Environmental Noise Monitoring Report - October 2021

Jamestrong Packaging

28 October 2021

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1 Introduction

1.1 Jamestrong Packaging

Jamestrong Packaging, herein referred to as Jamestrong, commissioned MJM Environmental to conduct Environmental Noise Monitoring on the 18th and 19th of October 2021. Jamestrong's facility is located at 2 Hallstrom Avenue, Taree NSW 2430.

Jamestrong operates under NSW Environmental Protection Authority (EPA) Environmental Protection Licence (EPL) number 11714.

1.2 Background and scope of project

Jamestrong operate under EPL 11714. Jamestrong have provided a draft EPL notice of variation on the 28th of May 2020. The draft EPL is not enforced at this time. The EPA's POEO website states that the EPL 11714 in force is dated November 2014.

Jamestrong requested the environmental noise monitoring be performed as per the draft EPL conditions, specifically condition L4.

MJM therefore completed environmental noise monitoring for industrial noise exposure and contributions to the surrounding area as per the draft EPL as per Jamestrong's request.

The draft EPL states that the following is to be monitored at each monitoring point in the EPL and compared to specific criteria.

Noise quality monitoring was performed for L_{Aeq} readings as identified in section L4 of Jamestrong's draft EPL. The sampling points included Jamestrong's plant boundary at 2 Hallstrom Avenue, and at the closest receiver to the Jamestrong site. The closest receiver was determined to be 410 Kolodong Road, Taree NSW 2430.

Sampling was conducted over 15-minute periods at the following times:

- Evening Period from 21:25 to 21:59 on the 18th of October 2021;
- Night Period from 22:02 to 22:17 on the 18th of October 2021; and
- Day period from 10:25 to 12:03 on the 19th of October 2021.

This report outlines and evaluates results from the noise quality monitoring performed at the closest noise sensitive receiver as stated in the EPL and the boundary of the Jamestrong site. Calibration certificates are presented in Appendix A.

2 Methodology

2.1 Definitions and Terminology

Table 2-1 defines the terminology used in this report.

Table 2-1: Noise assessment terminology

Term	Definition
L_A	A-weighted root mean squared (RMS) noise level
L_{A90}	Noise level exceeded for 90% of the time; approximately average of the minimum noise cycles; often referred to as the 'background' noise level and commonly used to determine noise criteria for assessment purposes
L_{MIN}	Minimum noise level recorded during a measurement period
L_{MAX}	Maximum noise level recorded during a measurement period
L_{Aeq}	Average noise energy during a measurement period
dB(A)	Noise level measurement in unit decibels; A-weighting scale is used to describe human response to noise
SPL	The Sound Pressure Level (SPL) from a source. It can be used in distance attenuation calculations to determine noise emission values at intermediate distances.

2.2 Monitoring Device

A Sound Pro SP-DL Sound Level Meter (serial number BLJ090019) and a Quest QC-10 Sound Level Meter Calibrator were used for the attended monitoring to record representative site sources and existing ambient noise. The Bureau of Meteorology's Taree Airport Station No. 060141 records were used for the weather data, with the exception of wind speed which was measured onsite using a vane anemometer.

2.3 Sampling Locations and Identification

The location of the identified receiver and the distance from the Jamestrong site is identified in Figure 2-1.

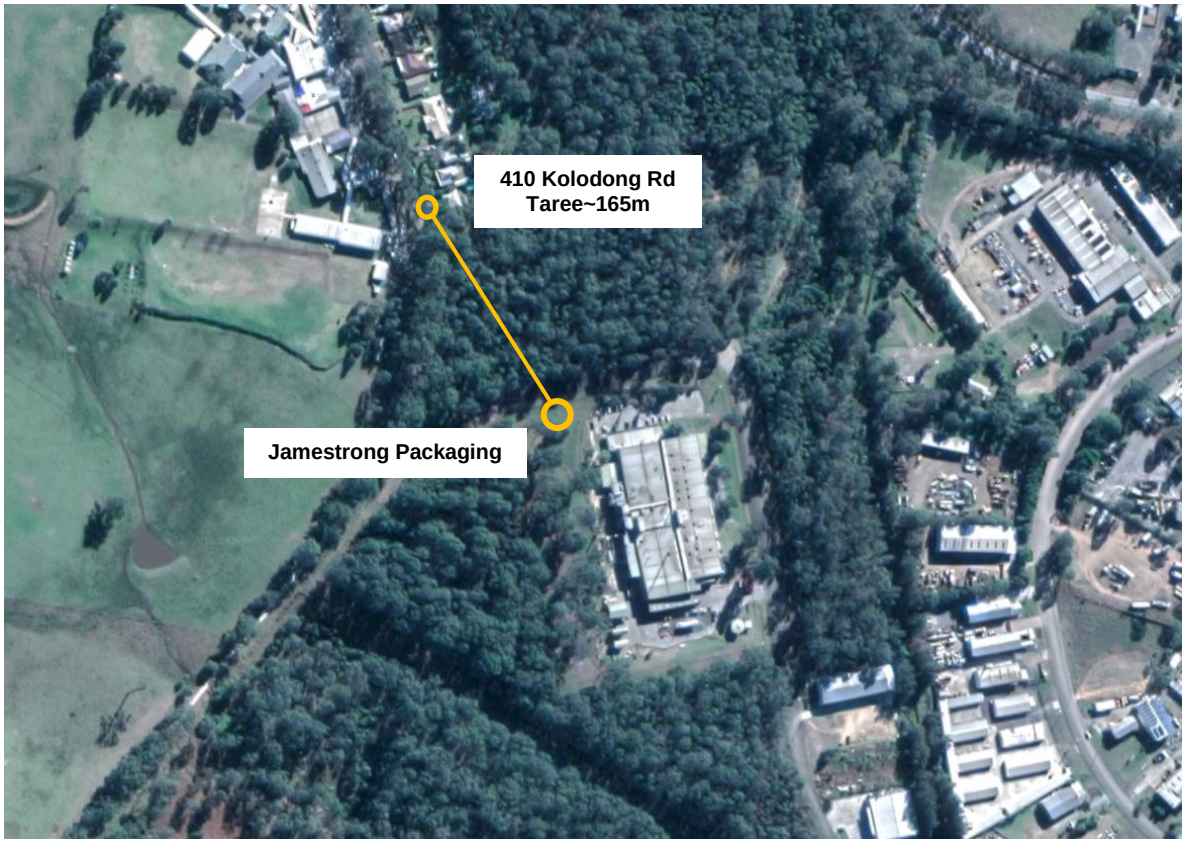

Figure 2-1: Jamestrong location map showing identified noise monitoring locations and distance from site

The sampling times and corresponding weather data for the 18th and 19th of October 2021 are presented in Table 2-2.

Table 2-2: Sampling dates and corresponding weather data

Period Averages	Time	Temperature (°C) [1]	Wind Speed (m/s) [2]	Average Cloud Cover	Solar Radiation (W/m²)
Day	10:25 – 12:03	26.6	0.2	Few Clouds	296
Evening	21:25 – 21:59	25.8	0.0	Few Clouds	
Night	22:02 – 22:36	25.8	0.0	Few Clouds	

[1] Temperature data was sourced from the Bureau of Meteorology (http://www.bom.gov.au/) Taree Airport Station 060141.
[2] Wind data was taken onsite using a vane anemometer.

2.4 Quality Assurance and Quality Control

The apparatus used for monitoring environmental noise and their models are shown below.

Sound Pro SE DL Sound Level Meter	Quest QC-10 Calibrator
	

Figure 2-2: Sound Pro SE DL Sound level meter and Quest QC-10 Calibrator

The Sound Pro SE DL Type 1 sound level meter was calibrated before the start of sampling and calibration checked at the end of the sampling. The calibration and calibration check had a variation of no more than +/-1 dB.

3 Assessment Criteria and Calculations

3.1 Assessment Criteria

The assessment criteria used for environmental noise at Jamestrong is published in their EPL conditions. The EPL states that operational noise generated at the premises must not exceed the noise limits shown in Table 3-1 at the nearest noise sensitive receiver.

Noise monitoring is to be performed during normal or peak operations as advised by Jamestrong.

The closest receiver was determined to be 410 Kolodong Road, Taree NSW 2430.

Table 3-1: Receiver amenity criteria L_{Aeq} as per EPL

Time period	Measurement Parameter	Limit dB(A)
Day (07:00 – 18:00)	L_{Aeq} (15 min)	40
Evening (18:00 – 22:00)	L_{Aeq} (15 min)	40
Night (22:00 – 07:00)	L_{Aeq} (15 min)	40

3.2 Calculations

The formula for distance attenuation noise calculations used in this report is shown below.

Distance attenuation SPL_2:

$$SPL(x)_2 = SPL_1 - 10 \text{ Log} \left(\frac{R_2^2}{R_1^2} \right)$$

Where SPL_1 = sound pressure level at point 1
SPL_2 = sound pressure level at point 2
R_1 = distance from sound source to point 1
R_2 = distance from sound source to point 2
x = distance from SPL_1 to SPL_2 to in metres

4 Results

The noise levels were measured in 15-minute intervals during three (3) periods, being:

- Daytime (07:00 – 18:00)
- Evening (18:00 – 22:00)
- Night-time (22:00 – 07:00)

As per Jamestrong's assessment criteria, L_{Aeq} was measured at the nearest noise sensitive receiver.

It is important to recognise that the total noise levels measured at this location are not necessarily due to the Jamestrong site activities. In order to mathematically remove some noise that may be emanating from the surrounding areas, a simulated noise distance attenuation formula was used to calculate the noise levels at each receiver from Jamestrong's operations. The noise attenuation calculation results, expressed as SPL(*x*), were based on the distance of each receiver from Jamestrong's most noise affected area. The distance to the receiver from Jamestrong's operational site was shown previously in Figure 2-1 and is presented in Table 4-1.

Table 4-1: Distance to Jamestrong operations from the nearest receiver

Location	Distance to Jamestrong operations (m)
410 Kolodong Road, Taree NSW 2430	165

4.1 Daytime Sampling

Table 4-2 shows the noise results at Jamestrong and the closest receiver during the daytime period.

Table 4-2: L_{Aeq}, L_{A90} and attenuation (SPL_{165}) results for Daytime monitoring

Monitoring Station	Date	Time	L_{Aeq} dB(A)	L_{A90} dB(A)	$SPL_{(165)}$ dB(A)	Limit dB(A)
410 Kolodong Road	19/10/2021	11:48 – 12:03	**45.1**	41	35.5	40
Jamestrong		10:25 – 10:43	51.9	51	-	-

*Results reflect the total noise measured at the location, which potentially includes noise sources external to Jamestrong operations.

4.2 Evening Sampling

Table 4-3 shows the noise results at Jamestrong and the closest receiver during the evening period.

Table 4-3: L_{Aeq}, L_{A90} and attenuation (SPL_{165}) results for Evening monitoring

Monitoring Station	Date	Time	L_{Aeq} dB(A)	L_{A90} dB(A)	$SPL_{(165)}$ dB(A)	Limit dB(A)
410 Kolodong Road	18/10/2021	21:25 – 21:40	**41.6**	41	36.2	40
Jamestrong		21:44 – 21:59	52.6	52.5	-	-

*Results reflect the total noise measured at the location, which potentially includes noise sources external to Jamestrong operations.

4.3 Night Sampling

Table 4-4 shows the noise results at Jamestrong and the closest receiver during the night period.

Table 4-4: L_{Aeq}, L_{A90} and attenuation (SPL_{165}) results for Night time monitoring

Monitoring Station	Date	Time	L_{Aeq} dB(A)	L_{A90} dB(A)	$SPL_{(165)}$ dB(A)	Limit dB(A)
410 Kolodong Road	18/10/2021	22:21 – 22:36	40.8	40	35.8	40
Jamestrong		22:02 – 22:17	52.2	52	-	-

*Results reflect the total noise measured at the location, which potentially includes noise sources external to Jamestrong operations.

5 Pasquill Stability Class

Pasquill Stability Classes A to F were used to establish the level of atmospheric turbulence present during sampling periods. As illustrated in Table 5-1, Class A is categorised as the most turbulent of conditions and Class F as the most stable and least turbulent weather conditions. The Pasquill Stability Classes for the Taree area on the 18th and 19th of October 2021 from A to F are shown in Table 5-2 and
Table 5-3. Data was obtained from the Australian Bureau of Meteorology using Taree Airport station number 060141 with the exception of wind speed which was measured onsite using a vane anemometer.

The incoming solar radiation for the 19th of October 2021 was calculated at 296 W/m^2. As shown in Table 5-2 these values correspond to a slight level of solar radiation (<300 W/m^2). Cloud cover during the day, evening and night was mostly clear (1 okta). Wind speed was zero throughout the sampling periods and below the licence requirement of <3 m/s.

Table 5-1: Pasquill stability classes and classification

Pasquill Stability Classes	
A: Extremely Unstable Conditions	D: Neutral Conditions
B: Moderately Unstable Conditions	E: Slightly Stable Conditions
C: Slightly Unstable Conditions	F: Moderately Stable Conditions

Pasquill Stability Class Table adapted from http://www.arl.noaa.gov

Table 5-2: Modified Pasquill stability class results

Surface Wind Speed (m/s)	Daytime Incoming Solar Radiation (W/m^2)				Night-time conditions		
					Thin overcast or >4/8 cloud	<=4/8 cloud	
	Strong (>600)	Moderate (300-600)	Slight (<300)	Overcast			
<2	N/A	N/A	1B	N/A	N/A	N/A	1B
<3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
>6	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1] Daytime condition
[2] Evening condition
[3] Night-time condition
N/A – Information is not applicable as the applicable values are based monitoring times only.

A summary of Pasquill Stability Class results for daytime, evening and night-time sampling periods is shown in
Table 5-3. These results indicate weather conditions existent during the sampling periods stayed moderately stable throughout all tests.

Table 5-3: Pasquill stability class results for daytime, evening and night time periods

Sampling Period	Stability Class (A-F)
Daytime	B
Evening	B
Night	B

6 Discussion

The noise emissions were assessed using a Type 1 Sound Level Meter over 15-minute periods on 18th and 19th of October 2021.

Meteorological conditions during monitoring were 'slight' solar radiation levels (<300 W/m^2), clear skies, and low wind speeds less than 2 m/s. The Pasquill Stability Class was class B for the day, evening and night period and shows the overall atmospheric turbulence during the sampling periods was moderately stable throughout all tests.

In order to mathematically remove noise emanating from the surrounding external noise sources, a simulated noise distance attenuation formula was used to calculate the noise levels at the receiver from Jamestrong operations. The noise attenuation

calculation results, expressed as SPL(*x*), were based on the distance of the receiver from Jamestrong's most noise affected area.

It is suggested that the noise attenuation calculations should be evaluated and used as a guideline value for compliance with the EPL conditions rather than using the measured value at the receiver, as they can be more directly attributed to Jamestrong's operations. The measured values at the receiver were influenced by factors outside of Jamestrong's operation, such as high background noise levels from traffic at Wingham Road, the industrial area located to the east of site, residential and school activities. Results also showed the L_{A90} values, which represents background noise, were relatively high for receiver locations.

Therefore, the recorded value from each receiver may not be reflecting the true noise propagation from Jamestrong. Using the attenuation values, it could be said that Jamestrong are operating within the EPL limits for noise.

7 Conclusion

Jamestrong commissioned MJM Environmental to complete an environmental noise assessment at the nearest noise sensitive receiver from the Jamestrong site. Noise propagation was assessed using a Type 1 Sound Level Meter on the 18th and 19th of October 2021.

The noise measurements at the receiver had contributions from external noise sources such as traffic, local industry and residential activities. In order to mathematically remove the noise emanating from surrounding areas, a simulated distance attenuation calculation was performed to simulate the noise levels at each receiver generated by Jamestrong's operations.

The noise propagation simulated attenuation calculations gave results below the EPL noise condition limits at the receiver. Using the attenuation values, it could be said that Jamestrong are operating within the EPL limits for noise.