

fisher acoustics

1NQ, Tariff Street, Manchester

Environmental Noise Study

November 2022

Report Reference: PR0680-REP01B-MPF

Flint Glass Works, 64 Jersey Street, Manchester, M4 6JW

0161 605 0905 

info@fisheracoustics.co.uk 

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PROJECT TITLE 1NQ, TARIFF STREET, MANCHESTER

REPORT TITLE ENVIRONMENTAL NOISE STUDY

CLIENT MARCO LIVING 2 LTD AND AXIS RE LTD
81 NEWTON ST
MANCHESTER
M1 1EX

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AUTHOR MATT FISHER, BENG (HONS) CENG MIOA

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1.0 SUMMARY

Fisher Acoustics Ltd has been commissioned by Marco Living 2 Ltd and Axis RE Ltd to conduct an environmental noise study relating to a proposed residential development at Tariff Street, Manchester.

Noise surveys have been conducted to determine the pre-existing environmental noise levels during the day and night at and around the site.

The recommended acoustic performance of the external wall and windows to achieve the recommended internal noise levels within apartment rooms has been determined. In particular, it has been determined that double glazed units that achieve specific acoustic performances would be acoustically suitable for the windows of the proposed apartments.

The expected acoustic sound insulation performance of the external wall has also been identified.

Overall environmental noise limits have also been recommended for building services plant serving the development and in relation to noise egress from the proposed commercial units on the ground floor of the development.

2.0 INTRODUCTION

Fisher Acoustics Ltd has been commissioned by Marco Living 2 Ltd and Axis RE Ltd to conduct an environmental noise assessment relating to a full planning application for a proposed residential development at Tariff Street, Manchester, M1 2FF.

The proposal is for full planning permission for the demolition of an existing building on site and the erection of two residential apartment buildings (Use Class C3) including a part 9, part 10 (with set back amenity level) and a separate stand-alone 12 storey building (comprising of 267 dwellings in total), with ground floor commercial use (Use Class E), associated resident's amenity space, cycle parking, landscaping, access, street loading and other associated works.

This report examines the pre-existing environmental noise conditions at the site and advises on the required sound insulation performance of façade elements to the proposed dwellings to achieve recommended internal noise criteria.

The steps undertaken in compiling this study are as follows:

- Assessment of daytime and night time external noise survey data to determine the typical levels of noise at the site during daytime and night time periods
- Calculation of the required sound reduction index of the windows and external wall to dwellings to allow the achievement of appropriate internal noise levels due to external noise sources.
- Determination of suitable overall noise limits for building services plant to safeguard residential amenity
- Calculation of noise limits relating to noise egress from the proposed commercial units at ground floor of the development.

3.0 DESCRIPTION OF SITE

General Site Description

The Proposed Development Site ("the Site") is located between Port Street and Tariff Street within the Piccadilly Basin Historic Strategic Regeneration Framework (SRF). The Piccadilly Basin Historic SRF itself lies within the neighbourhood of Ancoats on the northern part of Manchester City Centre.

The Site is bounded by Port Street to the north west, a surface car park to the south west, and Tariff Street to the south east. To the north east the site is bounded by a small office building and a planning-approved residential development on Port Street.

The Site is currently comprised of a surface level car park of low-quality hardstanding.

There are a mixture of uses surrounding the Site, including offices, residential buildings, cafes, bars and surface car parks. To the east of the Site is Brownsfield Mill, ('Avro') a Grade II* Listed mill building which has been recently refurbished to create new apartments. To the south of the Site is a number of mid to high-rise residential developments on Tariff Street, including Jacksons Warehouse, a grade II* listed building, converted into apartments..

To the west of the Site on Port Street is the Stage and Radio Bar, a café bar that hosts club nights in the basement of the venue.

Great Ancoats Street forms part of the inner ring road in Manchester. It is a major road that is heavily trafficked with HGV's, buses, coaches, cars and vans. Port Street is a one-way side road that gives access onto Great Ancoats Street. Tariff Street is lightly trafficked.

Figure 1 shows the Port Street Development site in the context of the surrounding roads and buildings.

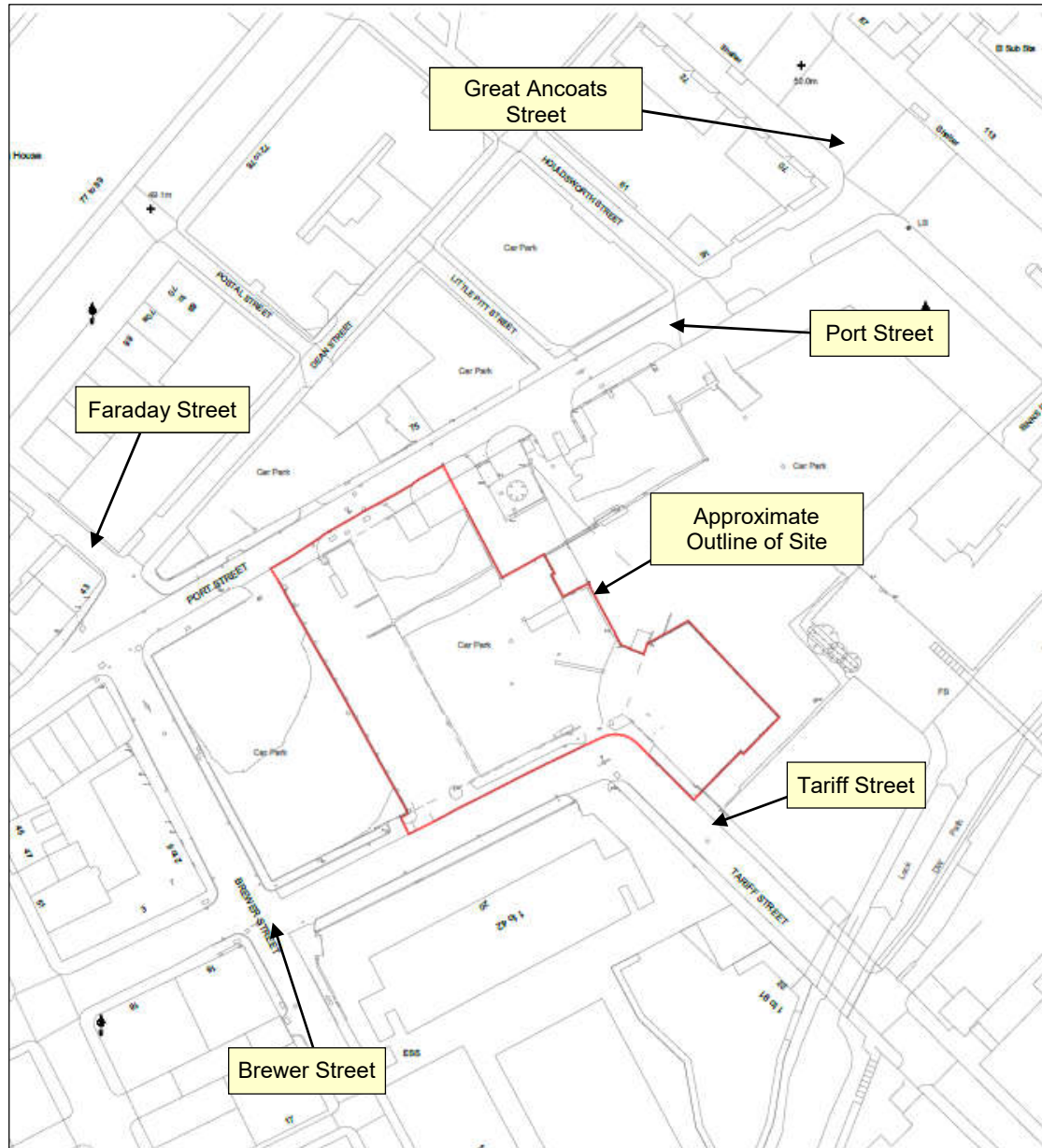


Figure 1: Site location plan

4.0 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposal is for full planning permission for the demolition of an existing building on site and the erection of two residential apartment buildings (Use Class C3) including a part 9, part 10 (with set-back amenity level) and a separate stand-alone 12 storey building (comprising of 267 dwellings in total), with ground floor commercial use (Use Class E), associated resident's amenity space, cycle parking, landscaping, access, street loading and other associated works.

he proposed uses within the part 9-storey and part 10-storey building are as follows:

- Lower Ground Floor: Apartments, Cycle Store, Tank Room, Comms Room
- Ground Floor: Apartments, Entrance Lobby, Office, Parcel Store, Refuse Stores, Dual Substation, Switch room, Retail units,
- Level 01 to 09: Apartments
- Level 10: Private Dining, Gym, Multi-purpose room, Amenity
- Level 11: Roof

The proposed uses within the 12-storey building are as follows:

- Lower Ground Floor Level 1: Cycle Store, Tank Room, Comms Room
- Ground Floor: Entrance lobby, Retail Unit, Refuse Store, Switch room, Cleaners store, Parcel store
- Level 01 to 11: Apartments
- Level 12: Roof

Figure 2 shows the Ground Floor plan of the proposed buildings.

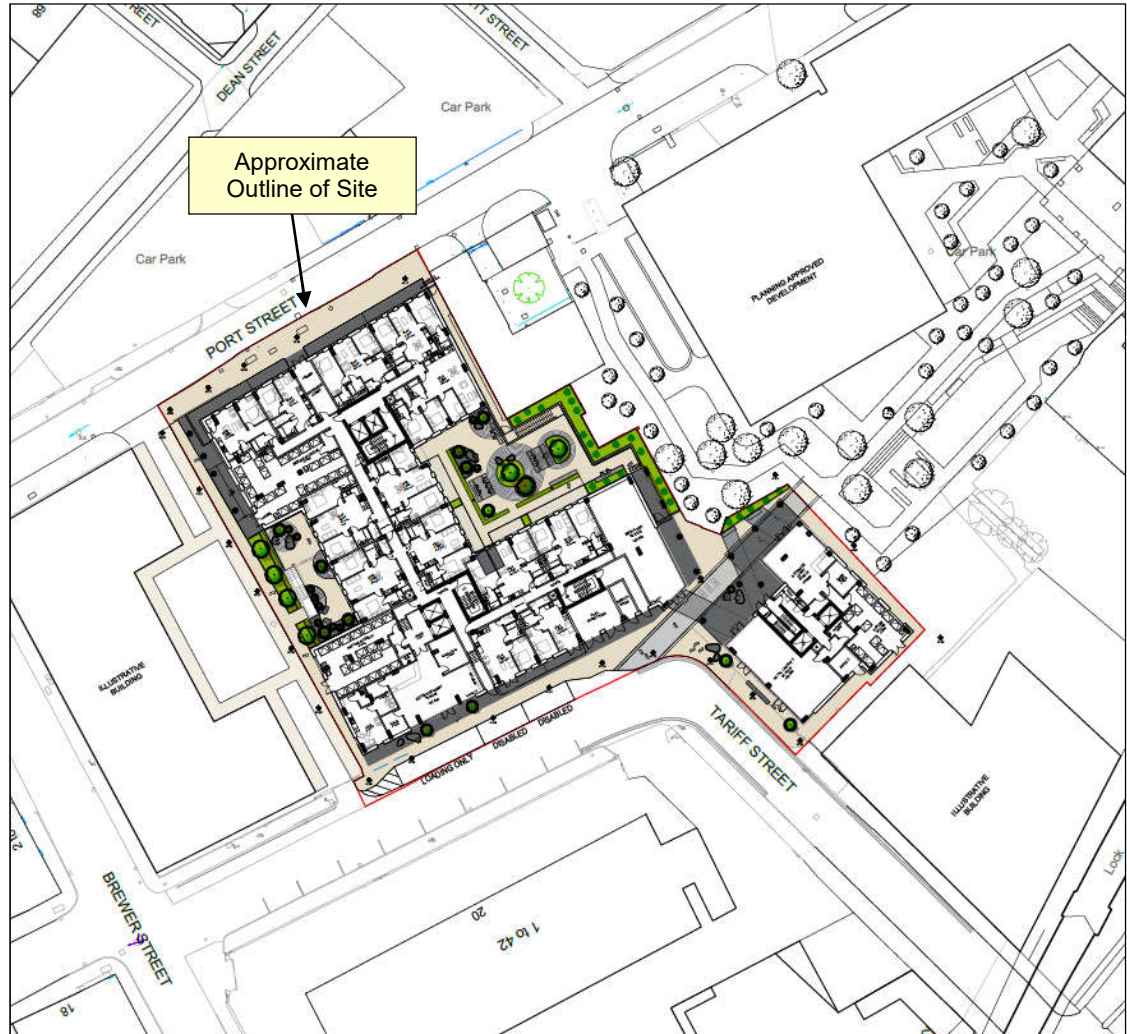


Figure 2: Proposed Ground Floor plan

5.0 RELEVANT GUIDANCE DOCUMENTS

NATIONAL PLANNING POLICY

The National Planning Policy Framework (NPPF), published in July 2021 by the Ministry of Housing, Communities and Local Government 'sets out the Government's planning policies for England and how these should be applied'.

Clause 174 of the National Planning Policy Framework states that 'Planning policies and decisions should contribute to enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability'.

Clause 185 of the National Planning Policy Framework states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

The National Planning Policy Framework document cross references the 'Explanatory Note to the Noise Policy Statement for England'. The 'Noise Policy Statement for England' (NPSE) was published by the Department for Environment Food and Rural Affairs in March 2010.

The NPSE does not give suggested external noise criteria for commercial Developments. In the absence of specific criteria, reference shall be made in this document to established guidance and principles, as established in British Standards and the local Planning policy.

National Planning Practice Guidance – Noise

‘Planning Practice Guidance – Noise’ is a web-based resource provided by the Ministry of Housing, Communities and Local Government (last revision date 22 July 2019) which gives guidance on Planning considerations in relation to noise.

The document identifies the subjective grading of noise and the recommended actions and different effect levels. Again, as ‘Planning Practice Guidance – Noise’ does not refer to objective criteria, reference shall be made in this document to established guidance and principles, as established in British Standards and the local Planning policy.

LOCAL PLANNING POLICY

Manchester City Council’s Core Strategy was adopted on 11th July 2012 and is the key Development Plan Document in the Local Development Framework (LDF).

Section 13.6 ‘Development Management’ of the Core Strategy states that ‘all new developments should follow the ‘Development Principles’ and accord with the design guidance set out in the Supplementary Planning Documents.

Policy DM 1, ‘Development Management’ of the Core Strategy states that:

- All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-Effects on amenity, includingnoise, vibration.... This could also include proposals which would be sensitive to existing environmental conditions, such as noise.

‘Planning & Noise, Technical Guidance’, dated June 2022 has been issued by the Environmental Protection, Environmental Health and The Neighbourhoods Service sections of Manchester City Council. The document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development. Reference is also made in the document to the relevant supporting information and guidance documents that Developers are expected to refer to when submitting a planning application.

Internal noise criteria

With regard to noise ingress to residential dwellings, section 3.7.1.1 'MCC Assessment Criteria – Residential Developments' of 'Planning & Noise, Technical Guidance' advises that Manchester City Council has adopted the internal noise limits for residential properties identified in Table 1.

With reference to BS8233: 2014, the noise criteria given in Table 1 are typically applicable to noise sources without acoustic 'character', such as road traffic.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq, 16 hours	-
Dining	Dining room / area	40 dB LAeq, 16 hours	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hours	30 dB LAeq, 8 hours 45dB LAmax (ten excesses over 45dB LAmax normally allowed per night)

Table 1: Intrusive noise criteria

Entertainment Noise

With regard to the potential noise impact on a proposed residential development from a pre-existing entertainment venue, Section 3.7.1.2 'Entertainment Venues' of 'Planning & Noise, Technical Guidance' states

- 'a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be: 'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively'. This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue'.

Environmental noise due to Building Services plant

With regard to external noise due to building services plant at a proposed development, Section 3.7.1.5 of 'Planning & Noise, Technical Guidance' states:

- '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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'

Figure 3 identifies the nearest noise sensitive residential premises to the proposed development site.

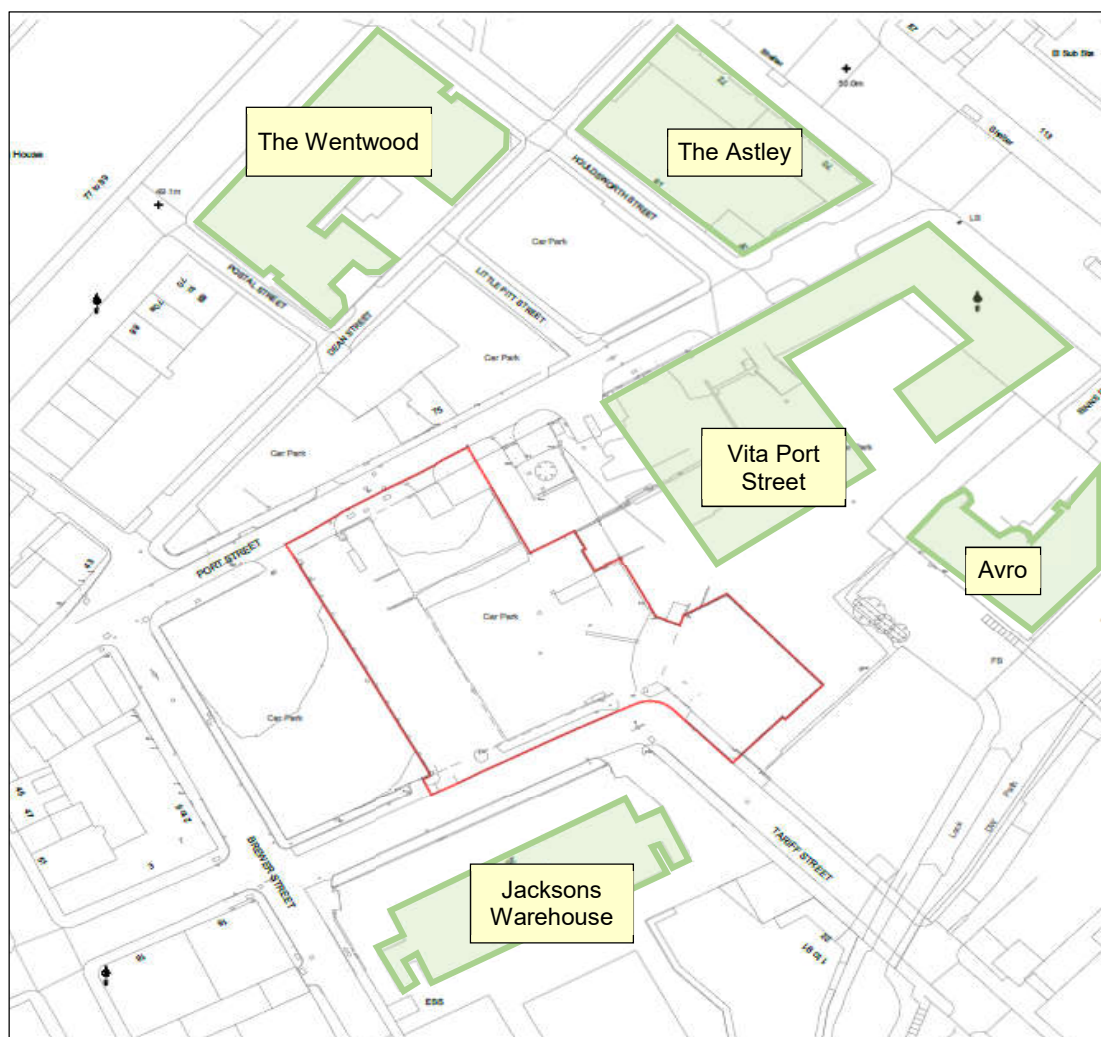


Figure 3: Noise sensitive residential premises close to proposed development site

Noise from Commercial Operations

With regard to proposals for new entertainment venues, 'Planning & Noise, Technical Guidance' states:

- A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is: 'Entertainment noise (LAeq,5min) should be controlled to 5dB below the typical background noise level (LA90) in each octave band at the nearest noise sensitive location'.

As the proposed commercial spaces may employ music replay, it would be appropriate to establish external environmental noise limits for music noise to ensure that during design development, the building incorporates any required mitigation measures to maintain residential amenity at and around the site.

6.0 ENVIRONMENTAL NOISE SURVEY

In order to determine the prevailing ambient noise levels at and around the site, manned surveys of the existing noise environment at the Site were carried out by Fisher Acoustics Ltd on the following dates:

- Friday 4th November 2022, 2:30 pm to 5:45 pm
- 11:45 pm, Friday 4th November 2022 to 1:55 am, Saturday 5th November 2022
- 10:55 pm, Wednesday 9th November 2022 to 00:40 am, Thursday 10th November 2022

The measurement locations used for the surveys are identified on Figure 4 and are representative of the positions of the façades of the proposed development and of the nearest existing residential properties. The measured noise levels can therefore be used to assess the expected internal noise levels within the proposed buildings and also to determine acceptable levels of noise at the existing sensitive properties around the site due to noise from the Development.

The measurement locations are as follows:

- Location 1: At location of closest façade of the proposed development to 'Stage & Radio' bar on Port Street, at a microphone height of 1.5 metres above street level
- Location 2: Tariff Street, at 4.4 metres from the kerb, at a microphone height of 1.5 metres above street level.
- Location 3: Tariff Street, 3 metres from kerb, microphone height of 1.5 metres above site ground level
- Location 4: To rear of proposed stand-alone block, 80 metres from Great Ancoats Street, microphone height of 1.5 metres above ground level.
- Location 5: Port Street, 3.5 metres from the kerb, microphone height of 3 metres above street level

Full survey details are given in Appendix A. Appendix A also contains a summary of the results obtained from the surveys.

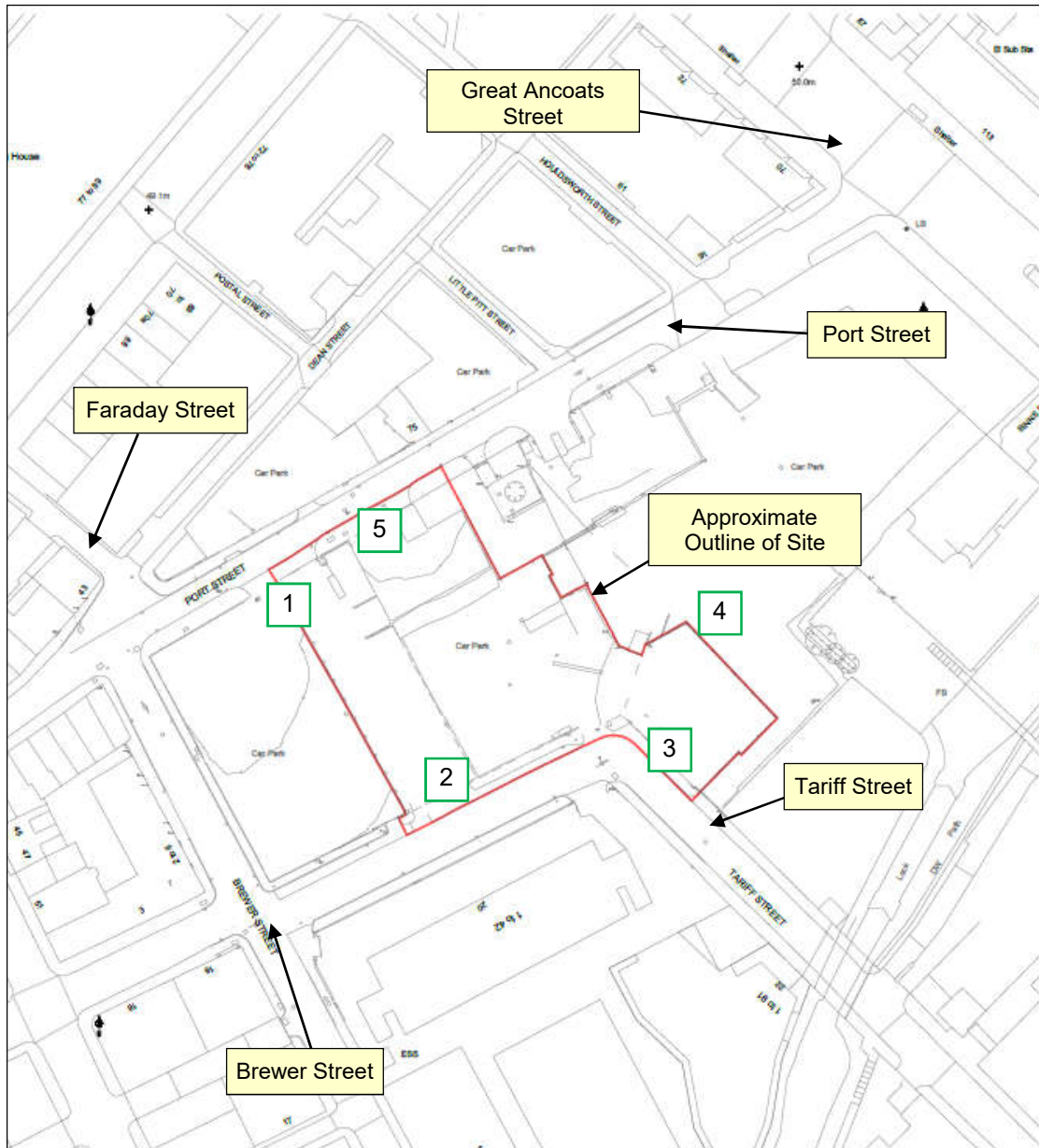


Figure 4: Noise survey measurement locations

The noise levels measured during the noise surveys are summarised in Table 2.

Measurement Location	Measured Noise Level					
	Daytime (defined as 7 am to 11 pm)			Night time (defined as 11 pm to 7 am)		
	dB, LAeq	dB, LAmax	dB, LA90	dB, LAeq	dB, LAmax	dB, LA90
1 – 4/ 5 Nov 2022	61	53 to 80	47 to 53	55	53 to 77	46 to 54
2 – 4/ 5 Nov 2022	58	61 to 76	48 to 51	52	52 to 72	45 to 50
3 – 4/ 5 Nov 2022	56	65 to 69	48 to 51	51	51 to 67	46 to 50
4 – 4/ 5 Nov 2022	52	61 to 69	48 to 50	-	-	-
5 – 9/ 10 Nov 2022	-	-	-	58	51 to 82	47 to 54
2 – 9/ 10 Nov 2022	-	-	-	51	59 to 68	44 to 47
3 – 9/ 10 Nov 2022	-	-	-	52	59 to 76	46 to 48
4 – 9/ 10 Nov 2022	-	-	-	50	56 to 57	47 to 48

Table 2: Summary of measured environmental noise levels

The statistical noise levels ('LAmax' and 'LA90') given in Table 2 show the range of noise levels measured over the sample periods. The quoted average (LAeq) noise levels are the average noise levels measured over the full measurement periods in question at each measurement position.

The noise environment around the Site is currently determined by road traffic on Port Street and Tariff with a lesser contribution from more the more distant road traffic on Great Ancoats Street.

Low-frequency music noise egress (ie in the 63 Hz octave band) from the Stage and Radio basement club venue contributes to the noise climate at the north western area of the site on Thursday, Friday and Saturday nights. As the club nights are held in the basement of the venue, there is no significant higher frequency music noise egress from Stage & Radio.

7.0 NOISE INGRESS

The external noise survey data have been used to calculate the required sound insulation performance of façade elements to achieve the internal noise criteria within apartment rooms due to external noise. The calculations are based on the 'more rigorous' calculation method identified in Annex G.2.1 of BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'.

The calculations take into account the measured levels of noise at the site, the areas of individual façade elements, (i.e. windows and external wall) identified in the drawings submitted for planning purposes and the expected reverberation time of the apartment rooms.

The apartments of the proposed development are to be provided with continuously running supply and extract ventilation in order to achieve the background ventilation requirements of Approved Document F of the Building Regulations. Therefore, no passive trickle ventilators are required within the façade of the proposed habitable rooms. Purge ventilation is to be achieved through via opening purge vents.

Windows

It has been determined that two acoustic specifications for the windows to the proposed apartment rooms will be required to achieve the internal noise criteria detailed in Section 5 of this report. Figures 5 to 10 identify the locations of the various recommended specification types. Table 3 identifies the minimum recommended sound reduction index of the window types. The performance values in Table 3 relate to the composite performance of the window assembly including glazing, frames and seals.

Window type	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
TYPE A	24	24	26	30	38	38	38
TYPE B	20	24	24	30	35	33	35

Table 3: Minimum recommended sound reduction index of windows, including frame

The achievement of the recommended performance at 63 Hz for the 'Type A' window is crucial in relation to the control of low-frequency music noise ingress from Stage & Radio.



Figure 5: Acoustic specification location plan, Lower Ground Floor – Living Rooms & Bedrooms

Key



- Acoustic Specification A
- Acoustic Specification B



Figure 6: Acoustic specification location plan, Ground Floor – Living Rooms & Bedrooms

Key



- Acoustic Specification A
- Acoustic Specification B



Figure 7: Acoustic specification location plan, Level 01 – Living Rooms & Bedrooms

Key



Acoustic Specification A
Acoustic Specification B



Figure 8: Acoustic specification location plan, Level 02 to Level 08 – Living Rooms & Bedrooms

Key



Acoustic Specification A



Acoustic Specification B



Figure 9: Acoustic specification location plan, Level 09 – Living Rooms & Bedrooms

Key



- Acoustic Specification A
- Acoustic Specification B



Figure 10: Acoustic specification location plan, Level 10 to Level 11 – Living Rooms & Bedrooms

Key



Acoustic Specification A
Acoustic Specification B

External Wall

The external wall of the proposed buildings is to comprise an external brickwork skin fixed to a lightweight structural framing system (SFS) which will be drylined internally.

Table 4 identifies the minimum expected sound insulation performance of the external wall.

External Wall Construction	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Brickwork, SFS system drylined internally	34	45	50	55	60	65	65

Table 4: Minimum recommended sound reduction index of external wall construction

Roof

The principle acoustic elements of the proposed roof of the development are a concrete slab and a ceiling that comprises a single layer of 12.5 mm wallboard fixed to a suspended metal frame. The expected minimum weighted sound reduction index of the roof construction is 60dB Rw. This performance is fully commensurate with the achievement of the target internal noise levels within the proposed apartments.

External noise ingress via MVHR ductwork

It is possible that in-line ductwork silencers would need to be introduced to some of the proposed apartment MVHR systems to reduce external noise ingress via the atmosphere terminations of the MVHR systems (i.e. the intake and exhaust of the MVHR fans) and to achieve the recommended internal noise.

As the detailed design progresses, the acoustic requirements of any in-line ductwork silencers will need to be assessed.

Conclusion

Compliance with the recommended sound insulation performances of the façade and roof elements is expected to allow full compliance with the daytime and night time 'average' noise level criteria identified in Section 5 above.

Given the recommended sound insulation performances given above for the façade elements and roof, compliance with the recommendations of Manchester City Council in relation to maximum (LA_{max}) internal noise levels in bedrooms during the night is expected.

8.0 EXTERNAL NOISE LEVELS DUE TO BUILDING SERVICES

The measured background noise levels around the site can be used to establish the acceptable level of noise from plant serving the development. Final plant selections have not been made at this early design stage. In the absence of specific selection of plant items, overall plant noise limits can be provided.

With reference to the discussion in Section 5, the cumulative rating level due to all simultaneously operating non-emergency plant must be at least 5 dB lower than the typical pre-existing background noise level at the nearest residential receptors to the site.

Table 5 identifies the allowable combined free-field noise level at the nearest residential receptors to the development, due to all simultaneously-operating non-emergency building services plant and equipment.

Location	Rating noise level (dB LAeq)	
	Daytime (07:00 hrs to 23:00 hrs)	Night time (23:00 hrs to 07:00 hrs)
Proposed Development, Tariff Street Elevation	43	41
Proposed Development, Port Street Elevation	44	43
Proposed Development, Eastern (Great Ancoats Street) Elevation	43	42
Proposed Development, Brewer Street Elevation	43	40
The Astley, Port Street	49	42
The Wentwood, Dean Street	49	42
Jacksons Warehouse, Tariff Street	43	39
Avro, Great Ancoats Street	43	40

Table 5: Environmental noise limits for non-emergency building services plant

Emergency plant

If any emergency plant is required at the Development, it is expected that such plant would only operate during emergencies and during periodical test runs (perhaps test runs of thirty minutes every two months).

On this basis, it is not considered appropriate to require any proposed emergency plant to comply with the noise limits for continuously operating non-emergency plant. It is therefore suggested that the noise level from any emergency plant is no more than 10 dB(A) greater than the ambient noise level (measured as an LAeq) at any residential receptor.

It is therefore recommended that the noise level at any residential façade during operation of any emergency plant does not exceed the daytime noise levels given in Table 6.

Location	Daytime noise level (dB LAeq)
Proposed Development, Tariff Street Elevation	66
Proposed Development, Port Street Elevation	71
Proposed Development, Eastern (Great Ancoats Street) Elevation	62
Proposed Development, Brewer Street Elevation	68
The Astley, Port Street	72
The Wentwood, Dean Street	72
Jacksons Warehouse, Tariff Street	69
Avro, Great Ancoats Street	64

Table 6: Environmental noise limits for emergency building services plant

The above noise limits for non-emergency and emergency plant must be forwarded to the project's Mechanical Engineer to allow the selection of appropriate equipment and any associated noise control hardware. Building services equipment must also be provided with appropriate vibration isolation to minimise the risk of disturbance to the building occupants by structureborne noise.

9.0 NOISE EGRESS FROM COMMERCIAL UNITS

In order to avoid potential noise nuisance to the existing and proposed noise-sensitive buildings around the site, activity noise egress from the proposed commercial units must be controlled. As the proposed Planning Class for the commercial units includes food & beverage, it is recommended that environmental noise limits relating to music noise are established.

As detailed in Section 5 above, Manchester City Council suggests that external music noise levels (measured as an L_{eq} noise level) external to a residential property due to an entertainment venue should be 5 dB lower than the prevailing background noise level in each octave band.

Octave band noise limits at the nearest noise sensitive receptors have been determined by reference to the results of the noise surveys.

Table 7 identifies the recommended maximum allowable cumulative daytime and night time free-field noise levels at the closest residential façades due to music noise from the commercial units within the proposed development to comply with the guidance of Manchester City Council.

Location/period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Proposed Development, Port Street Elevation (0700 to 2300)	53	45	42	41	40	35	28
Proposed Development, Port Street Elevation (2300 to 0700)	46	42	41	40	39	32	22
Proposed Development, West Elevation (0700 to 2300)	52	43	41	41	39	34	26
Proposed Development, West Elevation (2300 to 0700)	48	42	38	36	35	29	19
Proposed Development, East Elevation (0700 to 2300)	54	46	41	40	39	34	26
Proposed Development, East Elevation (2300 to 0700)	49	45	41	38	37	30	22
Proposed Development, Tariff Street Elevation (07:00 to 23:00)	52	45	42	41	39	33	24
Proposed Development, Tariff Street Elevation (2300 to 0700)	49	45	41	38	37	30	22
The Wentwood (07:00 to 23:00)	59	53	48	45	43	41	35
The Wentwood (2300 to 0700)	54	48	43	39	37	32	22
The Astley (07:00 to 23:00)	59	53	48	45	43	41	35
The Astley (2300 to 0700)	54	48	43	39	37	32	22
Avro (07:00 to 23:00)	52	45	42	41	39	33	24
Avro (2300 to 0700)	48	43	40	38	38	33	25
Jacksons Warehouse (07:00 to 23:00)	52	44	42	41	39	34	26
Jacksons Warehouse (2300 to 0700)	51	44	38	37	36	30	20
Vita, Port Street (07:00 to 23:00)	54	46	41	40	39	34	26
Vita, Port Street (2300 to 0700)	48	43	40	38	38	33	25

Table 7: Maximum allowable external music noise levels due to proposed commercial units

Internal Noise transfer from amenity areas to apartments

There are residential apartments directly below the proposed amenity areas at Level 9 and above the proposed Ground Floor commercial units. There is therefore the possibility of internal noise transfer between these areas and the apartments via the party floor and any flanking structures. In order to avoid potential noise nuisance, it is recommended that the internal noise levels within an apartment due solely to music replay in the amenity areas and commercial units do not exceed the values given in Table 8.

Room	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Apartment Living Room & Bedroom	40	30	23	20	17	15	12

Table 8: Maximum recommended noise levels in apartments due to music replay in amenity areas

During the detailed design stages, the sound insulation requirements of the party floor to comply with the above noise limits will be determined.

In addition, the recommended measures to control potential impact noise from the proposed gym at Level 9 of the building will need to be assessed during the detailed design process as the proposals for the gym are developed.

APPENDIX A: NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION

Port Street, Manchester

DATES AND TIMES

2:30 pm to 5:45 pm, Friday 4th November 2022

11:45 pm Friday 4th November 2021 to 1:55 am Saturday 5th November 2022

10:55 pm Wednesday 9th November 2022 to 00:40 am Thursday 10th November 2022

WEATHER DURING SURVEYS

Friday 4 th November 2022 (Day time)	2/8 cloud cover, 3 m/s wind, light rain, 10°C
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Friday 4 th November 2022 (Night time)	5/8 cloud cover, 1 m/s wind, no rain, 6°C
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Wednesday 9 th November 2022 (Night time)	8/8 cloud cover, 4 m/s wind, no rain, 9°C
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PERSONNEL PRESENT DURING SURVEY

Matt Fisher – Fisher Acoustics

Lee Copley – Fisher Acoustics

INSTRUMENTATION

Norsonic Type 118 IEC 60651 Type 1 Integrating-Averaging Sound Level Meter (serial no. 31498)

Norsonic Type 140 IEC 60651 Type 1 Integrating-Averaging Sound Level Meters (serial no. 1406387)

Norsonic Type 140 IEC 60651 Type 1 Integrating-Averaging Sound Level Meters (serial no. 1403193)

Norsonic Type 1251 IEC 60942-1997 Class 1 Sound Calibrators (x2) (serial nos. 31971, 27878)

MEASUREMENT METHODOLOGY

Before and after the noise survey the sound level meters were checked calibrated to an accuracy of ± 0.3 dB using the Norsonic Type 1251 Calibrators - no drift in sensitivity was detected. The measurement microphones were installed at the locations identified in this report. All survey measurements were in 'free field' conditions.

Figures A1 to A2 and Tables A1 to A8 identify the free-field noise levels measured at various locations on the Site. Measurement locations are shown in Figure 4 and described below.

- Location 1: At location of closest façade of the proposed development to 'Stage & Radio' bar on Port Street, at a microphone height of 1.5 metres above street level
- Location 2: Tariff Street, at 4.4 metres from the kerb, at a microphone height of 1.5 metres above street level.
- Location 3: Tariff Street, 3 metres from kerb, microphone height of 1.5 metres above site ground level
- Location 4: To rear of proposed stand-alone block, 80 metres from Great Ancoats Street, microphone height of 1.5 metres above ground level.
- Location 5: Port Street, 3.5 metres from the kerb, microphone height of 3 metres above street level

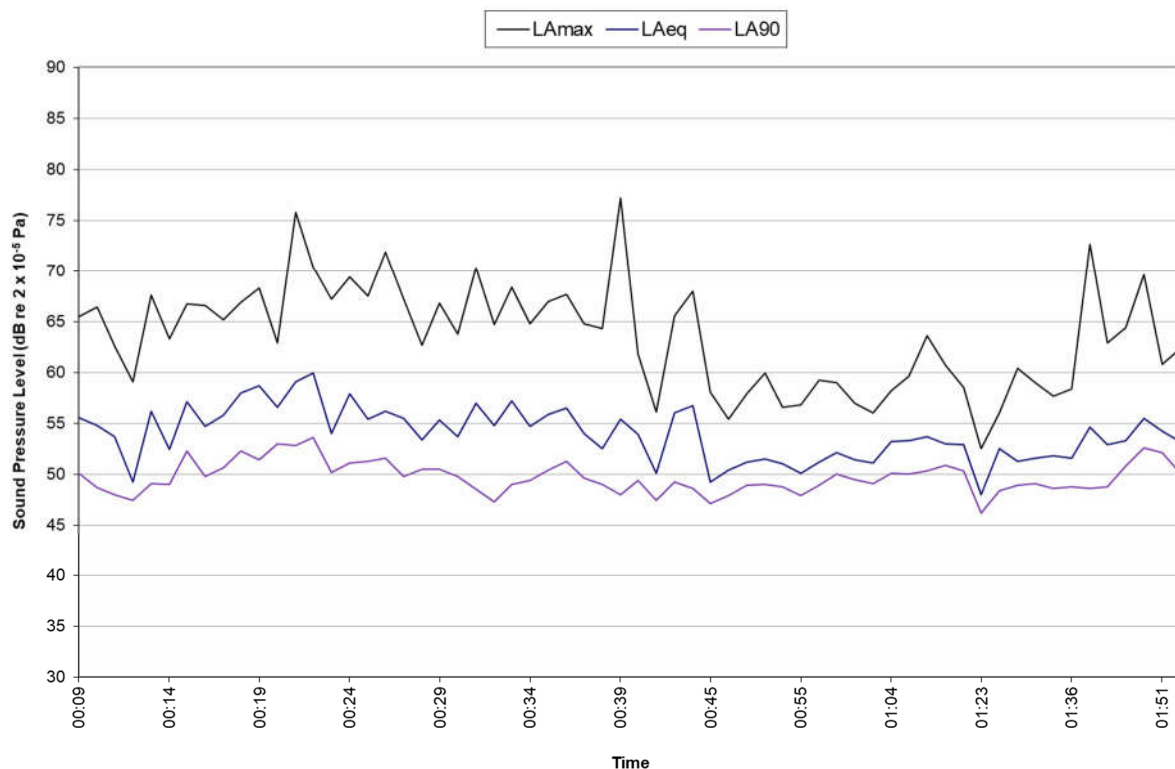


Figure A1: Position 1 noise measurements, Night time Saturday 5th November 2022 - maximum (LMax), average (LAeq) and background (LA90) noise levels

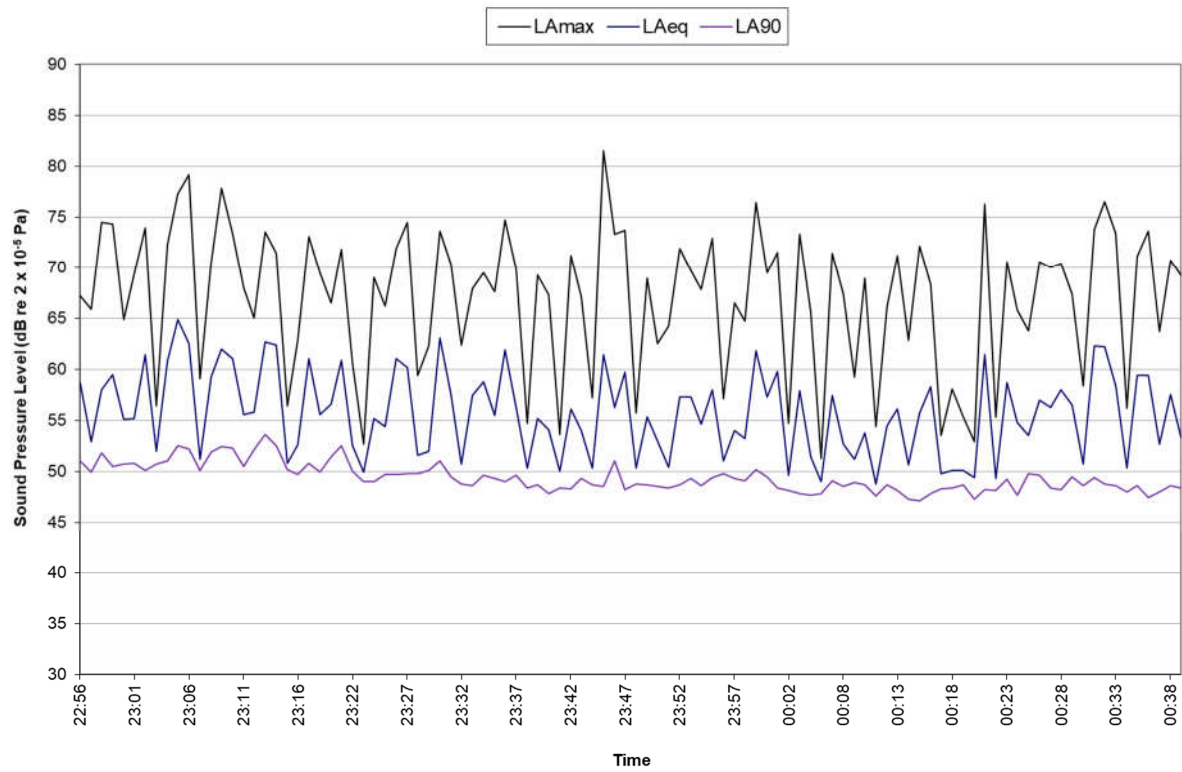


Figure A2: Position 5 noise measurements, Night time Wednesday 9th November 2022 - maximum (LAmx), average (LAeq) and background (LA90) noise levels

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
5	14:29	59.3	72.6	50.1	Local and distant road traffic
5	14:34	62.9	78.8	51.3	"
5	14:39	61.7	80.4	51.6	"
5	15:22	49.0	53.3	47.4	"
5	15:23	59.5	75.5	49.0	"
5	15:28	58.7	73.2	49.8	"
5	16:00	61.3	76.8	52.7	"
5	16:06	60.4	71.1	51.4	"
5	16:11	62.7	78.2	52.5	"
5	16:52	56.0	61.8	50.2	"
5	16:54	61.4	76.8	52.8	"
5	16:59	62.2	77.2	52.3	"
5	17:04	61.0	74.6	52.0	"
5	17:22	58.6	69.9	50.4	"
5	17:27	60.5	71.9	51.0	"
5	17:32	61.1	77.9	53.3	"
2	14:45	57.2	74.0	50.2	"
2	14:50	55.9	73.4	47.8	"
2	14:55	51.4	61.3	48.5	"
2	15:49	56.4	68.5	49.1	"
2	15:54	57.0	70.0	49.7	"
2	16:41	59.1	72.7	49.6	"
2	17:38	61.2	76.0	51.3	"
2	17:43	57.4	74.5	49.3	"
3	15:01	54.1	65.1	48.8	"
3	15:08	53.3	66.1	48.3	"
3	16:47	58.4	68.9	50.6	"
4	15:35	51.7	61.7	48.9	"
4	15:41	51.5	61.1	48.1	"
4	17:13	51.5	68.7	49.5	"

Table A1: Summary Statistical Noise Levels, Day time, 4th November 2022

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
5	14:29	59.3	64.8	57.1	56.5	55.4	55.8	51.4	45.5
5	14:34	62.9	69.0	63.9	61.5	59.0	58.4	55.3	50.3
5	14:39	61.7	68.1	70.9	62.1	59.2	55.7	51.6	46.7
5	15:22	49.0	62.9	50.7	47.1	44.9	44.6	40.2	36.9
5	15:23	59.5	66.6	57.3	56.1	56.0	55.6	51.5	46.1
5	15:28	58.7	64.7	56.3	55.4	54.9	55.1	50.8	45.4
5	16:00	61.3	64.4	57.7	57.8	56.5	57.6	54.3	47.3
5	16:06	60.4	62.6	55.9	56.0	55.1	56.3	53.5	49.6
5	16:11	62.7	63.7	59.5	56.5	56.9	58.7	56.0	52.2
5	16:52	56.0	62.6	54.8	53.3	51.5	51.8	48.0	45.3
5	16:54	61.4	64.4	59.4	56.7	56.3	57.4	54.0	50.7
5	16:59	62.2	64.7	56.2	56.4	57.7	58.3	54.9	51.4
5	17:04	61.0	65.7	56.8	56.0	55.9	57.5	53.5	50.0
5	17:22	58.6	63.5	56.9	54.3	53.1	55.2	51.3	46.4
5	17:27	60.5	65.9	62.7	59.2	55.4	56.9	52.4	47.5
5	17:32	61.1	66.2	60.2	57.2	55.9	56.8	52.4	53.4
2	14:45	57.2	74.0	50.2	14:45	57.2	74.0	50.2	14:45
2	14:50	55.9	73.4	47.8	14:50	55.9	73.4	47.8	14:50
2	14:55	51.4	61.3	48.5	14:55	51.4	61.3	48.5	14:55
2	15:49	56.4	68.5	49.1	15:49	56.4	68.5	49.1	15:49
2	15:54	57.0	70.0	49.7	15:54	57.0	70.0	49.7	15:54
2	16:41	59.1	72.7	49.6	16:41	59.1	72.7	49.6	16:41
2	17:38	61.2	76.0	51.3	17:38	61.2	76.0	51.3	17:38
2	17:43	57.4	74.5	49.3	17:43	57.4	74.5	49.3	17:43
3	15:01	54.1	63.8	55.3	52.4	50.4	50.2	46.0	39.8
3	15:08	53.3	61.2	54.5	52.3	50.5	49.4	43.8	37.1
3	16:47	58.4	64.1	60.9	55.3	53.2	54.8	50.6	46.6
4	15:35	51.7	63.8	54.9	50.1	47.4	47.8	43.3	37.6
4	15:41	51.5	63.7	55.6	48.6	46.9	47.9	43.5	34.5
4	17:13	51.5	64.6	57.7	49.8	47.2	47.0	43.0	38.0

Table A2: Measured Octave Band L_{eq} Noise Levels, Day time, 4th November 2022

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
2	23:47	50.3	58.6	46.6	Local and distant road traffic
2	23:49	53.5	65.6	47.6	"
2	23:52	51.0	58.9	47.1	"
2	23:53	50.6	59.8	46.5	"
2	23:54	54.2	65.0	47.7	"
2	23:55	52.1	63.2	48.1	"
2	23:56	60.7	70.2	46.4	"
2	23:57	51.4	60.5	45.1	"
2	23:58	49.0	52.0	48.0	"
2	23:59	49.6	58.7	47.5	"
2	00:13	48.8	58.8	46.5	"
2	00:15	48.6	60.1	46.8	"
2	00:16	50.3	57.6	48.2	"
2	00:17	51.2	65.1	47.5	"
2	00:19	50.7	63.7	48.4	"
2	00:20	54.5	63.5	49.7	"
2	00:21	55.0	62.9	49.5	"
2	00:22	52.6	60.1	50.1	"
2	00:23	53.2	65.2	47.8	"
2	00:24	50.1	57.1	46.9	"
2	00:49	56.0	71.6	44.9	"
2	00:50	49.0	53.0	46.8	"
2	00:51	49.5	53.8	46.3	"
2	00:52	47.9	51.6	46.1	"
2	00:53	47.5	56.7	44.8	"
2	00:54	47.7	52.6	44.8	"
2	00:55	48.2	54.3	45.3	"
2	00:56	49.9	59.7	45.7	"
2	00:57	50.1	59.7	47.6	"
2	00:58	56.8	66.6	48.2	"
2	01:11	49.5	59.1	47.4	"
2	01:12	48.3	52.1	45.7	"
2	01:13	54.0	65.1	45.2	"
2	01:14	48.4	53.2	46.6	"
2	01:15	49.9	59.7	47.9	"

Table A3: Summary Statistical Noise Levels, Position 2 Night time 4th & 5th November 2022

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
2	23:47	50.3	61.6	53.5	47.9	47.3	45.7	41.4	38.1
2	23:49	53.5	62.5	55.9	52.1	51.0	48.9	44.5	40.7
2	23:52	51.0	64.8	54.5	48.4	46.6	47.2	42.3	36.9
2	23:53	50.6	62.4	54.2	47.1	46.4	47.0	42.1	37.3
2	23:54	54.2	63.3	54.8	49.9	50.1	50.5	46.4	40.9
2	23:55	52.1	60.7	53.3	48.2	48.4	48.4	44.9	34.4
2	23:56	60.7	71.2	63.0	56.7	58.7	57.0	51.9	40.2
2	23:57	51.4	60.1	52.4	48.3	49.6	47.9	41.7	30.2
2	23:58	49.0	58.9	50.7	45.5	46.1	45.7	40.3	29.7
2	23:59	49.6	58.3	51.4	46.4	47.4	45.4	40.7	35.1
2	00:13	48.8	60.8	52.0	46.9	45.9	44.8	40.0	31.7
2	00:15	48.6	59.8	51.0	45.6	46.1	44.7	39.6	31.7
2	00:16	50.3	60.0	51.7	47.0	47.3	46.8	41.9	33.2
2	00:17	51.2	62.3	51.8	46.2	49.1	47.6	41.5	35.1
2	00:19	50.7	62.7	53.8	47.6	47.7	47.0	41.8	34.5
2	00:20	54.5	64.0	53.8	49.6	50.7	50.2	47.5	41.5
2	00:21	55.0	63.8	58.5	49.5	51.2	50.5	48.4	41.4
2	00:22	52.6	62.1	53.6	49.4	49.4	48.9	44.7	37.2
2	00:23	53.2	59.8	51.9	48.8	48.8	49.3	46.1	41.3
2	00:24	50.1	61.0	51.1	46.6	47.1	47.1	40.7	31.3
2	00:49	56.0	64.4	56.4	51.7	50.0	50.9	49.5	47.0
2	00:50	49.0	63.3	50.4	44.7	45.0	45.8	40.4	30.0
2	00:51	49.5	63.0	51.7	45.2	45.9	46.2	40.9	31.7
2	00:52	47.9	58.8	50.8	44.0	43.7	45.1	39.1	28.1
2	00:53	47.5	59.0	50.6	43.3	43.7	44.1	39.0	31.0
2	00:54	47.7	62.3	49.9	43.4	43.7	44.5	39.4	28.7
2	00:55	48.2	59.5	48.8	43.5	45.6	44.5	39.7	31.0
2	00:56	49.9	59.7	51.6	45.3	45.8	46.3	42.6	35.8
2	00:57	50.1	60.7	51.2	46.2	47.7	46.2	41.8	31.7
2	00:58	56.8	62.6	55.7	52.5	52.5	53.2	49.1	44.7
2	01:11	49.5	63.1	51.8	45.0	45.5	46.1	41.4	33.3
2	01:12	48.3	64.7	52.3	43.8	44.7	44.9	39.2	28.2
2	01:13	54.0	65.6	54.2	50.1	49.6	51.0	45.3	39.1
2	01:14	48.4	66.5	56.3	44.1	44.3	44.4	39.0	30.0
2	01:15	49.9	60.7	50.5	43.9	45.5	46.3	43.0	34.3

Table A4: Measured Octave Band Leq Noise Levels, Position 2 Night time 4th & 5th November 2022

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
3	00:03	49.0	54.8	47.4	Local and distant road traffic
3	00:04	49.6	62.2	47.2	"
3	00:05	49.9	53.6	46.7	"
3	00:06	50.5	66.6	45.6	"
3	00:07	52.0	61.4	48.0	"
3	00:08	52.2	63.4	47.0	"
3	00:09	51.5	61.8	47.3	"
3	00:10	48.9	53.4	46.7	"
3	00:11	48.5	52.7	46.3	"
3	00:12	47.7	52.1	46.4	"
3	00:26	50.3	58.2	47.9	"
3	00:27	54.3	61.0	49.4	"
3	00:28	54.1	62.5	50.2	"
3	00:29	51.5	58.8	49.0	"
3	00:30	53.5	60.7	49.2	"
3	00:31	50.6	59.0	47.1	"
3	00:32	48.2	52.1	45.6	"
3	00:33	48.4	53.4	46.2	"
3	00:34	50.5	61.1	48.3	"
3	00:35	53.6	64.2	47.9	"
3	00:36	49.8	54.0	47.5	"
3	00:37	49.9	62.6	47.3	"
3	00:38	47.7	52.5	46.4	"
3	00:39	48.1	55.7	45.9	"
3	00:40	53.9	64.0	48.1	"
3	00:41	48.8	52.2	46.2	"
3	00:42	47.6	58.4	45.9	"
3	00:43	48.5	52.5	45.7	"
3	00:45	52.7	63.6	46.0	"
3	00:46	47.6	50.9	45.9	"
3	01:01	49.2	54.1	47.2	"
3	01:02	50.3	62.6	46.5	"
3	01:03	50.1	61.2	47.8	"
3	01:04	53.9	64.1	47.5	"
3	01:05	51.4	59.7	47.9	"
3	01:06	48.1	53.1	46.0	"
3	01:07	52.7	63.1	47.0	"
3	01:08	48.5	53.6	47.1	"

Table A5: Summary Statistical Noise Levels, Position 3 Night time 4th & 5th November 2022

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
3	00:03	49.0	58.5	53.5	48.4	47.1	44.6	38.8	30.5
3	00:04	49.6	61.9	54.1	49.6	46.9	45.4	40.2	30.4
3	00:05	49.9	61.4	52.1	47.9	47.4	46.3	40.2	31.0
3	00:06	50.5	60.5	56.8	52.8	47.7	45.5	40.0	30.4
3	00:07	52.0	59.7	54.0	51.0	48.7	48.2	43.4	36.1
3	00:08	52.2	60.5	54.5	51.1	49.0	48.3	43.8	37.3
3	00:09	51.5	59.4	54.4	51.0	49.0	47.1	42.6	35.8
3	00:10	48.9	59.5	51.4	47.7	46.5	44.8	39.7	30.9
3	00:11	48.5	59.3	51.6	47.1	45.6	44.8	39.7	30.0
3	00:12	47.7	58.2	52.1	47.0	45.1	43.6	38.7	28.6
3	00:26	50.3	58.7	52.5	47.8	47.7	46.7	41.4	33.2
3	00:27	54.3	62.0	54.2	51.7	50.8	50.8	45.9	39.6
3	00:28	54.1	61.2	54.7	51.0	50.3	50.8	46.0	38.3
3	00:29	51.5	60.2	53.5	50.3	48.8	47.2	42.8	35.5
3	00:30	53.5	60.3	53.5	51.2	50.7	49.8	45.1	38.3
3	00:31	50.6	58.3	52.4	49.6	48.4	46.4	41.6	35.0
3	00:32	48.2	58.0	51.4	47.0	45.2	44.5	39.1	29.8
3	00:33	48.4	60.3	52.0	47.0	45.2	44.6	39.1	30.7
3	00:34	50.5	62.3	53.3	49.9	47.2	46.6	41.8	33.8
3	00:35	53.6	64.9	55.4	51.7	50.8	49.3	45.2	39.5
3	00:36	49.8	64.7	52.6	47.6	46.8	46.0	41.1	32.1
3	00:37	49.9	62.5	52.6	47.2	48.2	45.0	40.8	34.4
3	00:38	47.7	58.9	51.8	47.2	45.1	43.3	38.2	32.9
3	00:39	48.1	57.9	52.0	47.2	46.1	43.9	38.5	31.4
3	00:40	53.9	61.4	53.8	52.5	49.8	50.6	45.4	38.0
3	00:41	48.8	59.3	50.7	48.1	46.6	44.9	39.1	28.1
3	00:42	47.6	59.7	51.0	45.9	44.4	43.9	38.3	30.6
3	00:43	48.5	59.8	51.4	46.7	45.3	44.8	40.0	30.4
3	00:45	52.7	61.1	53.5	50.8	48.9	49.0	44.3	37.9
3	00:46	47.6	60.8	52.5	47.3	45.8	43.1	36.6	27.4
3	01:01	49.2	60.6	51.3	46.9	46.0	45.6	40.4	31.1
3	01:02	50.3	60.0	52.1	49.2	47.1	46.5	41.3	35.4
3	01:03	50.1	62.4	51.6	47.3	46.2	47.0	41.6	32.9
3	01:04	53.9	63.5	54.9	51.5	49.8	50.6	45.0	37.2
3	01:05	51.4	62.3	53.4	50.0	48.3	47.4	42.6	35.1
3	01:06	48.1	62.3	51.8	46.8	46.3	43.7	37.7	30.3
3	01:07	52.7	62.7	53.6	50.4	48.7	49.5	43.9	36.7
3	01:08	48.5	62.1	50.3	46.4	45.6	44.9	39.5	30.1

Table A6: Measured Octave Band L_{eq} Noise Levels, Position 3 Night time 4th & 5th November 2022

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
2	23:03	50.1	64.1	46.8	Local and distant road traffic
2	23:08	52.5	66.0	46.6	"
2	23:32	49.6	64.0	45.0	"
2	23:37	51.2	63.7	44.6	"
2	00:03	48.0	58.5	43.9	"
2	00:08	50.3	67.7	44.1	"
3	23:13	56.9	76.2	48.1	Local and distant road traffic including distant emergency vehicle siren
3	23:18	50.9	62.7	47.6	Local and distant road traffic
3	23:43	50.8	67.9	46.7	Local and distant road traffic & pedestrians
3	23:48	49.1	59.3	46.6	Local and distant road traffic
3	00:14	49.2	62.2	46.0	"
3	00:19	49.9	68.3	45.8	"
4	23:26	51.1	57.0	48.0	"
4	23:56	50.8	57.2	47.8	"
4	00:27	49.2	55.8	46.6	"

Table A7: Summary Statistical Noise Levels, Night time, 9th & 10th November 2022

Measurement Position	Start Time	Noise Level, dB L _{Aeq}	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
2	23:03	50.1	58.7	51.3	47.7	47.1	46.1	41.3	35.5
2	23:08	52.5	60.7	53.2	49.5	48.1	49.1	44.5	37.5
2	23:32	49.6	58.4	52.4	48.0	46.7	46.1	40.0	32.5
2	23:37	51.2	58.5	51.9	48.1	46.7	47.9	43.3	37.1
2	00:03	48.0	60.0	50.8	46.0	44.3	44.1	39.5	33.6
2	00:08	50.3	57.8	51.7	47.6	46.0	47.1	42.2	33.2
3	23:13	56.9	59.3	53.5	49.2	46.2	52.7	52.8	36.8
3	23:18	50.9	57.3	53.3	51.1	48.6	46.9	40.7	33.4
3	23:43	50.8	56.7	52.2	49.2	48.4	47.0	41.1	33.7
3	23:48	49.1	57.3	52.6	48.8	45.6	45.3	39.8	33.0
3	00:14	49.2	57.8	52.5	50.9	45.9	44.7	39.0	31.6
3	00:19	49.9	58.7	52.9	48.5	48.1	45.2	39.8	32.4
4	23:26	51.1	59.3	53.6	49.2	46.8	47.7	42.6	34.0
4	23:56	50.8	59.7	53.1	49.2	45.9	47.3	42.7	34.7
4	00:27	49.2	59.3	50.9	46.6	44.5	45.7	41.0	34.7

Table A8: Measured Octave Band L_{eq} Noise Levels, Night time, 9th & 10th November 2022