

**ANNUAL NOISE COMPLIANCE TESTING
OF PF FORMATION PTY LTD EXTRACTIVE INDUSTRY
OPERATIONS**

HITCHCOCK ROAD SAND PROJECT

(OCTOBER 2018 - APRIL 2019)

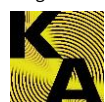
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1.0 CONSULTANT'S BRIEF

Koikas Acoustics Pty Ltd was engaged by PF Formation Pty Ltd to undertake noise compliance testing during the sand extraction operations for Hitchcock Road Sand Project in Maroota.

The assessment provides the following:

- a discussion of the applicable noise criteria at each site, and
- attended noise monitoring survey results.

Sand extractions have been undertaken in this area for many years. Koikas Acoustics has been advised that there have been no noise complaints received from the local community in regard to the sand quarrying extraction works since periodic noise surveys commenced.

All monitoring procedures were done in accordance with the requirements of the Project Approval of 3rd February 2009 and EPA Licence 3407.

Some measurements of sleep disturbance could not be taken 1 metre from a bedroom window. Sound level measurements were taken from the boundary. Measurements taken from the boundary were closer to the noise source and therefore louder compared to if measurements had been taken outside a bedroom window.



2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The Hitchcock Road Sand Project site is bounded by:

- Old Northern Road along the East;
- Wisemans Ferry Road to the West (intersecting with the Old Northern Road to the North), and
- Other rural properties to the South.

Refer to Figure 1 below for the project site extraction area.



Figure 1. Hitchcock Road Sand Project Site Area

2.2 HOURS OF OPERATION

The hours of operation are specified in the project approval as shown in Table 1 below.

Table 1. Hours of Operation		
Activity	Day	Time [Hours]
Construction	Monday to Friday	0700 – 1800
	Saturday	0800 – 1300
	Sunday and Public Holiday	None
Quarrying and processing including overburden removal	Monday to Saturday	0700 – 1800
	Sunday and Public Holiday	None
Product Transportation	Monday to Saturday	0600 – 1800
	Sunday and Public Holiday	None
Maintenance	Monday to Saturday	0700 – 1800
	Sunday and Public Holiday	None

2.3 AMBIENT NOISE PROFILE OF THE NOISE MONITORING SITES (RECEIVERS)

The assessment site is located in a rural-residential area. The main roads passing through this area being Old Northern Road and Wisemans Ferry Road carry light and heavy vehicles.

During the daytime, the perceived intrusiveness of noise from vehicles traversing along these roads whilst residents are inside or outside their homes is expected to be significantly greater compared to the noise of sand quarrying extraction activities.

The rustling of leaves with slight wind speeds would normally raise background noise levels. For periods when the wind is calm, background noise levels would typically be that of distant noise emanating from trucks and cars, and environmental noise such as insects and birds.

2.4 MONITORING LOCATIONS

Noise monitoring was conducted in the Maroota area at the following locations:

1. Tornatola property Hitchcock Road (driveway);
2. Pignataro property (corner of Wisemans Ferry Road and Old Northern Road);
3. Jurds property (back of fire shed, adjacent to Old Northern Road), and
4. Maroota Public School (rear of school).

The site locations are attached as an aerial photo in **Appendix A**.

3.0 NOISE CRITERIA

The noise criteria are specified in the project approval, EPA Licence 3407 and approved Noise Management Plan.

3.1 BACKGROUND NOISE

The noise criterion has been derived from previous noise surveys by undertaking long term ambient noise level measurements at a representative site. The background noise level was determined over consecutive 15 minute periods for a duration of at least one week. From this data of $L_{A90,15 \text{ minutes}}$ noise levels, the 10 percentile lowest background noise levels were determined for each of the days. The *rating background level* was then determined by calculating the median value of the daily 10 percentile background noise levels for each of the three specific time periods: daytime, evening and night time.

The rating background level result is used to determine the noise criteria applicable to the surrounding residential properties in accordance with the Environment Protection Authority's (EPA) Noise Policy for Industry (NPI) October 2017 assessment procedures.

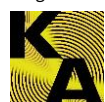
The background noise level $L_{A90, 15 \text{ minutes}}$ is normally determined in the absence of extraneous noise such as traffic, wind, rain, conversation, birds chirping, insect noise and unnatural increases in noise from distant sources due to local air movement. The EPA defines such sources as *incidental noise* which can cause the masking of offensive noise from a specific source. When traffic or other incidental noises cannot be excluded, then it is considered that these noise sources are part of the background noise.

3.2 EPA NOISE POLICY FOR INDUSTRY (NPI)

The NPI defines two criteria, the Intrusive Noise Criterion and the Amenity Noise Criterion. The EPA requires that compliance with both the intrusive and amenity criteria be achieved for the purpose of controlling the intrusive nature of the industrial noise in the short term and also maintaining the noise level amenity of the area for residences and other land uses.

For the purpose of applying the NPI the following time periods apply:

- Daytime 7am to 6pm Monday to Saturday
 8am to 6pm Sunday
- Evening 6pm to 10pm Monday to Sunday
- Night-time 10pm to 7am Monday to Saturday



10pm to 8am Sunday

3.2.1 Intrusive Noise Criterion

The intrusiveness of an industrial noise source is generally considered acceptable by people if the equivalent continuous (A-weighted) noise level ($L_{Aeq, 15 \text{ minutes}}$) does not exceed the background noise level by more than 5 dB. The intrusive noise criterion is defined as:

$$L_{Aeq, 15 \text{ minutes}} = (\text{rating background level}) L_{90, \text{Period}} + 5\text{dB}$$

When the noise source contains annoying characteristics such as prominent tonal, impulsive, intermittent, irregular and dominant low frequency components, adjustments are made.

3.2.2 Amenity Noise Criterion

In order to limit the continuing increase in noise, the EPA has nominated recommended acceptable and maximum ambient noise levels for various receiver sites from industrial noise.

Table 2.2 of the EPA's NPI (below) specifies the following acceptable and maximum recommended $L_{Aeq, \text{Period}}$ noise levels for this project-specific type area. In this case, the area is described as being Rural.

The EPA refers to rural as:

Rural —means an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic. Such areas may include:

- an agricultural area, except those used for intensive agricultural activities
- a rural recreational area such as resort areas
- a wilderness area or national park
- an area generally characterised by low background noise levels (except in the immediate vicinity of industrial noise sources).

This area may be located in either a **rural, rural-residential, environment protection zone or scenic protection zone**, as defined on a council zoning map (Local Environmental Plan (LEP) or other planning instrument).

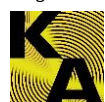


Table 2.2: Amenity noise levels.

Receiver	Noise amenity area	Time of day	L _{Aeq} , dB(A)
(see Table 2.3 to determine which residential receiver category applies)			Recommended amenity noise level
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom – internal	All	Noisiest 1-hour period when in use	35 (see notes for table)
Hospital ward internal external	All	Noisiest 1-hour	35
	All	Noisiest 1-hour	50
Place of worship – internal	All	When in use	40
Area specifically reserved for passive recreation (e.g. national park)	All	When in use	50

Both the predicted amenity noise level criterion and the intrusive noise level criteria need to be satisfied. In this case, the intrusive noise criterion has been considered as it is clearly the most stringent due to the low Rating Background Level (RBL).

3.3 NOMINATED NOISE CRITERIA

As per the approved Noise Management Plan January 2016, the following noise criteria were adopted:

Table 9.1 Noise impact assessment monitoring locations and criteria				
Noise assessment location	Other locations covered	Day	Night 1	Night 1
		L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
1. R9 – Young, Hitchcock Road	R10 Tornatola	39	35	45
2. R5 - Pignataro	R6 Camilleri	42	35	45
3. R3 – Fire station/Jurd	R1 Hammond and R2 Hitchcock	40	35	45
4. R7 – Maroota Public School	R6 Camilleri and R8 Portelli	36(L _{Aeq} (1 hour))	N/A	N/A

Note 1: Night time is defined as the period between 10.00pm and 7.00am. Activities on the site start at 6.00am and are completed by 6.00pm. There is no activity on the site during the evening period.

4.0 NOISE SURVEYS

4.1 NOISE MONITORING PROCEDURES

All noise methodologies and equipment used comply with the following Australian Standards:

- *AS1259.2-1990 "Acoustics - Sound Level Meters - Integrating - Averaging", and*
- *ISO 1996.2-2007 "Acoustics – Description, measurement and assessment of environmental noise" Part 2: Determination of environmental noise levels.*

All sound and noise level measurements were A-frequency and Fast-time weighted.

4.2 ATTENDED NOISE MONITORING

Attended noise monitoring was conducted on the following days at each monitoring location below:

At Location 1 Tornatola Property Hitchcock Road (@ driveway)

19 th October 2018*	Daytime hours
22 nd October 2018*	Night-time hours
7 th February 2019	Night-time hours
7 th February 2019	Daytime hours
15 th April 2019	Daytime hours
16 th April 2019	Night hours

At Location 2 Pignataro Property (corner of Wisemans Ferry Road and Old Northern Road)

19 th October 2018*	Daytime hours
22 nd October 2018*	Night-time hours
7 th February 2019	Night-time hours
7 th February 2019	Daytime hours
15 th April 2019	Daytime hours
16 th April 2019	Night hours

At Location 3 Jurds Property (back of fire shed, adjacent to Old Northern Road)

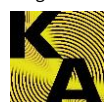
19 th October 2018*	Daytime hours
22 nd October 2018*	Night-time hours
7 th February 2019	Night-time hours
7 th February 2019	Daytime hours
15 th April 2019	Daytime hours
16 th April 2019	Night hours

At Location 4 Maroota Public School (rear of school)

19 th October 2018*	Daytime hours
7 th February 2019	Daytime hours
15 th April 2019	Daytime hours

* Noise level measurements and analysis for October 2018 were also included in the annual acoustical report prepared for the year 2017-2018. These were the re-testing measurements to indemnify the invalid data collected in September 2018 on account of instrumentation error. The noise data for October 2018 were also included in this report for completeness as the testing time sessions fall within the 2018-2019 period.

The noise measurements taken from October 2018 to April 2019 were conducted with a Class 1 Svan 971 S/N 40412 Sound Level Meter and calibrated with a Svantek SV 33 Class 1 Acoustic Calibrator.



5.0 NOISE SURVEY RESULTS

Table 2, 3, 4 and 5 refers to the measured noise levels obtained at locations 1, 2, 3 and 4 respectively for each monitoring period. **It is noted, that in all cases the measured L_{Aeq} was dominated by environmental and intermittent noise sources unrelated to the quarry noise. The exceeding levels are therefore not that of quarry activities.**

Table 2. Location 1 Tornatola Property Hitchcock Road - Noise Survey Results [dB]

Date	Applicable Criterion Level	Measured Noise Level	Measured L_{A90}	Exceeding Criterion	Note
19 th October 2018 Daytime hours	39 $L_{Aeq,15min}$	53 $L_{Aeq,15min}$	36	14	Noise dominated by road traffic. See also Note 1.
22 nd October 2018 Night-time hours	35 $L_{Aeq,15min}$ 45 $L_{A1,1min}$	53 $L_{Aeq,15min}$ 65 $L_{A1,1min}$	42	18 20	Noise dominated by road traffic. See also Note 3.
7 th February 2019 Night-time hours	35 $L_{Aeq,15min}$ 45 $L_{A1,1min}$	58 $L_{Aeq,15min}$ 55 $L_{A1,1min}$	36 38	23 10	Noise dominated by road traffic and strong wind. See also Note 1.
7 th February 2019 Daytime hours	39 $L_{Aeq,15min}$	62 $L_{Aeq,15min}$	56	23	Noise dominated by road traffic and insects. See also Note 3.
15 th April 2019 Daytime hours	39 $L_{Aeq,15min}$	41 $L_{Aeq,15min}$	29	2	Noise dominated by road traffic and insects. See also Note 1.
16 th April 2019 Night-time hours	35 $L_{Aeq,15min}$ 45 $L_{A1,1min}$	46 $L_{Aeq,15min}$ 54 $L_{A1,1min}$	34 37	11 9	Noise dominated by road traffic and quarry noise for a short duration. See also Note 7.

Table 3. Location 2 Pignataro Property - Noise Survey Results [dB]

Date	Applicable Criterion Level	Measured Noise Level	Measured L_{A90}	Exceeding Criterion	Note
19 th October 2018 Daytime hours	42 $L_{Aeq,15min}$	57 $L_{Aeq,15min}$	39	15	Noise dominated by road traffic. See also Note 1.
22 nd October 2018 Night-time hours	35 $L_{Aeq,15min}$ 45 $L_{A1,1min}$	60 $L_{Aeq,15min}$ 74 $L_{A1,1min}$	39	25 29	Noise dominated by road traffic. See also Note 3.
7 th February 2019 Night-time hours	35 $L_{Aeq,15min}$ 45 $L_{A1,1min}$	64 $L_{Aeq,15min}$ 78 $L_{A1,1min}$	44 39	29 33	Noise dominated by road traffic and strong wind. See also Note 7.
7 th February 2019 Daytime hours	42 $L_{Aeq,15min}$	65 $L_{Aeq,15min}$	43	23	Noise dominated by road traffic and insects. See also Note 4.
15 th April 2019 Daytime hours	42 $L_{Aeq,15min}$	50 $L_{Aeq,15min}$	44	8	Noise dominated by road traffic and insects. See also Note 5.
16 th April 2019 Night-time hours	35 $L_{Aeq,15min}$ 45 $L_{A1,1min}$	44 $L_{Aeq,15min}$ 69 $L_{A1,1min}$	39 47	9 24	Noise dominated by road traffic and strong wind. See also Note 1.

Table 4. Location 3 Jurds Property - Noise Survey Results [dB]

Date	Applicable Criterion Level	Measured Noise Level	Measured LA90	Exceeding Criterion	Note
19 th October 2018 Daytime hours	40 LAeq,15min	53 LAeq,15min	30	13	Noise dominated by road traffic. See also Note 1.
22 nd October 2018 Night-time hours	35 LAeq,15min 45 LA1,1min	48 LAeq,15min 61 LA1,1min	34	13 16	Noise dominated by road traffic. See also Note 3.
7 th February 2019 Night-time hours	35 LAeq,15min 45 LA1,1min	49 LAeq,15min 64 LA1,1min	33 34	14 19	Noise dominated by road traffic. See also Note 2.
7 th February 2019 Daytime hours	40 LAeq,15min	54 LAeq,15min	37	14	Noise dominated by road traffic. See also Note 2.
15 th April 2019 Daytime hours	40 LAeq,15min	56 LAeq,15min	35	16	Noise dominated by road traffic. See also Note 2.
16 th April 2019 Night-time hours	35 LAeq,15min 45 LA1,1min	60 LAeq,15min 73 LA1,1min	39 37	25 28	Noise dominated by road traffic and quarry noise for a short duration. See also Note 7.

Table 5. Location 4 Maroota Public School - Noise Survey Results

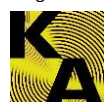
Date	Applicable Criterion Level	Measured Noise Level	Measured LA90	Exceeding Criterion	Note
19 th October 2018 Daytime hours	36 LAeq,15min	46 LAeq,15min	40	10	Noise dominated by traffic and distant quarries. See also Note 8.
7 th February 2019 Daytime hours		43 LAeq,15min	40	7	Noise dominated by traffic and distant quarries. See also Note 8.
15 th April 2019 Daytime hours		40 LAeq,15min	36	4	Noise dominated by traffic and distant quarries. See also Note 8.

- Note 1.** Dominant noise source is that of traffic and birds chirping or natural sounds such as wind and rustling of leaves (during lulls in traffic). Quarry noise was not audible.
- Note 2.** Dominant noise source is that of traffic. Quarry noise was not audible and not measurable.
- Note 3.** Dominant noise source is that of traffic and/or insect noise. Quarry noise was not audible and not measurable.
- Note 4.** Dominant noise source is that of traffic and/or insect noise. Quarry noise was audible during lulls in traffic but not measurable.
- Note 5.** Dominant noise source is that of traffic, birds chirping, music from residents and natural sounds such as wind/rustling of leaves (during lulls in traffic). Quarry noise was not audible.
- Note 6.** Dominant noise source is that of traffic and school noise. Quarry noise audible but not quantifiable nor intrusive.
- Note 7.** Dominant noise source is that of traffic and quarry noise for a short duration. It is in our opinion that the quarry noise was not intrusive.

Note 8. Dominant noise source is that of traffic and distant quarry noise (barely audible). It is in our opinion that the quarry noise was not intrusive on account of high ambient noise levels from school premises.

On account of the large distances between the sand quarrying extraction activities to the surrounding residential premises, it is often not measurable because it is either less than the prevailing background noise or inaudible. At all the noise monitoring sites, the noise currently emanating from the Hitchcock Road Sand Project has minimal contribution compared to the ambient noise such as traffic noise, birds chirping, insect noise, rustling of leaves and other quarry operation.

The noise criteria nominated by EPA Licence 3407, Minister of Planning approval and Table 9.1 of the approved Noise Management Plan January 2016 for the hours of operation were therefore not exceeded.



6.0 CONCLUSIONS

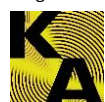
Koikas Acoustics was requested to undertake noise measurements around the Hitchcock Road Sand Project sand quarrying extraction and processing quarry (from October 2018 to April 2019) and ascertain whether the noise from the extraction and processing works currently exceed the nominated noise criteria as nominated by EPA licence 3407 and the project approval.

The results of the noise surveys show that the site extraction works currently comply with all the nominated noise criteria (including cumulative noise criteria).

At most sites, quarry activities are either barely audible or inaudible and in most of cases, the noise emanating from the site was found not to be measurable on account of that the natural noise (which includes birds chirping, insects, rustling of leaves) and un-natural noise (being cars and trucks traversing along the main roads).

There are no noise mitigation measures necessary to be implemented for the subject quarry sites.

Koikas Acoustics therefore certifies that the subject Maroota Hitchcock Road Sand Project currently complies with the nominated noise criteria despite that the measured noise levels (predominantly that of traffic and other natural sound sources) are currently producing sound levels in excess of the nominated noise criteria.



APPENDIX A - AERIAL PHOTOGRAPH

