

Noise Impact Assessment

Great Ancoats Street/ Laystall Street, Manchester

Reference: 9840/PR/BL

Client:
ANCOATS MANCHESTER LIMITED

Document Control				
Version	Revision Description	Date	Author:	Reviewed by:
1.0	--	27/09/22	Pedro Rodrigues, MIOA	Blake Lucas MIOA
REV A	Client Comments	28/10/2022	Pedro Rodrigues, MIOA	Blake Lucas MIOA
REV B	Client Comments	04/11/2022	Pedro Rodrigues, MIOA	Blake Lucas MIOA
REV C	Updated Planning Layouts	23/11/2022	Pedro Rodrigues, MIOA	Blake Lucas MIOA
Document Reference: 9840/PR/BL				

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustics or vibration aspects as included in this report. We provide advice only in relation to noise and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

Table of Contents

1. Introduction.....	4
2. The Site.....	7
3. Planning and Noise.....	9
3.1. National Planning Policy Framework	9
3.2. Noise Policy Statement for England	9
3.3. National Planning Practice Guidance, Noise.....	10
3.4. Manchester City Council – DM1 Development Management	10
4. Assessment Criteria.....	11
4.1. External Road Traffic Noise Ingress Control	11
4.1.1. British Standard 8233:2014	11
4.2. External Plant Noise	11
4.2.1. British Standard 4142:2014	11
4.3. Entertainment Venues	12
4.4. Construction Noise	12
5. Baseline Noise Survey	13
5.1. Monitoring Equipment	13
5.2. Weather Conditions.....	13
5.3. Monitoring Procedure	13
5.4. Measured Noise Levels	13
6. External Noise Control	14
6.1. Noise Modelling.....	14
6.2. Calculation Method.....	15
6.3. Mitigation Locations	15
6.4. External Wall Construction.....	17
6.5. Window Construction	17
6.6. Ventilation Provisions	17
6.7. Effect of Mitigation Measures	17
7. External Plant Noise Limits.....	19
7.1. Plant Noise Limits.....	19
8. Music Noise Assessment	20
8.1. Proposed Music Noise Limits	20
8.2. Music Noise Impact from Music Noise Breakout from Bar/ restaurant (worst case)	20

8.3. Music Noise Impact from Music Noise transfer from Bar/ restaurant through demised wall 21	
9. Construction Noise.....	22
10. Summary and Conclusions.....	22

1. Introduction

Ancoats Manchester Limited appointed Acoustic Consultants Limited to provide noise and acoustic advice for the proposed Hotel at Great Ancoats St/ Laystall St, Manchester. The client is seeking Full Planning Permission for a hotel development comprising 154 hotel rooms (Use Class C1) with supporting internal amenity spaces, associated landscaping, cycle parking and other associated works.

This report provides the results of a noise survey conducted on the site and a noise impact assessment of external sources on the sensitive elements of the development. Additionally, the results of the noise monitoring will be used to set plant limits that if met will satisfy the conditions of British Standard 4142:2014.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF 2021), Noise Policy Statement for England (NPSE), National Planning Practice Guidance (NPPG), British Standard 4142:2014 (BS4142) and British Standard 8233:2014 (BS8233). It also provides guidance based on Manchester City Council Policy DM 1 – Development Management and Manchester's City Council – Technical Guidance October 2022 such as construction noise and music noise impact upon sensitive receivers.

The Ground floor Layout plan and indicative upper floor plans are provided below:

Figure 1: Ground Floor Plan

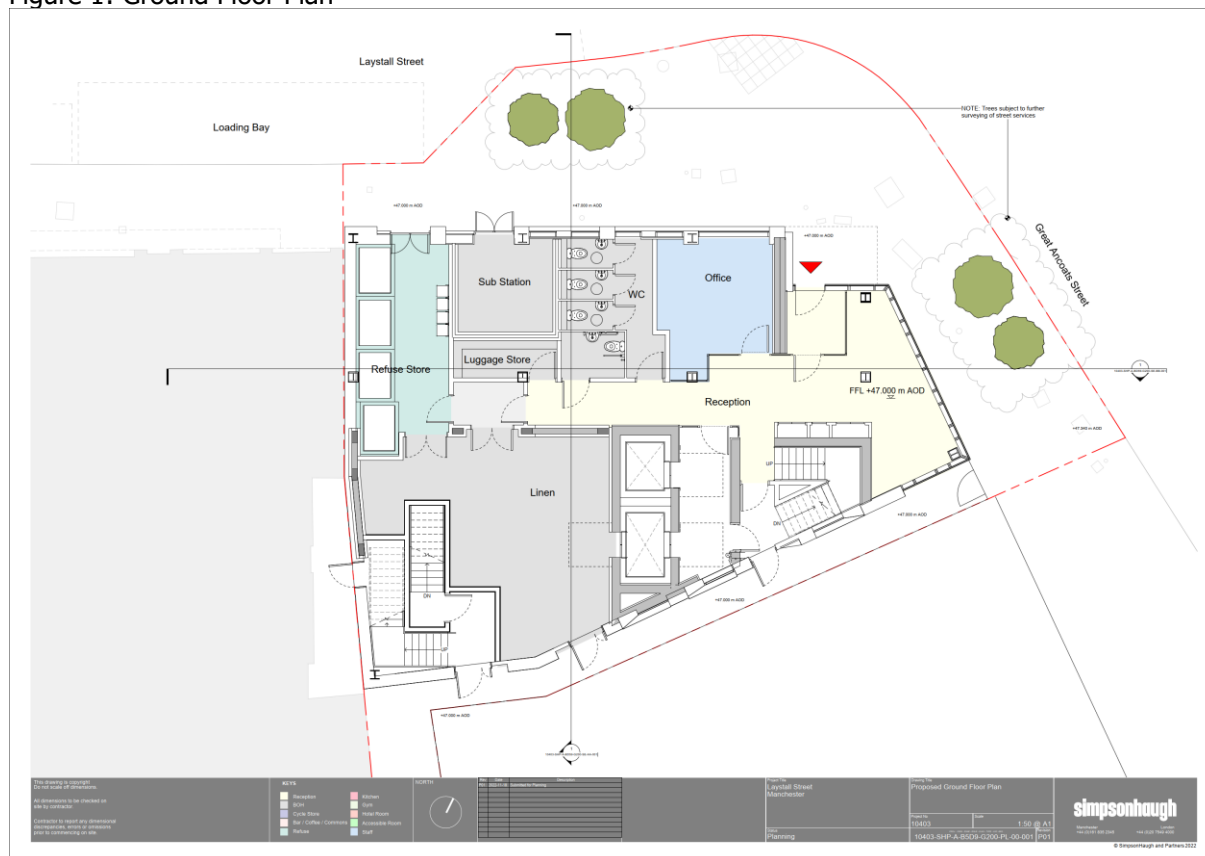


Figure 2: Level 01 Plan

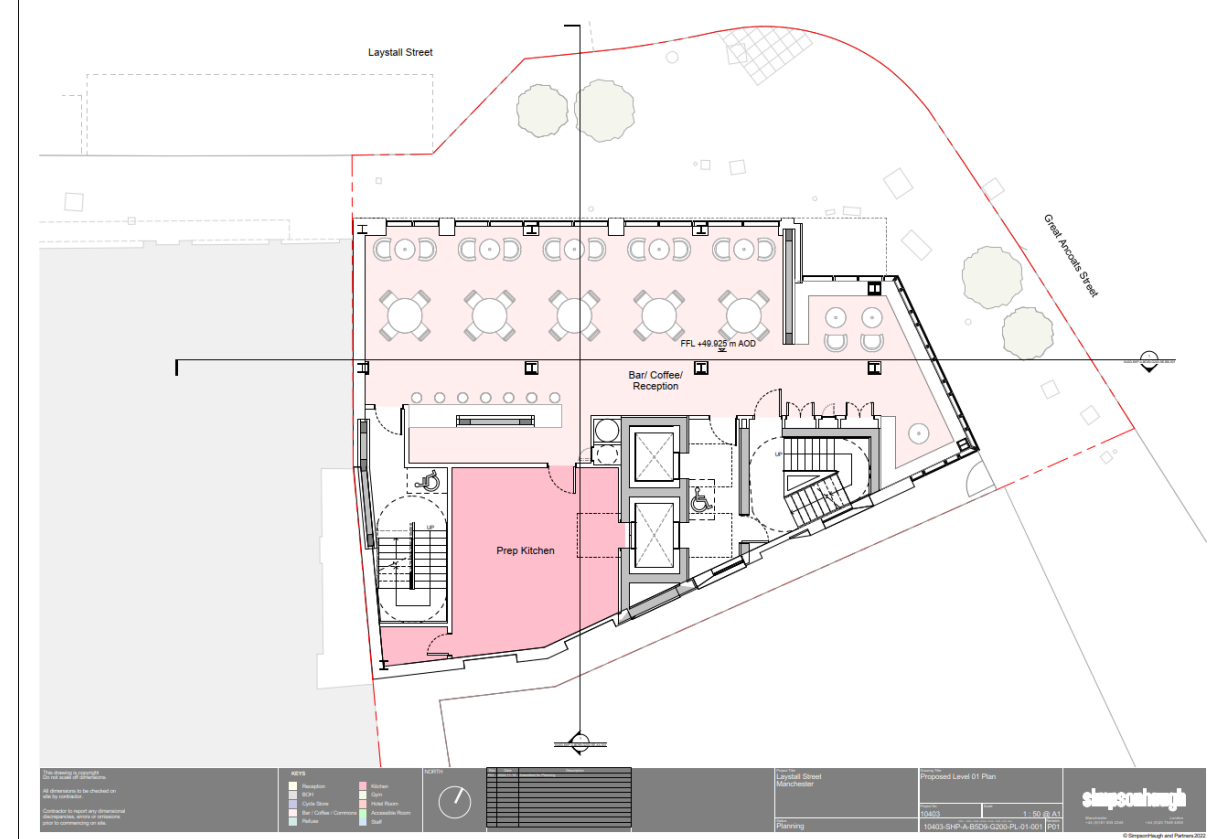


Figure 3: Mezzanine Level Plan

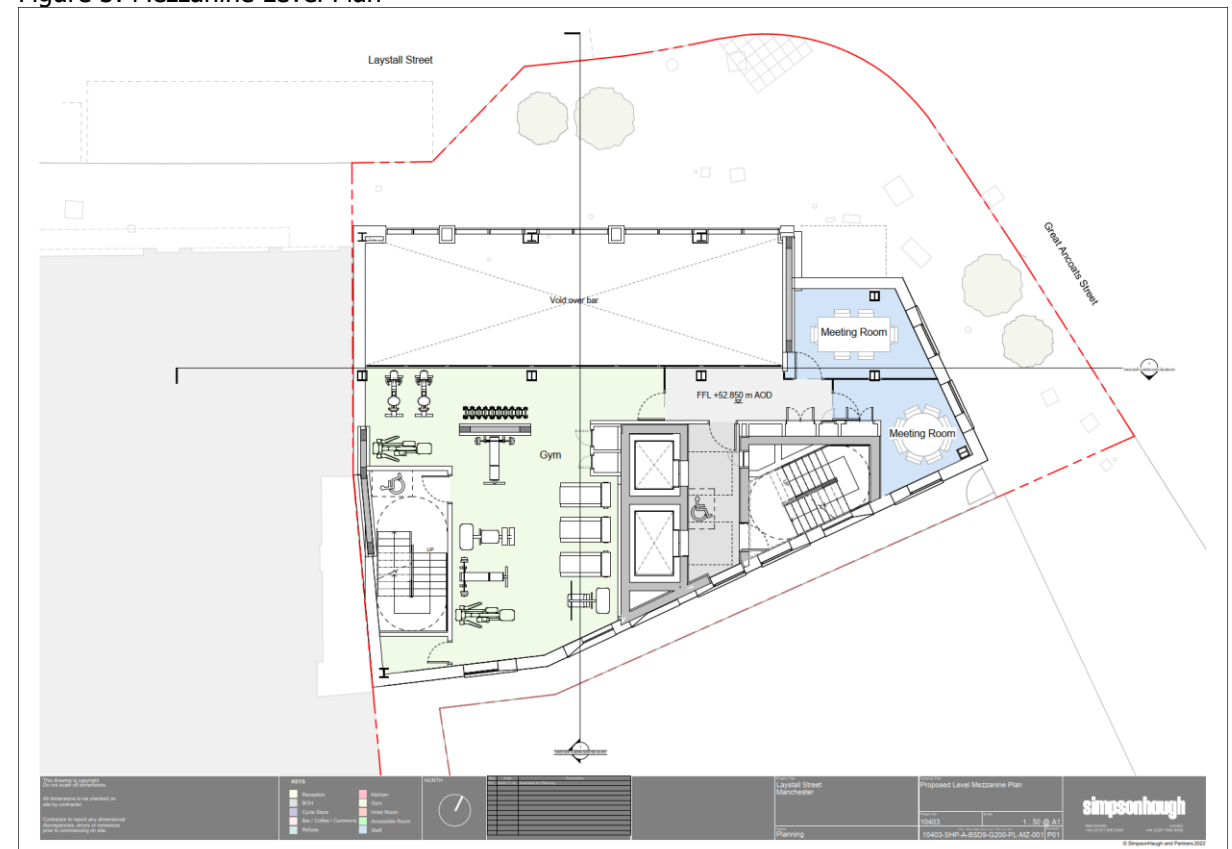


Figure 4: Typical Lower Level Plan – Level 02-11 inclusive Plan



Figure 6: 7th – Roof Floor Plan

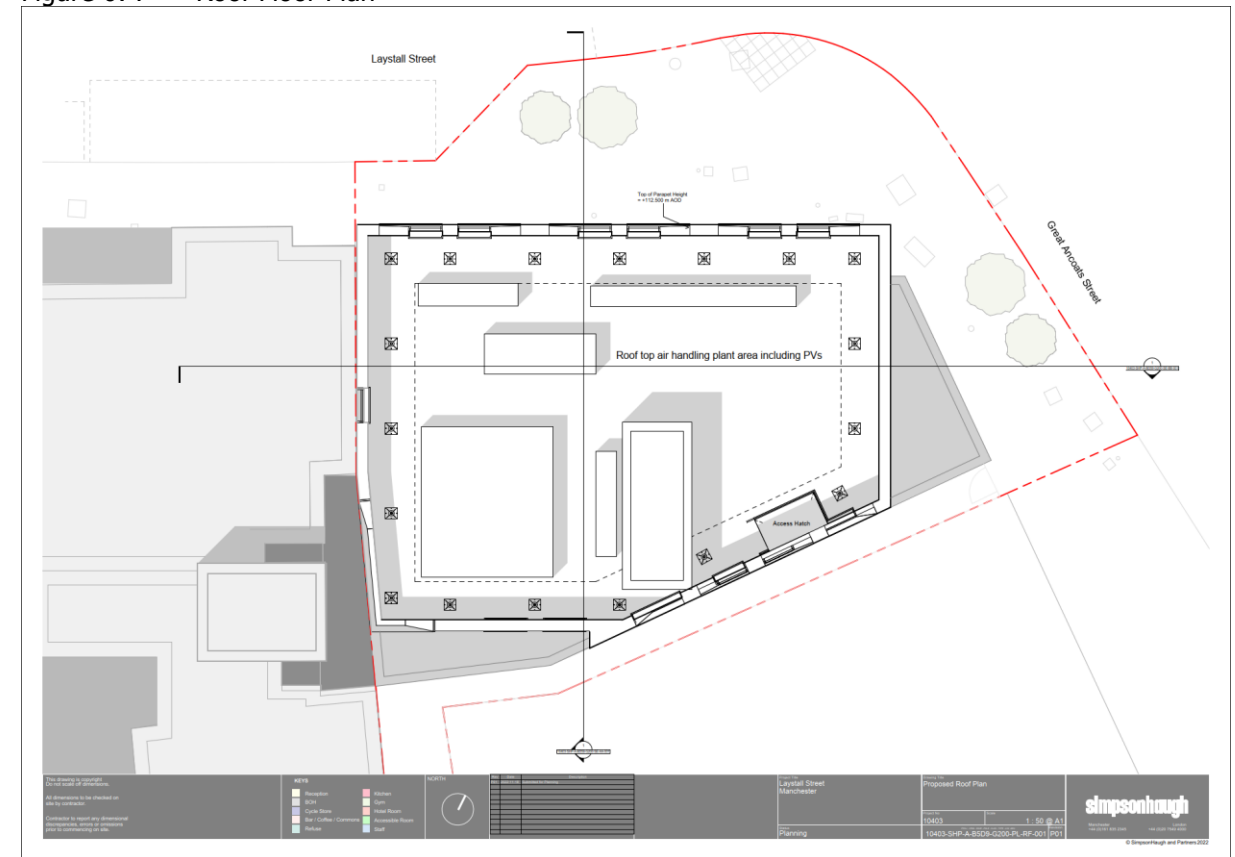


Figure 5: Typical Upper Level Plan – Level 12 – 19 Inclusive

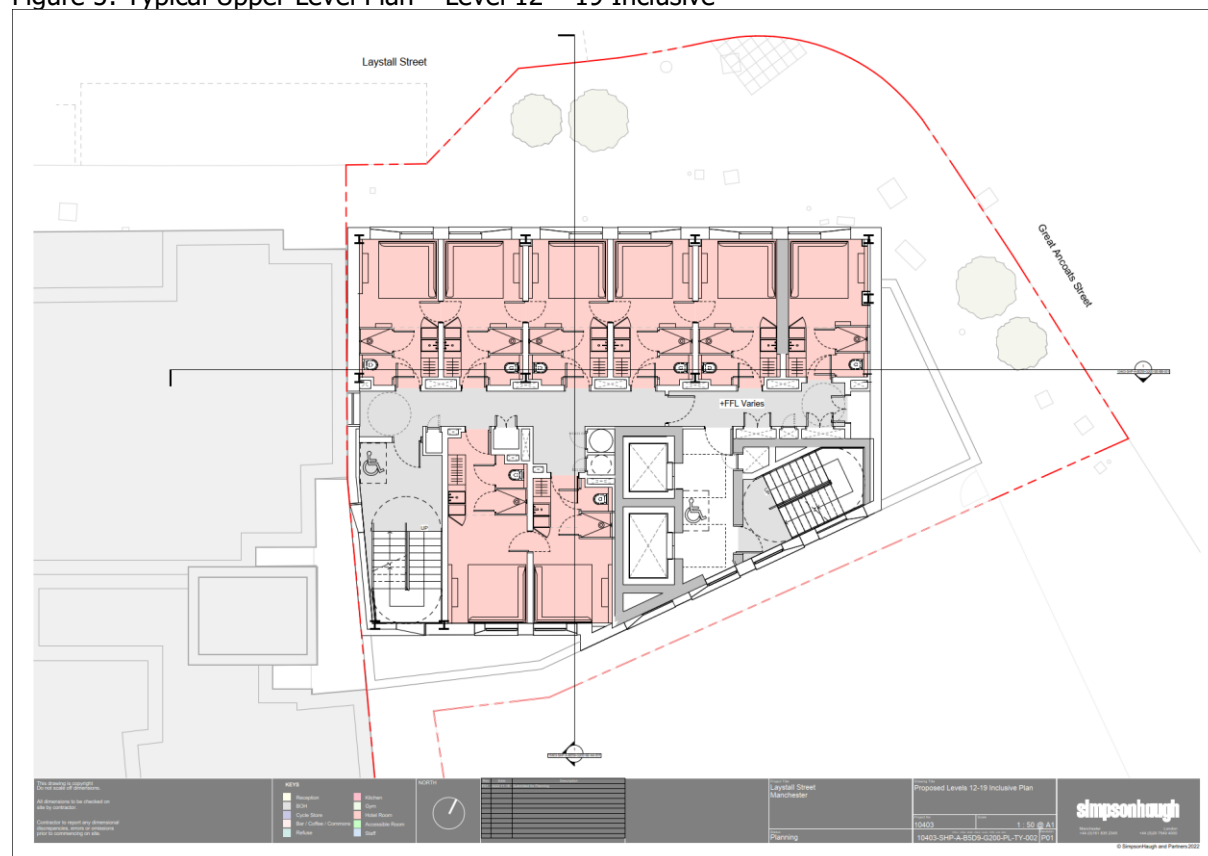


Figure 7: North Elevation



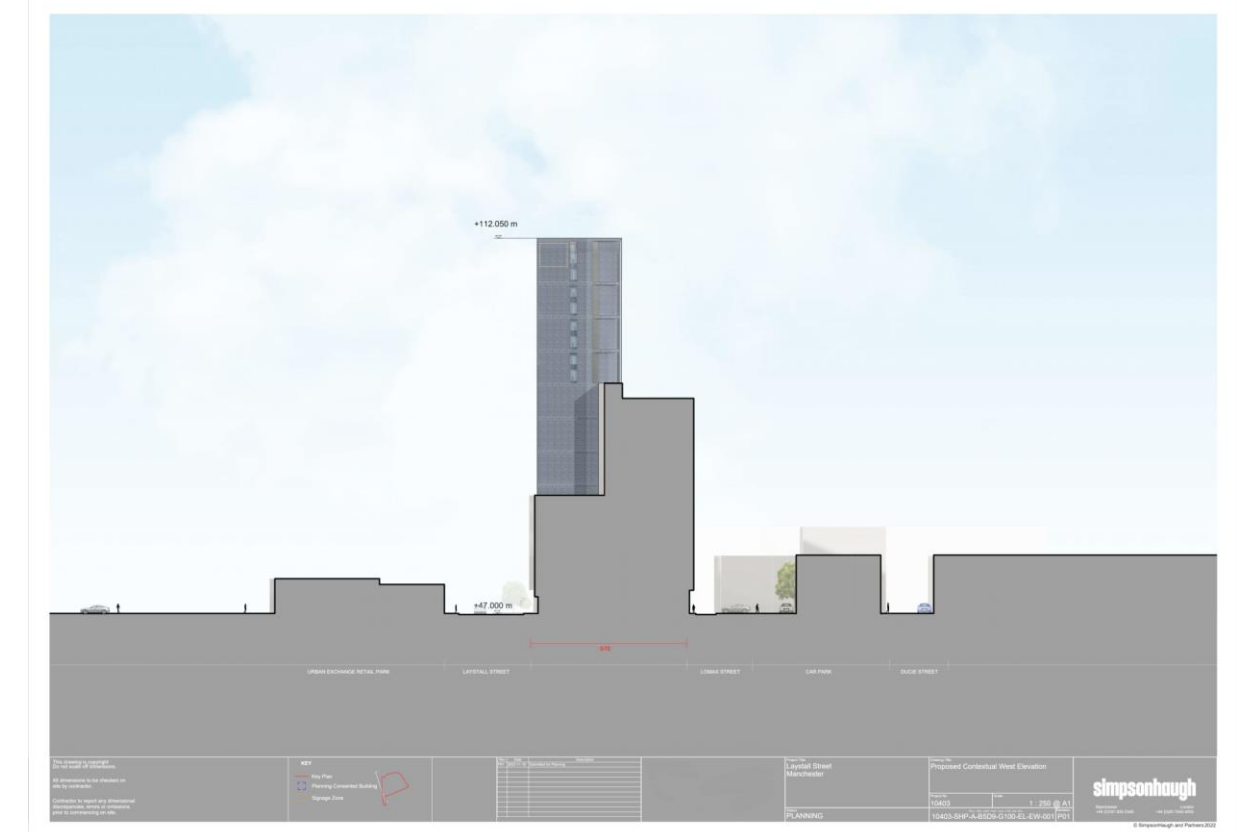
Figure 9: South Elevation



Figure 8: East Elevation



Figure 10: West Elevation



2. The Site

The Site is located in Manchester City Centre. It is bounded by Laystall Street to the north, Great Ancoats Street to the east, vacant land at Lomax Street to the south and an apart-hotel to the west, . The Site extends to approximately 0.032 hectares.

The Site is currently comprised as a construction compound for the alteration works to the adjacent apart-hotel (The Northern Quarters). On the Great Ancoats Street / Laystall Street corner of the Site there is a digital roadside billboard, providing 24/7 advertisement along Manchester's main arterial route. The Site is currently closed off for public access and is secured by temporary security fencing. The Site consists of previously developed land and is predominantly hard standing with a limited amount of vegetation.

The site is approximately 5 metres to the south of Great Ancoats St (A665), to the south of Urban Exchange, a retail area, with a light industrial area to the south. The A665 is a busy main road, with road traffic determining the noise climate.

It is also understood that planning permission has been granted for an entertainment venue located on Store Street, Manchester (Ref. 133523/FO/2022). An environmental noise impact assessment has been provided by Hoare Lea (planning noise assessment report Rev 03, dated 2022-03-24) which provides an assessment of the impact of music noise upon the nearby sensitive receivers (NSRs) such as the Oxigen residential apartments to the south east. Mitigation measures have been proposed and music noise limits provided to protect the NSRs in accordance with Manchester's City Council requirements.

We would consider that the proposed mitigation measures and music noise limits outlined in the Hoare Lea report will be sufficient to control music noise impact upon the proposed hotel site and therefore no further assessment will be required. In addition, mitigation required to control road traffic noise levels from Great Ancoats St (A665) are expected to be sufficient to control noise ingress from external noise sources such as those from the entertainment event.

A google image of the proposed hotel site location is shown in the figure below. The proposed planning boundary of the site is also shown in red in figure below.

Figure 11: Approximate Google Site Location

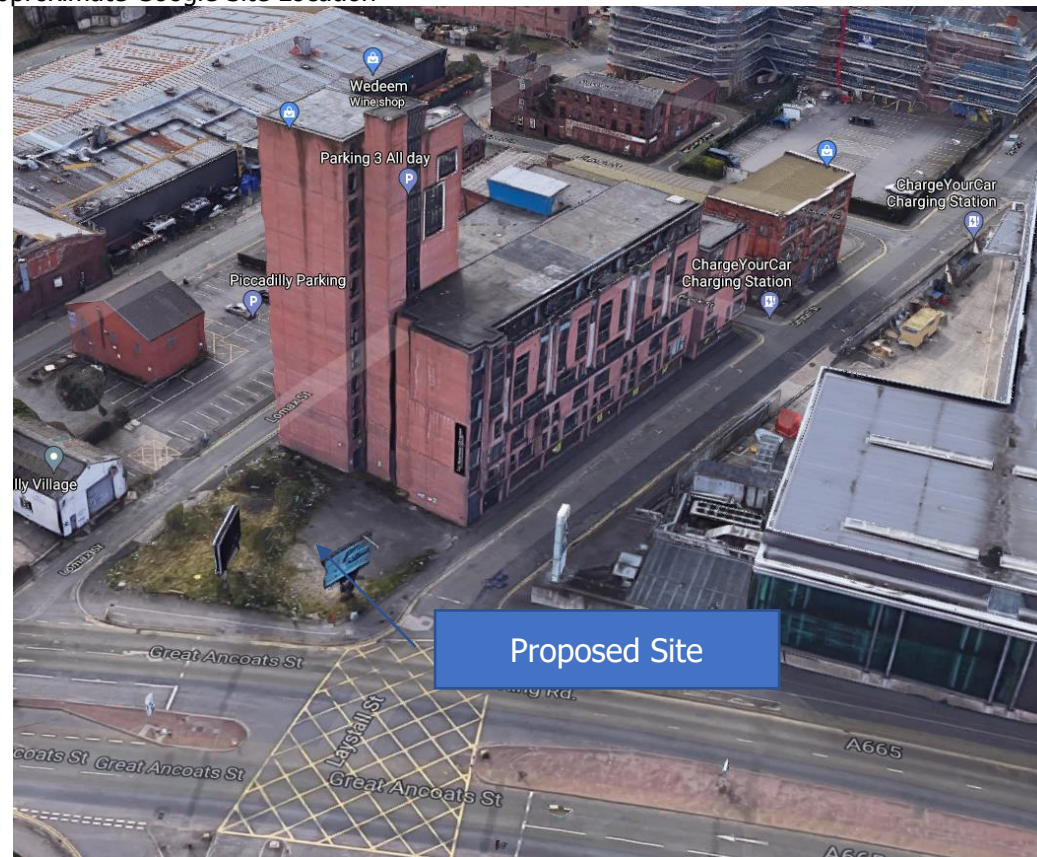
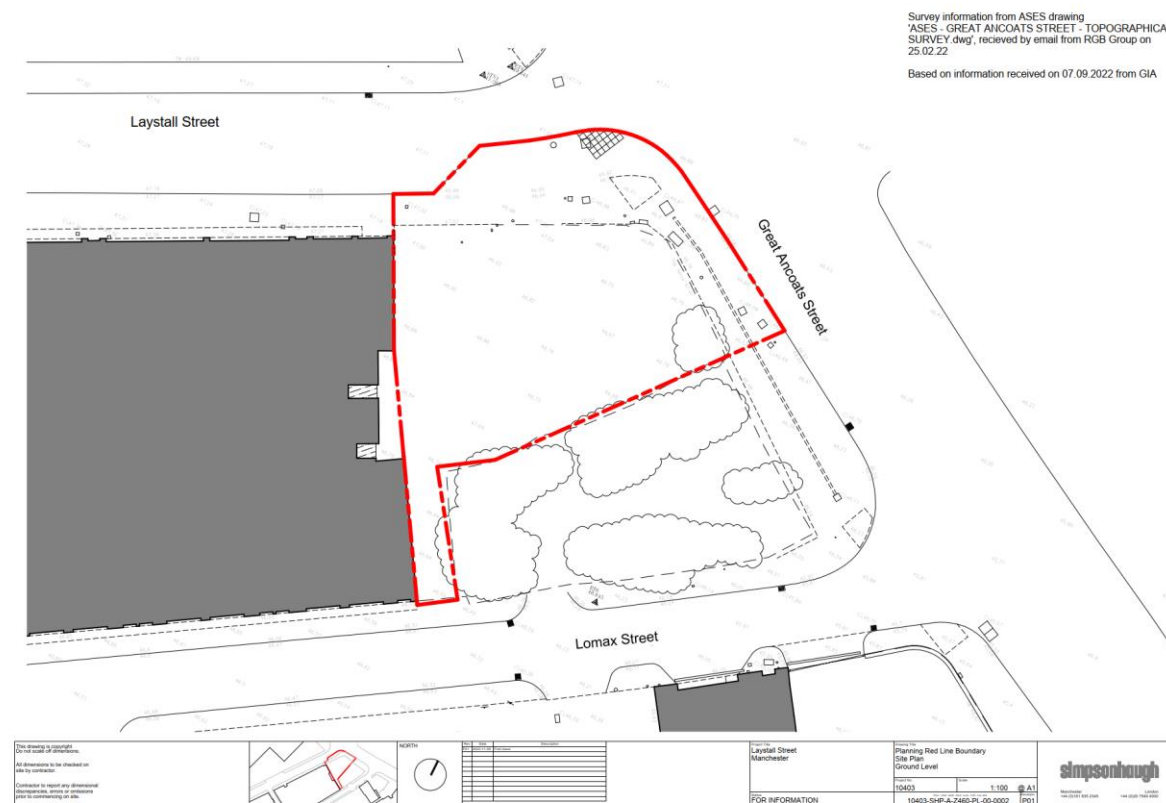


Figure 12: Approximate Google Site Location



3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in July 2021. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 174 states:

"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."

Paragraph 185 states:

"185. 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 document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise, and refers you to the NPSE.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;*
- mitigate and minimise adverse impacts on health and quality of life; and*
- where possible, contribute to the improvement of health and quality of life."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits. The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. National Planning Practice Guidance, Noise

The National Planning Practice Guidance (NPPG) on noise, referred to here, is based on the current version (July 2019) as provided on the Planning Guidance Website.

It states that *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

The document provides generic guidance on how to determine the impact of noise and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the NPPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below.

3.4. Manchester City Council – DM1 Development Management

Manchester City Council states the following within Policy DM1 - Development Management

"Development Management

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-

- *Flood risk and drainage. Flood risk and drainage.*
- *Existing or proposed hazardous installations.*
- *Subject to scheme viability, developers will be required to demonstrate that new development incorporates sustainable construction techniques as follows (In terms of energy targets this policy should be read alongside policy EN6 and the higher target will apply):-*

a) For new residential development meet as a minimum the following Code for Sustainable Homes standards. This will apply until a higher national standard is required:

*Year 2010 – Code Level 3;
Year 2013 - Code Level 4;
Year 2016 - Code Level 6; and*

b) For new commercial developments to demonstrate best practice which will include the application of the BREEAM (Building Research Establishment Environmental Assessment Method) standards. By 2019 provisions similar to the Code for Sustainable Homes will also apply to all new non-domestic buildings."

- *Appropriate siting, layout, scale, form, massing, materials and detail*
- *Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.*
- *Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.*
- *Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes.*
- *Community safety and crime prevention.*
- *Design for health.*
- *Adequacy of internal accommodation and external amenity space.*
- *Refuse storage and collection.*
- *Vehicular access and car parking.*
- *Effects relating to biodiversity, landscape, archaeological or built heritage.*
- *Green Infrastructure including open space, both public and private.*
- *The use of alternatives to peat-based products in landscaping/gardens within development schemes.*

4. Assessment Criteria

The performance specification below is based on meeting the requirements specified in British Standard 4142:2014+A1:2019 (plant noise impact) and British Standard 8233:2014 when assessing noise ingress from external noise sources, such as traffic which is considered to be most significant external noise source impacting upon the site.

4.1. External Road Traffic Noise Ingress Control

4.1.1. British Standard 8233:2014

British Standard 8233:2014 entitled "Guidance on sound insulation and noise reduction for buildings" came into effect on 28th February 2014. Section 7.7.2 Table 4 of the British Standard 8233:2014 provides internal ambient noise levels for dwellings from noise sources 'without a specific character'.

The British Standard guideline states that noise levels should not exceed those as noted in Table 2 of the British Standard. These criteria are based on the guidance provided within WHO 1999 and are summarised below:

Table 1: British Standard 8233:2014 Internal Noise Criteria

Activity	Location	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Resting	Living Room	35 dB $L_{Aeq,16 \text{ hour}}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16 \text{ hour}}$	30 dB $L_{Aeq,8 \text{ hour}}$

BS8233:2014 also states that "Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

As this is considered an hotel development where guestrooms are known to stay for a limits amount of time, we would consider that a marginal exceedance to the above BS8233:2014 noise limits by around 5dB to still be considered acceptable in planning terms.

4.2. External Plant Noise

4.2.1. British Standard 4142:2014

For plant noise, the most relevant criteria is provided in the British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound'.

The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes or temporary accommodation and considered to be sensitive receiver.

The principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'.

The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours).

Section 9 entitled 'Rating Level' states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location.

In Section 11 of the Standard, entitled 'Assessment of the Impacts', it states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following."

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

Based on the initial assessment outcomes of British Standard 4142, and, depending on context, it is our opinion that the NOEL, LOAEL and SOAEL levels stated in the Noise Policy Statement for England would generally fall within the following categories when considered in conjunction with the effect levels of the NPPG Noise.

- NOEL – The No Observed Effect Level is considered to apply where the rating level does not exceed the background sound level (less than or equal to 0 dB) would fall within the No Effect level or No Observed Adverse Effect level of the NPPG Noise.
- LOAEL – The Lowest Observed Adverse Effect Level is considered to fall between a difference of 0 dB (where, according to BS 4142:2014, the impact is low) and 5dB (where, according to the same, there is a likely indication of adverse impact).
- SOAEL– The Significant Observed Adverse Effect Level is considered to fall between a difference of 5 dB (where, according to BS 4142:2014, there is a likely indication of

adverse impact) and 10 dB (where, according to the same, there is a likely indication of significant adverse impact). A difference in excess of 10 dB is expected to result in an unacceptable adverse effect and therefore exceeds the Significant Observed Adverse Effect Level.

4.3. Entertainment Venues

Manchester's City Council – Technical Guidance, October 2022 provides the following guidance with regards to Entertainment Venues, including noise from recording music, live bands, or karaoke, etc.

It is not clear whether the bar/ restaurant will include amplified music operating at such level that could impact upon the nearest noise sensitive receivers. We expect the operational music noise levels within these spaces to be of low level and typical of a bar with low background music noise levels. Nevertheless, an assessment of music noise impacting upon the nearest noise sensitive receivers will be conducted. These are understood to be the bedrooms of the demised building, The Northern Quarters, Serviced Apartments overlooking Laystall St.

Manchester's City Council – Technical Guidance, October 2022 states the following with regards to music noise assessment and criteria.

"Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{eq,5min}$), respectively".

This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue.

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 ($L_{Aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location'.

Depending on the circumstances it could be that both the above criteria are applicable for the same development (new entertainment venue). In order to control music noise levels so as not to exceed any agreed maximum permissible operating levels, as a last resort, a suitable noise limiting device may be necessary to install, in addition to structural acoustic treatments such as uprated lobby systems and size, location and fixing of loudspeakers."

4.4. Construction Noise

Manchester's City Council – Technical Guidance, October 2022 states the following with regards to construction noise.

"Noise from construction or demolition works as part of a development can be intrusive or disruptive to local businesses and/or noise sensitive land uses. For this reason, construction or demolition activities should be restricted to daytime periods and have finite start and finish times.

All noisy works (i.e. those that are audible beyond the site boundary) should be restricted to the following hours to minimise disruption:

- *Monday - Friday: 7.30am - 6pm*
- *Saturday: 8.30am - 2pm*
- *Sunday / Bank holidays: No work*

These restrictions apply to deliveries/collections to the site

By utilising set working hours for activities on site as well as deliveries to the site, respite is provided for local residents and businesses near to the development. Noise and disruption to local residents will occur during development works, so it is important to remember that local residents may not necessarily be in favour of the development or all aspects of it. By keeping an open dialogue and attempting to placate any complaints or grievances, the development is likely to progress more efficiently.

For larger developments or developments that are likely to progress over a long period of time, it may be worth considering a 'Considerate Contractors Scheme'. These schemes suggest guidelines to minimise disruption to local residents and businesses and provide a code of conduct for employees on site so that their work does not unduly upset local residents and/or businesses. These schemes include noise as well as many other elements such as dust suppression, deliveries, working hours, behaviour on site, approved delivery routes, etc.

A Construction Management Plan (CMP) shall be submitted to and approved by the Council for large schemes. This should contain a Noise & Vibration section that bases the assessment on BS 5228 (see section 3.5), with reference to other relevant standards. It should also contain a community consultation strategy which includes how and when local businesses and residents will be consulted on matters such out of hours works."

It is understood that the proposed scheme will be constructed in accordance with the Manchester's City Council – Technical Guidance, October 2022 with regards to construction noise and a Construction Management Plan will be submitted with the application which should incorporate the above.

5. Baseline Noise Survey

A site noise survey was undertaken between 18th and 21st of June 2021 to determine the existing noise climate at the site.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using three Class 1 sound level meters with half-inch condenser microphones, using the 'fast' setting.

The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available upon request.

Table 2: Equipment and Calibration Status

Location	Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
LT1	SLM, NTI, XL2	A2A-13561-E0	11/11/2019	43780
	Pre-Amp, NTI, MA220	7606	11/11/2019	43780
	Microphone, NTI, MC230A	A17955	11/11/2019	43780
	Calibrator, Larson Davis, CAL200	15064	27/08/2019	32691

The measurement system was checked before and after use with the noted calibrator and no significant drift was detected.

5.2. Weather Conditions

Conditions during the survey were generally dry and clement, with an average temperature approximately 17 degrees Celsius and wind speeds not normally exceeding 5 metres per second.

5.3. Monitoring Procedure

A long term monitoring exercise was undertaken outside of Room 201 (LT1) overlooking Laystall St. LT1 was to the north east elevation at second floor level. The microphone was in a façade position. Monitoring Location is displayed below in Figure 9.

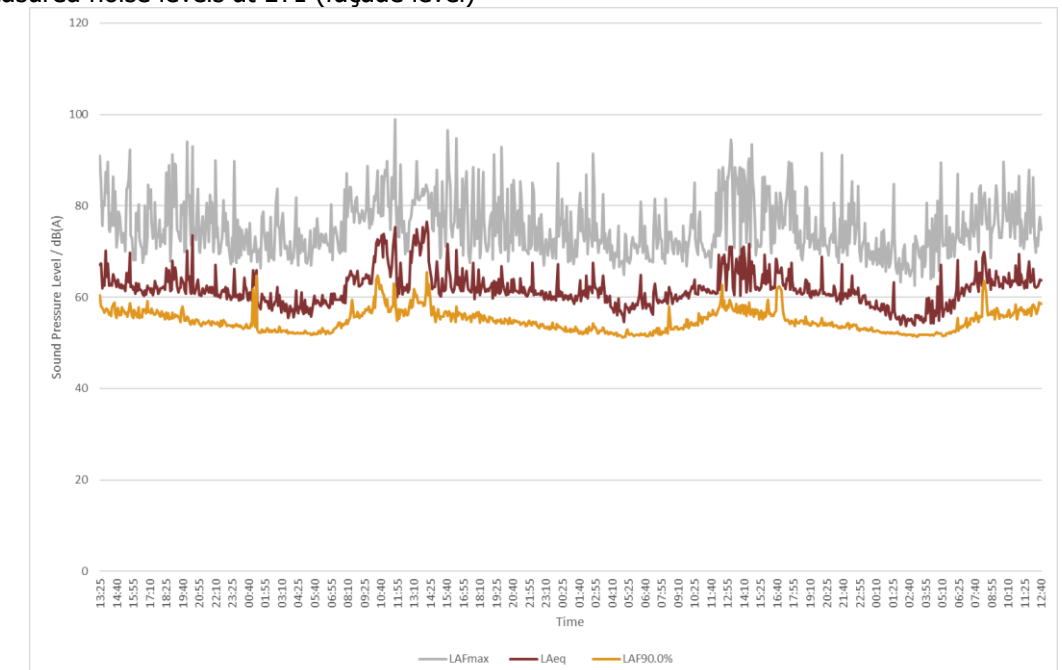
Figure 13: Monitoring Location at existing services apartment building on Laystall Street next to proposed hotel



5.4. Measured Noise Levels

Measurements were completed in accordance with BS8233:2014, BS7445 and BS4142:2014. The relevant data from the survey is the A-weighted L_{eq} , and L_{max} , spectral values and L_{A90} values which are displayed below in both tabulated and graph form below. The variation in noise levels is provided below:

Chart 1: Measured noise levels at LT1 (façade level)



The tabulated octave band data from this location is given below.

Table 3: Logarithmically averaged noise data from LT1 (façade level)

Period	Parameter	Sound Pressure Level per Octave Band / dB								dB(A)
		63	125	250	500	1000	2000	4000	8000	
Day	Leq16hr	75	66	64	62	61	57	52	55	65
Night	Leq8hr	76	61	59	56	55	52	47	40	60

The background sound levels at LT1 are as follows, this data is used to determine the plant limits and is considered most representative of the dwellings in the vicinity to the east:

Table 4: Baseline Background Sound Levels LT1 (façade level)

Period	LA90,15min	
	Range	Mode
Day (07:00 - 23:00)	52 - 66	56
Evening (19:00 - 23:00)	53 - 58	54
Night (23:00 - 07:00)	51 - 65	52

The determined L₉₀ per octave band is also provided below:

Table 5: Baseline Background Sound Levels LT1 per octave band levels

Period	Parameter	Sound Pressure Level per Octave Band / dB							
		63	125	250	500	1000	2000	4000	8000
Night	L ₉₀	75	54	49	47	44	43	33	20

6. External Noise Control

6.1. Noise Modelling

To determine noise levels across the site, noise modelling has been undertaken using computer modelling package Cadna:A by DataKustik and the road traffic noise data noted above in Table 3.

The software predicts road traffic noise propagation using the method of 'The Calculation of Road Traffic Noise 1988', and a verification model has been created to ensure the measured and predicted levels are comparable. This model is available upon request.

The following daytime L_{Aeq(1hr)} and night-time L_{Aeq(1hr)} and maximum noise levels L_{AFmax} maps have been created of the road traffic noise.

Figure 14: Daytime dB L_{Aeq(16hrs)} Road Traffic noise affecting development



Figure 15: Night-time dB LAeq(8hr) Road Traffic noise affecting development



Figure 16: Mitigation locations (Guestrooms, Level 2 Up to Level 7, Lower Floor Levels)

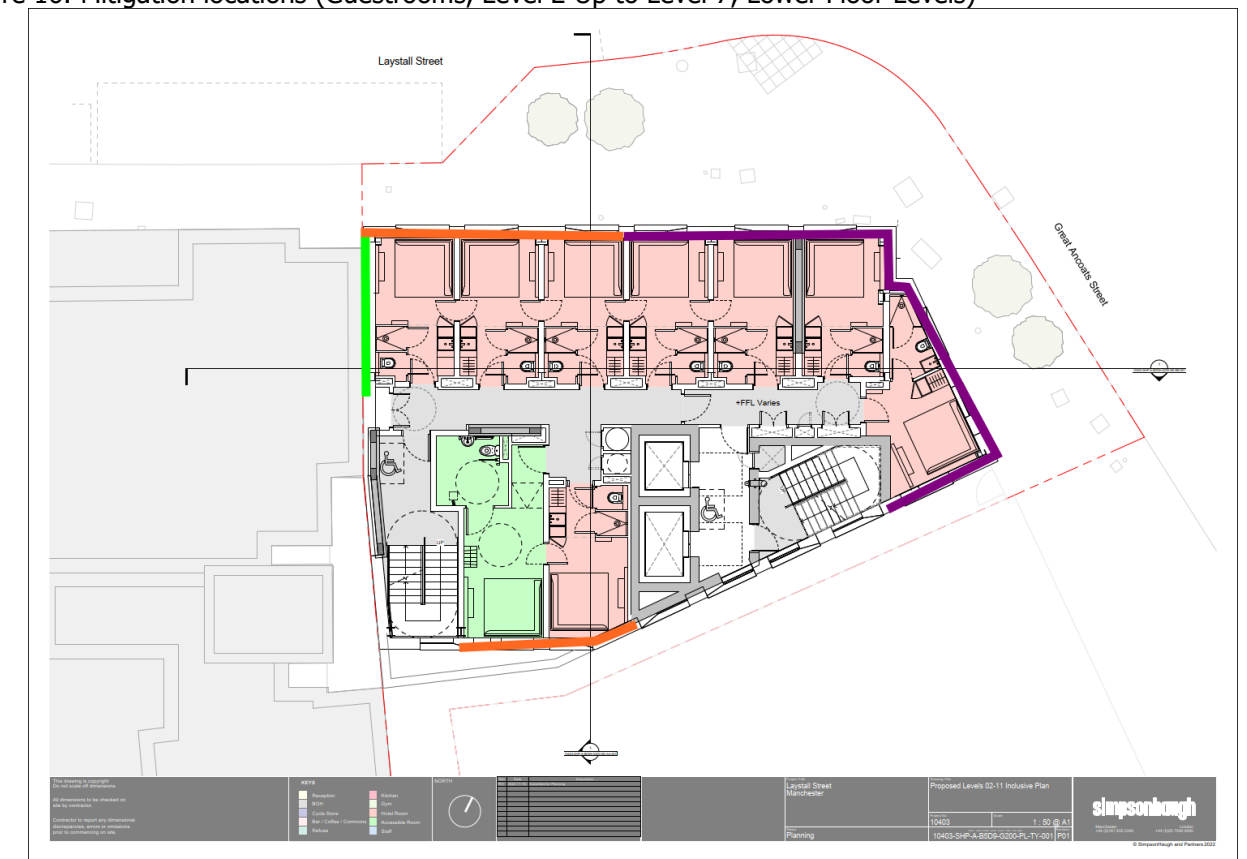


Figure 17: Mitigation locations (Guestrooms, Level 8 Up to Level 12, Lower Floor Levels)



6.2. Calculation Method

Calculations for the internal ambient noise levels have been undertaken using the calculation method provided by Annex G of British Standard 8233:2014. The calculations have been undertaken using traditional building façade constructions noted within this section and noise modelling and survey results.

Alternative constructions to those noted below could be used, however they would need to be assessed to ensure they control external noise to within the recommended internal ambient noise level criteria.

6.3. Mitigation Locations

We have rationalised mitigation measures down to four facades in order to keep the acoustic design of the scheme as concise as possible. The mitigation locations are marked up in the figures below.

Figure 18: Mitigation locations (Above Level 13, Upper Floor Levels)

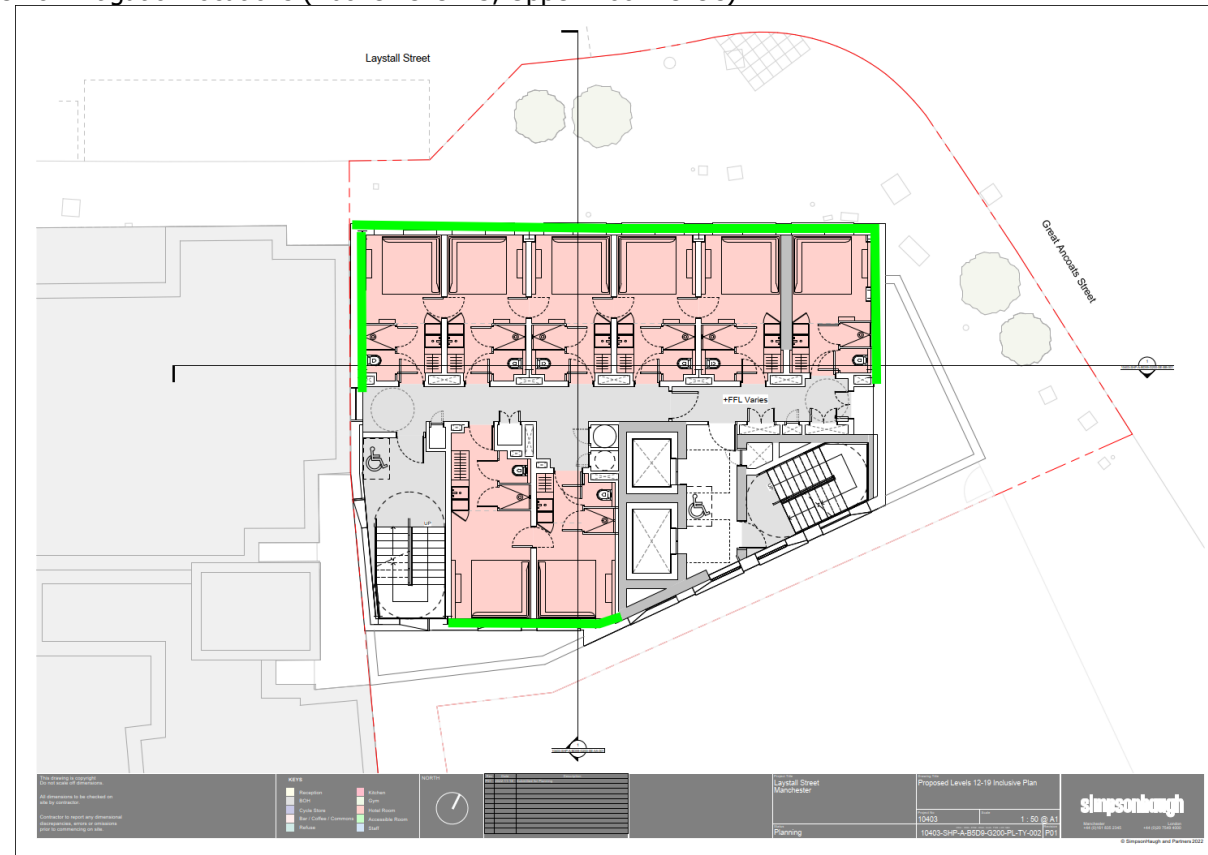


Figure 20: Mitigation locations (Mezzanine Level, Gymnasium, Meeting Room)

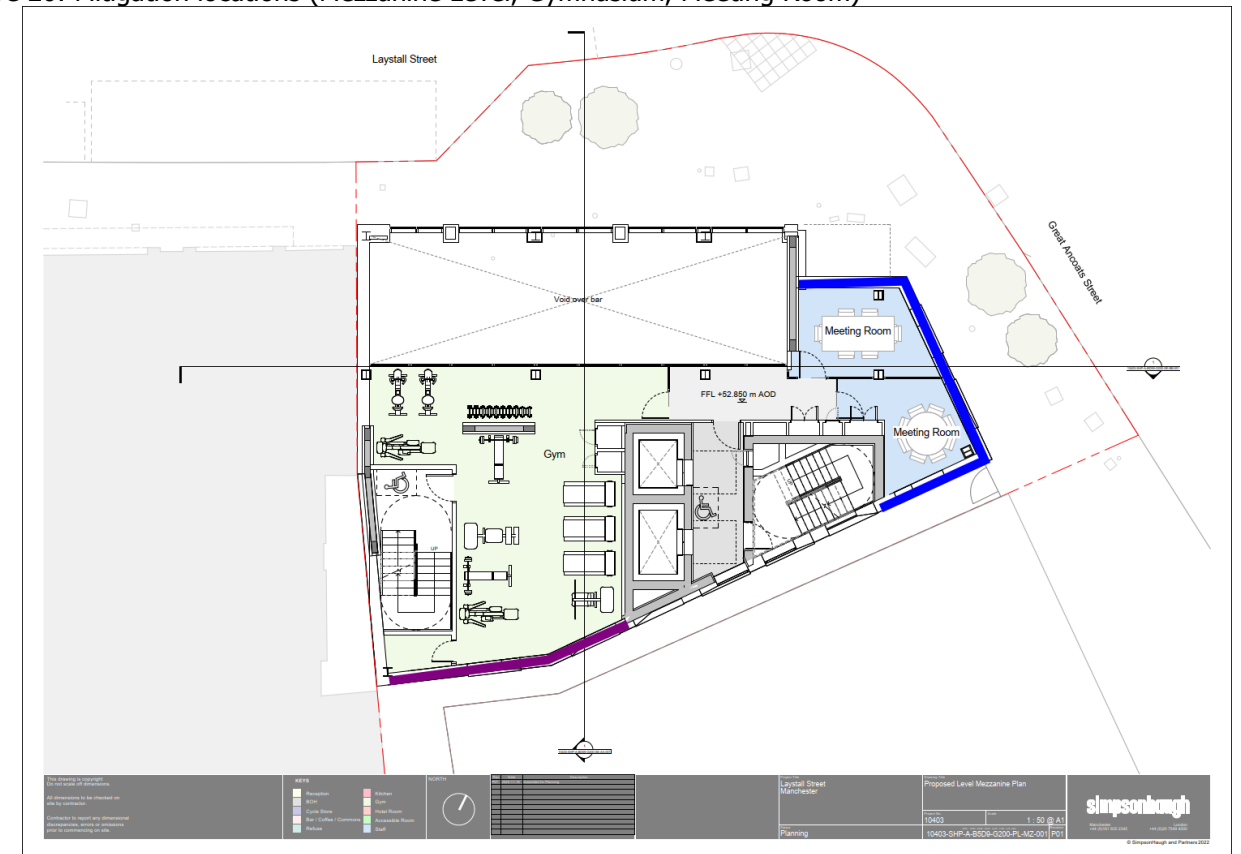


Figure 19: Mitigation locations (Ground Floor, Lobby/ Reception and Offices)

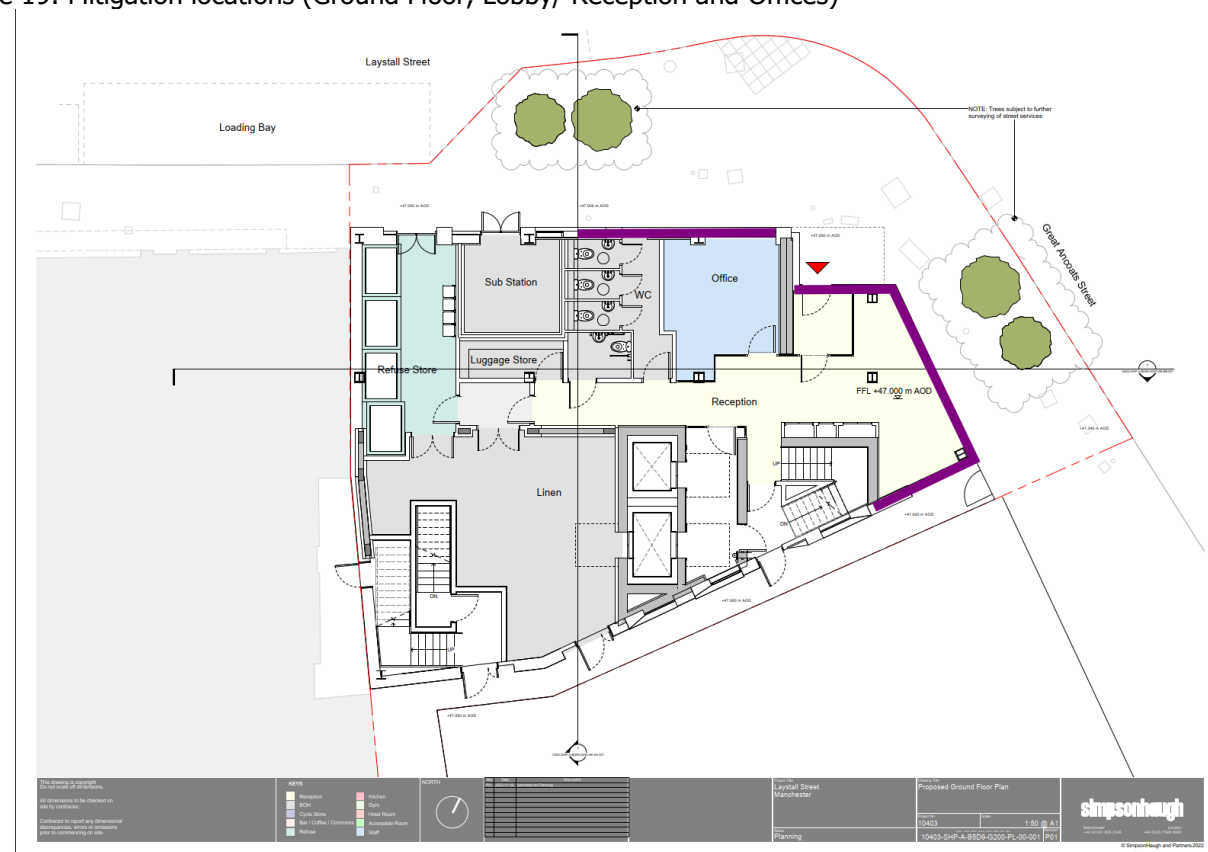
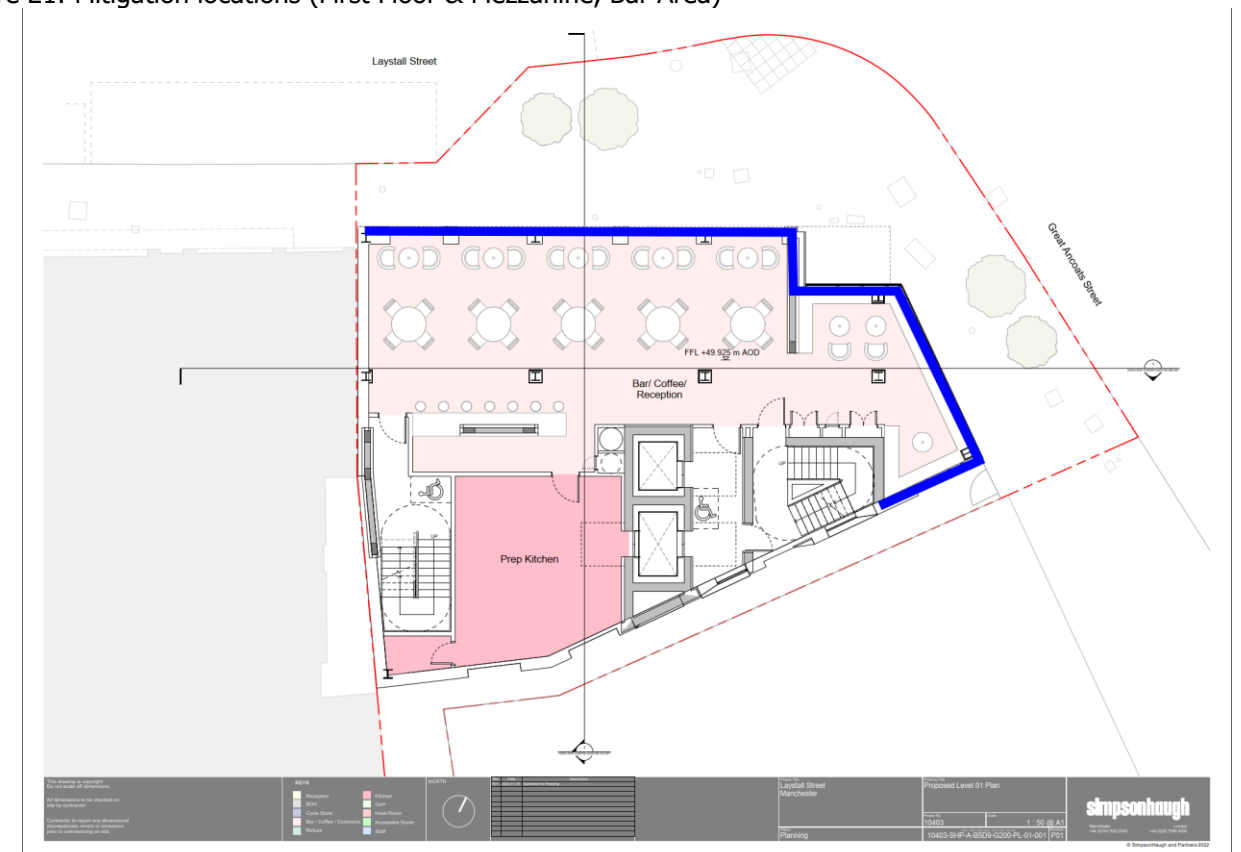


Figure 21: Mitigation locations (First Floor & Mezzanine, Bar Area)



6.4. External Wall Construction

The exact construction at this stage is not known, however, discussions made with the client and architect suggests that the construction will comprise the following SFS construction:

- 28mm brick slip system mechanically fixed (min. density 1600 Kg/m³)
- 80mm air gap
- 100mm Mineral Wool insulation (min. density 30 kg/m³)
- 12.5 cement board (min. density 1444 Kg/m³)
- 150mm Mineral Wool insulation between SFS studs (min. density 30 kg/m³)
- 2x12.5mm plasterboard (min. mass per unit area of not less than 10kg/m² each board)

Table 6: Minimum sound reduction index of external walls

Freq. (Hz)	63	125	250	500	1000	2000	4000	8000	R _w
R (dB)	32	49	54	58	60	67	70	67	62

6.5. Window Construction

The windows should be constructed from at least a double-glazed construction housed in sturdy and good quality frames with airtight compression seals.

The sound insulation performance for the windows should achieve the following as a minimum, a typical build up is also provided. The supplier should confirm the performance (octave band R and R_w) is achievable with the chosen systems.

The performance for the hotel suites and ancillary spaces is provided below:

Table 7: Required minimum sound insulation of windows

Façade	R dB per Octave Band (Hz)								R _w (dB)	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
	33	40	41	47	51	53	59	59	50	⁽¹⁾ 68.2 lam/24/66.2 lam
	31	35	41	47	50	52	65	60	49	⁽²⁾ 88.2 lam/15/88.2 lam
	24	25	31	40	39	43	57	55	40	10/15/13.6
	16	21	20	31	39	37	47	46	33	6/12/6.4

⁽¹⁾This is a specialist laminate glass comprising of one layer of 68.2 Stadip silence, a 24mm gap and one layer of 66.2 Stadip Silence.

⁽²⁾ This is a specialist laminate glass comprising of one layer of 88.2 Stadip silence, a 15mm gap and one layer of 88.2 Stadip Silence.

6.6. Ventilation Provisions

The guestrooms of the development are to be ventilated using trickle ventilation above the windows.

The vents are required to achieve the following element normalised level difference (D_{n,e}) in the open position. The supplier of any chosen ventilation product should provide test data confirming that the ventilation system meets the following performance data. There should be no unattended vents or openings in the façade.

Table 8: Required Minimum Sound Insulation Performance of Vents

Room	Required Ventilator Sound Insulation Performance, D _{n,e} per Octave Band (Hz)								D _{n,e,w} (dB)	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
Guestrooms	32(*)	32.4	30.7	44.8	52.3	50.2	50(*)	50(*)	46	Trickle Ventilation, Duco – 'Alto 10' (Open)

(*) assumed performance, manufacturer's data limited to 125 Hz to 2KHz

It is understood that Gym, Bar and potentially the Meeting rooms / office areas within the ground, first and mezzanine levels will be served by MVHR unit (s). This can be addressed in more detail at later design stage if required. This is not typically required at planning stage and below IL are indicative only and will depend on the final ventilation design strategy and layouts.

Table 9: Minimum IL to Meeting Room Atmospheric Attenuators

Room Type	Zone	Minimum Insertion Loss (dB) at Centre Freq (Hz)							
		63	125	250	500	1000	2000	4000	8000
Ground Floor Gym / Lobby / Toilets		8	12	26	35	40	30	33	46
First Floor Bar		12	17	30	40	45	35	39	51
Meeting Rooms/ Office		16	21	35	45	50	40	44	57

6.7. Effect of Mitigation Measures

Mitigation measures are required to control external road traffic noise. With the proposed fabric construction and suitable ventilation provisions noted above, the predicted internal equivalent noise levels meet the recommended BS8233 daytime noise level limit of 35dB L_{Aeq}, 16 hours and night time 30dB L_{Aeq}, 8 hours within the majority of proposed guestrooms of the proposed hotel.

The only exception are the most exposed guestrooms facing Ancoats Road up to the 6th Floor level approximately, where daytime and night time predictions have marginally exceeded the recommended BS8233:2014 noise limits by 1dB and 3dB respectively.

As stated above, BS8233:2014 states that "Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

The proposal is also for an hotel where guests will stay only for a limits amount of time. Therefore, we would consider the 1dB and 3dB exceedance to BS8233:2014 noise limits during the daytime and night time periods respectively to be acceptable in planning terms.

Calculations are presented for the worst case guestrooms below.

Figure 22: Noise Ingress Prediction at the most affected guestrooms facing Ancoats Road, up to 6th Floor Level

Free Field Level at Façade									
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq}(16\text{ hour})$	80	71	69	67	66	62	57	60	71
Night $L_{eq}(8\text{ hour})$	80	65	63	60	59	56	51	44	64
Building Façade Construction									
External Element		63	125	250	500	1000	2000	4000	8000
Vent: Alto 10 Dnew 46dB (-2,-6))	D_{re}	32	32	31	45	52	50	50	50
	Number of	1							
		0.00090	0.00082	0.00121	0.00005	0.00001	0.00001	0.00001	0.00001
Wall: User Defined		32	49	54	58	60	67	70	67
	Area	5							
		0.00048	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Enhanced glazing: 14.8/24/12.8 - 50 Rw		33	40	41	47	51	53	59	55
	Area	1.7							
		0.00012	0.00002	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000
Calculations to BS EN 12354									
	63	125	250	500	1000	2000	4000	8000	
Sum	0.00149787	0.000853783	0.001234969	5.3268E-05	1.10942E-05	1.49859E-05	1.46298E-05	1.51726E-05	
10log sum	-28.2452616	-30.68652293	-29.08343974	-42.73533556	-49.54902651	-48.24316295	-48.34761821	-48.18940936	
10log S/A	0.17728767	0.17728767	0.17728767	0.17728767	0.17728767	0.17728767	0.17728767	0.17728767	
correction factor +3	3	3	3	3	3	3	3	3	
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq}(16\text{ hour})$	55	43	43	27	20	17	12	15	36
Night $L_{eq}(8\text{ hour})$	55	37	37	20	13	11	6	-1	32

7. External Plant Noise Limits

Noise from plant serving the development affecting nearby noise sensitive receivers will need to be suitably controlled. These are considered to be the adjacent existing services apartment building on Laystall Street. The plant final selection is not currently known at this stage.

As such, we have provided noise limits for plant noise at the nearest receivers based on the assessment methodology of British Standard 4142:2014 at the nearest noise sensitive receivers.

However, road traffic noise is likely to be predominant in relation to any plant associated with the development when assessed against any nearest noise sensitive receivers.

7.1. Plant Noise Limits

Any plant associated with the proposed hotel is understood to operate 24 hours a day. Cumulative plant noise levels must comply with the requirements of the local authority (typically at least equal to background noise levels BS442 as described above). Nevertheless, we have applied a more stringent criteria of plant not exceeding 50dB L_{Aeq} at the site boundary or 45dB L_{Aeq} in public areas.

Based on the above criteria and operational hours, the maximum cumulative rating sound level limit of noise from plant associated with the development are as follows.

Table 10: Free-field Plant Rating Level limits

Location	Period	Plant Limits $L_{Ar,15min}$ dB
Existing Dwellings	Day (07:00 - 23:00)	50
	Evening (19:00 - 23:00)	50
	Night (23:00 - 07:00)	45

The plant should be selected to ensure any character (tonality, intermittency or other sound characteristics) are not readily distinguishable at the nearby serviced apartment rooms and guestrooms of the proposed scheme. If character is present a character correction should be applied as per BS4142:2014.

With plant meeting the above Plant Noise limits, then the plant rating noise level in accordance with BS4142 at the nearest noise sensitive receivers is likely to result in a "difference" of 0 decibels. According to BS4142, *"this is an indication of the specific sound source having a low impact, depending on the context."*

8. Music Noise Assessment

The proposed Bar/ Coffee/ Reception is located within the first floor level of the proposed scheme. The gymnasium is also located to the east on the ground floor level. There is also a gymnasium located on the ground floor to the east.

At this stage the operational noise levels and activities to be held within these spaces are not known. It is anticipated that any form of amplified music noise will be from background music noise only and therefore the impact upon the nearest noise sensitive receivers is expected to be low.

However, should the hotel decide to include entertainment events including amplified music, karaoke, live music or music within the gymnasium then the impact of music noise will need to be assessed to demonstrate compliance with the criteria set by Manchester's City Council guidance.

Based on Manchester's City Council Technical Guidance, the following criteria has been considered:

"Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{eq,5min}$), respectively'."

"Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location'."

The determined background noise levels for each octave band is provided below in the monitoring section 5.4. In addition, music noise levels within the rooms of the NSR, considering open windows providing 15dB reduction should be restricted to 47dB and 41dB ($L_{eq,5min}$) in the 63Hz and 125 Hz respectively.

Indoor music noise level data from amplified systems obtained previously at other similar sites have been used in the assessment below. The indoor music noise levels have been adjusted until the predicted music noise level achieves the proposed criteria of 5dB below background and music noise limits at 63Hz and 125 Hz at the adjacent serviced apartment building. The expected building construction elements including wall and curtain wall glazing, as well as the demised wall have been considered in the assessment and the minimum sound insulation performances have also been provided.

8.1. Proposed Music Noise Limits

The exact music noise level limit can be calibrated and restricted on site if required using limiters together with noise measurements at the received rooms. Also please note that the music noise levels to be held within the proposed bar might also need to be assessed at design stage to control noise level emissions to guestrooms above. This is not typically assessed at planning stage, and this assessment considers the impact of the development upon the nearby sensitive receives.

Therefore, the below level should be used as a guide only and can be assumed to be a typical music noise level in the middle of the room and in proximity of the speakers/ source. The source locations should be selected with care and positioned away from nearby receptors (away from demised walls preferably). Resilient fixings should also be considered when fixing speakers to walls, or preferably avoid these fixings is possible.

Table 11: Proposed Music Noise Limits within the source room

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	dBA
$L_{eq,T}$	83	83	83	83	83	83	83	79	90

8.2. Music Noise Impact from Music Noise Breakout from Bar/ restaurant (worst case)

The required curtain wall glazing within the first floor level will need to provide a minimum of Rw 50dB as shown in Table 7. The SFS external wall shown in 6.5 has also been considered.

Assuming the proposed music noise limits stated above within the bar, the prediction of music noise levels at the window of the nearest noise sensitive receiver is as follows. For the purposes of this assessment the area of bar located near the adjacent serviced apartment building has been used (worst case, wall area of 5.6x4.4 metres height). The prediction outside the nearest NSR window is shown below:

FAR FIELD CALC								
SPL2=SPL1 - R_{AV} + 10Log S_{TOT} - 20Log r - 14								
All levels are in unweighted decibels								
	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz
	63	125	250	500	1000	2000	4000	8000
SPL 1 (Source room)	83.0	79.0	83.0	83.0	83.0	83.0	83.0	79.0
Area of partition (S_{TOT})	24.6							
Distance from partition (r)	2.0							
Source room (SPL 1)	83.0	79.0	83.0	83.0	83.0	83.0	83.0	79.0
Average S.R.I (- R_{AV})	-32.5	-42.3	-43.5	-49.4	-53.3	-55.6	-61.4	-61.2
10Log S	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9
- 20Log r	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
-14.0	-14.0	-14.0	-14.0	-14.0	-14.0	-14.0	-14.0	-14.0
SPL 2 (outside - free field)	44	31	33	27	24	21	15	12
Rec SPL2 (incl +3dB safety factor)	47	34	36	30	27	24	18	15
Background Level (L_{A90})								
	75	54	49	47	44	43	33	20
SPL2 minus B.N.L	-28	-20	-13	-17	-17	-19	-15	-5
Within Limit -5dB Below Background	ok	ok	ok	ok	ok	ok	ok	ok

As it can be seen above, where the proposed music noise limit is considered, then the noise limits outside the window of the nearest noise sensitive receiver meet the Manchester's City Council guidance. Also, when considering an open window and noise reduction of around 15dB, the music noise levels are also expected to be met for the 63Hz and 125 Hz.

8.3. Music Noise Impact from Music Noise transfer from Bar/ restaurant through demised wall

The exact wall construction is unknown. However, considering that the proposed wall will most likely be physically disconnected to the existing external wall of the nearby demised residential building, then it is expected that the wall will achieve at least $\geq 70\text{dB } R_w$.

The existing wall of the adjacent building is expected to be a cavity block wall. The demised wall traditionally comprises a twin stud SFS construction based on similar hotel schemes. For the purposed of this assessment the below separating wall (demised wall + existing wall) construction was considered, and sound insulation predicted using INSUL.

- Cavity Brick Wall, total mass 180kg/m^2 , lined with plasterboard and mineral wool
- Independent twin stud with overall 250mm thick, (hotel) comprising 15mm thick plasterboard (min. 12.5kg each board) and 50 mm thick mineral wool

The sound insulation has been predicted to be as follows:

Table 12: Minimum sound reduction index of demise external wall + Existing brick cavity wall

Freq. (Hz)	63	125	250	500	1000	2000	4000	8000	R_w
R (dB)	46	67	81	80(*)	80(*)	80(*)	80(*)	80(*)	>80

(*)The obtained prediction is higher however this has been limited to 80dB

The noise transfer is also provided below.

$$(SPL2 = SPL1 - R_{av} + 10\log S - 10\log A)$$

	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	dB(A)
	63	125	250	500	1000	2000	4000	8000	Av.
Area of partition (S , m^2)	12.0								
Abs. in receiving room (A)	2.3	2.7	2.7	3.9	5.5	10.0	13.2	13.8	
SPL 1 (source room)	83	83	83	83	83	83	83	79	90
Average S.R.I (-RAV)	-46.0	-67.0	-81.0	-80.0	-80.0	-80.0	-80.0	-80.0	-74.3
(10 log S)	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	
(- 10 log A)	-3.7	-4.2	-4.3	-5.9	-7.4	-10.0	-11.2	-11.4	
SPL 2 (receiving room)	44.1	22.6	8.5	7.9	6.4	3.8	2.6	-1.6	19.2
SPL 2 (incl +3dB flanking factor)	47	26	11	11	9	7	6	1	22
	15	4	-1	7	9	10	11	9	NR15
Sound level Difference	35.9	57.4	71.5	72.1	73.6	76.2	77.4	77.6	83.0
Within Limit at 63Hz and 125Hz?	yes	yes							

As it can be seen above, where the proposed music noise limit is considered and separating element achieves the above sound insulation performance, then the received music noise levels at the nearest adjacent serviced apartment rooms meet the Manchester's City Council guidance for the 63Hz and 125 Hz .

9. Construction Noise

Construction noise should be assessed and restricted as required in Manchester's City Council – Technical Guidance, October 2022.

To minimize the impact of construction noise to nearby sensitive receptors all construction works must adhere to the City's guidance, which states:

"All noisy works (i.e. those that are audible beyond the site boundary) should be restricted to the following hours to minimise disruption:

- *Monday - Friday: 7.30am - 6pm*
- *Saturday: 8.30am - 2pm*
- *Sunday / Bank holidays: No work*

These restrictions apply to deliveries/collections to the site"

By adhering to the above hours of work, suitable respite can be afforded to local residents, visitors of the nearby serviced apartment building and businesses. It is expected that the main contractor will be a member of a Considerate Constructors Scheme, whereby the contractor signs up to code of conduct to minimise disruption to nearby businesses and residents. In addition, the contractor will be required to submit a Construction Environmental Management Plan (CEMP) to City for approval. This typically include a section on noise and suite of best practicable means to control noise emissions from various work activities or stages.

10. Summary and Conclusions

Ancoats Manchester Limited appointed Acoustic Consultants Limited to provide noise and acoustic advice for the proposed Hotel at Great Ancoats St/ Laystall St, Manchester. The client is seeking Full Planning Permission for a hotel development comprising 154 hotel rooms (Use Class C1) with supporting internal amenity spaces, associated landscaping, cycle parking and other associated works.

This report provides the results of a noise survey conducting on the site and a noise impact assessment of external sources on the sensitive elements of the development. Additionally, the results of the noise monitoring will be used to set plant limits that if met will satisfy the conditions of British Standard 4142:2014.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF 2021), Noise Policy Statement for England (NPSE), National Planning Practice Guidance (NPPG), British Standard 4142:2014 (BS4142) and British Standard 8233:2014 (BS8233). It also provides guidance based on Manchester City Council Policy DM 1 – Development Management and Manchester's City Council – Technical Guidance October 2022 such as construction noise and music noise impact upon sensitive receivers.

Noise mitigation measures are required to meet BS8233:2014 internal noise criteria in rooms. Noise mitigation advice is provided in this report in the form of building façade constructions.

With the proposed fabric construction and suitable ventilation provisions, the predicted internal equivalent noise levels due to external noise are meet BS8233:2014 daytime 35dB $L_{Aeq, 16 \text{ hours}}$ and 30dB $L_{Aeq, 8 \text{ hours}}$ of BS8233:2014 for the majority of the proposed sensitive guestrooms of the scheme.

The only exception are the most exposed guestrooms facing Ancoats Road up to the 6th Floor level approximately, where daytime and night time predictions have marginally exceeded the recommended BS8233:2014 noise limits by 1dB and 3dB respectively.

As stated above, BS8233:2014 states that *"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."*

The proposal is also for an hotel where guests will stay only for a limits amount of time. Therefore, we would consider the 1dB and 3dB exceedance to BS8233:2014 noise limits during the daytime and night time periods respectively to be acceptable in planning terms.

Plant noise limits for any plant use within the development site was also given in this report and are based on British Standard 4142:2014.

In addition, music noise assessment carried out considering the proposed music noise limits and building envelope construction has been determined to meet Manchester's City council technical Guidance criteria of 5dB below background for each octave band at the nearest noise sensitive receptors as well as the music noise limits on 63Hz and 125 Hz within the rooms of the nearest receptors through an open window or demised adjacent wall.

As such, we would consider that noise is suitably controlled and below the LOAEL of the NPPG internally to the dwellings.



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