevant daytime noise criteria.

Table 6-1 Attended Noise Measurement Results (Thursday, 1 October 2015)

Location	Time	$L_{Aeq,15min}$ due to Quarry Operations (dBA)	Daytime Criteria $L_{Aeq,15min}$ (dBA)	Comments
CN-1	11.00am – 11.15am	32	41	Distant washery audible during lulls in traffic, est. 28-34dBA. Distant mobile from the site audible very briefly, 37-41dBA. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 50-54dBA and L_{Amax} 60-65dBA, respectively.
CN-3	11.21am – 11.36am	Inaudible	39	Quarry noise inaudible at all times. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 53-55dBA and L_{Amax} 63-67dBA, respectively.
CN-4	11.40am – 11.55am	Inaudible	35	Quarry noise inaudible at all times. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 42-46dBA and L_{Amax} 45-51dBA, respectively.
CN-2	12.02pm – 12.17pm	Inaudible	40	Quarry noise inaudible at all times. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 49-52dBA and L_{Amax} 56-59dBA, respectively.

Table 6-1 shows that measured $L_{Aeq,15min}$ noise levels due to quarry operations comply with the relevant daytime noise criteria at all four (4) receivers.

7 CONCLUSION

Attended compliance noise monitoring was conducted on Thursday, 1 October 2015. The results of the survey indicated that noise emissions from the Calga Sand Quarry plant complied with the daytime limits set in the Noise Monitoring Program at all four (4) identified receivers.