

**Bridgewater House
Chester Road
Manchester**

Acoustic Planning Report
0905/APR1
Revision 2

11 August 2022

For:

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Registered in England and Wales Company No. 09085491

1.0 Introduction

Lighthouse Acoustics has been appointed by Watch This Space (Jembrana) Limited to undertake an environmental sound survey at Bridgewater House, Chester Road, Manchester and to undertake a detailed sound assessment for the proposed residential development.

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

2.0 Objectives

To establish the Local Authority's acoustic requirements for the proposed residential development.

To visit site to undertake a detailed environmental sound survey in order to establish existing environmental sound levels at the proposed residential development.

To produce a detailed sound map of the proposed site layout based on information received from the developer/architect and the results of the environmental sound survey and to undertake a detailed sound assessment to establish the acoustic specification for glazing/ventilation/screening elements required across the proposed residential development in order to achieve the acoustic requirements of the Local Authority.

To propose atmospheric plant noise emission limits at the nearest noise sensitive receptors for subsequent use in designing building services proposals in order to comply with the requirements of the Local Authority.

3.0 Site Description

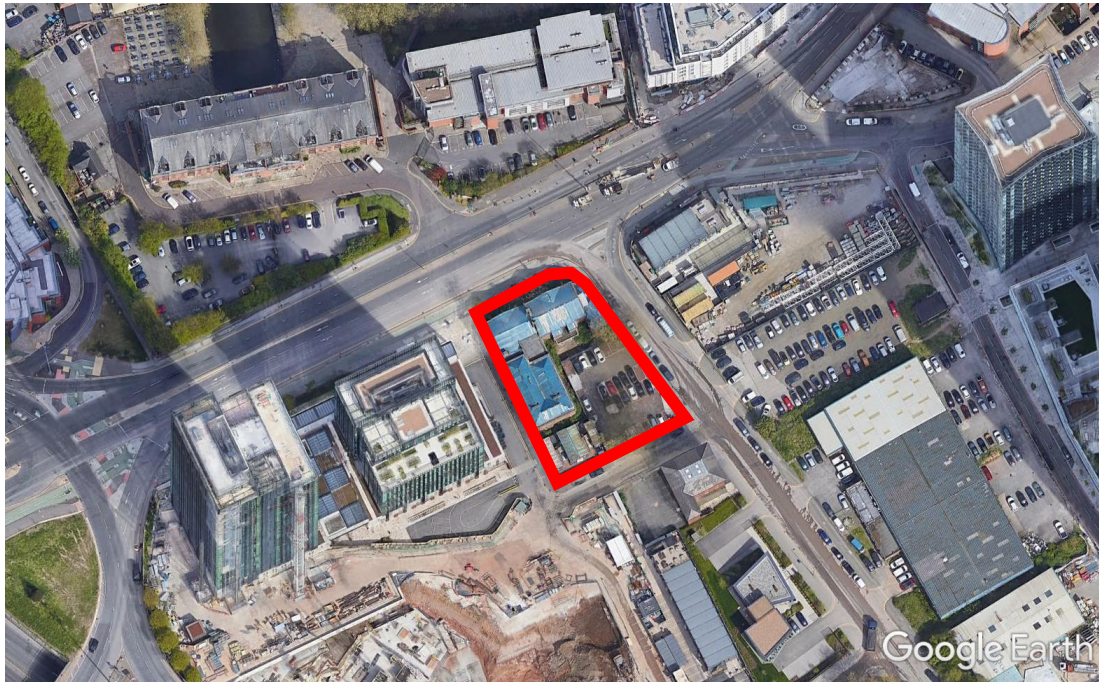
The proposed residential development is situated at Bridgewater House, Chester Road, Manchester.

The site comprises a derelict 3 storey detached building with basement situated to the north of the site with car park to the south of the site. The site is bound by Chester Road (A56) to the north, Great Jackson Street to the east, Silvercroft Street to the south and Crown Street to the west.

Existing residential properties are situated to the north of the site opposite Chester Road (A56) and to the west of the site opposite Crown Street. The Three60 and Blade residential developments are currently under construction to the south west of the site.

The proposal is for the restoration and conversion of the abandoned Grade II listed Bridgewater Canal office building and redevelopment of car park area to provide 53 new homes, including landscaping to courtyard, bike storage and associated works.

The site plan below indicates the extent of the site and the surrounding environment.



Site plan indicating the extent of the site and the surrounding environment

4.0 Local Authority Requirements

4.1 Residential Developments

With regard to residential developments, Section 3.6.1.1 of the Planning & Noise Technical Guidance document (dated December 2015) produced by Manchester City Council states the following:

“Manchester City Council has adopted the following internal noise limits for residential properties:

- **Bedrooms (night time - 23.00 - 07.00) 30dB L_{Aeq} (individual noise events should not normally exceed 45dB $L_{Amax,F}$ by more than 15 times)**
- **Living Rooms (daytime - 07.00 - 23.00) 35dB L_{Aeq}**
- **Gardens and terraces (daytime) 55dB L_{Aeq} ”**

4.2 Building Services

With regard to noise and vibration from fixed plant/equipment, Section 3.6.1.5.1 of the Planning & Noise Technical Guidance document (dated December 2015) produced by Manchester City Council states the following:

"The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.'

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 10:00 hours on Friday 17 June 2022 to 10:00 hours on Tuesday 21 June 2022. During this period the L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods along with the corresponding octave band sound pressure levels.

5.2 Weather Conditions

At the start of the survey period there was a gentle southerly breeze (<5m/s) and the sky was clear. There was no rainfall and road surfaces were dry. The temperature was approximately 22°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 19°C.

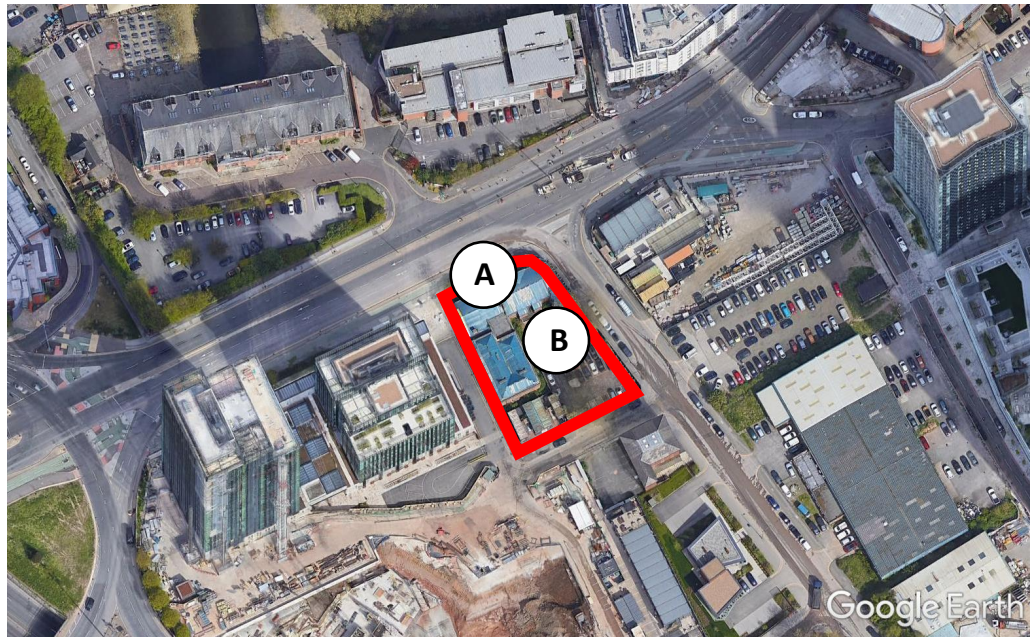
Based on publicly available weather data for the survey period it is understood that weather conditions remained similar for the duration of the survey with no significant periods of rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for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

5.3 Measurement Positions

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

Position	Description
A	Microphone situated at 1m above the hoarding line to the front of the building overlooking Chester Road.
B	Microphone situated at 1m above the hoarding line to the rear of the building overlooking the car park.

The measurement positions are shown on the site plan below.



Site plan showing measurement positions

The measurement positions were selected in order to assess typical environmental sound levels across the site.

5.4 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.

5.5 Results

5.5.1 Time History Graphs

The results of the environmental sound survey are presented on Time History Graphs 0956/THG1 and 0956/THG2 enclosed at the rear of the report.

5.5.2 $L_{Aeq,T}$ Ambient Sound Levels

In order to compare the results of the environmental sound survey with the internal noise limits it is necessary to convert the $L_{Aeq,15min}$ sound levels into single figure daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ sound levels. This has been calculated using the following formula:

$$L_{Aeq,T} = 10 \log_{10} \left(\frac{1}{N} \sum_i^N 10^{L_{Aeq,15min}i/10} \right)$$

The calculated daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ sound levels at each measurement position are presented in the table below.

Day	Position A		Position B	
	Daytime $L_{Aeq,16hour}$ (dB)	Night-time $L_{Aeq,8hour}$ (dB)	Daytime $L_{Aeq,16hour}$ (dB)	Night-time $L_{Aeq,8hour}$ (dB)
Friday	70	67	56*	52
Saturday	70	68	55	52
Sunday	69	64	54	52
Monday	70	64	56*	51

* Affected by construction works noise from the adjacent site.

The highest daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ sound levels at each measurement position are presented in the table below along with the corresponding octave band sound pressure levels.

Position	Period	Leq Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
A	Daytime (16 hour)	69	67	66	65	68	61	50	42	70
	Night-time (8 hour)	66	62	63	62	66	60	49	39	68
B	Daytime (16 hour)	58	55	52	50	52	45	34	25	55
	Night-time (8 hour)	54	49	48	47	51	42	30	23	52

5.5.3 $L_{Amax,F}$ Sound Level Events

The highest 15No. individual $L_{Amax,F}$ sound level events measured during the night-time periods (23:00 to 07:00 hours) over the entire survey period at each measurement position are detailed in the table below along with the corresponding octave band sound pressure levels.

Position	L _{max,F} Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
A	84	83	77	78	94	83	73	56	93
	96	98	98	94	86	82	77	69	93
	84	87	95	88	88	83	71	74	93
	82	74	76	77	91	87	83	73	92
	85	79	75	78	83	89	85	66	91
	88	96	93	89	87	81	74	69	91
	79	80	88	90	87	79	71	58	90
	85	85	91	91	87	80	73	66	89
	85	84	90	91	85	77	68	58	89
	84	82	83	82	88	81	68	61	89
	87	85	77	80	81	84	86	78	89
	89	92	92	90	84	82	77	72	89
	82	90	87	85	87	77	67	62	89
	88	87	81	81	86	83	73	65	88
	85	78	77	79	86	86	74	66	87

Position	L _{max,F} Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
B	81	84	88	84	79	68	63	56	85
	86	78	74	74	74	70	63	53	77
	81	85	80	75	71	66	60	54	77
	75	78	73	74	73	63	56	44	76
	75	72	67	69	74	60	51	44	74
	73	70	71	74	72	61	62	52	74
	80	82	77	75	65	56	50	44	72
	81	72	73	70	67	62	52	45	71
	84	79	67	70	67	62	47	38	71
	73	64	63	65	68	61	68	44	69
	69	67	74	70	62	56	46	33	69
	81	72	68	69	65	57	52	50	69
	77	77	67	69	65	54	57	41	68
	72	72	66	66	66	64	45	46	68
	73	74	68	66	65	56	50	40	67

5.5.4 LA90,T Background Sound Levels

The lowest representative daytime and night-time LA90,15min background sound levels measured at each position during the survey period are detailed in the table below.

Position	Lowest Representative LA90,15min Background Sound Levels (dB)	
	Daytime	Night-time
A	59	52
B	52	44

These levels will be used to specify atmospheric plant sound emission limits at the nearest noise sensitive receptors for subsequent use in assessing atmospheric plant sound emissions from the proposed development.

5.6 Discussion of Sound Climate

At the start and end of the survey period the dominant sound source at Position A was noted to be frequent road traffic along Chester Road (A56) to the north of the site. During lulls in road traffic along Chester Road, road traffic from the surrounding road network contributed towards the measured sound climate.

At the start and end of the survey period the dominant sound source at Position B was noted to be road traffic from the surrounding road network. Construction noise from the adjacent construction site also contributed towards the measured sound 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 from the surrounding road network remained the dominant sound source.

6.0 Detailed Sound Assessment

6.1 Assessment Method

In order to assess environmental sound levels across the proposed residential development a three dimensional model of the site has been constructed using SoundPLAN sound mapping software.

The software uses the measured sound data to predict how environmental sound from the surrounding transportation sound sources radiates across the site returning a colour contour map showing the variations in sound levels.

The calculation method used by the software takes into account acoustic corrections such as distance propagation, ground absorption, reflections and screening.

In order to establish the acoustic specification for glazing/ventilation elements required to achieve the internal daytime $L_{Aeq,16hour}$, night-time $L_{Aeq,8hour}$ and night-time $L_{Amax,F}$ requirements an assessment has been undertaken in accordance with the more rigorous calculation method detailed in BS 8233:2014, "Guidance on sound insulation and noise reduction for buildings".

This calculation method takes into account the external sound pressure level, the sound reduction indices of the façade elements, the area of the facade and the absorption within the room at octave band centre frequencies.

6.2 Proposed Site Layout

The assessment has been based on the following drawings.

Author	Drawing No.	Revision	Date
Snook Architects	111-D	D	04.07.22
	112-C	C	20.06.22
	113-B	B	20.06.22
	114-B	B	20.06.22
	115-C	C	04.07.22
	116-A	A	20.06.22
	117-A	A	20.06.22
	118-A	A	20.06.22
	119-A	A	20.06.22
	120-B	B	04.07.22
	121-C	C	04.07.22
	122-B	B	04.07.22

The proposals include the refurbishment of the existing 3 storey detached building to form 20No. residential flats and the construction of 33No. new build flats.

The ground floor flats along the northern elevation of the existing building will feature private gardens along the northern site boundary. Private and communal gardens will be situated within the centre of the site at ground floor level.

6.3 Acoustic Requirements

The proposed flats comprise living room/dining room/kitchen and bedroom internal spaces along with garden external spaces.

Based on the requirements of the Local Authority detailed in Section 4.1, the following internal and external sound limits have been assessed to.

Location	07:00 to 23:00	23:00 to 07:00
Living/Dining/Kitchen	35dB LAeq,16hour	-
Bedroom	35dB LAeq,16hour	30dB LAeq,8hour 45dB LAmax,F*
Garden	55dB LAeq,16hour	-

* should not be exceeded more than 15 times per night.

6.4 Construction Proposals

It is understood that the external walls and roof of the buildings will comprise the following typical constructions.

Element	Typical Construction
External Walls	Brickwork with cavity, insulation and internal plasterboard lining
Roof Existing	Tiled with timber boarding above ceiling joists, insulation and double layer plasterboard ceiling
Roof New Build	Concrete slab with insulation in void and plasterboard ceiling

The following typical Sound Reduction Indices have been assumed for the various elements.

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
External Walls	32	40	44	45	51	56	56	56
Roof Existing	20	35	50	50	50	50	50	50
Roof New Build	35	38	42	49	53	55	55	55

6.5 Room Assumptions

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

Room Type	Typical Room Dimensions	Typical Window Area	Typical Room Finishes / Furnishings
Existing Living/Dining/Kitchen	6m x 7m x 2.4m	4m ²	Hard floor, curtains, sofa, table chairs
Existing Bedroom	3m x 4m x 2.4m	2m ²	Hard floor, curtains, bed
New Build Living/Dining/Kitchen	4m x 8m x 2.4m	4m ²	Hard floor, curtains, sofa, table chairs
New Build Bedroom	3m x 4m x 2.4m	2m ²	Hard floor, curtains, bed

6.6 Glazing Specifications

In order to achieve the internal daytime and night-time requirements the glazing/external door system as a whole including glass, frame, seals and openings shall provide the following minimum sound insulation performance when tested in accordance with BS EN ISO 10140-2: 2010.

Facade Zone	Room Type	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
A	Living/Dining/Kitchen	23	27	29	36	41	42	52	56
	Bedroom	24	28	32	43	46	48	55	59
B	Living/Dining/Kitchen	21	25	22	33	40	43	44	48
	Bedroom	23	27	29	36	41	42	52	56
C	Living/Dining/Kitchen	20	24	20	25	34	37	35	39
	Bedroom	21	25	22	33	40	43	44	48

The table below presents typical configurations and R_w sound insulation values which may be expected to achieve the sound insulation performance specified above.

Facade Zone	Room Type	Typical R_w Sound Insulation Value (dB)	Typical Configuration
A	Living/Dining/Kitchen	40	10mm/16mm/6.4mm
	Bedroom	45	10mm/16mm/16.8mm
B	Living/Dining/Kitchen	35	10mm/16mm/4mm
	Bedroom	40	10mm/16mm/6.4mm
C	Living/Dining/Kitchen	30	6mm/16mm/4mm
	Bedroom	35	10mm/16mm/4mm

Acoustic test data for the proposed glazing systems should be forwarded for review.

Facade Zones A, B and C are indicated on the sound maps in Sections 6.8 and 6.9 for daytime and night-time periods at ground floor (2.5m), 1st floor (5.0m), 2nd floor (7.5m) and 3rd floor (10.0m) heights.

6.7 Ventilation Provision

6.7.1 Background Ventilation

In order to achieve the internal daytime and night-time requirements openable windows must remain closed.

It is understood that background ventilation will be provided to all flats by Mechanical Ventilation Heat Recovery (MVHR) systems.

The MVHR systems should achieve noise levels of $L_{Aeq} \leq 30\text{dB}$ (NR25) in living rooms and bedrooms and $L_{Aeq} \leq 35\text{dB}$ (NR30) in kitchens and bathrooms where providing continuous background ventilation.

A mechanical services engineer should be consulted to ensure that a suitable system is proposed. Detailed proposals should be forwarded for review acoustically.

6.7.2 Rapid/Summer Cooling Ventilation

In addition to background ventilation Manchester City Council require rapid/summer cooling ventilation in order to minimize the need for occupants to open windows during hot summer days.

In order to provide this, the MVHR systems should feature a user controllable 'boost' function which delivers increased air flow at the occupants discretion.

A mechanical services engineer should be consulted to ensure that a suitable system is proposed. Detailed proposals should be forwarded for review acoustically.

6.7.3 Purge Ventilation

Purge ventilation will be provided via openable windows at the occupants discretion. As such, the internal daytime and night-time requirements may potentially be exceeded during purge ventilation conditions. It is understood that this method of providing purge ventilation is deemed acceptable by Manchester City Council.

6.8 Internal Daytime Requirements

The sound map below indicates the external daytime $L_{Aeq,16hour}$ environmental sound levels across the proposed site at Ground floor level (2.5m) and the Façade Zones required in order to achieve the internal daytime requirements.



Sound map indicating the external daytime $L_{Aeq,16hour}$ environmental sound levels at Ground floor level (2.5m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south and west site boundaries should fall within Façade Zone B at Ground floor level. Facades facing towards the centre of the site should fall within Façade Zone C at Ground floor level.

The sound map below indicates the external daytime $L_{Aeq,16hour}$ environmental sound levels across the proposed site at 1st floor level (5.0m) and the Façade Zones required in order to achieve the internal daytime requirements.



Sound map indicating the external daytime $L_{Aeq,16hour}$ environmental sound levels at 1st floor level (5.0m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south site boundary should fall within Façade Zone C and the west site boundary should fall within Façade Zone B at 1st floor level. Facades facing towards the centre of the site should fall within Façade Zone C at 1st floor level.

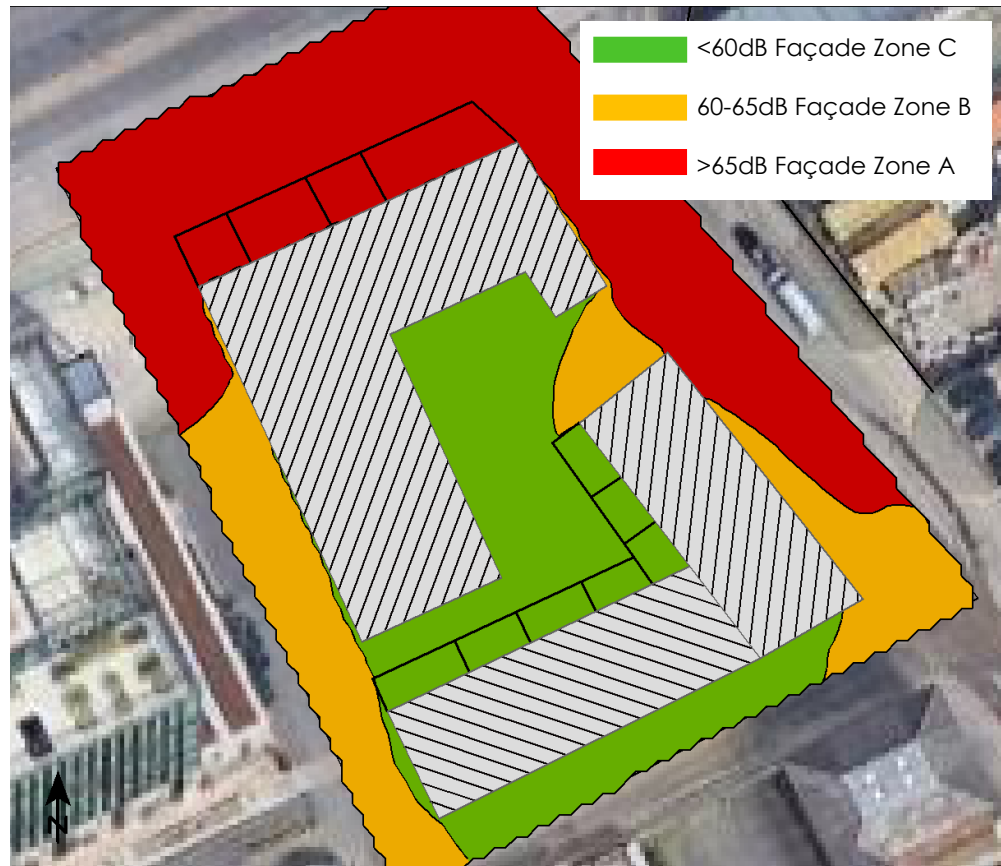
The sound map below indicates the external daytime $L_{Aeq,16hour}$ environmental sound levels across the proposed site at 2nd floor level (7.5m) and the Façade Zones required in order to achieve the internal daytime requirements.



Sound map indicating the external daytime $L_{Aeq,16hour}$ environmental sound levels at 2nd floor level (7.5m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south site boundary should fall within Façade Zone C and the west site boundary should fall within Façade Zone B at 2nd floor level. Facades facing towards the centre of the site should fall within Façade Zone C at 2nd floor level.

The sound map below indicates the external daytime $L_{Aeq,16hour}$ environmental sound levels across the proposed site at 3rd floor level (10.0m) and the Façade Zones required in order to achieve the internal daytime requirements.

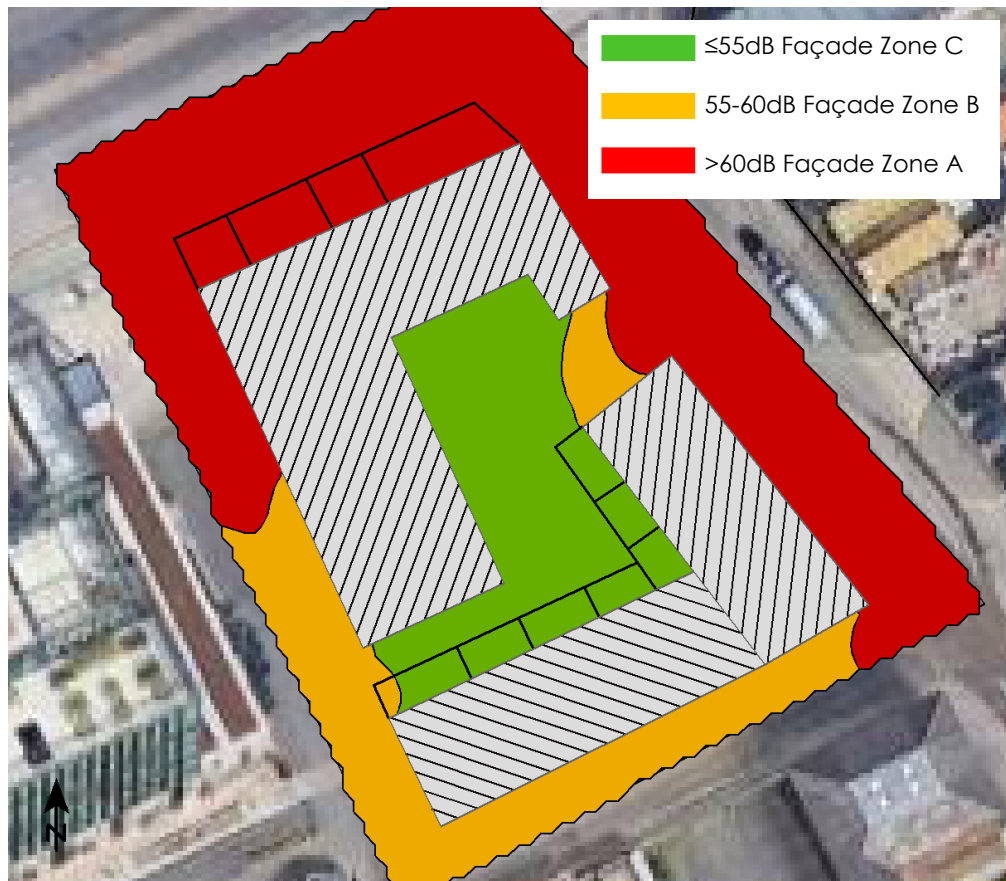


Sound map indicating the external daytime $L_{Aeq,16hour}$ environmental sound levels at 3rd floor level (10.0m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south site boundary should fall within Façade Zone C and the west site boundary should fall within Façade Zone B at 3rd floor level. Facades facing towards the centre of the site should fall within Façade Zone C at 3rd floor level.

6.9 Internal Night-time Requirements

The sound map below indicates the external night-time $L_{Aeq,8hour}$ environmental sound levels across the proposed site at Ground floor level (2.5m) and the Façade Zones required in order to achieve the internal night-time requirements.



Sound map indicating the external night-time $L_{Aeq,8hour}$ environmental sound levels at Ground floor level (2.5m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south and west site boundaries should fall within Façade Zone B at Ground floor level. Facades facing towards the centre of the site should fall within Façade Zone C at Ground floor level.

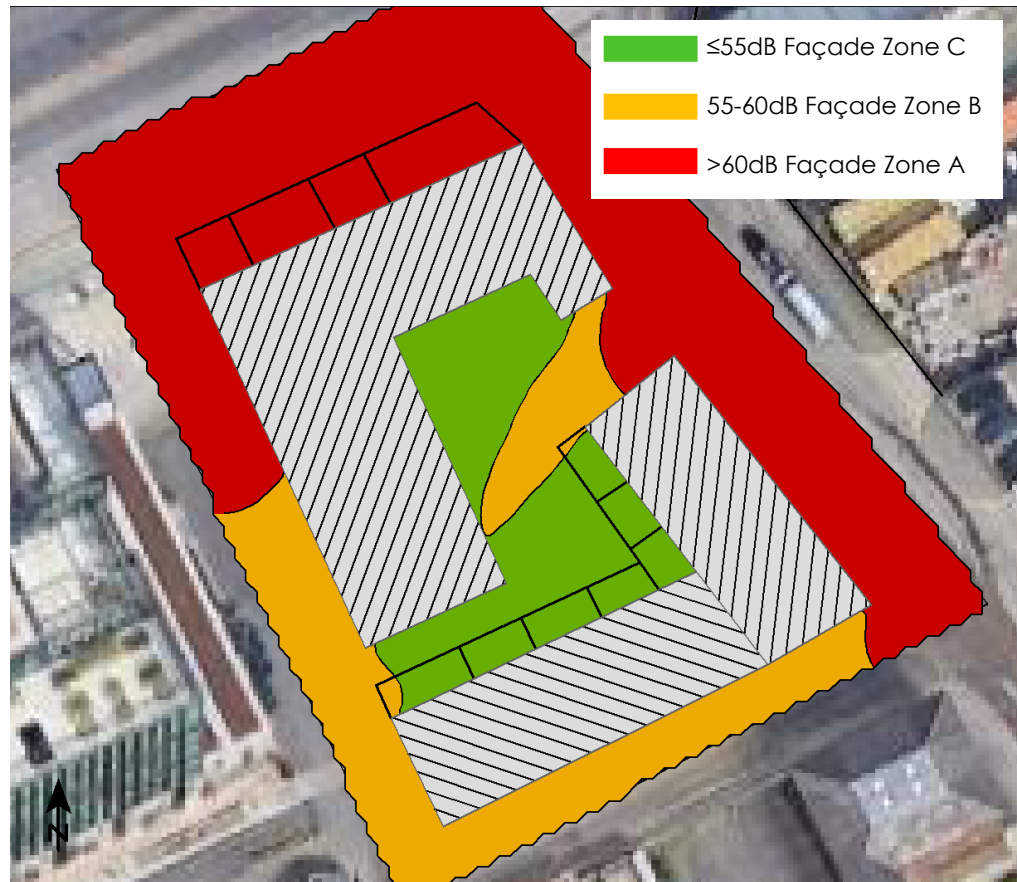
The sound map below indicates the external night-time $L_{Aeq,8hour}$ environmental sound levels across the proposed site at 1st floor level (5.0m) and the Façade Zones required in order to achieve the internal night-time requirements.



Sound map indicating the external night-time $L_{Aeq,8hour}$ environmental sound levels at 1st floor level (5.0m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south and west site boundaries should fall within Façade Zone B at 1st floor level. Facades facing towards the centre of the site should fall within Façade Zone C at 1st floor level.

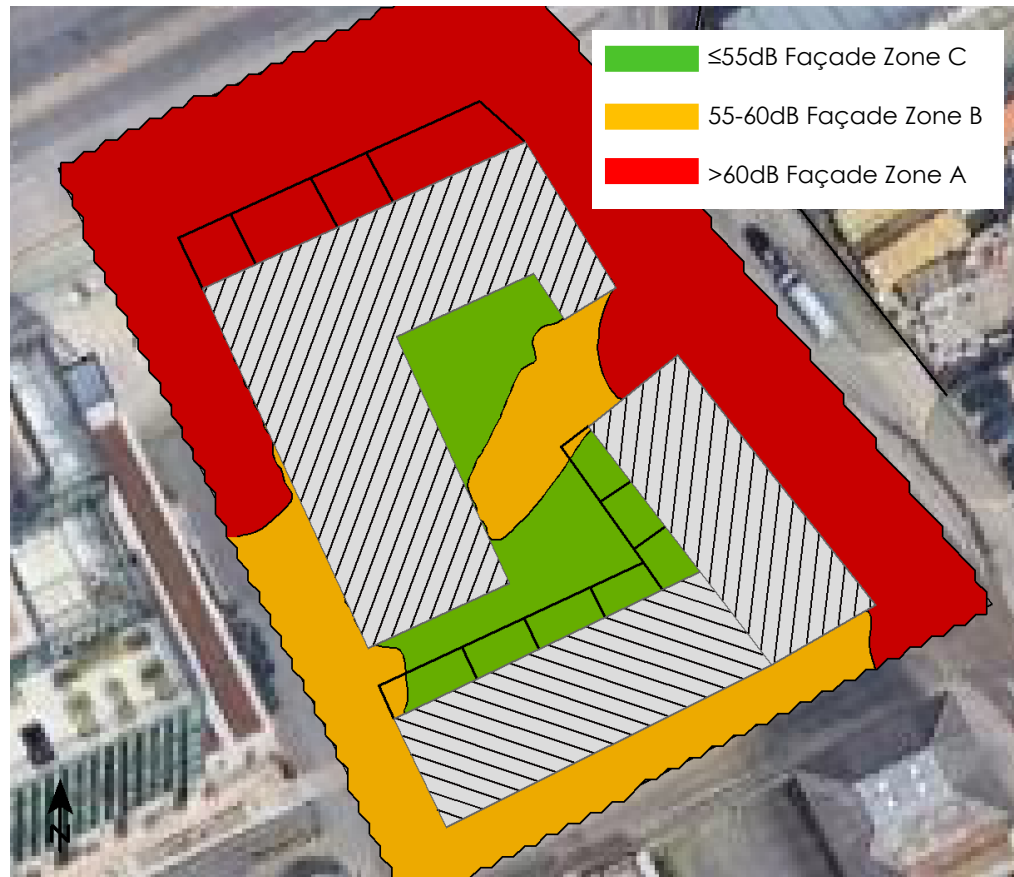
The sound map below indicates the external night-time $L_{Aeq,8hour}$ environmental sound levels across the proposed site at 2nd floor level (7.5m) and the Façade Zones required in order to achieve the internal night-time requirements.



Sound map indicating the external night-time $L_{Aeq,8hour}$ environmental sound levels at 2nd floor level (7.5m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south and west site boundaries should fall within Façade Zone B at 2nd floor level. Facades facing towards the centre of the site should fall within Façade Zone C at 2nd floor level.

The sound map below indicates the external night-time $L_{Aeq,8hour}$ environmental sound levels across the proposed site at 3rd floor level (10.0m) and the Façade Zones required in order to achieve the internal night-time requirements.

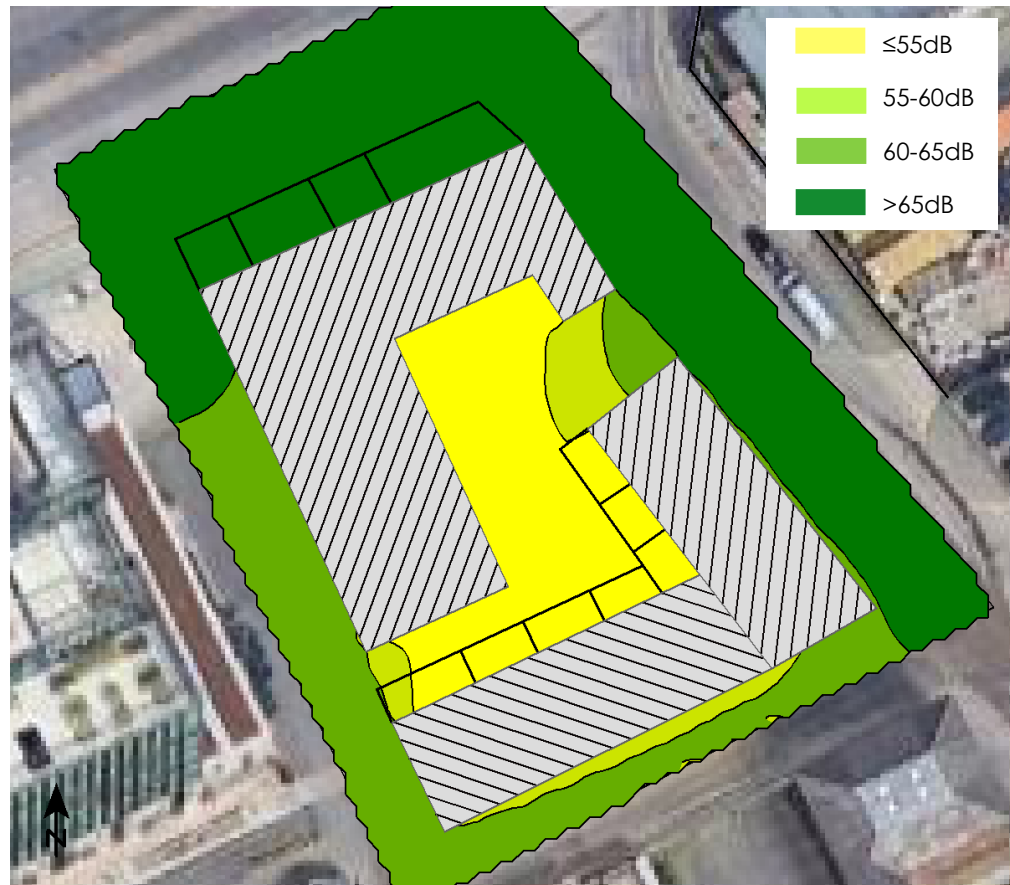


Sound map indicating the external night-time $L_{Aeq,8hour}$ environmental sound levels at 3rd floor level (10.0m)

As can be seen, facades facing the north and east site boundaries should fall within Façade Zone A whilst facades facing the south and west site boundaries should fall within Façade Zone B at 3rd floor level. Facades facing towards the centre of the site should fall within Façade Zone C at 3rd floor level.

6.10 External Daytime Requirements

The sound map below indicates the external daytime $L_{Aeq,16hour}$ environmental sound levels across the proposed site at head height ground floor level (1.8m).



Sound map indicating the external daytime $L_{Aeq,16hour}$ environmental sound levels at head height ground floor level (1.8m)

As can be seen, whilst external daytime $L_{Aeq,16hour}$ environmental sound levels in gardens within the centre of the site are likely to achieve the external daytime requirement of $L_{Aeq,16hour} \leq 55$ dB, those to the north of the site are likely to exceed the external daytime requirement of $L_{Aeq,16hour} \leq 55$ dB by up to 15dB.

Due to the proximity of Chester Road (A56) it is not considered to be practicable to achieve lower levels due to the height of the acoustic barrier required.

BS 8233: 2014 recognizes that the requirement of $L_{Aeq,16hour} \leq 55$ dB in gardens may not be achievable in all circumstances, such as higher noise areas adjoining the strategic transport network, and that a compromise between elevated noise levels and other factors may be warranted.

In such situations, the development should be designed to achieve the lowest practicable levels in external amenity space, but should not be prohibited.

7.0 Plant Sound Emission Limits

In order for cumulative plant sound emission levels from the development to comply with the requirements of the Local Authority, cumulative plant sound emission levels from the development should achieve the following cumulative plant sound emission limits at the nearest noise sensitive receptors.

Nearest Noise Sensitive Receptor	Approximate Distance*	Period	Cumulative Plant Sound Emission Limits at Nearest Noise Sensitive Receptor
To the north	50m	Daytime (07:00-23:00)	L _{Aeq,1hour} 54dB
		Night-time (23:00-07:00)	L _{Aeq,15min} 47dB
To the east, south & west	10m	Daytime (07:00-23:00)	L _{Aeq,1hour} 47dB
		Night-time (23:00-07:00)	L _{Aeq,15min} 39dB

* Approximate distance between site boundary and nearest noise sensitive receptor.

Plant sound emissions should be assessed in accordance with BS 4142:2014.

8.0 Conclusions

The Local Authority's acoustic requirements for the proposed residential development have been established.

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels at the proposed residential development.

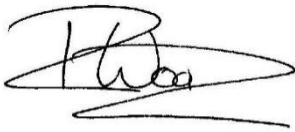
A detailed sound map of the proposed site layout has been produced based on information received from the developer/architect and the results of the environmental sound survey and a detailed sound assessment has been undertaken and glazing/ventilation/screening specifications have been provided in order to achieve the internal daytime and night-time requirements of the Local Authority.

Additionally, the assessment indicates that external daytime environmental sound levels in gardens at ground floor level within the centre of the site are likely to achieve the external daytime requirements of the Local Authority. Gardens at ground floor level to the north of the site are likely to exceed the external daytime requirement by up to 15dB.

Due to the proximity of Chester Road (A56) and the height of the surrounding buildings it is not considered to be practicable to achieve lower levels due to the height of the acoustic barrier required.

BS 8233: 2014 recognizes that the requirement of $L_{Aeq,16hour} < 55dB$ in gardens may not be achievable in all circumstances, such as higher noise areas adjoining the strategic transport network, and that a compromise between elevated noise levels and other factors may be warranted. In such situations, the development should be designed to achieve the lowest practicable levels in gardens, but should not be prohibited.

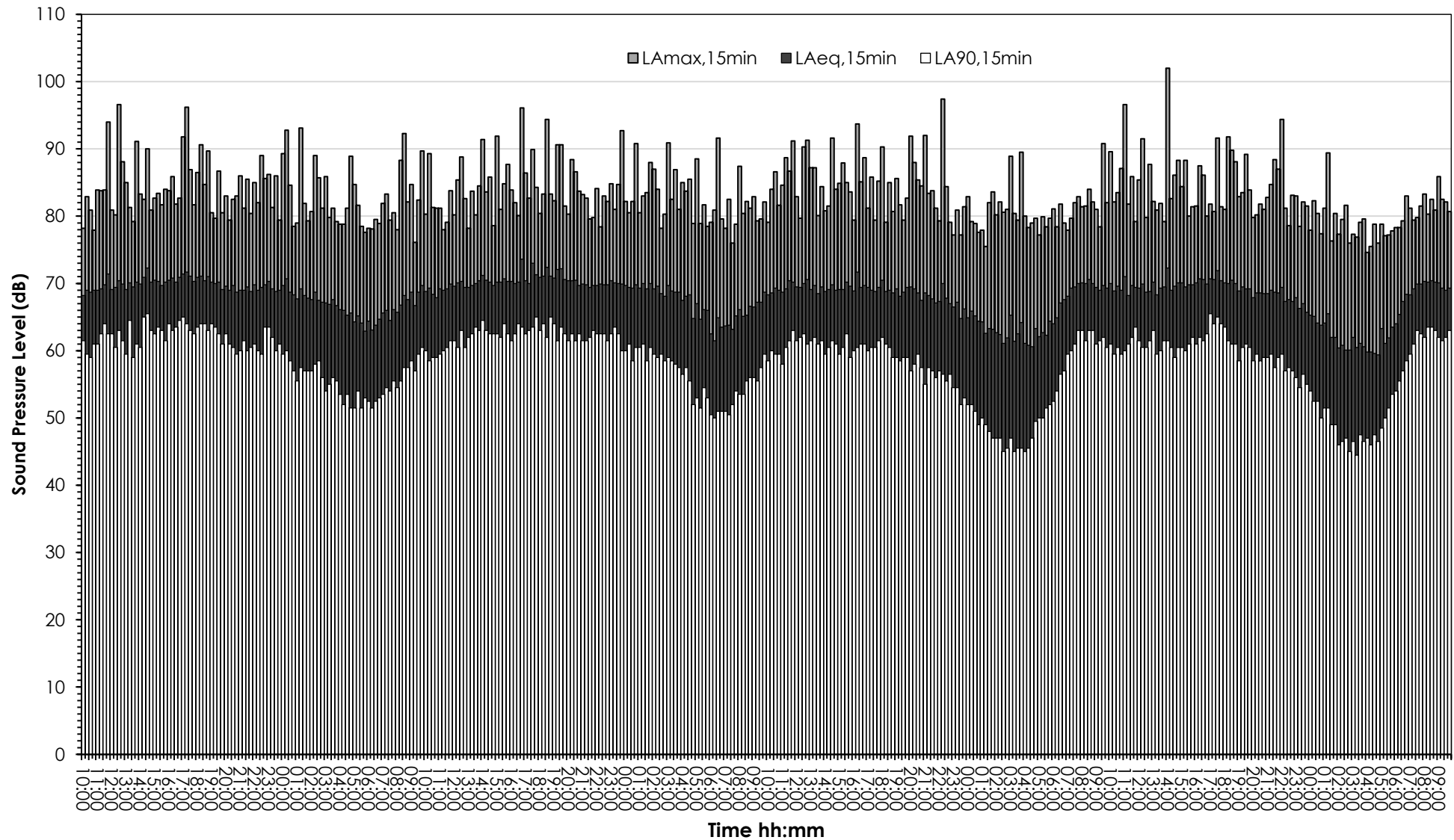
Atmospheric plant noise emission limits at the nearest noise sensitive receptors have been proposed for subsequent use in designing building services proposals in order to comply with the requirements of the Local Authority.

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

Robin Wood
LIGHTHOUSE ACOUSTICS

0905/THG1

Bridgewater House, Chester Road, Manchester
Time History Graph - Friday 17 June 2022 to Tuesday 21 June 2022
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A



0905/THG2

Bridgewater House, Chester Road, Manchester
Time History Graph - Friday 17 June 2022 to Tuesday 21 June 2022
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position B

