InfraBuild Recycling Pty Ltd
10-Dec-2020
60493017

# InfraBuild Recycling Hexham Quarterly Noise Monitoring Report - Quarter 4 2020

# InfraBuild Recycling Hexham Quarterly Noise Monitoring Report - Quarter 4 2020

Client: InfraBuild Recycling Pty Ltd

ABN: 28002707262

Prepared by

**AECOM Australia Pty Ltd**
17 Warabrook Boulevard, Warabrook NSW 2304, 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

10-Dec-2020

Job No.: 60493017

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

# Quality Information

| | |
|---|---|
| Document | InfraBuild Recycling Hexham Quarterly Noise Monitoring Report - Quarter 4 2020 |
| Ref | 60493017 |
| Date | 10-Dec-2020 |
| Prepared by | James Enright |
| Reviewed by | Paul Wenta |

Revision History

| Rev | Revision Date | Details | Authorised | |
|---|---|---|---|---|
| | | | Name/Position | Signature |
| 0 | 10-Dec-2020 | Final Report | Paul Wenta<br>Principal Scientist - Air Quality |  |

# Table of Contents



## List of Tables



## List of Figures

# 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 4 2020 noise monitoring survey was conducted at two offsite receivers and two site boundary locations during December 2020 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 107 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's NSW Industrial Noise Policy (INP) makes an allowance for assessment by other methods.

Section 11.1.2 Notes on noise monitoring of the INP states:

- ***Where existing noise levels are high.***

  *When compliance is being measured it may be found that, in many cases, existing noise levels are higher than noise level from the source, making it difficult to separate out the source noise level. When this happens, it may not be feasible to measure compliance at the specified location, and other methods will be needed. In these cases, measurements may be taken closer to the source and then calculated back to the specified location. In doing this, take care to account for the 'near field', a region in which sound pressure levels do not decrease with distance in the normal way. Definitions of the extent of this region are contained in many noise textbooks (for example, Bies and Hanson 1996). Any calculations should be done in accordance with the validation requirements set out in Section 6.2.*

Section 6.2 goes on to discuss assessment of large sites through the use of a computer noise model.

One of the notes attached to Table 4 in the project approval conditions of the INP states;

*'noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the INP'.*

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 INP was considered appropriate. In this case site boundary measurements were used to predict noise impacts at each receiver location. Boundary noise monitoring was carried out at two monitoring locations on the Northwest and Southeast of the site premises, 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 L10(15 min), LAeq(15 min) and LA90(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.*

*5dB(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 3oC/100m.*

## 3.1 NSW Industrial Noise Policy

In reference to determining compliance with noise conditions, the Industrial Noise Policy (INP) states the following:

***11.1.3 Non-compliance with noise conditions***

*When is a development in non-compliance with a noise condition?*

*A development will be deemed to be in non-compliance with a noise consent or licence condition if the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence condition. This may occur for two reasons:*

- *The noise from the development is excessive, in which case the development is truly not complying with its consent or licence condition.*
- *The noise was increased by extreme, non-standard weather effects - in which case the development is not considered to be in non-compliance with its consent or licence condition. Non-standard weather effects can be considered to be present during monitoring if the cloud cover is less than 40 per cent and the wind speed (at 10 m height) is less than 1.0 m/s (represents an extremely adverse weather condition for noise) - during the period from 6 pm to 7 am in non-arid areas (see Section 9.2).*

  *In this latter case, further monitoring at a later date is required to determine compliance under the meteorological conditions specified in the consent/licence condition.*

# 4.0 Monitoring

## 4.1 Attended Monitoring

Attended measurements were conducted during the daytime (0700 – 1800), evening (1800 – 2200) and night time (2200 - 0700) on 3 December 2020 at the monitoring locations listed in **Section 1.2** 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 overcast with a slight to moderate breeze.

### 4.1.2 Site Operations

On the dates 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

Noise monitoring was conducted at the two defined receiver locations during the daytime when the primary noise sources on site were operational. Attended monitoring 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 3 December 2020 are presented in **Table 1**.

**Table 1 Quarter 4 2020 – Attended Noise Monitoring Results Summary**

| Location | Date / Time | EPL limits $L_{Aeq(15mins)}$ dB(A) | Measured Noise Level dB(A) | | Description of Noise Environment |
|---|---|---|---|---|---|
| | | | $L_{Aeq}$ (15 min) | $L_{A90}$ (15 min) | |
| **Day (7:00 – 18:00)** | | | | | |
| R1 – 15 Shamrock Street, Hexham | 3/12/20 13:20 | 47 | **57** | 53 | - Site clearly audible at times<br>- Heavy traffic from Maitland Rd<br>- Local traffic entering the service station and McDonalds<br>- Parked car idling nearby (20m)<br>- Birds and insects<br>- Passing trains |
| R2 – Calvary St Joseph's Retirement Community | 3/12/20 11:29 | 53 | 52 | 49 | - Site audible but not dominant with metallic clanging<br>- Highway traffic dominant source, particularly trucks<br>- Trees rustling<br>- Birds and insects |

| Location | Date / Time | EPL limits $L_{Aeq(15mins)}$ dB(A) | Measured Noise Level dB(A) | | Description of Noise Environment |
|---|---|---|---|---|---|
| | | | $L_{Aeq}$ (15 min) | $L_{A90}$ (15 min) | |
| **Evening (18:00 – 22:00)** | | | | | |
| R1 – 15 Shamrock Street, Hexham | 3/12/20 19:26 | 48 | **51** | 47 | - Site inaudible<br>- Highway traffic the dominant source<br>- Local traffic entering McDonalds and service station<br>- Residents entering street<br>- Birds, insects and barking dogs<br>- Monitoring paused for passing trains and trucks entering/exiting the service station area. |
| R2 – Calvary St Joseph's Retirement Community | 3/12/20 20:00 | 42 | **64** | 63 | - Frogs very loud and constant<br>- Site audible intermittently (metal clanging)<br>- Highway traffic the dominant source<br>- Passing trains<br>- Birds, insects and cicadas |
| **Night (22:00 – 7:00)** | | | | | |
| R1 – 15 Shamrock Street, Hexham | 3/12/20 22:51 | 45 | **47*** | 41 | - Site inaudible<br>- Highway traffic the dominant source<br>- Traffic entering McDonalds and service station<br>- Crickets and insects<br>- Monitoring paused for passing trains and tucks entering/exiting the service station area. |
| R2 – Calvary St Joseph's Retirement Community | 3/12/20 23:26 | 41 | **44** | 40 | - Site inaudible<br>- Highway traffic the dominant source<br>- Insects and rabbits in bushes |

**Bold** values indicate measured noise level above EPL criteria

*Measured noise level within 2dB of EPL criteria

The results in **Table 1** show that the measured $L_{Aeq(15\ min)}$ noise level at R2 – Calvary St Joseph's Retirement Community is compliant with development EPL noise limit for the day-time period. The measured evening and night time results at the St Joseph's site were above the EPL criteria.

Measured $L_{Aeq(15\ min)}$ noise levels at R1 – 15 Shamrock Street for the day and evening time periods were above the EPL criteria. The night time period at Shamrock Street was measured within 2dB of the EPL criteria and therefore compliant as per **Section 3.1.**

In most cases highway traffic was noted to be the dominant noise source except for the evening period at St Joseph's which was noted to be dominated by frogs. In order to determine the noise contribution from the facility at the receiver locations, an alternative method of determining compliance, in accordance with the INP 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 3 December 2020 are presented in **Table 2**.

**Table 2 Quarter 4 2020 – 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 | 3/12/20 12:10 | 73 | 70 | - Mill operational and dominant<br>- 3 x material handlers operational<br>- No trucks in vicinity<br>- Passing trains barely audible above mill / scrap handlers |
| | Evening | 3/12/20 21:04 | 50 | 45 | - Metal handlers moving metal<br>- Passing trains (rail line close)<br>- Insects<br>- Traffic from Maitland Rd |
| | Night | 3/12/20 22:00 | 51 | 42 | - Cars leaving site<br>- Maintenance work – power tools and clanging etc.<br>- Traffic from Maitland Rd<br>- Passing trains<br>- Insects |
| Southeast Boundary | Day | 3/12/20 12:48 | 58 | 54 | - Activity in non-ferrous dominant<br>- Truck unloading + bobcat working 50m away<br>- Highway audible<br>- Material handlers working<br>- Siren on highway |
| | Evening | 3/12/20 20:33 | 53 | 45 | - Site work occurring 50m away<br>- Oxytorch cutting scrap metal<br>- 2 x Material handlers operational<br>- Workers shouting<br>- Birds, insects and crickets<br>- Traffic from Maitland Rd<br>- Passing trains |
| | Night | 3/12/20 22:25 | 43 | 40 | - Site Maintenance work (power tools etc.)<br>- Traffic Maitland Rd<br>- Birds and insects<br>- Passing trains |

## 5.3 Predicted Noise Levels

In order to predict resultant noise levels at each receiver from the InfraBuild facility alone, a 'flat ground' model was used based on hemispherical spreading, conservatively assuming no topographical shielding, ground or air absorption, directivity or meteorological effects. Calculated noise levels at each receiver location are presented in **Table 3**.

**Table 3 Quarter 4 2020 – Calculated Noise Levels at the Receiver Locations**

| Receiver Location | Time | Calculated noise impact, dB(A) | EPL noise limit, dB(A) | Comply |
|---|---|---|---|---|
| R1 – 15 Shamrock Street, Hexham | Day | 49* | 47 | Yes |
| | Evening | 27 | 48 | Yes |
| | Night | 27 | 45 | Yes |
| R2 – Calvary St Joseph's Retirement Community | Day | 42 | 53 | Yes |
| | Evening | 37 | 42 | Yes |
| | Night | 27 | 41 | Yes |

**Bold** values indicate measured noise level above EPL criteria

*Measured noise level within 2dB of EPL criteria

Calculated results show no non-compliances with EPL criteria are predicted at either receiver location. The day time calculated result at Shamrock street is within 2dB of the EPL criteria and therefore deemed compliant as discussed in **Section 3.1**.

# 6.0 Conclusion

Attended noise compliance monitoring at designated noise sensitive receivers was conducted on 3 December 2020 in accordance with the requirements of InfraBuild Hexham EPL No: 5345.

Measurements at the R2 – Calvary St Joseph's Retirement Community during the day-time were below the relevant criteria.

Ambient $L_{Aeq(15\ min)}$ noise levels above the EPL noise limits were measured at St Joseph's for the evening and night time periods and at Shamrock Street during the day, evening and night periods, however it was noted that extraneous noise sources, namely road traffic and frogs, contributed significantly to these noise levels.

Site noise from InfraBuild recycling was audible at Shamrock Street and St Joseph's Retirement Community receptors during the day and evening periods and inaudible during the night period. $L_{Aeq(15\ min)}$ levels measured at the receiver locations were largely influenced by extraneous noise sources such as road traffic and other ambient sources (e.g. frogs, birds, crickets) at both locations.

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

As shown in **Table 3**, calculated noise levels demonstrate compliance with the EPL noise limits at both receiver locations for the day, evening and night periods where $L_{Aeq(15\ min)}$ results measured directly at the receiver locations returned exceedances due to extraneous sources.

This page has been left blank intentionally.

# 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:<br>0dB(A) Threshold of human hearing<br>30dB(A) A quiet country park<br>40dB(A) Whisper in a library<br>50dB(A) Open office space<br>70dB(A) Inside a car on a freeway<br>80dB(A) Outboard motor<br>90dB(A) Heavy truck pass-by<br>100dB(A) Jackhammer/Subway train<br>110 dB(A) Rock Concert<br>115dB(A) Limit of sound permitted in industry<br>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. |
| $L_{max}$ | The maximum sound pressure level measured over the measurement period |
| $L_{min}$ | The minimum sound pressure level measured over the measurement period |
| $L_{10}$ | The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the $L_{10}$. |

| | |
|---|---|
| $L_{A90(15\ min)}$ | 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 $L_{eq}$ 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 NSW Industrial Noise Policy and the EPA's NSW Road Noise Policy.