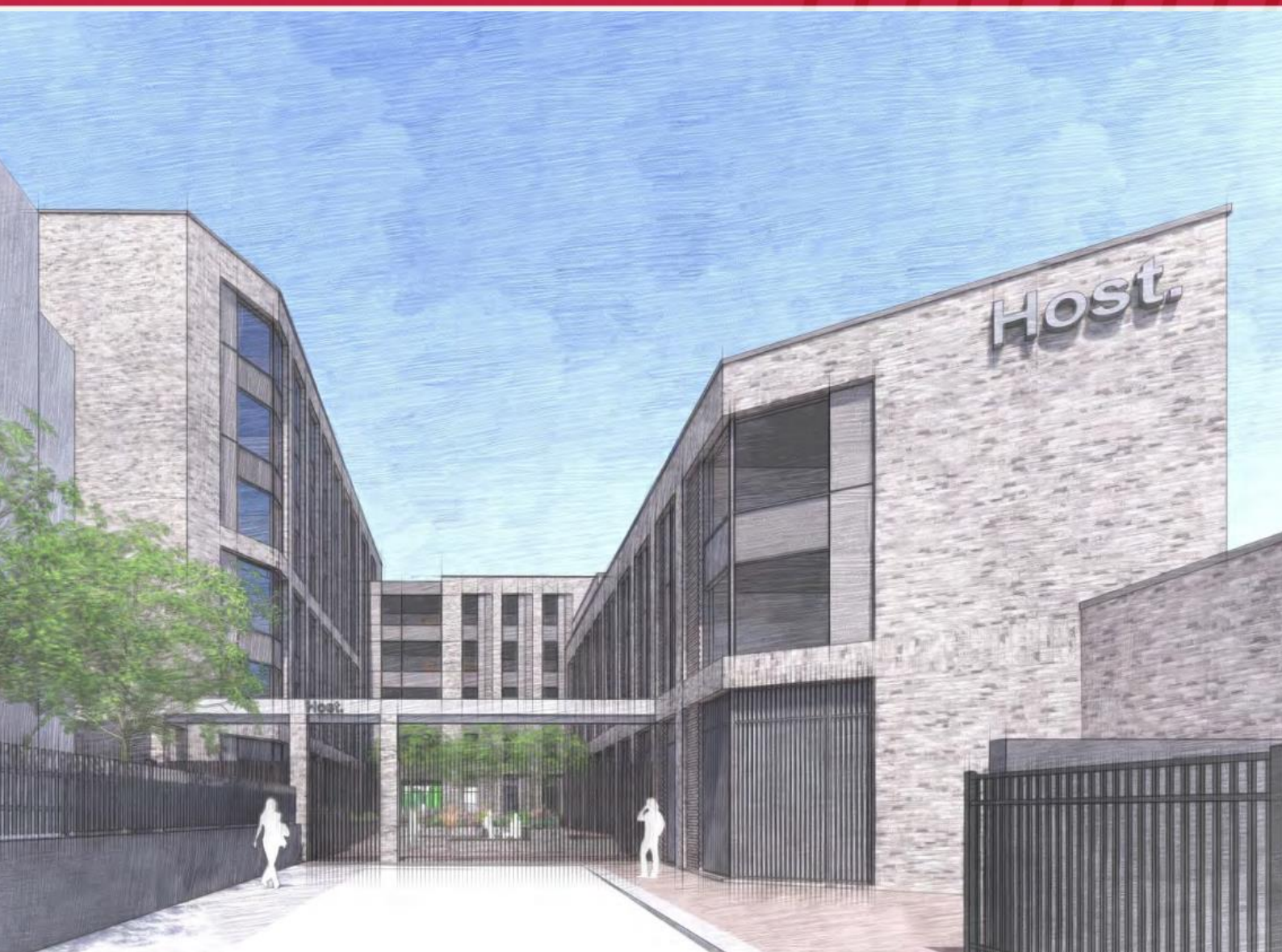


PROPOSED STUDENT ACCOMMODATION
SITE AT 88-90 CARMOOR ROAD,
MANCHESTER, M13 0FB

Noise Impact Assessment Report



Document History

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Contents

1.	Introduction	1
2.	Site Description	2
2.1	Site Location & Environment	2
2.2	Existing Acoustic Context	3
2.3	Proposed Development Plan	4
3.	Planning Policy and Guidance	5
3.1	Introduction	5
3.2	National Planning Policy Framework (NPPF) 2021	5
3.2.1	National Planning Policy Framework (NPPF) July 2021	5
3.3	Noise Policy Statement for England (NPSE, March 2010)	6
3.4	Planning Practice Guidance - Noise	7
3.5	ProPG: Planning and Noise Guidance	8
3.5.1	Stage 1 – Initial Assessment	8
3.5.2	Stage 2 – Full assessment	10
3.6	BS 7445-2:1991 ‘Description and Measurement of Environmental Noise’	10
3.7	BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound	10
3.8	BS 7445-2:1991 ‘Description and Measurement of Environmental Noise’	12
3.9	BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’	14
3.10	Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows, NANR116, 2007	14
3.11	Manchester City Council – Local Policy.....	14
3.11.1	Relevant policies to Noise and Vibration within the Manchester Core Strategy:	15
3.11.2	Relevant policies within the UDP	15
3.12	Manchester City Council Planning & Noise Technical Guidance, December 2015	16
3.12.1	MCC assessment criteria	16
3.12.2	MCC guidance.....	16
3.13	The Building Regulations 2010: Approved Document O – Overheating (2021)	18

4.	ENVIRONMENTAL NOISE SURVEY.....	20
4.1	Overview.....	20
4.2	Noise measurement Equipment	20
4.3	Weather Conditions.....	20
4.4	Noise Measurement Location	21
4.5	Measurement Results	22
5.	Site Suitability Assessment	23
5.1	Initial Appraisal/Risk Assessment.....	23
5.1.1	Potential Noise from the West Indian Organisations Community Centre.....	24
5.2	Plant and Equipment Serving the Proposed Development.....	25
5.2.1	Nearest Noise Sensitive Receptors	26
5.2.2	Standby / Emergency Generator (Item a).....	27
5.2.3	Air Source Heat Pumps (Item b)	28
5.2.4	Small Condensers (Item c).....	29
6.	Mitigation.....	30
6.1	Glazing	30
7.	Provision of Ventilation	33
7.1	Background Ventilation	33
7.1.1	Internal Noise Levels with a Partially Open Window.....	33
7.1.2	Mechanical Ventilation Heat Recovery (MVHR).....	34
7.2	Internal Noise Levels During the Overheating Condition.....	35
7.2.1	Overheating Mitigation	36
7.3	Purge Ventilation.....	36
7.3.1	Discussion	37
8.	Conclusions.....	38

Appendices	39
Appendix A – Glossary of Acoustic Terminology.....	40
Appendix B – Results of Noise Monitoring.....	44
Appendix C – Indicative Plans.....	1
Appendix D – Noise Monitoring Location.....	3
Appendix E – Report Limitations	4

1. INTRODUCTION

MZA Acoustics has been appointed by Tiger Developments Limited to undertake an acoustic impact assessment for a full planning application for the proposed development comprising the demolition of existing buildings and construction of purpose-built student accommodation with 172 beds in a mix of studio and cluster units alongside ancillary facilities and shared amenity space, site access and other associated works in a development of three to six storeys.

The site is located at 88-90 Carmoor Road, Manchester M13 0FB and is located within the development plan defined central area of Manchester. It sits just outside of the defined city centre, just beyond the Corridor Manchester sub-area of the city centre. It is also just outside of and within easy walking distance of the defined Oxford Road Corridor regeneration area. The Oxford Road Corridor is a focus for the University of Manchester teaching departments. The site is very close to the Manchester University NHS Foundation Trust hospitals on Upper Brook Street and Oxford Road.

Nearby Upper Brook Street is part of a high frequency bus route connecting Didsbury, universities and the city centre.

The site is not allocated for any specific use in the development plan.

Existing uses on the site includes a garage workshop and a building used previously as a private day nursery which is now vacant. None of the buildings are of any architectural merit or are subject to statutory protection. The nearest statutorily listed asset (Victoria Baths on Hathersage Road) is some distance away. The application site is not within a conservation area. It is situated some 250 metres north of Victoria Park conservation area.

The site is located immediately south of a community centre managed by the West Indian Organisations Co-ordinating Committee (WIOCC). The immediate area comprises a mix of residential and commercial uses, including offices and other Class E uses. Opposite the site is the Octagon office building, a private car park and an electricity sub-station. The Octagon is a multi-level office building of significant scale and massing. To the north and west of the site is the Liberty Park student accommodation. To the south are the rear of commercial uses fronting Hathersage Road. St Mary's Hospital occupies a significant site to the west side of Upper Brook Street. Layout, scale and massing locally is varied but it is generally to a suburban scale and relatively low-rise.

The impact of noise on future occupiers of the Site are considered in terms of the Manchester City Council's (MCC) published noise impact assessment criteria and related planning policy guidance.

This report occasionally employs technical terminology. In order to assist the reader, a glossary of terms is presented in **Appendix A**.

2. SITE DESCRIPTION

2.1 Site Location & Environment

The site is located within the development plan defined central area of Manchester. It sits just outside of the defined city centre; just beyond the Corridor Manchester sub-area of the city centre. It is also just outside of and within easy walking distance of the defined Oxford Road Corridor regeneration area. The Oxford Road Corridor is a focus of University of Manchester teaching departments. The site is very close to the Manchester University NHS Foundation Trust hospitals on Upper Brook Street and Oxford Road.

The location identified for the proposed development indicated in red in **Figure 1** and lies approximately 2.6km to the southeast of Manchester City Centre in the Ardwick area of the city.



Figure 1 – Site Location (Courtesy Bing Maps)

The Site is presented in more detail in **Figure 2**, annotated with surrounding land uses described below.

The Site is roughly rectangular in shape and is located to the west of Carmoor Road which forms the only roadside boundary to the Site. Remaining elevations are bounded by existing student accommodation buildings [1] to the west, The West Indian Community Centre [8] to the north and a traditional terraced row [2] providing a mix of ground floor commercial provision with residential to upper floors to the south, fronting Hathersage Road beyond.

Beyond the western boundary the existing student accommodation block fronts the A34 Upper Brook Street with the extended campus for Manchester Royal Infirmary [3], Royal Manchester Children's hospital and Manchester Royal Eye Hospital on the

opposite side of the A34. The closest element of which to the Site is a 6-storey car park serving the hospital [4].

To the east of Carmoor Road, is Octagon House [5] and associated car parking which provides Kidney Dialysis Services for the wider Manchester area, with upper floors providing office space. There is an extant planning permission for a CHP energy centre within the existing Octagon House car park, fronting Carmoor Road..

A Primary Substation [6] is situated on land opposite the northern section of the Site. To the south of Hathersage Road are further commercial/residential terraced properties, and student Hall of Residence.

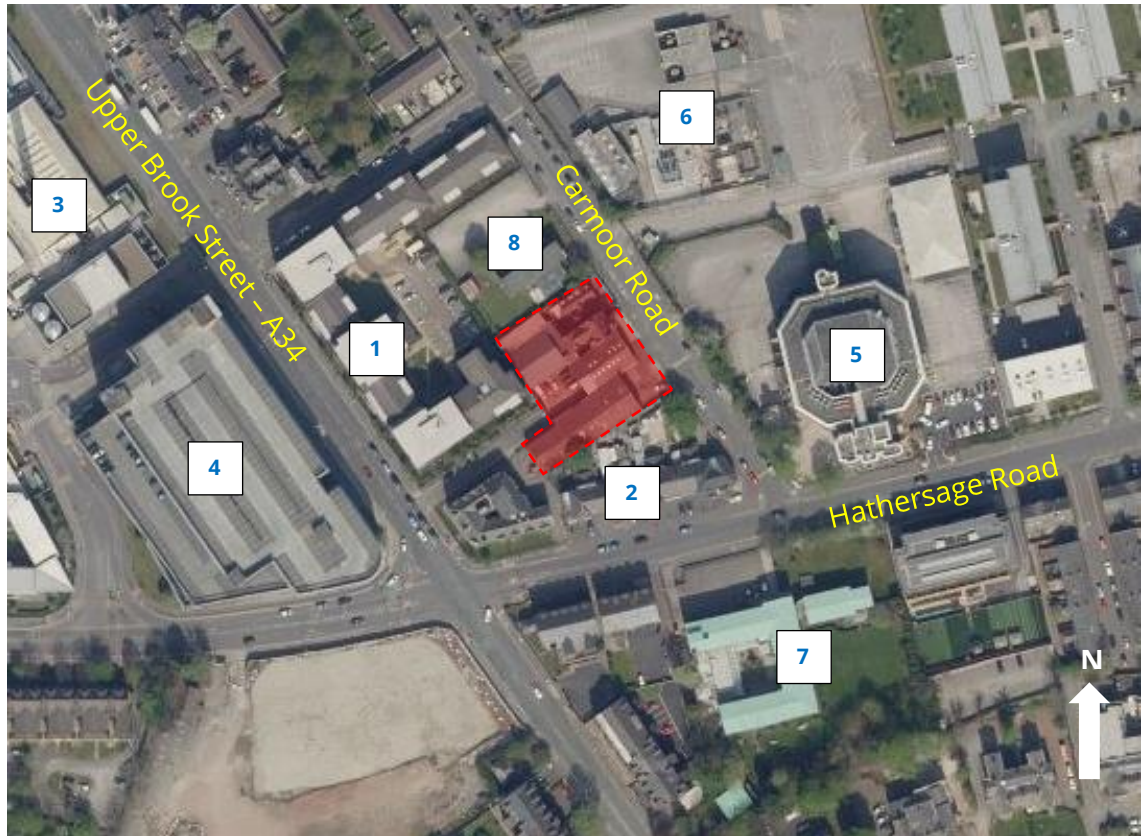


Figure 2 – Indicative Site Boundary & Surrounding Land Uses (Courtesy Bing Maps)

The Site currently includes a number of buildings including the Carmoor Road Garage (car repairs), a former private Nursery School and a residential dwelling. These existing buildings would be demolished as part of the proposed development.

2.2 Existing Acoustic Context

The key environmental noise sources affecting the site are typical of an urban mixed-use area with community/residential, commercial, light industrial and transport infrastructure sound sources.

Upper Brook Street is an arterial route from the inner ring road (A57(M) Mancunian Way) with an annual average daily traffic flow over 19,000 total vehicles. Traffic on Hathersage Road is comparatively light with around 7,000 vehicles per day, but due to

Whilst the development itself would relocate an existing potential source of industrial sound in the area (Carmoor Road Garage) a number of other fixed plant sources are present in the surrounding area. The most significant of these to the site are fixed plant at Octagon House, and the existing ENW Substation.

The proposed development includes the demolition of existing buildings and construction of purpose-built student accommodation with 172 beds in a mix of studio and cluster units alongside ancillary facilities and shared amenity space, site access and other associated works in a development of three to six storeys.

The site plan illustrates the layout of the University of Toronto Scarborough campus. Two specific areas are highlighted with red outlines and labeled: Block A and Block B. Block A is located in the lower right portion of the plan, while Block B is in the upper right. The plan includes numerous buildings, parking lots, and green spaces. Key features include the University of Toronto Scarborough Library, the University of Toronto Scarborough Student Centre, and the University of Toronto Scarborough Faculty Building. The plan also shows the location of the University of Toronto Scarborough Campus and the University of Toronto Scarborough Campus.

1700414-RP-NIA-0002 – Proposed Student Accommodation at Carmoor Road, Manchester / Acoustic Impact Assessment Report

3. **PLANNING POLICY AND GUIDANCE**

3.1 **Introduction**

Within the following section of the report, detail is presented relating to the guidance documents and assessment methodologies appropriate for noise impact associated with the proposed development of the site for residential purposes.

3.2 **National Planning Policy Framework (NPPF) 2021**

3.2.1 National Planning Policy Framework (NPPF) July 2021

The NPPF determines the government's planning policy for England. The document was first published in March 2012 with the most recent update in July 2021 which sets out how these policies are to be applied.

Section 15 'Conserving and enhancing the natural environment' states that Planning policies and decision should contribute to and enhance the natural and local environment by:

"...e) preventing new and existing development from contributing to, being put at 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..."

Paragraph 185 continues:

"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 guidance contained within the NPPF further determines that consideration should be given to the Noise Policy Statement for England (DEFRA, March 2010).

3.3 Noise Policy Statement for England (NPSE, March 2010)

The NPSE attends to three types of noise;

- “Environmental noise” which includes noise from transportation sources;
- “Neighbour noise” which includes noise from inside and outside people’s homes; and
- “Neighbourhood noise”, which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

In line with the aims determined in the NPPF, the NPSE determines three aims;

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development;
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; and,
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The guidance detailed within the NPSE relates a number of key phrases with regards to adverse effects which can be applied to noise impacts as used by the World Health Organisation.

- **NOEL – No Observed Effect Level** - The level below which no health effect or detrimental impact on the quality of life is observed.
- **LOAEL – Lowest Observed Adverse Effect Level** - The level at which adverse effects on health and quality of life can be detected
- **SOAEL – Significant Observed Adverse Effect Level** - The level above which significant adverse effects on health and quality of life occur.

The guidance indicates that it is not possible to have a single objective noise-based measure that defines SOAEL, and as such the SOAEL is likely to be different for different noise sources and receptors. The document indicates that further research is required to establish what may constitute a significant adverse impact on health and quality of life from noise.

While the NPSE determines the NOEL, LOAEL and SOAEL descriptions, the document indicates that, unlike other environmental disciplines, there are currently no European or national noise limits which have to be met although the NPSE states that “there can be specific local limits for specific developments” allowing for negotiation.

3.4 Planning Practice Guidance - Noise

The Planning Practice Guidance for noise (published in March 2014 and updated July 2019) broadly considers the same issues as demonstrated within both the NPPF and the NPSE with regards to noise within the planning realm.

The information detailed within the PPG indicates that noise should be considered when:

- New developments may create additional noise; and/ or,
- New developments would be sensitive to the prevailing acoustic environment.

The guidance indicates that Local Planning Authorities should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and,
- Whether or not a good standard of amenity can be achieved.

The impact of noise is rated within the policy document in terms of the relative 'Observed Effect Level', defined in line with the guidance within the NPSE. Based upon this, the Planning Practice Guidance provides the following matrix of likely average response:

Perception	Example of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/ or attitude, e.g. avoiding certain activities during periods of intrusion: where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/ or an ability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 1 - PPG Observed Effect Levels

3.5 ProPG: Planning and Noise Guidance

Professional Practice Guidance (ProPG): Planning and Noise was published in May 2017 in order to encourage better acoustic design for new residential schemes in order to protect future residents from the harmful effects of noise. This guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development, but without the nuance of ‘good acoustic design’ as outlined in ProPG.

ProPG allows the assessor to take a holistic approach to consider the site’s suitability, taking into consideration numerous design factors which previously may not have been considered alongside the noise level measured on site, for example the orientation of the building in relation to the main source of noise incident upon it.

It should be noted this document is not an official government code of practice, and neither replaces nor provides an authoritative interpretation of the law or government policy, and therefore should be seen as a good practice document only. The guidance presents a 2-phased assessment process.

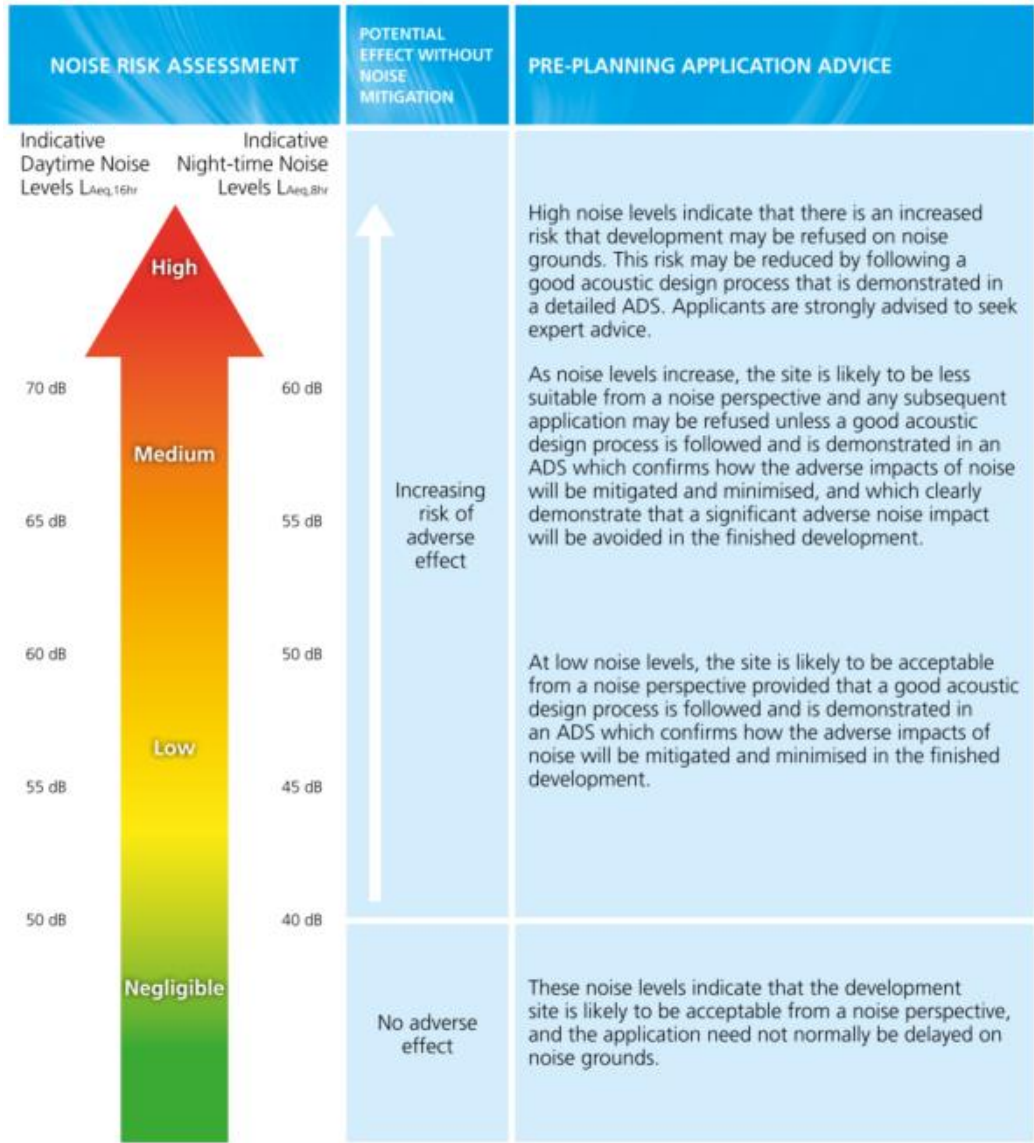
3.5.1 Stage 1 – Initial Assessment

Stage 1 is an initial noise risk assessment of the proposed development site. This should ideally be undertaken as early as possible, before any planning application is submitted. The noise risk assessment should indicate the likely risk of adverse effects from noise in the absence of any form of mitigation.

The noise risk assessment may be based on measurement or prediction, as appropriate and should aim to describe noise levels over a “typical worst case” 24-hour day either now or in the foreseeable future.

The Indicative Daytime ($L_{Aeq,16hr}$) and Indicative Night-time ($L_{Aeq,8hr}$) noise levels for each category are shown in **Figure 4** extracted from Figure 1 in ProPG. These are combined free-field noise levels from all sources of transport noise and may also include industrial/commercial noise where this is present but is “not dominant”.

The indicative noise levels provide an indication of the noise effect ‘challenge’ at a potential residential development site.



- Figure 1 Notes:**
- a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
 - b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is “not dominant”.
 - c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
 - d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,T} > 60$ dB means the site should not be regarded as negligible risk.

Figure 1. Stage 1– Initial Site Noise Risk Assessment

Figure 4 – ProPG Indicative Risk of Adverse Effects According to Stage 1 Assessment

It is strongly expressed in ProPG that the noise risk assessment outcome identified at a potential development site is *“not the basis for an eventual recommendation to the decision maker”*, but an opportunity for good acoustic design to be incorporated from the onset of the design process. A site considered to be high risk will be recognised as having more acoustic challenges, and a site defined with negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds.

3.5.2 Stage 2 – Full assessment

Stage 2 of the recommended approach is a systematic consideration of four key elements underpinned by the production of an Acoustic Design Statement or ADS:

1. Good Acoustic Design
2. Internal Noise Level Guidance
3. External Amenity Area Noise Assessment
4. Assessment of other Relevant Issues

At this point, the guidance refers back to existing assessment procedures such as BS 8233 (or local policy and guidance where applicable) and introduces the concept of mitigation to achieve suitable residential conditions.

It is indicated that the ADS for a high-risk site would be more detailed than that for a low risk site. If a site is determined as negligible, an ADS is not deemed to be necessary.

3.6 **BS 7445-2:1991 ‘Description and Measurement of Environmental Noise’**

BS 7445-2:1991 *‘Description and Measurement of Environmental Noise - Part 2: Guide to the acquisition of data pertinent to land use’* defines parameters, procedures and instrumentation required for noise measurement and analysis. Accordingly, together with associated guidance within the documents below, this Standard has been used to ensure the survey and data are fit for purpose.

3.7 **BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound**

BS 4142 provides a methodology for rating and assessing sound associated with both industrial and commercial premises. The purpose of the Standard is clearly outlined in the opening section where it states that the method is appropriate for the consideration of:

- Sound from industrial and manufacturing processes.
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.

- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

The Standard is based around the premise that the significance of the noise impact of an industrial/commercial facility can be derived from the numerical subtraction of the background noise level (not necessarily the lowest background level measured, but the typical background of the receptor) from the measured/calculated rating level of the specific sound under consideration. This comparison will enable the impact of the specific sound to be concluded based upon the premise that typically “the greater this difference, the greater the magnitude of the impact”. This difference is then considered as follows:

- 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."

BS 4142 further states that “where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact” again depending upon the specific context of the site.

The Standard further qualifies the assessment protocol by outlining conditions to the comparative assessment and stating that “not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”, thus implying that all sites should be assessed on their own merits and specifics.

The Standard quantifies the typical reference periods to be used in the assessment of noise, namely:

- Typical Daytime 07:00 – 23:00 1-hr assessment period
- Typical Night-time 23:00 – 07:00 15-min assessment period

The Standard also outlines methods for defining appropriate “character corrections” within the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency which would be audible at the assessment location. These are:

- a. the Subjective Method,
- b. the Objective Methods for tonality; and,
- c. the Reference Method.

It is noted by the Standard that where multiple features are present the corrections should be added in a linear fashion to the specific level and these are summarised in **Table 2**.

Level of Perceptibility	Tonal Correction dB	Impulsivity Correction dB	Correction for 'other sound characteristics' dB	Intermittency Correction dB
No Perceptibility	+0	+0	Where neither tonal nor impulsive but clearly identifiable +3	If intermittency is readily identifiable +3
Just Perceptible	+2	+3		
Clearly perceptible	+4	+6		
Highly perceptible	+6	+9		

Table 2 - BS 4142 Subjective Method Rating Correction

This standard and methodology will only be used to assess the impact of sound from any fixed and mobile plant activity associated with the proposed development on the nearest identified residential noise sensitive properties.

In relation to the effect level thresholds described in the PPG, it is considered that the following assessment outcomes would correspond to the effect levels shown in **Table 3**.

Threshold	BS 4142 Assessment Level Difference over Background $L_{A90,T}$
NOEL	0 dB or less
LOAEL	around +5 dB
SOAEL	+10 dB or more

Table 3 - Effect Level Thresholds in Respect of BS 4142 Assessment Outcomes

3.8 BS 7445-2:1991 'Description and Measurement of Environmental Noise'

BS 7445-2:1991 '*Description and Measurement of Environmental Noise - Part 2: Guide to the acquisition of data pertinent to land use*' defines parameters, procedures and

instrumentation required for noise measurement and analysis. Accordingly, together with associated guidance within the documents above, this Standard has been used to ensure the survey and data are fit for purpose.

3.9 **BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'**

This Standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in external noise levels to occupants of existing buildings.

In context of this project, BS 8233 is relevant with respect to external amenity space such as gardens and patios. It states that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,16h}$, with an upper guideline value of 55 dB $L_{Aeq,16h}$, which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances, such as within city centres, urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

3.10 **Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows, NANR116, 2007**

Napier University Edinburgh undertook research into acoustic performance of windows and façade openings, presenting the findings in the NANR116 report. The report presents the findings from a set of laboratory measurements undertaken as part of a contract let by the Department for Environment, Food and Rural Affairs to investigate the sound insulating performance of residential windows in their open and closed conditions and to provide additional guidance on related physical factors.

The overall aim of the study is to provide guidance on the acoustical properties of residential façades allowing for the requirements of natural ventilation, through either open windows or background ventilators. The guidance is used in this application, to determine internal noise levels based on measured external noise levels at proposed sensitive receptors.

3.11 **Manchester City Council – Local Policy**

The Development Plan in Manchester consists of the following documents:

- The Manchester Core Strategy (2012); and
- Saved policies of the Unitary Development Plan for the City of Manchester (1995)

The Core Strategy Development Plan Document 2012 -2027 ('the Core Strategy') was adopted by the City Council on 11th July 2012. It is the key document in Manchester's Local Development Framework. The Core Strategy replaces significant elements of the Unitary Development Plan (UDP) and sets out the long-term strategic planning policies for Manchester's future development.

A number of UDP policies have been saved until replaced by further development plan documents to accompany the Core Strategy. Planning applications in Manchester must be decided in accordance with the Core Strategy, saved UDP policies and other Local Development Documents as directed by the NPPF.

3.11.1 Relevant policies to Noise and Vibration within the Manchester Core Strategy:

Policy SP1 'Spatial Principles' states that one of the key spatial principles is the emphasis on the creation of neighbourhoods of choice, providing high quality and diverse housing around district centres which meet local needs, all in a distinct environment.

All development should have regard to the character, issues and strategy for each regeneration area.

The policy goes on to state that development in all parts of the City should make a positive contribution to neighbourhoods of choice including;

- Creating well designed places that enhance or create character.
- Making a positive contribution to the health, safety and well being of residents.
- Consider the needs of all members of the community.
- Protect and enhance the built and natural environment.
- Minimise emissions, ensure efficient use of natural resources and reuse previously developed land wherever possible.
- Improve access to jobs, services, education and open space by being located to reduce the need to travel and provide good access to sustainable transport provision.

Policy DM1 'Development Management' states that all development should have regard to the specific issues such as:-

- 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.
- Design for health.
- Adequacy of internal accommodation and external amenity space.

3.11.2 Relevant policies within the UDP

Saved policies **DC10** 'Food and Drink Uses' and Saved policy **DC26** 'Development and Noise' are not deemed relevant to this proposed sensitive development.

3.12 **Manchester City Council Planning & Noise Technical Guidance, December 2015**

Manchester City Council's Neighbourhoods Service have issued a document providing guidance relating to developments within the constituency. The document provides a summary of guidelines drawing on information that can be found in the local, national and international documents already discussed and identifies the expectations of Environmental Health Practitioners consulting on development proposals.

The document may be used by developers to clarify the criteria expected to be achieved for developments and assist with the submission of supporting information that would be considered as acceptable in terms of noise and vibration.

3.12.1 MCC assessment criteria

In the context of government policy, Manchester City Council require that developments aim for:

1. A noise level between the No Observed Effect Level **NOEL** (this is the level of noise exposure below which no effect at all on health or quality of life can be detected) and the Lowest Observed Adverse Effect Level **LOAEL** (this is the level of noise exposure above which adverse effects on health and quality of life can be detected). Conditions may be attached.

If point 1 cannot be achieved, then:

2. If the assessment results in a level between the Lowest Observed Adverse Effect Level **LOAEL** and the Significant Observed Adverse Effect Level **SOAEL** (this is the level of noise exposure above which significant adverse effects on health and quality of life occur), mitigation will be necessary to reduce the level and thus conditions will be attached.

If points 1 & 2 cannot be achieved, then:

3. If the assessment results in a Significant Observed Adverse Effect Level after mitigation, the application will be recommended for refusal.

3.12.2 MCC guidance

The MCC guidance document also states that:

"NPPF, NSPE and NPPG do not present absolute noise level criteria which define SOAEL, LOAEL and NOAEL which is applicable to all sources of noise in all situations in a planning context. One of the aims of this document, therefore, is to address this ambiguity and provide a suite of noise level design targets for typical developments (which are in accordance with current policies and standards). Where certain developments are not specifically covered, the applicant/consultant is encouraged to contact us with a view of discussing the best that can be achieved for the given situation (in the context of the scenarios listed in section 3.6)."

The relevant item in section 3.6 is presented in Figure 5 below.

3.6.1.1 Residential Developments

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

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

These criteria have been adopted for the following reasons:

- BS 8233: 2014 recognises these levels as a good standard for resting/sleeping conditions.
- The WHO document 'Guidelines for Community Noise' recommends an internal L_{Aeq} of 30dB for optimal sleep conditions (and no more than 35dB for internal rooms during daytime).
- The performance of acoustic insulation schemes can often be below that specified, according to the quality of installation, materials, noise spectrum and deterioration / wear and tear of building elements. A high design specification introduces a 'safety margin' should building elements not perform as well as expected ('on-site' performance).
- Performance specification for glazing does not usually take into account the detrimental effect of vents on the sound insulation. Even 'acoustic' vents will reduce the performance of the facade insulation, as they will inherently contain a free open area for air exchange.
- There is a general increase in urban noise levels, which can in the future be reasonably accommodated by these standards.
- The standards support the Local Authority corporate objective to prevent ill-health and improve local people's health and well being.

Figure 5 – MCC Assessment Criteria for Residential Developments

No further consultation with the Authority is considered necessary to interpret the requirements of the noise design criteria for the proposed student accommodation

3.13 The Building Regulations 2010: Approved Document O – Overheating (2021)

This approved document is for the application of new residential buildings only and took effect on 15th June 2022 for use in England. It applies to all Building Regulations building notices, full plans applications and initial notices submitted from this date and to any buildings with prior approvals where construction is not started by 15th June 2023.

Its application is for new residential buildings only.

The aim of requirement O1 is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

Requirement O1(2)(a) of Schedule 1 to the Building Regulations 2010 is copied in Figure 6.

Requirement	
<i>Requirement</i>	<i>Limits on application</i>
O1 Overheating mitigation	
(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to—	
(a) limit unwanted solar gains in summer;	
(b) provide an adequate means to remove heat from the indoor environment.	
(2) In meeting the obligations in paragraph (1)—	
(a) account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and	
(b) mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.	

Figure 6 – ADO requirement O1(2)(a)

Requirement O1(2)(a) is met in a new residential building if the building's overheating mitigation strategy for use by occupants takes account of all the following:

- **Noise at night**
- **Pollution**
- **Security**
- **Protection from falling**
- **Protection from entrapment**

With respect to noise, the approved document states the following:

In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).

Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' 'Measurement of Sound Levels in Buildings' with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' 'Acoustics, Ventilation and Overheating: Residential Design Guide' (2020).

4. ENVIRONMENTAL NOISE SURVEY

4.1 Overview

A noise survey has been undertaken by MZA to measure the noise levels incident at the site boundary.

The noise measurement commenced at 09:53 hours on Monday 10th October and continued until 11:04 on Tuesday 11th October 2022.

4.2 Noise measurement Equipment

Noise measurements were undertaken using the Class 1 specification noise measurement equipment detailed in **Table 4**.

Item	Make & Model	Serial Number	Calibration Due Date
Sound Level Meter	01dB Metravib FUSION	11704	17/05/2024
Pre-amplifier	01dB Metravib PRE22	1707136	
Microphone	GRAS 40CD 1/2" Pre-polarised free-field	331728	
Calibrator	01dB Metravib CAL31	83395	17/05/2023

Table 4 - Details of Sound Measurement Equipment

The sound level meter, pre-amplifier and microphone were calibrated to traceable standards within the 24 months prior to the measurements. The portable calibrator used was calibrated within the 12 months preceding the date of the survey.

All equipment was field calibrated before and after the measurement survey and no significant drift (<0.5 dB) was noted.

4.3 Weather Conditions

The weather conditions during the survey period were dry, overcast and calm, with a typical daytime air temperature of 16°C with a slight breeze, less than 3m/s.

4.4 Noise Measurement Location

A single, unattended measurement position was used to quantify the noise incident from all passing road traffic on Carmoor Road and any commercial/industrial noise beyond.

The microphone was installed at a first-floor window of the existing residential dwelling on Carmoor Road at circa 4.5 m above ground level and at 1 m from the building façade. The location of the measurement position is indicated by the red dot on the floor plan in **Figure 7** below. Photographs of the measurement position and environs are presented in **Appendix D**.



Figure 7 - Noise Measurement Position (shown in red)

4.5 Measurement Results

A summary of measured sound pressure levels at the measurement position are presented in **Table 3** below. A correction of -3 dB has been applied to the measured levels to obtain a free-field level, accounting for the effect of the building façade. A correction has not been applied to the L_{A90} data as this is considered to comprise noise sources from the wider surrounding area in all directions.

Table 5 - Summary of Measured Sound Levels

Summary Period	$L_{Aeq,T}$	Typical L_{A90} Background ²	Typical L_{AFmax} (10 th event)
Daytime ¹ 07:00-23:00	53	49	-
Night-time 23:00-07:00	44	38	67
¹ Aggregated daytime data ² Typical L_{A90} levels calculated using histogram analysis			

The noise environment was observed to be dominated by road traffic noise from the surrounding road network and limited traffic on Carmoor Road. No industrial/plant noise was audible from Octagon House or the ENW Substation during the day.

The full time-history of measured sound levels are presented in **Appendix B**.

5. SITE SUITABILITY ASSESSMENT

This section presents the details and results of assessments to consider the suitability of the site for residential occupation, and to predict external amenity noise and intrusion into the proposed dwellings to demonstrate compliance with the adopted guidance criteria.

5.1 Initial Appraisal/Risk Assessment

An initial assessment of the site is undertaken to provide *“an indication of the likely risk of adverse effects from noise, were no subsequent mitigation to be included as part of the development proposal”* (from ProPG), and is presented in **Table 6**. The guidance in ProPG (Stage 1 Risk Assessment) is referenced.

Table 6 – Initial Appraisal/Risk Assessment

Elevation	Period	Equivalent Continuous Sound Level (Free-field, dB L _{Aeq,T})	ProPG Risk Assessment Outcome
North-east (Carmoor Road)	Daytime (07:00 – 23:00)	53	Low
	Night-time (23:00 – 07:00)	44	Low

Based on the outcomes presented in the above table, ProPG suggests that the site is likely to be acceptable from a noise perspective, provided that good acoustic design is followed and that suitable mitigation measures are implemented to minimise the adverse impacts of noise at the development.

Section 6 of this Report includes assessments of potential noise exposure and guides on prospective mitigation of impacts due to noise.

Note no noise from the ENW substation was subjectively audible on the site and the 100Hz noise levels through the night were analysed and no tones were detected.

5.1.1 Potential Noise from the West Indian Organisations Community Centre

The West Indian Organisations Community Centre (WIOCC) holds a Premises Licence for the sale of alcohol, regulated entertainment (plays, films, indoor sporting events, live music, recorded music and dance) and provision of late-night refreshment. The premises licence number is 087630.

Therefore, the potential for noise impacts needs to be considered.

The licence enables the sale of alcohol and events between 09:00 and 03:00 Monday to Saturday and 09:00 to 02:00 on Sundays (for sale on the premises only). The premises can remain open for 30mins after the sale of alcohol ceases.

A number of licence conditions are in place and are aimed at minimising noise complaints from nearby residents, these are repeated below;

Annex 3 – Conditions attached after hearing by the licensing authority

1. People under 18 years of age shall not be on the premises after midnight.
2. No regulated entertainment in the form of live or recorded music shall be played at the premises until noise limiter set at a level agreed with Environmental Health.
3. Staff shall be trained to recognise and refuse service to customers who have had too much to drink, how to handle potential troublemakers and diffuse difficult situations.
4. All windows and doors shall be closed, save for access and egress, whilst live or recorded music is being played.
5. No external speakers shall be allowed.
6. Taxi telephone numbers shall be displayed and arrangements made with local taxi firm(s) to require taxis to ring back the pub and announce the taxi is waiting outside.
7. The collection or disposal of waste, including glass bottles, shall not to be permitted at noise sensitive times i.e. between 2200 and 0800.
8. A comprehensive plan shall be in place for the quiet, rapid dispersal of customers throughout the evening.
9. A manager or member of staff shall supervise the exit of customers during the drinking up period to ensure customers do not remove glass/bottles from the premises nor congregate outside the premises.
10. Fit prominent signs shall be displayed near the exits requesting that customers respect local residents and leave quietly.
11. Deliveries shall be restricted between 0700 and 2200, apart from newspaper deliveries.
12. Staff shall ensure customers do not congregate outside the premises.

On the basis of the attached conditions it is considered that there are sufficient controls in place to minimise the potential for complaints from nearby residents.

A review of relevant websites and the Facebook page for the WIOCC indicates that there are no regular events at the facility, and it is most likely to be used for private parties / functions only. It would appear based on a review that there haven't been any events over the past couple of years (presumably due to Covid) but this cannot be confirmed.

As such it has not been possible to measure noise levels during an event at the WIOCC and therefore it is proposed that the following good practice design measures are incorporated into the scheme;

- Increased acoustic specification requirements for the external building envelope on elevations facing towards the WIOCC
- Ventilation systems for facades overlooking the WIOCC and entrance be designed such that windows can remain closed for normal ventilation and comply with the overheating requirements of Approved Document O without the need to open windows.

5.2 **Plant and Equipment Serving the Proposed Development**

There will be plant / equipment serving the development which has the potential to create noise levels that are audible beyond the site boundary.

Based on the information available at this time these are understood to be;

- a) 1 x Emergency / Standby Generator – circa 70dBA at 7m
- b) 4 x Air Source Heat Pumps (ASHP's) – circa 46dBA at 10m / L_{WA} 78dB
- c) 3 to 4 x small condensers – circa 52dBA at 1m / L_{WA} 70dB

Plant items a) and b) are proposed to be located on the roof

Plant items c) are proposed to be located on the roof directly above the amenity areas they serve.

An indicative plant layout is shown below. All plant will be at Level 3 (lower level roof) and the blue plant space will have a screen around for visual reasons.

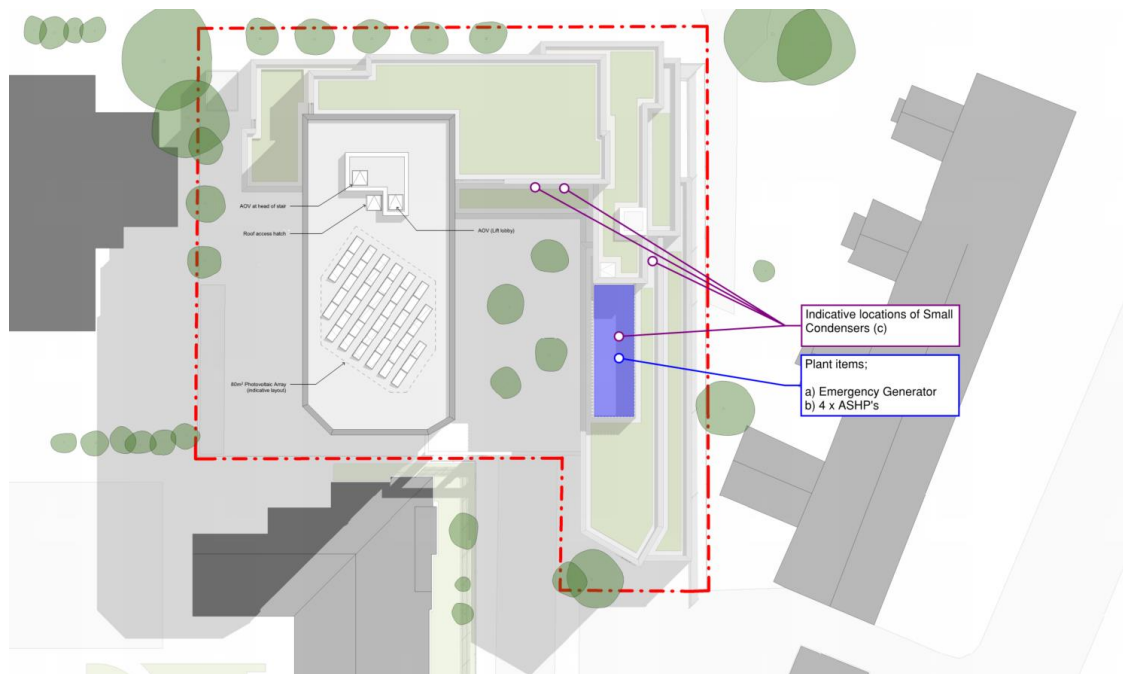


Figure 8 – Indicative Locations of Proposed Plant Items

5.2.1 Nearest Noise Sensitive Receptors

Given the location of the proposed items of plant the following noise sensitive receptors have been considered;

- 1) Noise Sensitive Receptor Group 1 – first floor dwellings of 60 to 74 Hathersage Road. Note all ground floor uses are commercial, including the ground floor single storey sections of the building that protrude towards the proposed development. Also some first floor uses are commercial but in the main these are residential.
- 2) Noise Sensitive Receptor Group 2 – student accommodation of Brook Hall. The Section nearest the proposed development is 5 storeys in height.

The location of these receptors is shown below;



Figure 9 – Location (and Distances) to Nearest Noise Sensitive Receptors

The assessment of the proposed plant items is presented in turn below.

5.2.2 Standby / Emergency Generator (Item a)

The standby generator will only operate when required to do so in an emergency (i.e. during a fire to provide emergency power to lighting etc for emergency evacuation etc). At such times all other normally operating plant will cease operation as they are not connected to the emergency power supply.

It is not necessary for such emergency equipment to be designed to meet the noise criteria for regularly operating plant and equipment. However, as the equipment will need to be tested (typically twice per year for a brief period during daytime hours) it is suggested that noise levels are considered. It is proposed that a design goal of +5dB above the daytime background noise levels be adopted (where practical) as this represents the level identified to be the LOAEL. However, the life safety aspect of the equipment must take priority and where acoustic attenuation measures hinder the life safety aspects, this criterion would need to be reconsidered.

On the basis that the generator is located to the eastern end of the blue plant space (circa 24m from either receptor) and the visual screen around the plant space is 2m in height and imperforate (with a mass per unit area of at least 13kg/m²) it is predicted that noise levels at NSR1 will be 53dBA and at NSR2 the noise level will be 50dBA.

The daytime background noise level was identified to be $L_{A90,T}$ 49dB and as such the proposed generator meets the selected criterion of being below $49 + 5 = 54$ dBA.

It has been confirmed that there is sufficient airflow around the plant space that the plant screen does not need to allow airflow. If, however, this changes it is likely that the screen will need to be constructed using acoustic louvres in order to maintain the above acoustic targets.

5.2.3 Air Source Heat Pumps (Item b)

4 x Air Source Heat Pumps (ASHP's) are required to provide the hot water for the development. At peak demand all 4 x ASHP's are required. However, a buffer vessel is provided to store hot water meaning that all 4 units will not need to operate at night.

Based on the noise data for the indicative equipment selections the following requirements have been identified;

- The visual screen around the plant space must be a minimum of 2m in height and imperforate (with a mass per unit area of at least 13kg/m²)
- All 4 ASHP's can operate during the daytime without additional consideration
- At night only 1 ASHP can operate and that unit must be located a minimum of 22m from the nearest window of NSR1 and 21m from the nearest window of NSR2. As such this unit will be located towards the eastern end of the plant space. See Figure X for allowable space for the ASHP which operates at night.
- Should the plant screen be required to provide airflow it is likely that the screen will need to be constructed using acoustic louvres in order to maintain the above acoustic targets

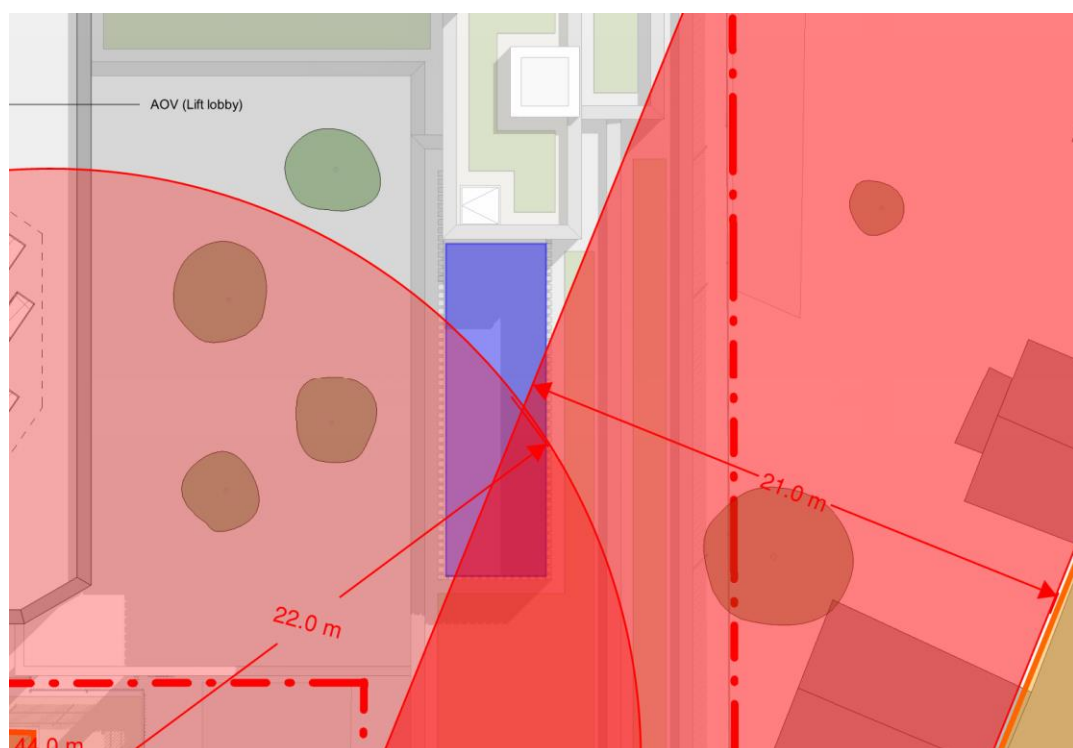


Figure 10 – ASHP Exclusions Zones (shown in red)

5.2.4 Small Condensers (Item c)

There is a requirement for 3 or 4 small outdoor condenser units serving the ground floor amenity spaces, such as Fitness Suite, Amenity Room, Management Areas and Server / Comms Room. As such it is anticipated that only 1 unit is required to operate 24hrs (serving the Comms Room).

Based on the noise data for the indicative equipment selections the following requirements have been identified;

- All units operating during the daytime produce a maximum noise level of 30dBA at NSR1 and NSR2, well below the criterion of 44dBA.
- The above assumes no barrier effects, but it is likely that some could be provided when located behind parapet walls and / or within the plant enclosure space
- At night it is understood that only the unit serving the Comms Room would need to operate and this is predicted to create a noise level of 23dBA at NSR1 and 22dBA at NSR2. This could be reduced further with careful siting to maximise distance and screening effects.

6. MITIGATION

Based on the recommendations of the initial appraisal/risk assessment presented previously in this report, this section provides an assessment of mitigation required to ensure future occupants' exposure to noise is appropriately controlled at the planning stage. Discussion on the use of open windows for providing cooling and ventilation, with regards to achieving the internal acoustic criteria, is also presented.

This section is considered to represent the Pro:PG Stage 2 assessment.

The most appropriate and viable method of controlling external noise intrusion in this instance is through appropriate acoustic design of the building's façade to ensure the internal targets are met. This is discussed in this section.

6.1 Glazing

Typically, the glazing and the ventilation elements will be the weakest acoustical elements in the façade of a building. Assuming other elements are significantly more resistant to the passage of sound, the glazed elements and method of ventilation will control the overall internal noise level.

A calculation, in accordance with BS 12354-3, has been undertaken to establish the performance requirements for the glazed elements of the façade. The break-in calculations are based on the external levels as measured on site, and the internal noise level targets summarised in **Section 3**.

The required glazing performance is driven by the night-time maximum noise level (L_{AFMax}) and **Table 7** shows the recommended glazing performances.

It should be noted that, noise levels are low enough that glazing selected to achieve appropriate thermal performance will also ensure the acoustic requirements are met by default. This generally occurs where all of the following three statements are true:

- Daytime average noise levels fall below around 60 dB $L_{Aeq,T}$.
- Night-time average noise levels fall below around 55 dB $L_{Aeq,T}$.
- Night-time maximum noise levels fall below around 65 dB L_{AFmax} .

Table 7 - Glazing performance requirements

Location	Glazing Performance & Indicative System Type
All elevations (except those adjacent to the WIOCC)	Noise levels are sufficiently low that basic thermal double glazing will suffice to meet the acoustic requirement. It is considered likely that other factors (thermal, solar performance) will drive the specification of the glazing, ensuring the acoustic performance is met by default. An example acoustic performance for standard thermal double glazing may be: 33 dB R_w 6 mm glass / 12 mm air / 4 mm glass
Enhanced Specification for Elevations Adjacent to the WIOCC	38 dB R_w 6 mm glass / 16 mm air / 6.8 mm acoustic laminate glass

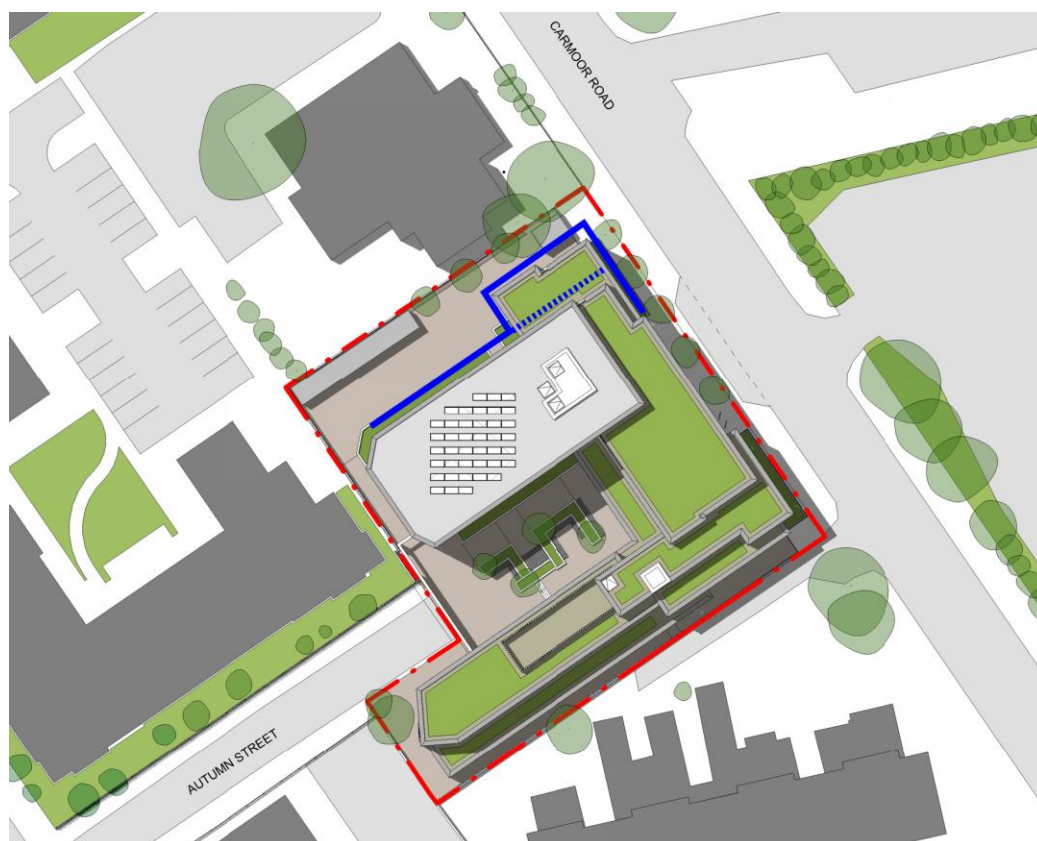


Figure 11 – Extent of Enhanced Specification of Glazing (shown in blue)

These minimum acoustic requirements assume that the non-glazed elements of the façade would be considerably more resistant to the passage of sound than the glazing elements and, therefore sound passage through these would not significantly contribute to the internal noise level.

It should also be noted that the acoustic performance specification could be met by glazing with alternate configurations to those presented in the above table provided the acoustic performance requirements are met.

Additionally, the minimum requirements in **Table 7** also rely on noise break-in through fresh air paths to be appropriately controlled.

While it is understood that the development will be mechanically ventilated (via mechanical ventilation with heat recovery (MVHR) units, and therefore trickle ventilators will not be required. It has been determined that attenuators are not required to the MVHR ductwork where standard glazing units are specified. It is recommended that minimum 500mm long MVHR attenuator (220mm x 90mm) be included on elevations overlooking the WIOCC (such as Domus 9SL-500) in order to account for potential noise during licenced events.

Glazing specifications may need to be higher to account for solar / thermal requirements and it is recommended that these are checked with the relevant consultants.

7. PROVISION OF VENTILATION

The performance requirements for the building envelope would be appropriate to control noise levels within habitable rooms when windows are closed only. However, typically, it would be preferable to provide means of ventilation through use of open windows.

The provision of ventilation through passive means (e.g. opening of windows) will result in a reduced level of sound insulation.

There are three conditions in which ventilation is required:

- Continuous background ventilation – to provide appropriate air changes to reduce damp etc.;
- Ventilation required for thermal comfort (to prevent overheating); and
- Purge ventilation – required on an ad-hoc basis, for example, to remove smells etc.

This section assesses the appropriateness of using open windows for ventilation in each of the above scenarios.

7.1 Background Ventilation

7.1.1 Internal Noise Levels with a Partially Open Window

In accordance with the guidance in the AVO Guide, a level difference of around 13 dB (from an external free-field noise level) is assumed when windows are opened partially to provide **background** ventilation. It is understood that all bedroom windows are to be fitted with restrictors to limit the amount that windows are able to open.

BS 8233 states that a relaxation in the internal L_{Aeq} criteria of up to 5 dB would still result in 'reasonable' conditions being achieved. While ProPG states that *"once L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people. Particularly, if such levels occur more than occasionally"*.

On this basis, and based on the noise levels predicted across the façades of the development, **Table 8** presents a broad assessment of the internal noise levels predicted were an open window to be used for provision of background ventilation.

With respect to the effects of high noise levels in internal spaces, exceedances during the night-time (which may lead to interrupted sleep) are considered to be the most sensitive.

Table 8- Worst-case internal noise levels with open windows used for provision of ventilation

Location	Period	Measured Noise Level (dB)	Internal Level with Open Window (dB)	Exceedance of Internal Criterion (dB)
Carmoor Road Elevation	Daytime Average (L _{Aeq,16hr})	53	40	+5
	Night-time Average (L _{Aeq,8hr})	44	31	+1
	Night-time Maximum(L _A F _{max})	67	54	+9

It can be seen that night-time max noise levels in rooms overlooking Carmoor Road exceed the internal targets by more than 5 dB, exceeding the level considered 'reasonable'. Therefore, an alternative means of ventilation is considered necessary.

7.1.2 Mechanical Ventilation Heat Recovery (MVHR)

As demonstrated above, use of partially open windows to provide background ventilation is not appropriate across parts of the development. Therefore, alternate means of providing background ventilation should be sought.

Background ventilation will be provided by a mechanical system (MVHR). This avoids the need for passive trickle ventilators.

The proposed system will provide background ventilation together with a boost mode to increase ventilation rates as and when required.

7.2 Internal Noise Levels During the Overheating Condition

Table 9 shows the internal noise levels expected in each plot when windows are partially open to mitigate overheating, assuming an outside to inside level difference of 7 dB. This level difference has been established in line with the simple method assessment for overheating in Approved Document O – assuming a window that is open equivalent to 4% of the floor area of the room floor area. Windows open further than this would result in higher internal noise levels.

The L_{AFMax} noise levels are predicted to exceed internal targets at night-time, on the Carmoor Road elevation only, when a partially open window is used to control overheating.

Table 9 - Worst-case noise levels with open windows used for mitigation of overheating

Location	Period	Measured Noise Level (dB)	Internal Level with Open Window (dB)	Approved Document O Criterion	Exceedance of ADO Criterion (dB)
Carmoor Road Elevation	Night-time Average ($L_{Aeq,8hr}$)	44	37	40	-
	Night-time Maximum(L_{AFmax})	67	60	55	+5
NW and SE Elevations	Night-time Average ($L_{Aeq,8hr}$)	39	32	40	-
	Night-time Maximum(L_{AFmax})	62	55	55	-
Rear / Courtyard Elevations	Night-time Average ($L_{Aeq,8hr}$)	34	32	40	-
	Night-time Maximum(L_{AFmax})	57	50	55	-

7.2.1 Overheating Mitigation

The mechanical and electrical consultants for the scheme (FutureServ) have run some preliminary overheating assessments (in accordance with CIBSE TM59) and have determined that based on the proposed building fabric performance specifications, the building orientation and MVHR systems, rooms overlooking the WIOCC and Carmoor Road will not overheat with windows closed for the entire night-time period. As such windows can remain closed at night.

For other elevations (not overlooking the WIOCC or Carmoor Road) a partially open window can be used where required. Restrictors should be provided to restrict the opening to no greater than an equivalent area equal to 4% of the floor area.

7.3 Purge Ventilation

Section 4.15 of Approved Document F of the Building Regulations suggests that, in addition to a normal ventilation rate, a higher 'purge' ventilation is also required to "...aid removal of high concentrations of pollutants and water vapour released from occasional activities such as painting and decorating or accidental releases such as smoke from burnt food or spillage of water." The document also states, however, that this higher ventilation rate is only required for short intermittent periods when such occasional activities occur.

Based on the above and considering the short periods and infrequent nature that this higher ventilation rates would be required, it is usually considered acceptable for windows to be opened. There is a general precedent that external sound levels should not determine the acceptability of opening windows to provide intermittent, occasional and ad-hoc, ventilation in cases such as those described above.

7.3.1 Discussion

According to ProPG, the determination at Stage 1 of a Site falling within the medium-risk category without mitigation indicates that whilst the site may have challenges from a noise perspective, the site is less likely to be rejected should a good acoustic design process be identified in a detailed 'Acoustic Design Statement' (ADS) which clearly demonstrates how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrates that a significant adverse noise impact is avoided in the finished development.

In terms of ambient sound, the majority of the Site is likely to fall within the low-risk classification during the daytime and night time periods with respect to the internal sound climate as the proposed layout around a courtyard will increase the screening to a significant proportion of the proposed study bedrooms.

The consideration of noise impact at this very early project stage is considered to be entirely suitable based on the outcomes of this Stage 1 risk assessment, and in terms of the MCC criterion.

Internal noise impact cannot be considered in detail until a baseline noise survey is undertaken is available, however mitigation options for internal living conditions in accordance with MCC and BS 8233 criteria include building positioning and orientation in combination with building envelope design, in line with the good acoustic design process, and where necessary the use of enhanced glazing to ensure that internal living spaces achieve acceptable to good internal sound levels throughout the development.

8. CONCLUSIONS

MZA Acoustics has been appointed by Tiger Developments Limited to undertake an acoustic impact assessment for a full planning application for the proposed development comprising the demolition of existing buildings and construction of purpose-built student accommodation with 172 beds in a mix of studio and cluster units alongside ancillary facilities and shared amenity space, site access and other associated works in a development of three to six storeys.

The Site is located in a mixed-use urban area of Manchester, in close proximity to main arterial routes, a major hospital facility, student accommodation and established residential uses.

The ProPG risk assessment described in the previous sections confirms that the site falls within the low risk category identified by the ProPG guidance, and the use of good acoustic design can be used to demonstrate during the planning process that adverse impact can be avoided for internal receptors.

The site is adjacent to the West Indian Organisations Community Centre (WIOCC) which is licenced for entertainment and liquor sales. However, licenced events appear to be sporadic and impacted by Covid. As such it has not been possible to obtain on-site measurements during a live event. As such acoustic upgrades in the form of enhanced acoustic glazing and attenuators on MVHR inlet / exhaust paths have been proposed. It has also been confirmed that dwellings on elevations overlooking the WIOCC building will not overheat and as such windows can remain closed through the night-time. It is considered that these measures, in conjunction with the conditions outlined in Appendix 3 of the Licence issued by Manchester City Council (such as requiring a noise limiter, doors to remain closed etc) provide sufficient control of noise impacts to the proposed development.

No noise from the ENW substation was audible or detectable on the trace, even through the quieter periods at night time.

An indicative assessment of proposed externally mounted plant and equipment has also identified that the MCC recommended criteria can be achieved with relatively minor mitigation / spatial arrangement planning.

Based on the findings of this impact assessment, it is concluded that noise effects can be managed, and good acoustic design should be a principal consideration throughout the project life in order to meet the MCC design criteria for internal and external noise amenity for the proposed student accommodation.

The limitations to this report, in addition to those limits and assumptions identified within the main text are presented in **Appendix D**.

Appendices

Appendix A – Glossary of Acoustic Terminology

Acoustics and Noise

Acoustics is the branch of physics concerned with the properties of sound, including ultrasound, infrasound and vibration. A scientist or engineer who works in the field of acoustics is an acoustician or acoustic engineer.

Sound can be measured by a sound level meter or other measuring system. Noise is related to a human response, and is routinely described as unwanted sound, or sound that is considered undesirable or disruptive.¹ Care has been taken in this document to use the most relevant of these terms (whereby 'sound' is used predominantly); however, in most reference documents, and, indeed, generally, 'sound' and 'noise' are used interchangeably. Consequently, just because the term 'noise' is used does not necessarily mean a negative effect exists or will occur, and the context of the accompanying text should be taken into account.

Human hearing is able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble), and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain).

The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify sound in a manner that approximates the response of the human ear, a weighting mechanism is used, which reduces the importance of lower and higher frequencies in a similar manner to human hearing.

The weighting mechanism that best corresponds to the response of the human ear (though not necessarily perfectly) is the 'A'-weighting scale. This is widely used for environmental sound measurement, and the levels are denoted as dBA, dB(A) or L_{Aeq} , L_{A90} etc. according to the metric being measured or determined (see the Definitions over leaf).

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. Where other changes occur (associated with the change in sound level), such as additional vehicle movements on a road, which can be seen, then these may result in changes in sound level being more noticeable than they might otherwise be.

Further to such visual clues, and any other non-acoustical factors that affect people's response (such personal characteristics, and social, residential or environmental factors), the subjective response to a sound is dependent not only upon the sound pressure level and component frequencies, but also its intermittency. Consequently, various metrics have been developed to try and correlate people's attitudes to different sounds with the sound level and its fluctuations. The metrics used in this document, as per the relevant guidance, are defined overleaf.

¹ Taken from the Foreword to BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*.

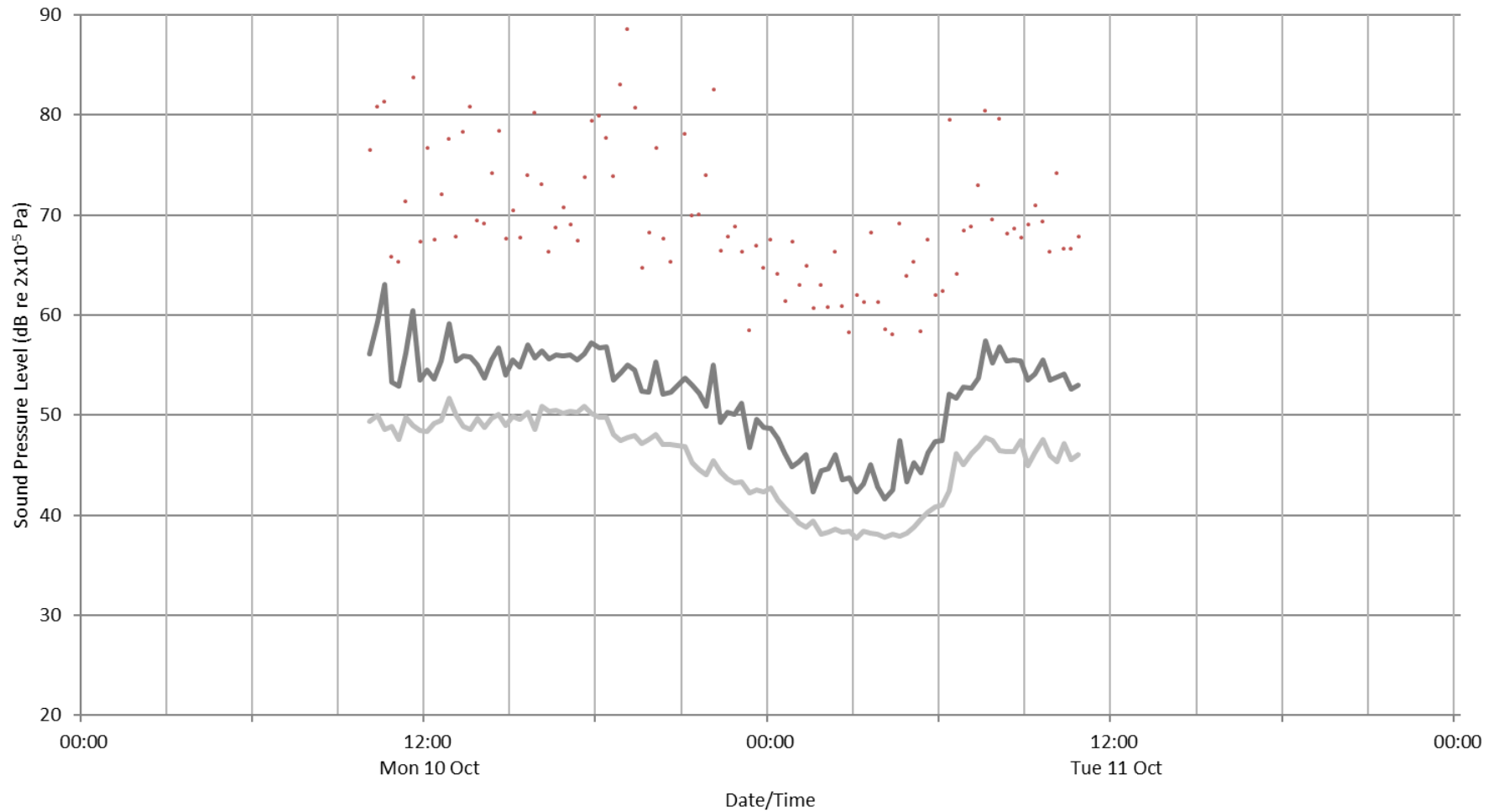
Airborne Sound	Sound that reaches the point of interest by propagation through air.
Ambient Sound:	Sound from all sources at any given time, from both near and far. Usually measured in terms of L_{Aeq} .
A-Weighting	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Background Sound Level	The A-weighted sound pressure level that can be considered the baseline in the absence of any noise from a specific source of sound under assessment. Measured in terms of $L_{A90, T}$.
Calibration	The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short-term measurement, and periodically for longer term monitoring.
Class 1	The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard IEC 60651 referred to the grade as "Type", whereas the new standard IEC 61672 refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however, MZA use Class 1 (or Type 1) meters by default, as required by BS 4142:2014, for example.
Decibel	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds (s_1 and s_2) is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 Pa.
Fast time Weighting (F)	Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 Electroacoustics. Sound level meters. Pattern evaluation tests.
Free-field / Façade	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
IoA	The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British Acoustical Society (a daughter society of the Institution of Mechanical Engineers). It is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels. MZA is a Sponsor Member of the Institute of Acoustics, and all our consultants/ engineers are individual Members.
$L_{AF90, T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T,

	measured using time fast time-weighting (F). Generally used to describe the 'background' sound conditions.
L_{AFmax}	The maximum A-weighted sound pressure level during a given time period. L _{max} is sometimes used for the assessment of occasional loud sounds, which may have little effect on the overall L _{eq} noise level but could still affect the sound environment. Unless described otherwise, it is measured using the fast time-weighting (F).
L_{eq, T}	A sound level index called the equivalent continuous sound level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded. Where the value is A-weighted, it will be presented 'L _{Aeq,T} ' or 'dBA L _{eq,T} ', otherwise it should be an un-weighted (or linear) value.
L_p	See Sound Pressure Level.
Noise	Related to human response to sound. Unwanted sound, or sound that is considered undesirable or disruptive.
Octave Band	Frequency ranges in which the upper limit of each band is twice the lower limit. Octave bands are identified by their geometric mean frequency, or centre frequency.
Line Source	An idealised way of modelling a sound source, consisting of a uniform, flat plane.
Point Source	An idealised way of modelling a sound source, consisting of an infinitesimally small point, radiating sound equally in all dimensions
Sound Level Metrics	Sound levels usually fluctuate over time, so it is often necessary to consider an average or statistical sound level. This can be done in several ways, so a number of different metrics have been defined, according to how the averaging or statistics are carried out.
Sound Power	In a specified frequency band, the rate at which acoustic energy is radiated from a source. In general, the rate of flow of sound energy, whether from a source, through an area, or into an absorber.
Sound Power Level	Of airborne sound, ten times the common logarithm of the ratio of the sound power under consideration of the standard reference power of 1 pW. Expressed in decibels.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20 Pa (20x10 ⁻⁶ Pascals) on a decibel scale.
Specific Sound	The sound source being assessed in a BS 4142:2014 assessment.
UKAS	United Kingdom Accreditation Service, recognised by government to assess organisations that provide certification, testing, inspection and calibration services against internationally agreed standards.

Appendix B – Results of Noise Monitoring

Carmoor Road
Acoustic Monitoring
MP1

— LAeq,15m
— LAF90,15m
• LAFmax,15m



Appendix C – Indicative Plans



Level 00 Plan
1:200

Scale Bar 1:200
0 1 2 3 4 5 6 7 8 9 10

NOTES

Has dimensions to be located from drawings. All dimensions to be checked on site prior to construction.

This drawing is to be used in conjunction with all relevant Structural Engineers and Mechanical & Electrical Engineers drawings and specifications. Any discrepancies between drawings and the conditions are to be reported to the relevant engineer.

Access and egress and can only be verified by a detailed dimensional survey of the completed building. Any decisions to be made on the basis of these conditions, whether or not to proceed with the project, shall be the responsibility of the client. The architect is not responsible for the design of the building or the building's performance. The architect is not responsible for the design of the building or the building's performance. The architect is not responsible for the design of the building or the building's performance.

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Architect

Lechler Hayes Architects

Client

tigerdevelopments

REVISIONS

Rev.	DATE	DESCRIPTION	APPROVED
P01	18.11.22	Planning submission	

North arrow pointing upwards.

Project

Carmoor Road for Tiger Developments Ltd

Title

Level 00 Plan

Station	Sheet size	Project No.	Drawing No.	Rev.
PLANNING	1:200 @ A1	2205	LHA-20-00-DR-A-PL-010	P01

Appendix D – Noise Monitoring Location



Noise monitoring location at first floor of existing dwelling, overlooking Carmoor Road.

Appendix E – Report Limitations

Report Limitations

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of MZA Acoustics Limited. MZA Acoustics Limited accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or MZA Acoustics Limited and agree to indemnify MZA Acoustics Limited for any and all loss or damage resulting therefrom. MZA Acoustics Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations MZA Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.



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