Prepared for
InfraBuild Recycling Pty Ltd
ABN: 28 002 707 262

InfraBuild Recycling Hexham

Quarter 1 2024 Noise Monitoring Report

27-Mar-2024

Commercial-in-Confidence

aecom.com

Delivering a better world

InfraBuild Recycling Hexham

Client: InfraBuild Recycling Pty Ltd

ABN: 28 002 707 262

Prepared by

AECOM Australia Pty Ltd
Awabakal and Worimi Country, Level 8, 6 Stewart Avenue, Newcastle West NSW 2302, PO Box 73, Hunter Region MC NSW 2310, Australia
T +61 2 4911 4900 F +61 2 4911 4999 www.aecom.com
ABN 20 093 846 925

27-Mar-2024

Job No.: 60493017

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	InfraBuild Recycling Hexham – Quarter 1 2024 Noise Monitoring Report
Ref	60493017
Date	27-Mar-2024
Originator	Samuel Moore
Checker/s	Cye Buckland
Verifier/s	Chad Whitburn

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
0	27 March 2024	Final Report	Cye Buckland – Project Manager	

This page has been left blank intentionally.

Table of Contents

List of Tables

List of Figures

This page has been left blank intentionally.

1.0 Introduction

1.1 Background

InfraBuild Recycling Hexham (the site) has engaged AECOM Australia Pty Ltd to conduct quarterly noise monitoring at the location of the nearest residential receivers from the Hexham recycling plant. The Quarter 1 2024 noise monitoring survey was conducted at two offsite receivers and two site boundary locations during March 2024 to meet requirements stated in InfraBuild Hexham's environment protection licence (EPL) No: 5345.

Acoustic terminology used in this report is defined in **Appendix A**.

1.2 Site

The site is located at Sparke Street, Hexham NSW. The site is bounded by vacant land and the Hunter River to the north and east, with Maitland Road located between the site and the river. To the south is Ironbark Creek with the Hunter Rail line to the west.

Site noise is generally characterised as heavy vehicle traffic due to delivery trucks visiting the site as well as the industrial shredder and associated site operations (handling scrap metal, heavy machinery etc.).

The site is open from 6:00 am to 6:00 pm from Monday to Saturday; however, delivery trucks and the mill area (which contains the shredder operations) operate between 7:00 am and 6:00 pm Monday to Saturday, in accordance with EPL condition L5.1. The site does not operate on Sunday.

2.0 Methodology

The influence of extraneous noise, i.e. road and rail traffic, makes it difficult to determine the noise contribution from the site in isolation, and therefore difficult to determine compliance with EPL limits.

Where direct measurement of noise contribution from an industrial facility is not possible due to persistent extraneous noise sources, the Environment Protection Authority Noise Policy for Industry (NPfI) makes an allowance for assessment by other methods.

Section 7.1.1 Options for noise monitoring of the NPfI states:

- *Direct measurement at alternative or intermediate location/s*

  Where direct measurement of noise at a compliance location is not practical because of poor signal-to-noise ratios (that is, extraneous noise is louder than the noise under investigation), or where access to the location has been denied or is unavailable, measurements at intermediate locations between the source and the receiver location, where signal-to-noise ratios are higher, may be a viable option. For this approach to be effective there needs to be well-established theoretical and/or empirical relationships between the intermediate location and the receiver location in terms of noise exposure. Noise modelling may be one option to establish this relationship. The techniques under the above section 'Direct measurement at a receiver location' would also be relevant in terms of quantifying the level of noise from the source at the intermediate location(s). Where this technique is relied upon, it is the responsibility of the proponent to demonstrate a robust acoustic relationship between the compliance location and the intermediate location.

Section 7.1.1 goes on to discuss assessment using computer noise modelling. It states:

> *"The use of intermediate means of model validation or calibration can be a useful technique"*

Determining compliance by prediction from site boundary noise levels is therefore deemed to be appropriate in this instance.

2.1 Boundary Noise Monitoring

Definitive compliance with EPL noise limits at the nominated receiver locations is difficult to determine through direct measurement due to the influence of extraneous noise sources during the day, evening, and night-time. Therefore, in order to determine the noise contribution of the facility at the receiver locations, an alternative method of determining compliance, in accordance with the NPfI was considered appropriate. In this case site boundary measurements were used in conjunction with source frequency measurements to predict noise impacts at each receiver location. Noise monitoring was carried out at two monitoring locations on the Northwest and Southeast boundary of the site in order to predict the noise levels at the EPL monitoring locations in the absence of external noise sources.

2.2 Instrumentation

Attended measurements were conducted using a Larson Davis SoundTrack LxT. This instrument has Class 1 characteristics as defined in AS IEC 61672.1-2004 "Electroacoustics - Sound Level Meters". Measurements were conducted over 15-minute intervals.

Calibration of the instrument was confirmed with a Larson Davis CAL150 Sound Level Calibrator prior to, and at the completion of monitoring.

All equipment used for the monitoring has current calibration certificates (i.e. calibrated in the last two years).

The sound level meter was set to 'fast' time weighting and programmed to store $L_{A10(15\ min)}$, $L_{Aeq(15\ min)}$ and $L_{A90(15\ min)}$ noise levels during each measurement period.

3.0 EPL Conditions

EPL Condition L4 – Noise Limits is reproduced below:

L4.1 Noise from the premises must not exceed the limits specified in the table below:

Location	Noise Limit dB(A)			
	Day	Evening	Night	
	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1\ (1min)}$
Any residence in Shamrock Street, Hexham, affected by noise from the premises	*47*	*48*	*45*	*55*
St Joseph's Retirement Community and any associated residence in Old Maitland Road, Hexham, affected by noise from the premises	*53*	*42*	*41*	*56*
Any operating industrial premises affected by noise from the premises	*70*	*70*	*70*	*N/A*

L4.2 The noise limits above comply when measured or computed at any point within one metre of the boundary of any affected residential premises. 5 dB(A) must be added to the measured level if the noise is substantially tonal or impulsive in character.

L4.3 Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays. Evening is defined as the period from 6pm to 10pm. Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L4.4 The noise emission limits identified in Condition L4.1 apply under the following meteorological conditions.

a) Wind speeds up to 3 m/s at 10 metres above ground level; and

b) Temperature inversion conditions of up to 3°C/100m.

3.1 Noise Policy for Industry

In reference to determining compliance with noise conditions, the Noise Policy for Industry (NPfI) notes that where noise levels are less than 2 dB above noise limit then the exceedance can be considered negligible.

4.0 Monitoring

4.1 Attended Monitoring

Attended measurements were conducted on 11 March 2024 during the daytime (0700 – 1800), evening (1800 – 2200) and night-time (2200 - 0700) at the monitoring locations listed in **Section 4.2**. Measurements were conducted at a height of 1.5m.

4.1.1 Weather Conditions

Weather conditions were within acceptable limits for noise monitoring with conditions noted to be clear, with only a slight breeze, these conditions remained consistent through to the evening and night.

4.1.2 Site Operations

On the date monitoring was performed, the InfraBuild Recycling facility was operating under normal conditions. Noise emission characteristics of the site are outlined in **Section 1.2**.

4.2 Monitoring Locations

The two EPL monitoring locations are:

- R1 – Empty lot at 15 Shamrock Street, Hexham; and
- R2 – Calvary St Joseph's Retirement Community – 240 Maitland Rd, Sandgate.

These EPL locations were selected as the nearest residential receiver locations to the north and south of the site. The monitoring locations are shown in **Figure 1**.

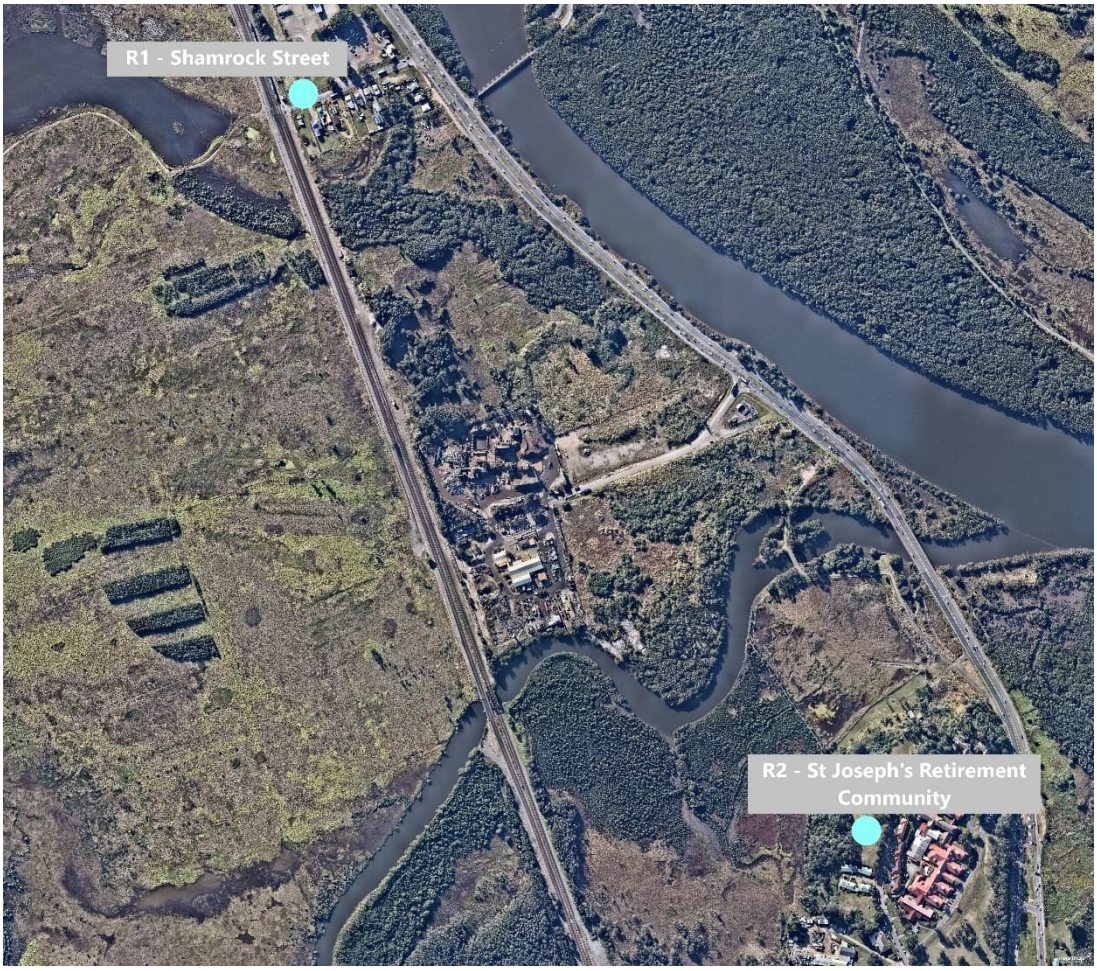

Figure 1 InfraBuild Site and Receiver Locations

Due to external noise sources dominating at the EPL monitoring locations, attended noise measurements were also conducted on the north and south boundaries of the site during day, evening and night periods in order to quantify site noise emissions for the prediction of noise levels at each receiver location in the absence of extraneous noise. Attended noise monitoring was conducted at the north and south boundaries of the site as shown in **Figure 2**.

Figure 2 Site Boundary Measurement Locations

5.0 Results

5.1 Receiver Location Monitoring

Attended noise monitoring was conducted at the two defined receiver locations during the daytime when the primary noise sources on site were operational. Attended monitoring was also conducted during the evening maintenance shift and night period was performed at receiver locations as part of EPL requirements. The results from the attended noise monitoring carried out on 11 March 2024 are presented in **Table 1**.

Table 1 Quarter 1, 2024 – Attended Noise Monitoring Results Summary

Location	Date / Time	EPL limits $L_{Aeq(15min)}$ dB(A)	Measured Noise Level dB(A)		Description of Noise Environment
			L_{Aeq} (15 min)	L_{A90} (15 min)	
Day (07:00 – 18:00)					
R1 – 15 Shamrock Street, Hexham	11/03/24 11:35am	47	**55**	49	• Traffic noise from Maitland Road significant. • Birds and Insects audible. • Site noises of banging metal and machinery clearly audible. • Trucks and cars entering the service centre. • Passing trains.
R2 – Calvary St Joseph's Retirement Community	11/03/24 11:01am	53	47	44	• Traffic noise from Maitland Road. • Birds and insects. • Occasional site noise of banging. • Passing trains. • Rustling trees.
Evening (18:00 – 22:00)					
R1 – 15 Shamrock Street, Hexham	11/03/24 8:52pm	48	**54**	46	• Site noise (machinery & banging) clearly audible on occasion. • Maitland Road traffic. • Local Traffic entering / exiting service station. • Idling truck in carpark. • Insects loud.
R2 – Calvary St Joseph's Retirement Community	11/03/24 8:15pm	42	**49**	47	• Site occasionally audible. • Traffic noise from Maitland Road. • Insect noise significant. • Rustling of trees / leaves. • Passing train.

Location	Date / Time	EPL limits $L_{Aeq(15min)}$ dB(A)	Measured Noise Level dB(A)		Description of Noise Environment
			L_{Aeq} (15 min)	L_{A90} (15 min)	
Night (22:00 – 07:00)					
R1 – 15 Shamrock Street, Hexham	11/03/24 11:23pm	45	47*	45	• Site barely audible. • Maitland Road traffi dominant • Idling truck in carpark. • Insects. • Traffic noise from service station.
R2 – Calvary St Joseph's Retirement Community	11/03/24 11:52pm	41	**45**	43	• Site inaudible • Insects. • Traffic noise from Maitland Road.

Bold values indicate measured L_{Aeq} noise level above EPL limit
* Result within 2 dB of criteria and considered compliant (NPfI)

The results in **Table 1** show that the measured $L_{Aeq(15\ min)}$ noise level at R2 – Calvary St Joseph's Retirement Community for the day-time period was below the EPL criteria. Measured $L_{Aeq(15\ min)}$ evening and night-time results for R2 – Calvary St Joseph's Retirement Community were above the respective EPL criteria, as were day and evening results at R1 – 15 Shamrock Street. The Night result at Shamrock Street was within 2 dB of the criteria and therefore considered compliance under the NPfI.

In most cases highway traffic was noted to be the dominant or significant noise source at the receiver locations. To determine the noise contribution from the facility at the receiver locations, an alternative method of determining compliance, in accordance with the NPfI was considered appropriate. In this case site boundary measurements were used to predict noise impacts for each receiver location.

5.2 Site Boundary Monitoring

Boundary noise measurements were conducted during daytime operation of the site with material handlers and the shredder operating on site. These measurements were also performed during evening and night-time periods. Site operations have conservatively been assumed to occur throughout the daytime (normal operations) and evening period (primarily maintenance). Results from the site boundary monitoring carried out on 11 March 2024 are presented in **Table 2**.

Table 2 Quarter 1, 2024 – Site Boundary Measurement Results

Location	Date / Time		Measured Noise Level, $L_{Aeq(15\ min)}$ and $L_{A90(15\ min)}$ dB(A)		Site Operation
			$L_{Aeq(15\ min)}$	$L_{A90(15\ min)}$	
Northwest Boundary	Day	11/03/24 1:34pm	78	74	• 4 material handlers moving scrap. • Mill and trommel dominant. • Loaders pushing scrap. • Consistent noise.
	Evening	11/03/24 9:50pm	52	47	• Traffic noise from Maitland Road. • Insects. • Noise from shredder yard (banging & cutting) • Minimal activity around mill.

Location	Date / Time		Measured Noise Level, $L_{Aeq(15\ min)}$ and $L_{A90(15\ min)}$ dB(A)		Site Operation
			$L_{Aeq(15\ min)}$	$L_{A90(15\ min)}$	
	Night	11/03/24 10:46pm	50	44	• Highway noise. • Occasional banging & pressure washer noise. • Forklift moving around mill. • Insects • Minimal site activity. • Forklift moving around mill. • Traffic noise from Maitland Road.
Southeast Boundary	Day	11/03/24 12:52pm	56	50	• 1 material handler operating. • Mill and trommel audible. • 1 forklift moving materials. • Passing trains. • Maitland Road traffic. • Birds
	Evening	11/03/24 10:00pm	47	44	• Insects • Traffic from Maitland Road dominant. • Some noise from mill (maintenance work, machinery moving)
	Night	11/03/24 10:15pm	52	48	• Minimal Site noise (occasionally banging) • Insects. • Maitland Road traffic the dominant noise.

5.3 Predicted Noise Levels

Due to extraneous noise sources such as road traffic noise at the nominated receiver locations in **Table 1**, it was not possible to ascertain the industrial noise contribution from the site. As a result, the methodology outlined in **Section 2.0** and taken from the NPfI was implemented. Site boundary noise monitoring results in **Table 2** were used as intermediate measurement points between the measured source(s) and receivers. These measured levels were then extrapolated to the receiver points using the relevant distance between the source and receiver of 600m in both cases.

A 'flat ground' model was used based on hemispherical spreading, conservatively assuming no topographical shielding, directivity, or meteorological effects. The CONCAWE noise propagation algorithm was utilised for the calculation. A ground absorption factor of 0.5 was employed as a conservative assumption, despite recognising the heavily vegetated land between the site and receivers.

Calculated noise levels at each receiver location are presented **Table 3** for both neutral and noise enhancing meteorological conditions as outlined in the EPL conditions in **Section 3.0** and the NPfI. For the latter scenario, an assessment of light wind speeds (0.5 m/s – 3 m/s) and directions over the last 10 years indicates that significant noise enhancing wind conditions occur during the day from the northwest direction. No other direction shows a significant percentage of winds in this velocity range. Therefore, noise-enhancing meteorological conditions have only been assessed for wind from a north-westerly direction.

Table 3 Quarter 1, 2024 – Calculated Noise Levels at the Receiver Locations

Receiver Location	Time	EPL noise limit, dB(A)	Predicted noise levels, neutral meteorological conditions, $L_{Aeq,15min}$, dB(A)	Predicted noise levels, noise-enhancing meteorological conditions, $L_{Aeq,15min}$, dB(A)	Comply
R1 – 15 Shamrock Street, Hexham	Day	47	48*	40	Yes
	Evening	48	<30	<30	Yes
	Night	45	<30	<30	Yes
R2 – Calvary St Joseph's Retirement Community	Day	53	32	37	Yes
	Evening	42	<30	<30	Yes
	Night	41	<30	42*	Yes

* Considered compliant as within 2 dB (NPfI)

The calculated results for Shamrock Street and Calvary St Joseph's Retirement Community show one minor exceedance (1 dB) of the EPL noise limits under neutral conditions during the daytime period at Shamrock Street. There is also a minor exceedance (1dB) under noise-enhancing conditions at St Josephs for the night time period.

It should be noted that the magnitude of these exceedances is 1 dB(A), which is considered barely perceptible. It is therefore considered to be compliant with EPL noise limits outlined in **Section 3.0**. Due to the lack of operation of the site during the night-time period, the Site is considered compliant with the $L_{A1,1min}$ criteria outlined in **Section 3.0**.

6.0 Conclusion

Attended noise compliance monitoring at designated noise sensitive receivers was conducted on 11 March 2024 (Quarter 1) in accordance with the requirements of InfraBuild Hexham EPL 5345.

Measured $L_{Aeq(15\ min)}$ noise levels were above the EPL noise limits at the Shamrock Street receiver for the day and evening period and withing 2 dB for the night period. Noise levels at St Joseph's Retirement Village were below the EPL criteria for the day period, but above for the evening and night periods. It was noted that extraneous noise sources, primarily road traffic, contributed significantly to the noise levels measured at the receivers.

Site noise from InfraBuild Recycling was audible at both the Shamrock Street and St Joseph's receiver during the day and evening periods. During the night period the site was barely audible at Shamrock Street and inaudible at St Joseph's. $L_{Aeq(15\ min)}$ levels measured at the receiver locations were largely influenced by extraneous noise sources such as road traffic and other ambient sources such as insects and birds.

Due to the difficulty in determining the contribution of the facility at the nominated receiver locations due to extraneous noise, an alternative method of determining compliance, in accordance with the NPfI, was considered appropriate. In this case site boundary measurements were used to predict noise impacts at each receiver location.

As discussed in **Section 5.3**, calculated noise levels demonstrate general compliance with the EPL noise limits at both the Shamrock Street and St Joseph's receiver locations for the daytime, evening, and night periods under both neutral and noise enhancing meteorological conditions. Therefore, the environmental noise emissions are considered to be compliant with the EPL limits for the site for all three time periods.

Appendix A

Glossary of Acoustic Terms

Appendix A Glossary of Acoustic Terms

The following is a brief description of acoustic terminology used in this report:

Sound power level	The total sound emitted by a source.
Sound pressure level	The amount of sound at a specified point.
Decibel [dB]	The measurement unit of sound.
A-Weighted decibels [dB(A)]	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows: 0dB(A) Threshold of human hearing 30dB(A) A quiet country park 40dB(A) Whisper in a library 50dB(A) Open office space 70dB(A) Inside a car on a freeway 80dB(A) Outboard motor 90dB(A) Heavy truck pass-by 100dB(A) Jackhammer/Subway train 110 dB(A) Rock Concert 115dB(A) Limit of sound permitted in industry 120dB(A) 747 take off at 250 metres
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high-pitched sound and a low frequency to a low pitched sound.
Equivalent continuous sound level [L_{Aeq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
L_{Amax}	The maximum sound pressure level measured over the measurement period.
L_{Amin}	The minimum sound pressure level measured over the measurement period.
L_{A10}	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the L_{A10}.

$L_{A90(15\ min)}$	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the $L_{A90(15\ min)}$.
Ambient noise	The all-encompassing noise at a point composed of sound from all sources near and far.
Background noise	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The $L_{A90(15\ min)}$ sound pressure level is used to quantify background noise.
Traffic noise	The total noise resulting from road traffic. The L_{Aeq} sound pressure level is used to quantify traffic noise.
Day	The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.
Evening	The period from 1800 to 2200 h Monday to Sunday and Public Holidays.
Night	The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.
Assessment background level [ABL]	The overall background level for each day, evening and night period for **each day** of the noise monitoring.
Rating background level [RBL]	The overall background level for each day, evening and night period for the **entire length** of noise monitoring.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 *"Acoustics – Glossary of terms and related symbols"*, the EPA's Noise Policy for Industry and the EPA's NSW Road Noise Policy.