

London office

1B(c) Yukon Road
London
SW12 9PZ
Tel: 0203 475 2280

Manchester office

105 Manchester Road
Bury
BL9 0TD
Tel: 0161 850 2280

855 STOCKPORT ROAD, LEVENSHULME, MANCHESTER

NOISE IMPACT ASSESSMENT

Report **14511-NIA-01 RevC**

Prepared on 27 July 2020

Issued For:
Camberwell & Metropolitan
80 Camberwell Road
London
SE5 0EG



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14511-SP1	Indicative Site Plan
14511-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	Acoustic Calculations

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Camberwell & Metropolitan to measure existing background noise levels at 855 Stockport Road, Levenshulme, Manchester. Measured noise levels have been used to determine noise emissions criteria for a proposed bar venue on the ground floor with residential properties above it, in agreement with the planning requirements of the Manchester City council.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

2.0 SITE DESCRIPTION

Current proposals are to use the existing ground floor commercial unit at 855 Stockport Road, Levenshulme, as a bar venue. It is understood the worst-case operating hours of the bar will be 11:00 to 01:00.

The site is bound by Stockport Road to the west and Drury Street to the east. Residential receivers have been identified at 861B Stockport Road adjacent as the nearest affected receivers.

This nearest noise sensitive receivers were identified through observations on-site and a search of council tax bands. If there are any receivers closer to that identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receptor should be confirmed by the client before the proposed bar venue or any noise mitigation measures are implemented.

It is understood a plant unit will be installed at the rear as part of the proposed ventilation system.

The residential space above the commercial unit itself is understood to form part of the same lease and will be used as staff accommodation. In this way, this flat is not considered noise sensitive.

Locations are shown in attached site plan 14511-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure

Measurements were undertaken at one position as shown on indicative site drawing 14511-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the site.

The microphone was mounted on a 1st storey window at the rear of the building. The microphone was positioned 1 m in front of the window and as such the monitoring position is not considered free-field according to the guidance of BS 4142: 2014. Based on the presence of the reflective surface and the nature of surrounding noise sources, a correction for reflections of 2 dB has been applied, in line with the recommendations of the standard. Noise levels at the monitoring position were dominated by commercial noise from a nearby extraction fan and traffic noise, during the installation and collection of equipment.

Continuous automated monitoring was undertaken for the duration of the survey between 15:12 on 28 March 2019 and 09:07 on 02 April 2019.

Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

The measurement procedure generally complied with BS 7445: 1991: *'Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use'*.

3.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 971 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

4.0 RESULTS

The $L_{Aeq:5min}$, $L_{Amax:5min}$, $L_{A10:5min}$ and $L_{A90:5min}$ acoustic parameters were measured at the location shown in site drawing 14511-SP1.

Measured noise levels are shown as a time history in Figure 14511-TH1, with minimum background noise levels summarised in Table 4.1.

	Minimum background noise level
	$L_{90:5min}$
Proposed Operating Hours (11:00 – 01:00)	50 dB(A)

Table 4.1: Minimum background noise levels during operational period

5.0 NOISE CRITERIA

5.1 Local Authority Criteria

It is understood the requirement according to the Local Authority is as follows:

“Before the commencement of the authorised Class A4 use, a scheme shall be submitted to and approved in writing by the City Council as local planning authority, detailing arrangements for the acoustic treatment of the ground floor application premises, including the forecourt eating / drinking area and any associated externally mounted equipment to achieve satisfactory attenuation of noise disturbance to upper floor and neighbouring residential uses. The agreed scheme shall be related to an acoustic report and noise survey that shall inform attenuation measures, which shall be implemented in full before the use commences and maintained in situ thereafter.”

Relevant criteria will be recommended for noise breakout of the proposed bar activities and an external seating area, and a proposed plant installation.

5.2 Transmission Through External Façade and External Seating Area

For 'entertainment noise', it is understood the requirement of the Local Authority is to ensure noise emissions do not exceed a criterion of 10 dB below the background noise level, measured without entertainment noise.

Based on the measured background noise level shown in Table 4.1, the criterion for entertainment noise is 40 dB(A).

There will be no music in the outdoor seating area, therefore assessing the noise from people drinking/dining outside as entertainment noise is considered particularly robust.

5.3 Proposed Plant Installation

For the proposed plant installation, a suitable criterion for noise emissions is recommended as follows:

"The 'A' weighted sound pressure level from the plant, when operating at its noisiest, shall not at any time exceed a value of 10 dB below the minimum external background noise, at a point 1 metre outside any window of any residential property."

The proposed criterion for plant noise emissions is therefore 40 dB(A).

6.0 PROPOSED ACTIVITIES

6.1 Internal Bar Area

The main proposed bar area is located at ground floor level, towards the front of the building.

Manual measurements were taken at an existing similar sized bar, with music played at a background level and customers in the bar. The noise levels measured are as shown in Table 6.1.

Source	Sound Pressure Level (dB) in each Frequency Band, at source								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Amplified Music	79	75	76	76	74	71	69	64	79

Table 6.1: Measured Music Noise Levels

These levels will be used to calculate the noise breakout to nearby noise sensitive receivers.

6.2 External Seating Area

Proposals are to form an external seating area at the front of the bar, set back underneath the first floor building envelope.

In order to predict the likely noise emissions of activity in the external seating areas, measurements have been used that were taken in an outdoor terrace area of a shisha bar. During these measurements, the terrace was occupied by approximately 25 people, which is seen as suitably representative of the worst-case number of patrons that will use the terrace at one time.

The noise levels measured during peak activity in the outdoor terrace of a shisha bar occupied by 25 people are as shown in Table 6.2.

Source	Sound Pressure Level (dB) in each Frequency Band, $L_{Aeq\ 30mins}$ at Source								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Measured Noise Level	64	59	59	61	57	54	50	44	62

Table 6.2: Measured Noise Levels in typical External Terrace Area

These levels will be used to calculate the impact to nearby noise sensitive receivers.

6.3 Plant Installation

The proposed plant installation is comprised of 2 Daikin RZQ71D3V1B air conditioning units.

Noise emissions for the proposed plant units, as provided by the manufacturer, are shown in Table 6.3. Loudest modes of operation have been used in order to present a robust worst-case assessment.

Unit	Sound Pressure Levels (at 1 meter, dB) in each Frequency Band								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Daikin RZQ71D3V1B air conditioning unit	51	48	49	46	45	39	36	29	49

Table 6.3: Manufacturer provided noise emissions levels

The proposed plant location is a wall mount on the ground floor wall at the rear of the building which is shown on indicative site plan 14511-SP1.

7.0 NOISE IMPACT ASSESSMENT THROUGH EXTERNAL FACADE

7.1 Noise Breakout Assessment – External Facade

At the rear of the site, the noise breakout transmission path is protected by buffer zones as well as a service access door, which will typically remain closed.

The façade noise breakout assessment will therefore focus on the proposed glazed front façade.

Receiver 1, a first floor residential window above an adjacent premises at the front façade of the bar could be affected by noise emissions through the glazed façade and entrance. It is not known if the front windows are residential in nature, but they will be assessed as such in order to present a robust assessment.

As the entrance is set back, the first-floor building envelope will provide some screening.

Levels have been calculated using music at a background level, the predicted sound reduction of the glazed facade (based on a nominal 5 mm single glazed pane) and the formulae shown in Appendix B1.

With music played back at the above levels, noise emissions levels at the closest residential window due to internal activities would be as shown in Table 7.1.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to amplified music)
Receiver 1 Window	40 dB(A)	25 dB(A)

Table 7.1: Noise levels and criteria at Residential Window

As shown in Table 7.1 and Appendix B1, transmission of noise to the nearest sensitive windows due to the effects of internal bar activities would comply with the set requirements.

8.0 NOISE IMPACT ASSESSMENT FOR EXTERNAL SEATING AREA

8.1 Assessed Scenario

It has been assumed that activity noise in the terrace area could be continuous, in order to present a robust assessment.

As the external seating area is recessed below the first floor, a certain degree of screening will be provided to noise emissions.

8.2 Noise Impact Assessment

The noise impact has been calculated for Receiver 1, a first-floor window to an adjacent building, overlooking the front façade of the bar.

The combined distance between anticipated external activity and the first-floor window has been calculated as 4 m.

With all corrections applied, the noise level at the receiver would be as shown in Table 8.1. Detailed calculations are shown in Appendix B2.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to external seating)
Receiver 1 Window	40 dB(A)	40 dB(A)

Table 8.1: Noise levels and criteria at Residential Window

As shown in Table 8.1, noise emissions from the proposed operations at Receiver 1 are expected to comply with the set requirements.

It should be noted that guidance is given in the noise management plan (Section 11.0) to avoid activity during night-time hours, when residential amenity is particularly sensitive.

9.0 NOISE IMPACT ASSESSMENT FOR PLANT INSTALLATION

9.1 Noise Impact Assessment

The closest receiver to the proposed plant units is Receiver 2, on the rear façade of a block of flats behind an adjacent building.

The façade facing the application site has no windows. The closest window is a skylight in the roof of the building, approximately 14 m from the proposed plant location, with screening provided by the intermediate building envelope.

Taking into account all necessary acoustic corrections, the resulting noise level at the identified residential windows would be as shown in Table 9.1. Detailed calculations are shown in Appendix B3.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to proposed plant)
Receiver 2	40 dB(A)	26 dB(A)

Table 9.1: Noise levels and criterion at noise sensitive receivers

As presented in Table 9.1 and Appendix B3, the proposed plant installation would be expected to meet the requirements of the proposed criteria.

10.0 NOISE IMPACT ASSESSMENT FOR ADDITIONAL NOISE SOURCES

Consideration will also be given to additional noise generated outside the building, namely patrons entering and exiting the building.

When patrons enter or exit the building, there are two possible elements of noise to consider:

- Additional egress of internal noise through an open door,
- Noise generated by patrons on the street outside.

As shown in Section 8.0, egress of internal noise is sufficiently controlled by a single glazed facade. The proposed glazed door would therefore be considered suitably when closed, although when opened the sound insulation provided is inherently reduced.

We would therefore recommend that an internal lobby area, with a further glazed entrance door could be used, such that one door can be kept closed at all times. In this way, we would expect the

entrance to maintain the assumed level of sound insulation even when being used to access or exit the building.

In terms of noise generated by patrons on the street outside the venue, it is noted that a number of late-night venues exist in the area, including public houses and bars. Provided the behaviour of patrons entering and exiting the venue is suitably monitored and controlled, we would therefore not expect any noticeable change to the existing level of noise generated on the surrounding streets.

11.0 PROPOSED NOISE MANAGEMENT PLAN

In order to ensure the calculated noise emission levels are not exceeded, we would recommend following certain steps when operating the proposed bar, as detailed below:

- We would recommend ensuring noise levels inside the bar do not exceed the predicted source noise levels as follows:

Source	Low Frequency Limits		Overall Limit
	63Hz	125Hz	
Amplified Music	79 dB	75 dB	79 dB(A)

- It should be ensured that loudspeakers are resiliently fixed to the building structure, such that structure borne noise is minimised,
- Cut-off point of 23:00 to be set, after which the external seating area should be closed, and all external doors and windows closed,
- Staff should be instructed to ensure that entrance doors are kept closed where possible,
- Any new external glazed elements should be selected to provide a sound reduction performance of at least R_w 31 dB,
- Staff should also remind patrons using the nightclub of the residential nature of surrounding premises and behaviour outside the premises should be monitored accordingly,

12.0 CONCLUSION

An environmental noise survey has been undertaken at 855 Stockport Road, Levenshulme, Manchester M19 3PW. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant units in accordance with the requirements of the Local Authority.

A noise impact assessment has then been undertaken using typical noise data to predict the noise levels, due to the proposed activities and plant, at the nearby noise sensitive receivers.

Calculations show that noise emissions from various noise sources should meet the requirements of the Local Authority with the recommended mitigation installed as stated herein.

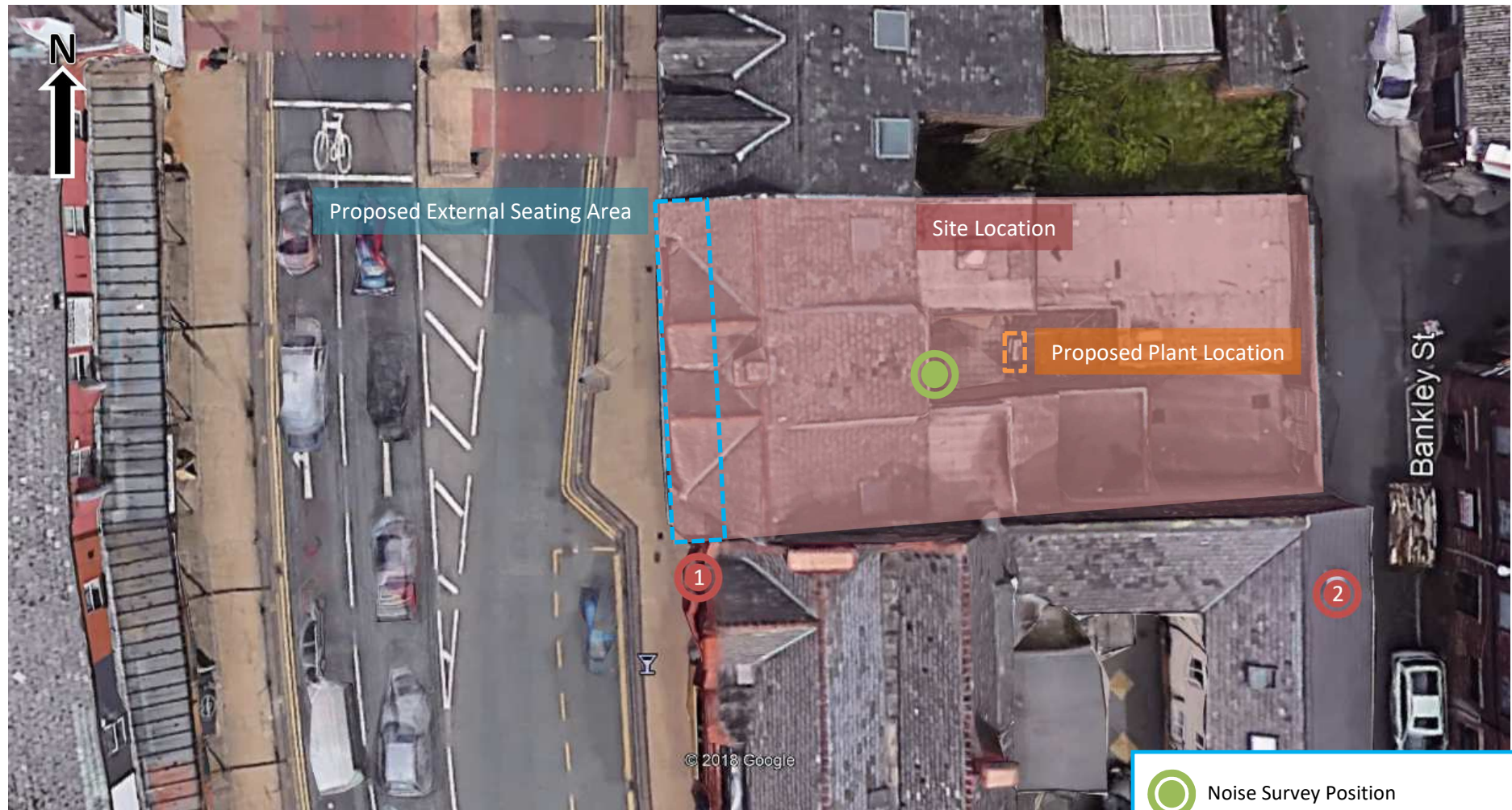
An outline noise management plan has been recommended, in order to minimise noise transmission due to other factors.

Report by

Duncan Martin MIOA

Checked by

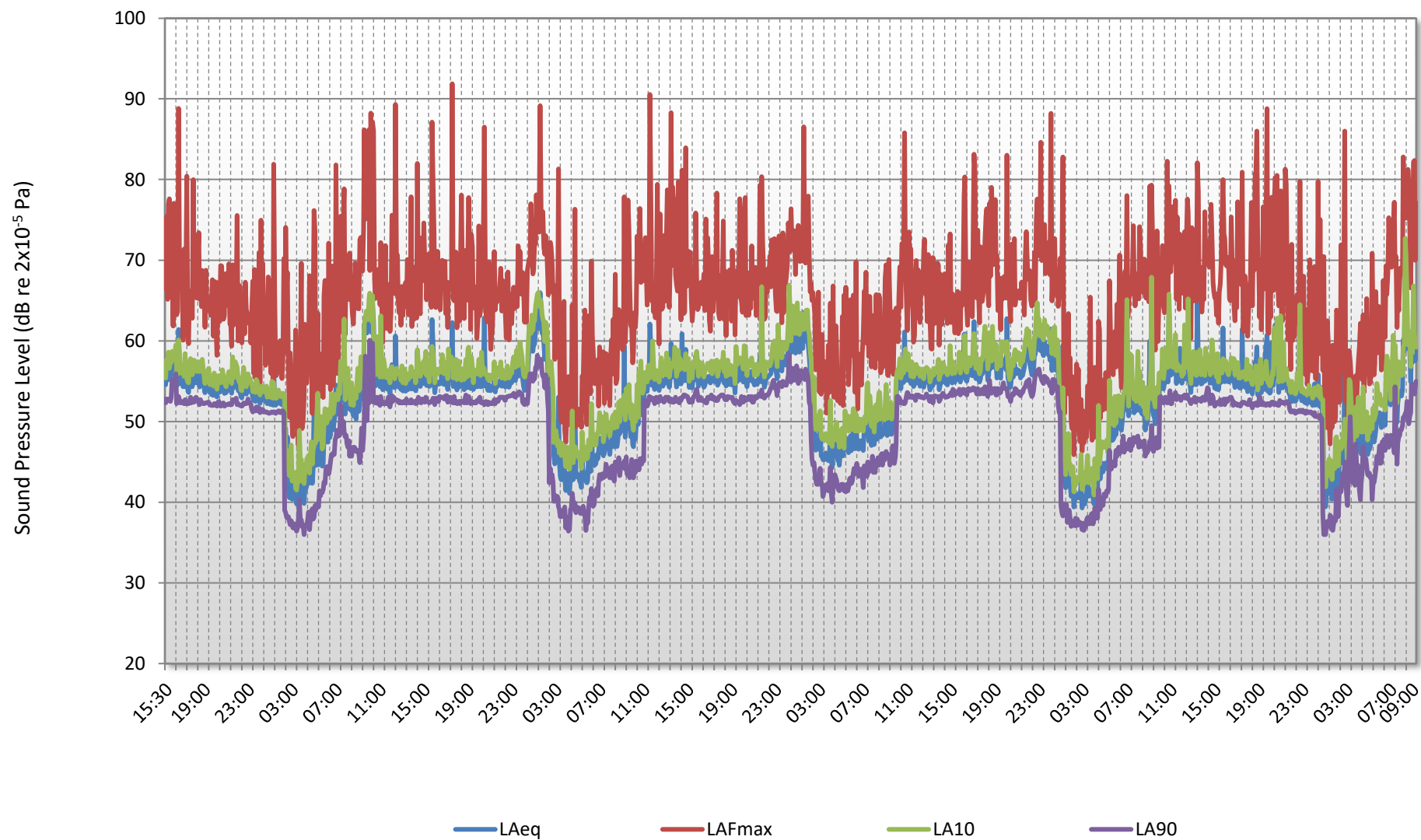
Florian Clement MIOA



855 Stockport Road, Levenshulme, Manchester

Environmental Noise Time History

28 March 2019 to 2 April 2019



GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10 dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B1

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855 Stockport Road, Levenshulme, Manchester

Acoustic Calculation used for Indoor to Outdoor Transmission:

$$SPL_{outdoor} = SPL_{indoor} - SRI_{composite} + 10 \log_{10} S + 10 \log \left(\frac{Q}{4\pi r^2} \right) - 6dB$$

Receiver 1: Receiver 1

Source: Background Music Levels

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Internal Sound Pressure Level									
Predicted Source Noise Level Within Ground Floor	79	75	76	76	74	71	69	64	79
Predicted Sound Reduction of glazed facade, dB (SRI)	-20	-19	-23	-30	-35	-27	-32	-35	
Correction for total area of building facade (S = 12m ²)	11	11	11	11	11	11	11	11	
Correction for directivity (Q) and distance (r) (Q=2, r = 5m)	-22	-22	-22	-22	-22	-22	-22	-22	
Non reverberant correction	-6	-6	-6	-6	-6	-6	-6	-6	
Screening due to first floor building envelope	-2	-4	-7	-9	-11	-12	-15	-15	
Sound pressure level at receiver due to music play back	40	35	29	20	11	15	5	-3	25

Criterion for Noise Emissions	40
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APPENDIX B3

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EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Receiver 2

Source: Proposed plant installation

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Manufacturer provided sound pressure level at 1 metre									
Daikin condenser unit, type RZQ71D3V1B	51	48	49	46	45	39	36	29	49
Correction for number of units (2)	3	3	3	3	3	3	3	3	
Correction for reflections, dB	6	6	6	6	6	6	6	6	
Screening from intermediate building envelope	-2	-4	-5	-8	-11	-12	-15	-15	
Distance correction to receiver, dB (14 m)	-23	-23	-23	-23	-23	-23	-23	-23	
Sound pressure level at receiver	35	30	30	24	20	13	7	0	26

Design Criterion	40
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