

Park Street Manchester

Plant Sound
Assessment Report
0928/PSA1
Revision 1

10 March 2022

For:

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Registered in England and Wales Company No. 09085491

1.0 Introduction

Lighthouse Acoustics has been appointed by VIEWS (Holdings) Limited to undertake an environmental sound survey at Park Street, Manchester and to assess operational sound emissions from the proposed 4No. kitchen extract fans to serve the proposed dark kitchen.

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 development.

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

To undertake an assessment of atmospheric sound emissions from the proposed 4No. kitchen extract fans to the nearest noise sensitive receptor and propose mitigation measures if required in order to achieve the requirements of the Local Authority.

3.0 Site Description

The site is situated on Park Street, Manchester and comprises an existing 2 storey detached building with car park. The site is bound by a public car park to the north east and south east, Park Street to the south west and Pimblett Street to the north west.

The surrounding buildings to the north east, south east and south west are commercial premises whilst a community centre (The Booth Centre) is situated to the north west opposite Pimblett Street.

The proposed 4No. kitchen extract fans are proposed to the roof of the existing building.

The nearest noise sensitive receptor is understood to be the community centre situated to the north west opposite Pimblett Street.

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

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 15:00 hours on Tuesday 22 February 2022 to 15:00 hours on Wednesday 23 February 2022. During this period the L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods.

5.2 Weather Conditions

At the start of the survey period there was a gentle westerly breeze (<5.0m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 9°C.

At the start of the survey period there was a gentle southerly breeze (<5.0m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 8°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.

5.3 Measurement Position

Environmental sound levels were measured at a single position on-site as described in the table below.

Position	Description
A	Microphone situated at 1m from the north west façade of the building at 1 st floor level.

The measurement position is shown on the site plan below.



Site plan showing measurement position

Measurement Position A was selected in order to assess typical environmental sound levels representative of those at the nearest noise sensitive receptor to the proposed 1No. kitchen extract fan.

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 Calibrator	Casella	120/1	3864878	02/11/2021
Environmental Noise Kit	Casella	6847	-	-
Microphone Extension Cable	Casella	C6717/5	-	-
Weather Protection System	Casella	6737	-	-

Field calibration checks were performed on the sound level meter 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 Graph

The results of the environmental sound survey are presented on Time History Graph 0928/THG1 enclosed at the rear of the report.

The presented results for Position A have been corrected for reflections from the façade by subtracting 3dB from the measured sound levels in order to obtain free field sound levels.

5.5.2 L_{A90} Background Sound Levels

The lowest representative daytime and night-time $L_{A90,15min}$ background sound levels measured during the survey period are detailed in the table below.

Position	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
A	43	37

The presented results for Position A have been corrected for reflections from the façade by subtracting 3dB from the measured sound levels in order to obtain free field sound levels.

5.5.3 Discussion of Sound Climate

At the start and end of the survey period the dominant sound sources at Position A were noted to be occasional road traffic along Park Street and Pimblett Street along with road traffic from the surrounding road network.

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.

6.0 Atmospheric Plant Sound Emission Limits

Based on the lowest representative daytime and night-time $L_{A90,15min}$ background sound levels measured during the environmental sound survey and the requirements of the Local Authority, cumulative atmospheric plant sound emissions should not exceed the following limits at the nearest existing noise sensitive receptor.

Receptor	L _{Aeq} Cumulative Atmospheric Plant Sound Emission Limits (dB) at Nearest Noise Sensitive Receptor	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
Noise Sensitive	38	32

The above limits are subject to final approval by Manchester City Council.

7.0 Plant Sound Emission Assessment

7.1 Plant Sound Data

Atmospheric building services sound levels have been assessed based on the manufacturers sound data received for the proposed 4No. kitchen extract fans which indicates octave band sound data as detailed in the table below.

FlaktWoods 56 MaXfan Compac at 2.19m³/s at 589Pa

Outlet Sound Power Level (dB) at Octave Band Centre Frequency (Hz)								dBA
63	125	250	500	1k	2k	4k	8k	
87	95	91	92	90	87	81	79	95

Whilst it is not possible to assess plant irregularity or impulsiveness based on manufacturer's sound data, BS 4142: 2014 provides an objective method for assessing the audibility of tones in sound. The one-third octave method states that if the level of a one third octave band exceeds the level of both adjacent one third octave bands by the following amounts, then a tonal component may be identified as present:

- 15dB in the low-frequency one-third-octave bands (25Hz to 125Hz);
- 8dB in the mid-frequency one-third-octave bands (160Hz to 400Hz);
- 5dB in the high-frequency one-third-octave bands (500Hz to 10kHz).

However, one third octave band sound data is rarely available from manufacturers as is the case in this instance.

By applying the same principal to the octave band sound data in the table above, a review indicates that these items are unlikely to exhibit a tonal component. As such, no character correction has been applied to the specific sound level for these items.

Should one third octave band sound data become available a revised assessment should be undertaken.

7.2 Operating Hours

It is understood that the proposed 4No. kitchen extract fans have the potential to operate 24 hours a day.

In order to undertake a worst case assessment, it is assumed that the proposed 4No. kitchen extract fans will operate for the full 1 hour daytime and 15 minute night-time assessment periods.

7.3 Plant Location

It is understood that the proposed kitchen extract ductwork penetrates the roof of the existing building and connects to the proposed 4No. kitchen extract fans which are situated externally with exhaust ductwork terminating horizontally at roof level roof.

7.4 Nearest Receptor

It is understood that the nearest receptor is the windows of the community centre situated approximately 20m to the north west of the proposed 4No. kitchen extract fans.

Based on the above it is proposed to achieve the cumulative atmospheric plant sound emissions limits at the windows of the community centre to the north west.

7.5 Attenuation Proposals

7.5.1 Atmospheric Silencer

The proposed 4No. kitchen extract fans shall be fitted with an atmospheric silencer as specified in the Silencer Schedule 0928/SS1 enclosed at the rear of the report.

7.5.2 Acoustic Lagging

The 4No. FlaktWoods 56 MaXfan Compac kitchen extract fan units and all ductwork between the penetration of the roof and the atmospheric silencers shall be acoustically lagged comprising 50mm (min.) mineral wool slab (min. 16kg/m³) wrapped with a polymeric heavy mass barrier material of at least 10kg/m².

7.6 Assessment

The table below details the calculated cumulative L_{Aeq} atmospheric plant sound emission level at the nearest receptor along with the proposed cumulative atmospheric plant sound emission limits and the differences between them.

Descriptor	Plant Item
	FlaktWoods 56 MaXfan Compac
Sound Pressure Level $L_{Aeq,T}$ at 1m (dB)	92
Percentage on-time (%)	100
On time correction (dB)	0
Sound Pressure Level $L_{Aeq,T}$ at 1m (dB)	92
Number of Units (#)	4
Correction (dB)	+6
Distance to Receptor (m)	20
Distance Attenuation (dB)	-26
Silencer Attenuation (dB)	-40
Calculated Atmospheric Plant Sound Emission Level $L_{Aeq,T}$ at Receptor (dB)	32
Cumulative Atmospheric Plant Sound Emission Limit $L_{Aeq,T}$ at Receptor (dB)	38 (Day) / 32 (Night)
Difference (dB)	-6 (Day) / -0 (Night)

The calculated cumulative L_{Aeq} atmospheric plant sound emission levels at the nearest receptor are between 0dB and 6dB below the proposed cumulative atmospheric plant sound emission limits.

The assessment therefore indicates that the building services proposals are likely to achieve the proposed cumulative atmospheric plant sound emission limits at the nearest receptor with the incorporation of the proposed mitigation measures.

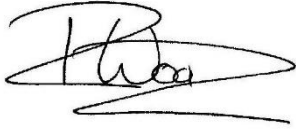
8.0 Conclusion

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

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

An assessment of atmospheric sound emissions from the proposed 4No. kitchen extract fans to the nearest noise sensitive receptor has been undertaken.

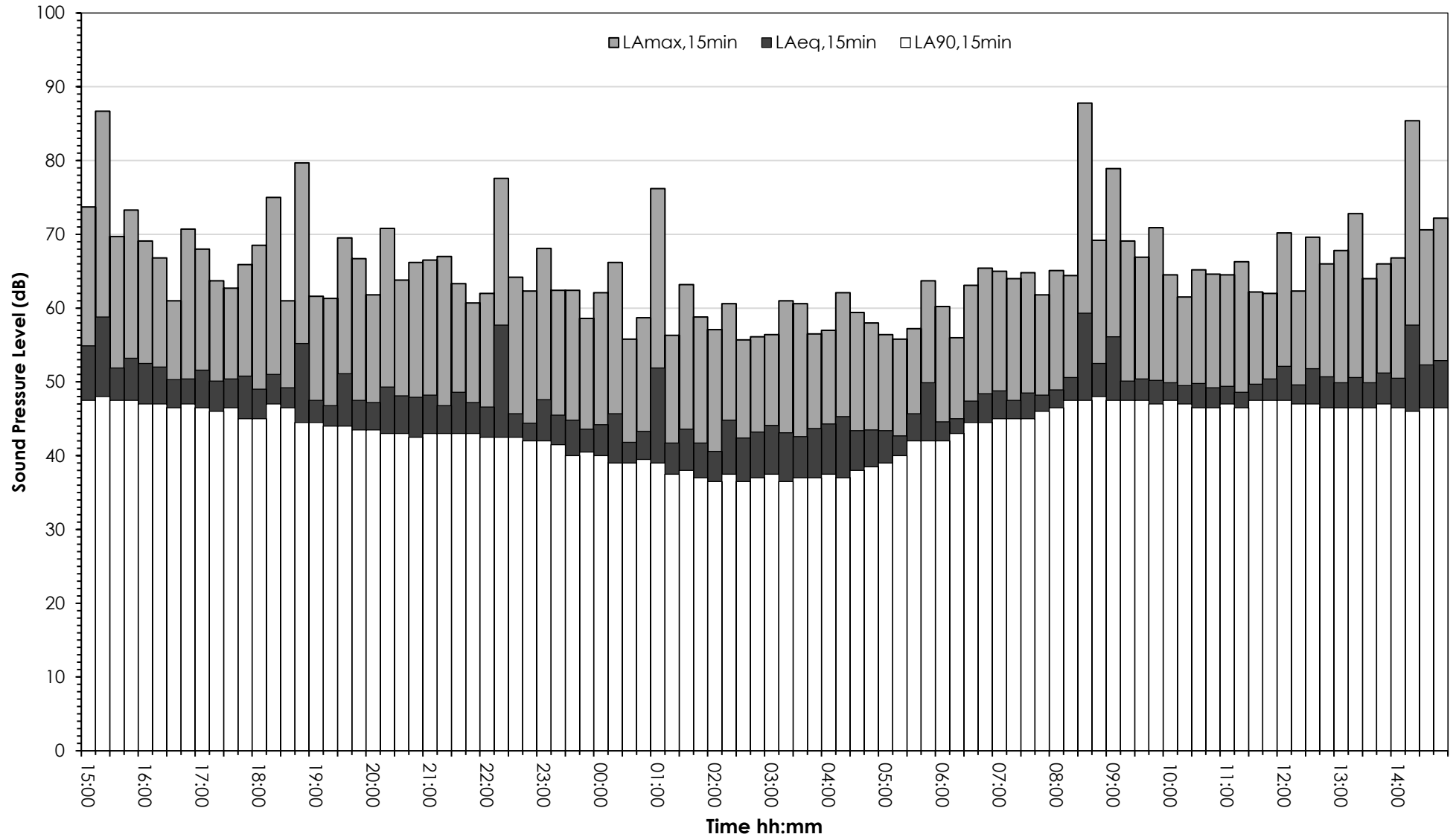
The assessment indicates that atmospheric plant sound emissions from the proposed 4No. kitchen extract fans are likely to achieve the requirements of the Local Authority at the nearest receptor with the incorporation of the proposed mitigation measures.

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

Robin Wood
LIGHTHOUSE ACOUSTICS

0928/THG1

Park Street, Manchester
Time History Graph - Tuesday 22 February 2022 to Wednesday 23 February 2022
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A



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Plant Ref.	Description	Inlet/Outlet	Vol. (m ³ /s)	Typical Length (mm)	Face Velocity (m/s)	Pressure Drop (Pa)	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
							63	125	250	500	1k	2k	4k	8k
	Kitchen Extract Fan FlaktWoods 56 MaXfan Compac	Outlet	2.19	2400	<4.0	<55	10	24	36	51	53	53	47	31