

**Teaching Centre
256 Ashfield Road
Rochdale**

Acoustic Planning Report
1110/APR1

19 June 2023

For:

Sufyan Khapi



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Acoustic Planning Report

1110/APR1

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1.0 Introduction

Lighthouse Acoustics has been appointed by Sufyan Khapi to undertake an environmental sound survey at the proposed site of the teaching centre situated at 256 Ashfield Road, Rochdale and to undertake assessments of typical operational sound levels from the proposed teaching centre.

The survey methodology, results and assessments are presented in this report.

2.0 Objectives

To visit site to undertake a detailed environmental sound survey in order to establish existing environmental sound levels representative of those at the nearest residential property.

To undertake an assessment of typical teaching centre operational sound breakout levels to the nearest residential property and comment on the acceptability.

To undertake an assessment of typical teaching centre operational sound transfer through the existing separating wall to the adjoining residential property based on a desktop assessment of the known construction of the separating wall and comment on the acceptability.

To propose representative background sound levels at the nearest residential properties for subsequent use in designing building services proposals.

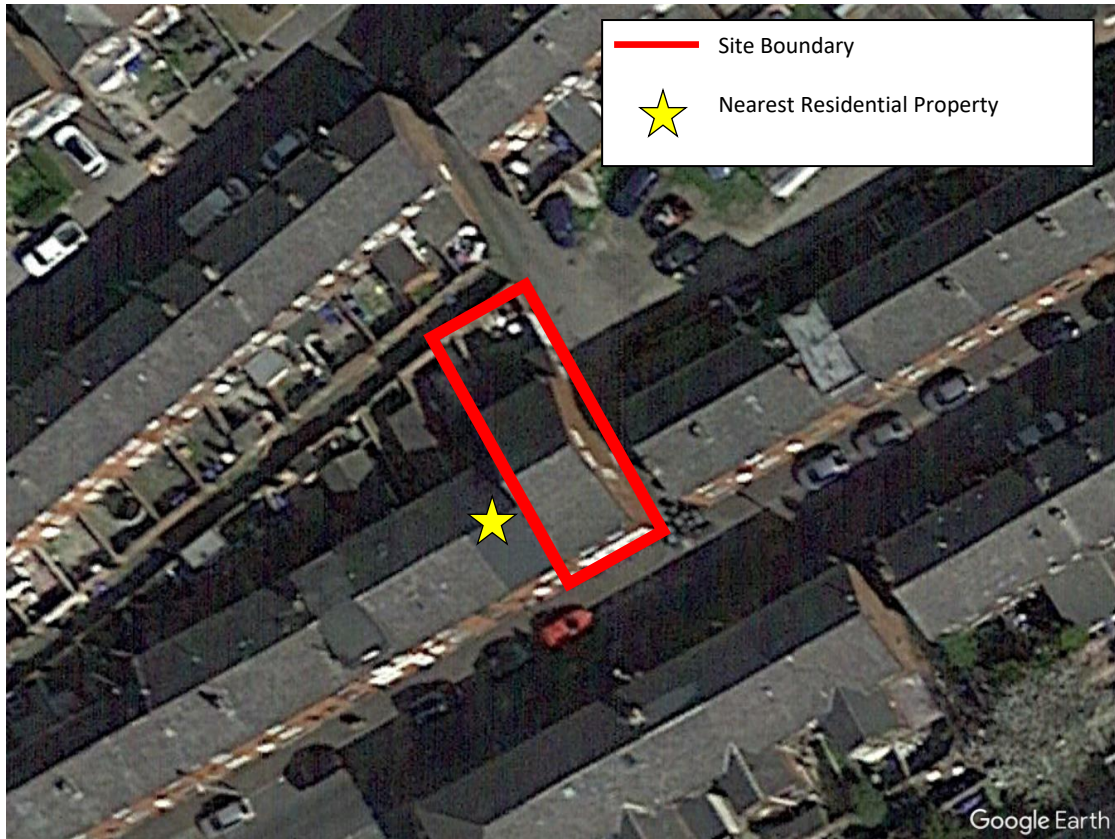
3.0 Site Description

The proposed teaching centre is situated at 256 Ashfield Road, Rochdale. The site comprises an end terrace 2 storey property with yard to the rear.

The site is bound an alley way to the north east, Ashfield Road to the south east, adjoining residential property to the south west and alley way to the north west.

Residential properties are situated to the north east of the site opposite the alley way, to the south east of the site opposite Ashfield Road and to the north west of the site opposite the alley way.

The site plan overleaf indicates the site boundary and the surrounding environment.



Site plan indicating the site boundary and the surrounding environment

4.0 Local Authority Requirements

It is understood that Rochdale Borough Council have requested that a Noise Impact Assessment is undertaken for the proposed teaching centre as the level noise which may occur would be over and above that of a residential dwelling.

5.0 Proposed Operational Activities

It is understood that the proposed teaching centre will operate between 16:00 and 19:00 hours Monday to Friday. There will be a maximum of 2No. classes with each class having their own teacher and a maximum of 17 pupils overall. There will be no amplified music and speech will be the main source of operational sound.

The assessment has been based on the following drawing.

Author	Drawing No.	Revision	Date
RAD Design Projects	RAD/1798/18/1	-	May 2018

This indicates that there will be 1No. 10 pupil classroom at ground floor level and 1No. 7 pupil classroom at 1st floor level.

6.0 Environmental Sound Survey

6.1 Measurements

Automated environmental sound measurements were undertaken from 11:00 hours on Wednesday 7 June 2023 to 11:00 hours on Thursday 8 June 2023. During this period the L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods.

6.2 Weather Conditions

At the start of the survey period the wind conditions were calm (<1m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 13°C.

At the end of the survey period the wind conditions were calm (<1m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 14°C.

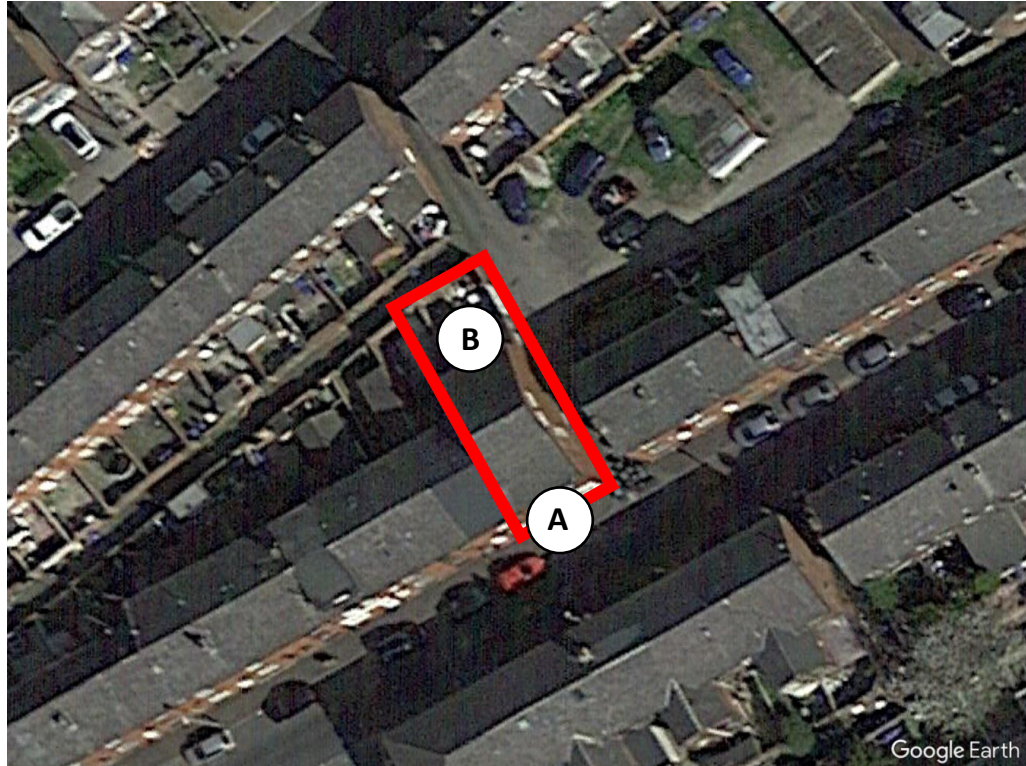
Based on publicly available weather data for the survey period it is understood that weather conditions remained similar for the duration of the survey with no periods of significant rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for undertaking measurements of sound levels.

6.3 Measurement Positions

Environmental sound levels were measured at two positions on-site as described in the table below.

Position	Description
A	Microphone situated at 1 st floor level at 1m from the south east façade overlooking Ashfield Road.
B	Microphone situated at 1 st floor level at 1m from the north west façade overlooking the alley way.

The measurement positions and site boundary are shown on the site plan below.



Site plan showing measurement positions and site boundary

Measurement Position A was selected in order to assess typical environmental sound levels representative of those at the front of the nearest residential property.

Measurement Position B was selected in order to assess typical environmental sound levels representative of those at the rear of the nearest residential property.

6.4 Equipment

The following equipment was used to undertake the environmental sound survey.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Casella	633C	0721320	28/09/2021
Preamplifier	Casella	495	001414	28/09/2021
Microphone	Casella	251	1025	28/09/2021
Class 1 Sound Level Meter	Casella	633C	0721319	28/09/2021
Preamplifier	Casella	495	001446	28/09/2021
Microphone	Casella	251	1996	28/09/2021
Class 1 Sound Calibrator	Casella	120/1	3864878	02/11/2021
Environmental Noise Kits	Casella	6847	-	-
Microphone Extension Cables	Casella	C6717/5	-	-
Weather Protection Systems	Casella	6737	-	-

Field calibration checks were performed on the sound level meters prior to and on completion of the survey and were found to be within acceptable tolerance limits.

6.5 Results

The results of the environmental sound survey are presented on Time History Graphs 1110/THG1 and 1110/THG2 enclosed at the rear of the report.

6.6 Discussion of Sound Climate

At the start and end of the survey period the dominant sound source at Positions A and B was noted to be frequent road traffic along Ashfield Road. During lulls in local road traffic distant road traffic from the surrounding road network contributed towards the measured noise climate.

Whilst we are unable to comment on dominant sound sources or individual sound events during the survey period, based on the surrounding environment it is likely that road traffic remained the dominant sound source.

6.7 $L_{Aeq,T}$ Ambient Sound Levels

The typical representative $L_{Aeq,15min}$ ambient sound level between the proposed operating hours of the teaching centre (16:00 and 19:00 hours) are detailed in the table below.

Nearest Noise Sensitive Receptor	Typical Representative $L_{Aeq,15min}$ Ambient Sound Levels (dB)
	Daytime (16:00–19:00)
Front (Ashfield Road)	62
Rear (Alley Way)	49

6.8 $L_{A90,T}$ Background Sound Levels

The lowest representative $L_{A90,15min}$ background sound levels are detailed in the table below.

Nearest Noise Sensitive Receptor	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
Front (Ashfield Road)	44	36
Rear (Alley Way)	42	35

7.0 Internal Sound Breakout Assessment

7.1 Requirements

The assessment of teaching centre noise falls outside the scope of BS 4142:2014 "Methods for rating and assessing industrial and commercial sound". Given the lack of a specific assessment methodology for nursery noise, guidance from the following documents has been considered.

BS 8233: 2014 "Guidance on sound insulation and noise reduction for buildings" states that external sound levels within external amenity space, such as gardens, should not exceed $L_{Aeq,T}$ 50dB with an upper guideline value of $L_{Aeq,T}$ 55dB.

Similarly, The World Health Organisation document on "Guidelines for Community Noise", 1999, states that external sound levels within outdoor living areas, such as gardens, should not exceed $L_{Aeq,16hour}$ 50dB with an upper guideline value of $L_{Aeq,16hour}$ 55dB.

In addition, the typical representative $L_{Aeq,15min}$ ambient sound level during the proposed operating hours of the teaching centre (16:00 to 19:00 hours) are 62dB at the front and 49dB at the rear.

Based on the above, an external limit for teaching centre sound of $L_{Aeq,1hour} \leq 50dB$ is proposed at the windows of the nearest residential property between the proposed operating hours (16:00 and 19:00 hours).

7.2 Sound Sources

It is understood that there will be a maximum of 2No. classes with each class having their own teacher and up to 10No. pupils in the ground floor classroom and up to 7No. pupils in the 1st floor classroom. There will be no amplified music and speech will be the main source of operational sound.

7.3 Sound Source Data

For a worst case assessment it is assumed that all of the pupils in each of the proposed classrooms could be talking at any one time. The sound pressure levels for 1No. person talking with a normal voice at 1m are detailed below and will be applied to the total number of pupils in each classroom.

Source Description	$L_{eq,T}$ Sound Pressure level (dB) at Octave Band Centre Frequency (Hz)						dBA
	125	250	500	1k	2k	4k	
1No. person talking with normal voice at 1m	47	57	60	54	49	44	60

7.4 Sound Source Levels

The reverberant sound pressure level within the proposed classrooms due to pupils talking has been calculated using the following formula:

$$L_{pr1} = L_{p1m} + 14 + 10 \log N + 10 \log A + 10 \log (1-\alpha)$$

Where:

L_{pr1} is the reverberant sound pressure level in the source room, dB;

L_{p1m} is the sound pressure level of 1No. person talking at 1m, dB;

N is the total number of pupils talking within the space, #;

A is the total absorption area in the receiving room, m².

α is the average absorption coefficient in the space.

7.5 Facade Construction

The existing front and rear facade constructions to the proposed teaching centre are understood to comprise the following elements.

Classroom	Façade	Elements
Ground Floor	Front	Masonry (1.5m ²), windows (7.5m ²), opening window (1m ²)
	Rear	Masonry (6m ²), windows (3m ²), opening window (1m ²)
1 st Floor	Front	Masonry (10m ²), windows (2m ²), opening window (1m ²)
	Rear	Masonry (5m ²), windows (1m ²), opening window (0.5m ²)

The following typical sound reduction indices have been assumed for the façade elements.

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Masonry	34	41	44	48	55	55	55	55
Window	20	24	20	25	34	37	35	39
Opening Window	0	0	0	0	0	0	0	0

7.6 Source Room Assumptions

The following dimensions and finishes/furnishings for the proposed classrooms have been assumed for the purpose of the assessment.

Classroom	Room Dimensions	Typical Room Finishes / Furnishings
Ground Floor	4m x 12m x 2.4m	Carpeted floor finish, plastered walls, plasterboard ceiling, tables, chairs
1 st Floor	3m x 12m x 2.4m	Carpeted floor finish, plastered walls, plasterboard ceiling, tables, chairs

7.7 Nearest Noise Sensitive Receptors

The table below details the approximate distances between the opening windows of the classrooms and the windows of the adjoining residential property.

Classroom	Adjoining Residential Property	Distance (m)
Ground Floor	Ground Floor Front	3
	Ground Floor Rear	8
1 st Floor	1 st Floor Front	3
	1 st Floor Rear	5

7.8 Calculation

The sound pressure level radiated from the facades of the proposed classrooms to the windows of the adjoining residential property has been calculated using the following formula:

$$L_p = L_{prev} + 10 \log S - 6 - SRI + 10 \log Q - 20 \log r - 11$$

Where:

L_p is the source sound pressure level at the receiver, dB;

L_{prev} is the reverberant sound pressure level in the space, dB;

S is the surface area of the separating element, m²;

SRI is the composite sound reduction indices of the facade, dB;

Q is the directivity factor, dB;

r is the distance between the facade and the receiver, m.

SRI is the sound reduction indices of the separating element, dB;

7.9 Results

The results of the worst case assessment are detailed in the table below.

Classroom	Adjoining Residential Property	Calculated $L_{Aeq,1hour}$ Sound Pressure Level (dB)
Ground Floor	Ground Floor Front	47
	Ground Floor Rear	39
1 st Floor	1 st Floor Front	48
	1 st Floor Rear	41

The worst case assessment indicates that $L_{Aeq,1hour}$ sound pressure levels radiated from the facades of the proposed classrooms are likely to achieve the proposed external limit for teaching centre sound of $L_{Aeq,1hour} \leq 50$ dB at the windows of the nearest residential property between the proposed operating hours (16:00 and 19:00 hours).

8.0 Internal Sound Transfer Assessment

8.1 Requirements

For sound transfer it is proposed that L_{Aeq} teaching centre operational sound levels are designed to achieve $L_{Aeq,1hour} \leq 30$ dB within the adjoining residential property between the proposed operating hours (16:00 and 19:00 hours).

8.2 Sound Sources

It is understood that there will be a maximum of 2No. classes with each class having their own teacher and up to 10No. pupils in the ground floor classroom and up to 7No. pupils in the 1st floor classroom. There will be no amplified music and speech will be the main source of operational sound.

8.3 Sound Source Data

For a worst case assessment it is assumed that all of the pupils in each of the proposed classrooms could be talking at any one time. The sound pressure levels for 1No. person talking with a normal voice at 1m are detailed below and will be applied to the total number of pupils in each classroom.

Source Description	Leq,T Sound Pressure level (dB) at Octave Band Centre Frequency (Hz)						dBA
	125	250	500	1k	2k	4k	
1No. person talking with normal voice at 1m	47	57	60	54	49	44	60

8.4 Sound Source Levels

The reverberant sound pressure level within the proposed classrooms due to pupils talking has been calculated using the following formula:

$$L_{pr1} = L_{p1m} + 14 + 10 \log N + 10 \log A + 10 \log (1-\alpha)$$

Where:

L_{pr1} is the reverberant sound pressure level in the source room, dB;

L_{p1m} is the sound pressure level of 1No. person talking at 1m, dB;

N is the total number of pupils talking within the space, #;

A is the total absorption area in the receiving room, m².

α is the average absorption coefficient in the space.

8.5 Existing Construction

The existing separating wall construction between the proposed teaching centre and adjoining residential property is understood to comprise solid masonry at least 2 leaves thick (206mm). The following typical sound reduction indices have been assumed for the separating wall construction.

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Separating Wall 206mm Brick	34	41	44	48	55	55	55	55

8.6 Source Room Assumptions

The following dimensions and finishes/furnishings for the proposed classrooms have been assumed for the purpose of the assessment.

Classroom	Room Dimensions	Typical Room Finishes / Furnishings
Ground Floor	4m x 12m x 2.4m	Carpeted floor finish, plastered walls, plasterboard ceiling, tables, chairs
1 st Floor	3m x 12m x 2.4m	Carpeted floor finish, plastered walls, plasterboard ceiling, tables, chairs

8.7 Receive Room Assumptions

The following typical dimensions and finishes/furnishings for the rooms of the existing adjoining residential property have been assumed for the purpose of the assessment.

Room Type	Typical Room Dimensions	Typical Room Finishes / Furnishings
Lounge	4m x 3m x 2.4m	Hard floor finish, plastered walls, plasterboard ceiling, sofa, cupboards, table, chairs, curtains
Bedroom	3m x 2.5m x 2.4m	Carpeted floor finish, plastered walls, plasterboard ceiling, bed, curtains

8.8 Calculation

The reverberant L_{Aeq} sound pressure level within the rooms of the existing adjoining residential property due to teaching centre operational sound levels has been calculated using the following formula:

$$L_{pr2} = L_{pr1} - SRI + 10 \log (S/A)$$

Where:

L_{pr2} is the reverberant sound pressure level in the receiving room, dB;

L_{pr1} is the reverberant sound pressure level in the source room, dB;

SRI is the sound reduction indices of the separating element, dB;

S is the surface area of the separating element, m²;

A is the total absorption area in the receiving room, m².

8.9 Results

The reverberant L_{Aeq} sound pressure level within the rooms of the existing adjoining residential property due to teaching centre operational sound levels are presented in the table below.

Receptor	Calculated $L_{Aeq,1hour}$ Sound Pressure Level (dB)
Lounge of existing adjoining residential property	24
Bedroom of existing adjoining residential property	23

The worst case assessment indicates that the reverberant $L_{Aeq,1hour}$ sound pressure levels within the lounge and bedroom of the existing adjoining residential property due to teaching centre operational sound levels are likely to achieve the proposed requirement for teaching centre sound of $L_{Aeq,1hour} \leq 30\text{dB}$ between the proposed operating hours (16:00 and 19:00 hours).

9.0 Building Services Sound Limits

Proposals for any building services systems are not known at this stage. As such, it is not possible to assess atmospheric sound emissions from any proposed building services systems to the nearest residential properties.

Once details for any proposed building services systems are known, an assessment of atmospheric sound emissions from any proposed building services systems to the nearest residential properties should be undertaken. This will determine whether any attenuation measures are required in order to achieve the acoustic requirements of the Local Authority.

The assessment should be undertaken in accordance with BS 4142:2014 and be assessed against the lowest representative daytime, evening and night-time $L_{A90,15min}$ background sound levels as detailed in the table below.

Nearest Noise Sensitive Receptor	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
Front (Ashfield Road)	44	36
Rear (Alley Way)	42	35

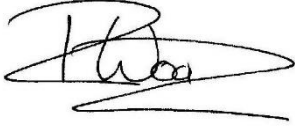
10.0 Conclusions

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels representative of those at the nearest residential property.

An assessment of typical teaching centre operational sound breakout levels has been undertaken which indicates that sound levels are likely to achieve the proposed external limit for teaching centre sound at the nearest residential property between the proposed operating hours (16:00 and 19:00 hours).

An assessment of typical teaching centre operational sound transfer through the existing separating wall to the adjoining residential property has been undertaken which indicates that sound levels are likely to achieve the proposed requirement for teaching centre sound between the proposed operating hours (16:00 and 19:00 hours).

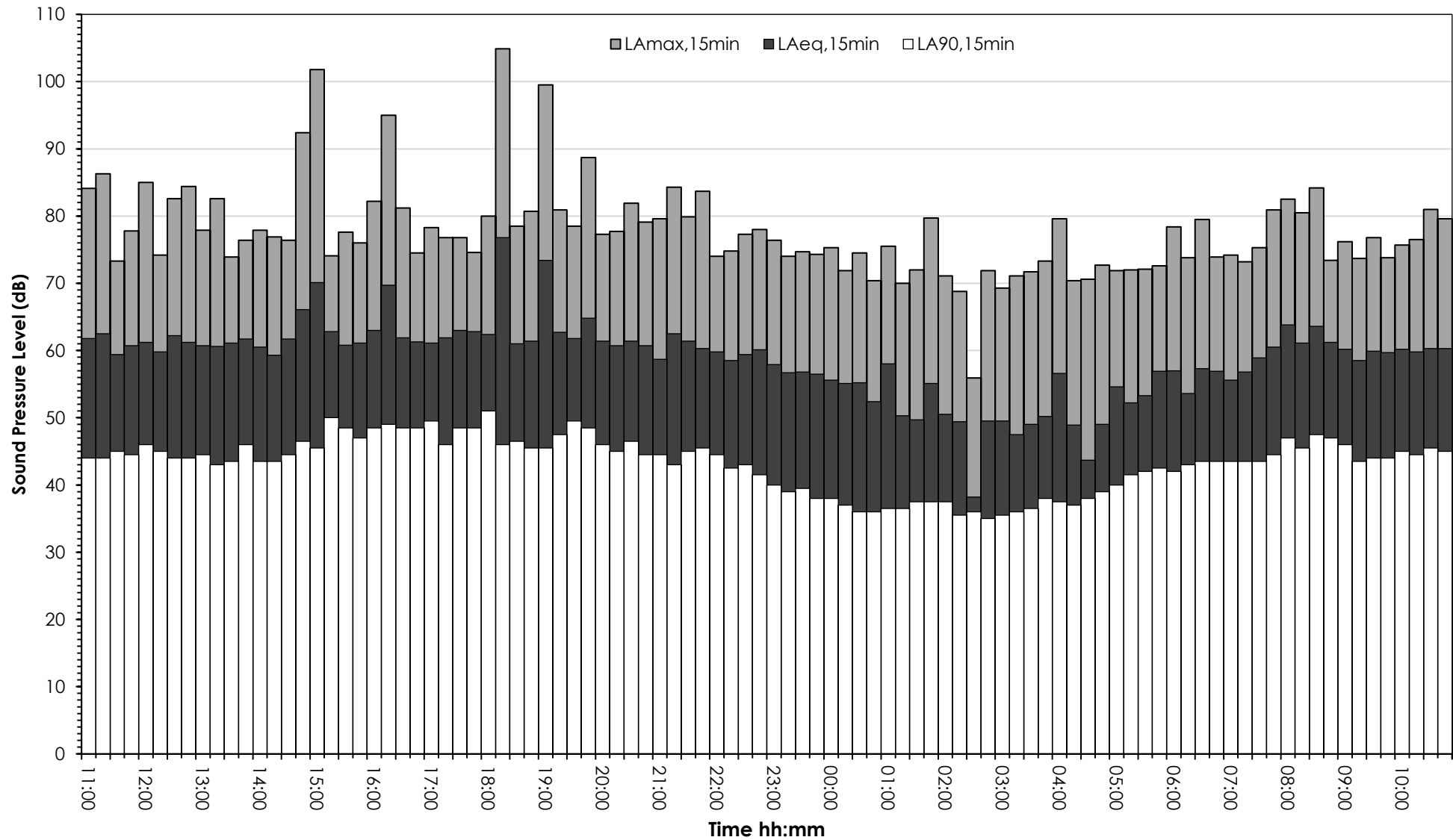
Representative background sound levels have been proposed at the nearest residential properties for subsequent use in designing building services proposals.

A handwritten signature in black ink, appearing to read 'R Wood', with a large, sweeping horizontal stroke underneath.

Robin Wood
LIGHTHOUSE ACOUSTICS

Teaching Centre, 256 Ashfield Road, Rochdale
Time History Graph - Wednesday 7 June 2023 to Thursday 8 June 2023

$L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A



Teaching Centre, 256 Ashfield Road, Rochdale
Time History Graph - Wednesday 7 June 2023 to Thursday 8 June 2023
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position B

