

Noise Impact Assessment

Site: 69 Dickenson Road, Manchester
Reference: 51-120-R1-2
Date: May 24





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EXECUTIVE SUMMARY

Site Address	69 Dickenson Road, Manchester M14 5HS
National Grid Reference	E 385665, N 395157
Proposed Development	Change of use of former children's home to create 24 no. self-contained residential units for short stay homelessness accommodation (sui generis), together with ancillary office and administrative space, associated elevational alterations and roof works.
Background	E3P were commissioned to undertake a Noise Impact Assessment in order to provide sufficient information in order to discharge conditions 7a and 8a in relation to the planning permission (138801/VO/2023).
Surveys Completed	E3P have two long term unattended surveys to capture road traffic associated with Dickenson Road, school yard usage and baseline levels of noise at existing and proposed receptors.
Assessments Completed	E3P have undertaken 3D noise modelling to assess all sound sources and assessed in accordance with BS 8233 to satisfy condition 7a. Fixed plant noise emission limits have been set in the absence of detail and in accordance with condition 8a and BS 4142.
Mitigation Recommendations	The assessment has recommended appropriate mitigation measures in order to control internal noise levels. Fixed plant noise emission limits have been set for any fixed plant items.
Conclusion and Discussion	This assessment has shown that, with mitigation measures in place, no adverse impact is predicted day or night at existing receptors.



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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Manchester City Council to undertake a Noise Impact Assessment for a proposed residential development on land at 69 Dickenson Road in Manchester, to be referred to hereafter as 'the site'.

This assessment looks to determine the key noise sources that have potential to impact upon the noise sensitive development and to assess their impact, if any, upon proposed receptors and to specify mitigation measures, where required.

Specifically, the report is to be used to satisfy the following conditions:

7) a) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Dickenson Road shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. The approved noise insulation and ventilation scheme shall be completed before any of the dwelling units are occupied. Noise survey data shall include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary.

8) a) Any externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. The scheme shall be submitted to and approved in writing by the City Council as Local Planning authority in order to secure a reduction in the level of noise emanating from the site. The approved scheme shall be completed before the apartments are occupied.

E3P note that post completion verification and testing is required, as given in parts b of each condition but these are not addressed here.

1.2. REPORT OBJECTIVES

The objectives of this report are as follows.



- ✿ Establish and measure the existing sound levels across the site, day and night.
- ✿ Consider the potential sources of sound impacting the site and to measure source sound levels of all applicable sources.
- ✿ Assess internal and external noise levels associated with road traffic in accordance with criteria given in BS 8233.
- ✿ Set plant noise emission limits in the absence of detail.
- ✿ Provide advice on mitigation measures, where required.

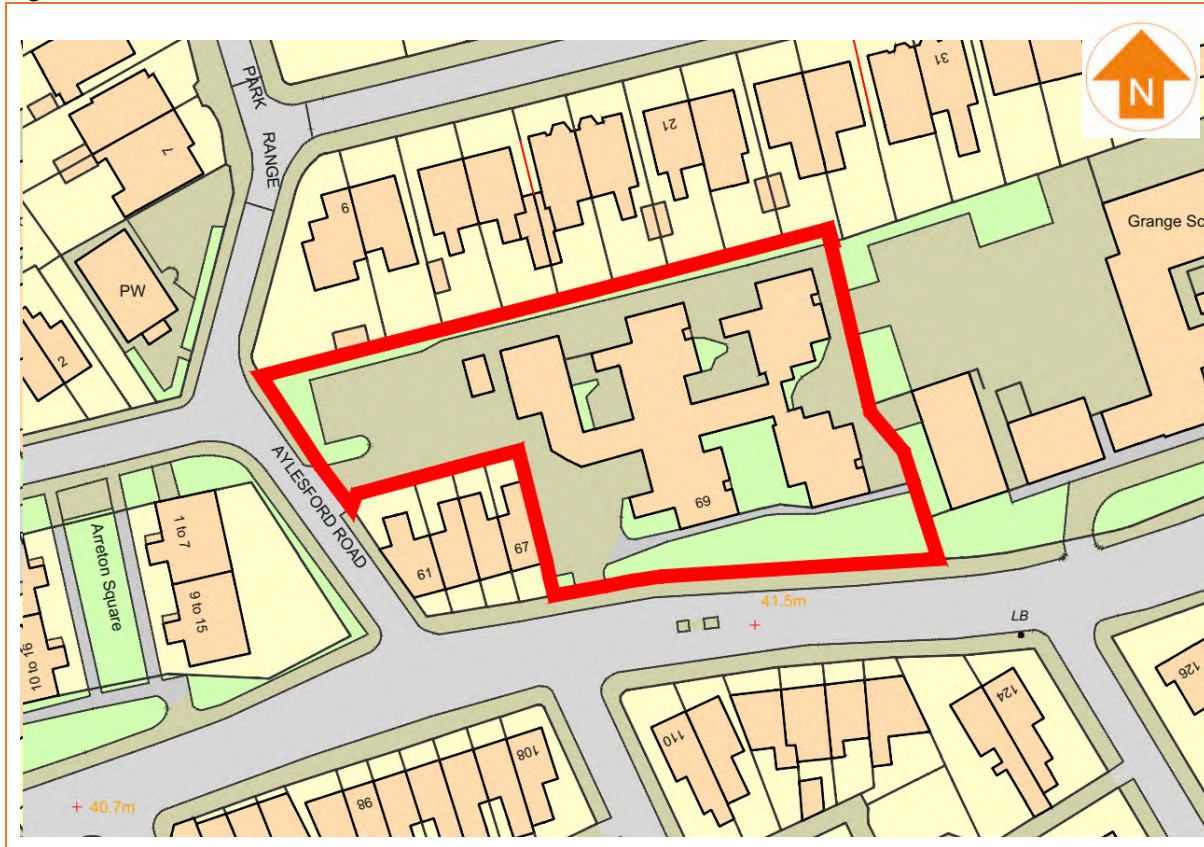


1.3. PROPOSED DEVELOPMENT

The site is a change of use of former children's home to create 24 no. self-contained residential units for short stay homelessness accommodation (sui generis), together with ancillary office and administrative space, associated elevational alterations and roof works.

The site location plan is indicated in Figure 1.

Figure 1 **Site Location**





2. ASSESSMENT METHODOLOGY

2.1. NATIONAL PLANNING POLICY FRAMEWORK

To prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be considered.

The national planning policy framework states that planning policies and decisions should aim to:

- ✿ Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.
- ✿ Mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.
- ✿ Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.
- ✿ Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.2. NATIONAL PLANNING PRACTICE GUIDANCE

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:

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

In line with the explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase, where applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The "observed effect levels" are as follows:



- ✿ Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- ✿ Lowest observed adverse effect level: This is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- ✿ No observed effect level: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1 Noise Exposure Hierarchy

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVEL	ACTION
Not Applicable	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, or having to close windows for some of the time because of the noise where there is no alternative ventilation. 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, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. 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 acoustic character of the area.	Significant observed effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or an inability 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 (auditory and non-auditory).	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any situation. These factors include the following:



- ✿ The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day. The adverse effect can also be greater simply because there is less background noise at night.
- ✿ For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise can be important.
- ✿ The spectral content of the noise and the general character of the noise. The local topology and topography should also be considered along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- ✿ Where applicable, the cumulative impacts of more than one source should be considered along with the extent to which the source of noise is intermittent and of limited duration.
- ✿ Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases, a suitable alternative means of ventilation is likely to be necessary.
- ✿ If external amenity spaces are an intrinsic part of the overall design, then the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.3. BUILDING REGULATIONS: APPROVED DOCUMENT F – VOLUME 1: DWELLINGS (JUNE 2022)

Approved document F Volume 1: Dwellings (ADF) provides guidance set by the Department for Levelling Up, Housing and Communities, that relates to means of ventilation within dwellings. The ventilation strategy specified within the ADF are as follows.

1.9 The ventilation strategy in this approved document relies on a combination of all of the following.

a. Extract ventilation from rooms where water vapour or pollutants are likely to be released (e.g. bathrooms and kitchens), to minimise their spread to the rest of the building. Ventilation fans may be either intermittent operation or continuous operation.

b. Whole dwelling ventilation to provide fresh air to the building and to dilute, disperse and remove water vapour and pollutants not removed by extract ventilation.

c. Purge ventilation to remove high concentrations of pollutants and water vapour. Purge ventilation is used intermittently and required only for pollutants produced by occasional activities (e.g. fumes from painting).

1.10 Ventilation may be delivered through natural ventilation, mechanical ventilation or a combination of both.

1.11 The ventilation systems in this approved document are examples of systems that comply with Part F of the Building Regulations. Other ventilation systems may be acceptable if they can be shown to meet an equal level of performance.



Within the ADF there are three system specific ventilation systems that can be utilised to provide sufficient ventilation. These methods are as follow.

1. Natural ventilation with background ventilators and intermittent extract fans (guidance suitable only for less airtight dwellings) - Ventilation provided by thermal, wind or diffusion effects through doors, windows or other intentional openings without the use of mechanically driven equipment. For the purposes of this approved document, natural ventilation refers to a ventilation strategy using background ventilators and intermittent extract ventilation.

2. Continuous mechanical extract ventilation - Mechanically driven ventilation that continuously extracts indoor air and discharges it to the outside.

3. Mechanical ventilation with heat recovery - A mechanically driven ventilation system that both continuously supplies outdoor air to the inside of the dwelling and continuously extracts indoor air and discharges it to the outside. For the purposes of this approved document, the guidance for mechanical ventilation with heat recovery applies to centralised or decentralised supply and extract systems, with or without heat recovery.

2.4. BUILDING REGULATIONS: APPROVED DOCUMENT O – OVERHEATING (JUNE 2022)

Approved document O - Overheating (ADO) provides guidance set by the Department for Levelling Up, Housing and Communities, that relates to the mitigation of overheating. In relation to noise the ADO provides the following guidance.

3.2 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).

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

- a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).*
- b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).*

3.4 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)



2.5. BRITISH STANDARD BS 4142: 2014+A1:2019 - METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ✳ 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 processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.

There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

- ✳ +2 dB: where the tonality is just perceptible.
- ✳ +4 dB: where the tonality is clearly perceptible; and
- ✳ +6 dB: where the tonality is highly perceptible.

Impulsivity

- ✳ +3 dB: where the impulsivity is just perceptible.
- ✳ +6 dB: where the impulsivity is clearly perceptible; and
- ✳ +9 dB: where the impulsivity is highly perceptible.

Intermittency

- ✳ +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.



Assessment of the rating level relative to the background sound level can yield the following commentary:

- ✿ Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of 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; and
- ✿ 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.6. BRITISH STANDARD BS 8233:2014+A1:2019 – GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

The scope of this standard is the provision of recommendations for the control of noise in and around buildings including residential dwellings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 2.

Table 2 BS 8233:2014 Recommended Internal Noise Levels

CRITERION	TYPICAL SITUATION	DESIGN CRITERION, $L_{Aeq,T}$ (dB)
Suitable resting and sleeping conditions	Living Room	35
	Bedroom	30

BS 8233 goes on to recommend noise levels for gardens:

It is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted.

BS 8233 goes on to say:

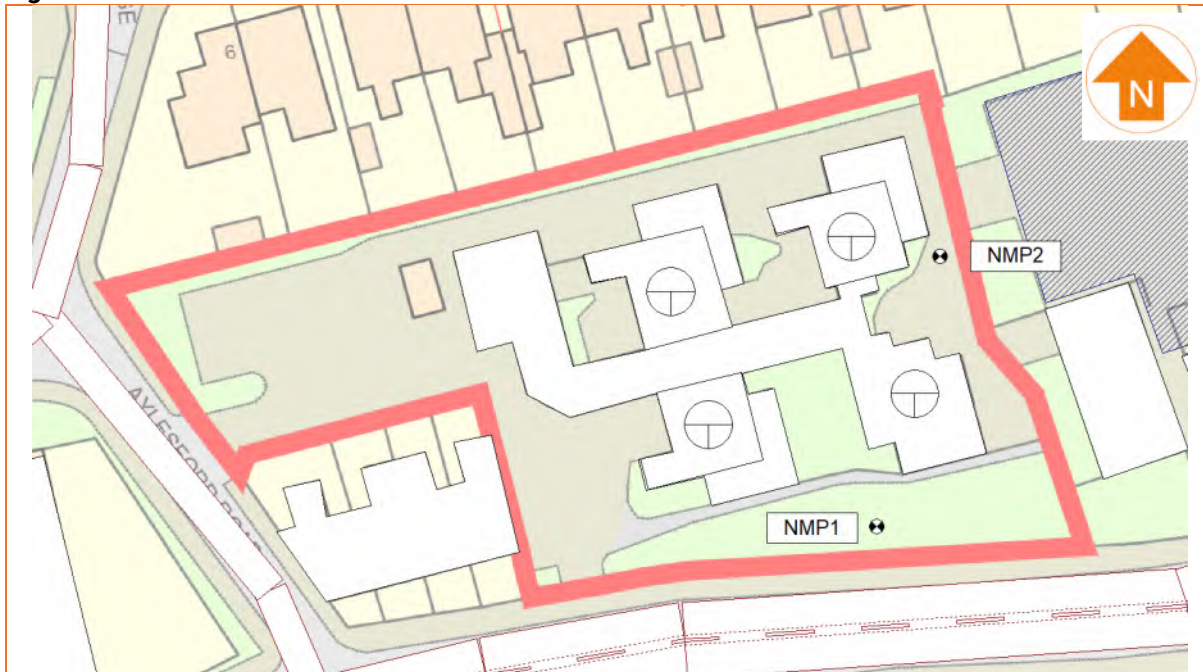
In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.



3. SURVEY RESULTS

E3P undertook two unattended weekday and weekend surveys in order to establish noise levels associated with Dickenson Road and any noise from the adjacent school. The surveys were conducted in the following locations:

Figure 2 Noise Measurement Positions



3.1. UNATTENDED AMBIENT SOUND SURVEY – DICKENSON ROAD

E3P have conducted an unattended ambient sound measurements on the southern boundary of the site in order to capture ambient sound levels associated with Dickenson Roads. The survey was carried out over the following time periods:

- 📍 12:00 Thursday 2nd May to 16:00 Tuesday 7th May 2024.

E3P note that on-site construction works were ongoing on Thursday 2nd and Tuesday 7th May. Works were stopped on Friday to allow measurement of uninterrupted noise levels of off-site sources. As such, the Friday will be used for the weekday traffic and all other periods for baseline levels of noise. The following position was used:

- 📍 Noise Measurement Position 1 (NMP1): Located on the southern boundary of the development approximately 5 m from the roadside edge of Dickenson Road. The microphone was located at a height of 2.5 m above ground level in order to clear the hoarding and in free-field conditions. The sound climate was dominated by road traffic sound.



A summary of the measured sound pressure levels is presented in Table 3.

The full hourly data is tabulated in Appendix III.

Table 3 Average and Range of Measured Ambient Sound Pressure Levels

DATE	ASSESSMENT PERIOD	RANGE OF MEASURED AMBIENT SOUND LEVELS, $L_{Aeq,T}$ (dB)	AVERAGE MEASURED AMBIENT SOUND LEVELS, $L_{Aeq,T}$ (dB)
Friday 3rd May 2024	Day	63.0-68.7	65.3
	Night	58.4-67.4	63.8
Saturday 4th May 2024	Day	62.6-68.7	65.7
	Night	57.1-66.0	62.7
Sunday 5th May 2024	Day	60.1-71.3	64.6
	Night	57.0-67.0	62.7
Monday 6th May 2024	Day	60.0-66.3	63.3
	Night	54.1-62.7	59.8

The 10th highest 5-minute maximum noise level from the night-time period between Friday and Saturday is noted to be 80.4 dB $L_{Amax,fast}$.

3.2. UNATTENDED AMBIENT AND BACKGROUND SOUND SURVEY – EASTERN BOUNDARY

E3P have conducted an unattended ambient sound measurements on the eastern boundary in order to further calibrate Dickenson Road, collect worst-case daytime school yard noise and establish background sound levels representative of existing and proposed receptors. The survey was carried out over the following time periods:

- 📍 12:00 Thursday 2nd May to 16:00 Tuesday 7th May 2024.

E3P note that on-site construction works were ongoing on Thursday 2nd and Tuesday 7th May. Works were stopped on Friday to allow measurement of uninterrupted noise levels of off-site sources. As such, the Friday will be used for the weekday traffic and all other periods for baseline levels of noise. The following position was used:

- 📍 Noise Measurement Position 2 (NMP2): Located on the eastern boundary of the development approximately 5 m from the school fence. The microphone was located at a height of 2.5 m above ground level, in order to clear the hoarding and in free-field conditions. The sound climate was dominated by road traffic sound and low-level school yard noise.



A summary of the measured sound pressure levels is presented in Table 3.

The full hourly data is tabulated in Appendix III.

Table 4 Average and Range of Measured Ambient Sound Pressure Levels

DATE	ASSESSMENT PERIOD	RANGE OF MEASURED AMBIENT SOUND LEVELS, $L_{Aeq,T}$ (dB)	AVERAGE MEASURED AMBIENT SOUND LEVELS, $L_{Aeq,T}$ (dB)	MEDIAN MEASURED BACKGROUND SOUND LEVELS, $L_{A90,T}$ (dB)
Friday 3rd May 2024	Day	48.7-55.2	52.3	45
	Night	48.0-54.7	51.3	44
Saturday 4th May 2024	Day	50.0-55.6	52.3	45
	Night	46.1-51.6	49.0	39
Sunday 5th May 2024	Day	47.4-56.1	50.7	42
	Night	43.5-52.8	48.7	37
Monday 6th May 2024	Day	46.7-52.9	49.9	42
	Night	42.4-48.8	46.6	38

The 10th highest 5-minute maximum noise level from the night-time period between Friday and Saturday is noted to be 65 dB $L_{Amax,fast}$.

The equipment outlined in Table 5 was used for the noise survey.

Table 5 Noise Measurement Equipment and Calibration Dates

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE
NMP1	Sound Level Meter	01dB Fusion	14616	29th June 2024
	Pre-amplifier	01dB Pre22	20951	
	Microphone	GRAS 40CD	494264	3rd August 2024
	Calibrator	Cirrus CR 515	99206	
NMP2	Sound Level Meter	Cirrus CR:171A	G303884	15th September 2024
	Pre-amplifier	Cirrus MV:200F	12731F	
	Microphone	Cirrus MK:224	215899D	
	Calibrator	Cirrus CR:515	99403	

The sound level meters were field calibrated before and after measurements with no significant drift witnessed.



4. ROAD TRAFFIC NOISE IMPACT ASSESSMENT

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2023 MR1, to determine the impact of noise from road traffic sound.

The following inputs have been included in the model:

- ✿ Site elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government License v3.0.
- ✿ Existing buildings are included.
- ✿ A reflection order of 1 has been used in all calculations.
- ✿ Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

Figures 3 and 4 determine the noise levels across the Site during the daytime and night-time periods, respectively, due to road traffic sound.

4.1. EXTERNAL AMENITY AREA NOISE LEVEL ASSESSMENT

E3P do not note any external amenity areas associated with the development. As such, these are not considered in the assessment.

4.2. INTERNAL NOISE LEVEL ASSESSMENT

With regards internal noise levels, It is understood that the client intends to install triple glazing to all habitable rooms in the form of 4 mm glass / 12 mm air space / 4 mm glass / 12 mm air space / 4 mm glass which affords a sound insulation performance in the order of 31 dB R_w (C_{tr} -1; C_{tr} -5). The primary noise impact here is road traffic sound, as such, the C_{tr} correction is applied with a reduction of 26 dB.

The model has been used to predict façade noise levels at all floor levels and orientations. To determine any requirements for mitigation, E3P has added the reduction provided by the glazing (26 dB) to the relevant criterion for day (35 dB) and for night (30 dB). As such, any facades subject to noise levels higher than 61 dB during the day and/or 56 dB during the night will require higher specification glazing. Additionally, a level of 76 dB $L_{Amax,fast}$ is applicable.

Table 6 Predicted façade noise levels – per apartment

APARTMENT	ASSESSMENT PERIOD	WORST-CASE PREDICTED AVERAGE NOISE LEVEL, $L_{Aeq,T}$ (dB)	WORST-CASE PREDICTED MAXIMUM NOISE LEVEL, $L_{Amax,FAST}$ (dB)
1	Daytime	53	-
	Night-time	51	65
2	Daytime	53	-
	Night-time	51	65
3	Daytime	45	-
	Night-time	43	55
4	Daytime	45	-
	Night-time	44	55



5	Daytime	45	-
	Night-time	44	55
6	Daytime	43	-
	Night-time	41	55
7	Daytime	51	-
	Night-time	49	69
8	Daytime	56	-
	Night-time	54	69
9	Daytime	63	-
	Night-time	62	74
10	Daytime	53	-
	Night-time	51	55
11	Daytime	50	-
	Night-time	46	55
12	Daytime	50	-
	Night-time	46	55
13	Daytime	49	-
	Night-time	47	55
14	Daytime	46	-
	Night-time	44	55
15	Daytime	57	-
	Night-time	55	70
16	Daytime	62	-
	Night-time	61	74
17	Daytime	57	-
	Night-time	55	70
18	Daytime	53	-
	Night-time	51	65
19	Daytime	53	-
	Night-time	51	65
20	Daytime	53	-
	Night-time	51	65
21	Daytime	63	-
	Night-time	61	74
22	Daytime	58	-
	Night-time	56	70
23	Daytime	52	-
	Night-time	50	65
24	Daytime	53	-
	Night-time	51	65

As can be seen, most apartments achieve acceptable internal noise levels with standard triple glazing. However, exceedances are noted for apartments 9, 16 and 21. As such, higher specification glazing is required for these plots.

With regards opening windows, there is a requirement to consider the need to open windows for ventilation and the mitigation of overheating. At this stage, the assessment assumes that ventilation would be provided by way of extract fans in kitchens and bathrooms and openable windows.



4.2.1. VENTILATION CONDITION

It is assumed that the developer would be installing a whole dwelling ventilation system in accordance with Part F of the Building Regulations as it is assumed Natural Ventilation is not appropriate for these dwellings.

Where background ventilators form part of the system, consideration is required to the sound reduction provided by these when in the open position and, as such, are discussed in Section 6.0.

4.2.2. OVERHEATING CONDITION

E3P has considered the potential impact of noise, internally, should windows be opened to mitigate overheating, as per the criteria stipulated in ADO. Any plots/facades that pass this test can open windows for this without resulting in unacceptable internal noise levels. Those that fail the test would be subject to a Part O Overheating Assessment by a suitably qualified consultant.

Part O only applies to bedrooms at night in relation to the average 8-hour noise level and 10th highest maximum noise level.

Given that the site is within a moderate risk location, as per guidance within Approved Document O the external noise limit threshold is 49 dB during the night-time ($L_{Aeq,8hr}$) and 64 dB more than 10 times a night ($L_{Af,max}$).

As can be seen in Table 6, the following apartments would experience an exceedance and will require a Part O full overheating assessment:

- ✳ Apartments 1 and 2.
- ✳ Apartments 8 to 10.
- ✳ Apartments 15 to 24.

4.3. PROPOSED OFFICES

E3P note that office space is proposed on the ground floor denoted as Reception, Office and Manager. As such, consideration to internal noise levels, stipulated in BS 8223 is given. An acceptable internal noise level of 40 dB is proposed for these rooms. As such, an allowable external limit of 65 dB, windows closed, and 53 dB, windows open, is applied. As can be seen, predicted noise levels are up to 56 dB on this façade. As such, standard triple glazing is sufficient. However, consideration to a ventilation system is recommended for these spaces.



5. FIXED PLANT NOISE EMISSION LIMITS

In order to satisfy condition 8a of the planning permission, E3P have set plant noise emission limits for any externally mounted plant, in the absence of any detail.

Limits have been set based on the typical background sound levels measured at NMP2:

- ✿ **The cumulative rating level from all proposed fixed plant items shall not exceed 37 dB during the daytime and 32 dB during night-time periods when measured at the closest residential dwelling. The rating level shall include provision for any acoustic feature corrections, such as tonality.**



6. MITIGATION

6.1. FAÇADE INSULATION AND VENTILATION REQUIREMENTS

The previous section determined that standard triple glazing is sufficient for most plots but certain apartments would need higher specification glazing. As such, the table below details the requirements based on each apartment.

It is understood that the following triple glazed unit will be installed in the affected apartments:

- 🔧 6 mm glass / 16 mm air space / 4 mm glass / 16 mm air space / 6.8 mm laminated glass – 44 dB R_w (-3;-7) providing a $+C_{t,r}$ reduction of 37 dB.

The above glazing unit would result in internal noise levels of 26 dB during the day and 25 dB during the night, both of which are well below the required criteria.

Table 7 Glazing and Ventilation Requirements

Apartment	Minimum Reduction Required, $R_w + C_{t,r}$ (dB)	Example configuration (glass/air space/glass/air space/glass) (mm)	Part O Compliance
1	25	4 / 12 / 4 / 12 / 4	Part O overheating assessment req.
2	25	4 / 12 / 4 / 12 / 4	
3	25	4 / 12 / 4 / 12 / 4	
4	25	4 / 12 / 4 / 12 / 4	Part O Compliant
5	25	4 / 12 / 4 / 12 / 4	
6	25	4 / 12 / 4 / 12 / 4	
7	25	4 / 12 / 4 / 12 / 4	
8	25	4 / 12 / 4 / 12 / 4	Part O overheating assessment req.
9	33	6 / 16 / 4 / 16 / 6.8	
10	25	4 / 12 / 4 / 12 / 4	Part O Compliant
11	25	4 / 12 / 4 / 12 / 4	
12	25	4 / 12 / 4 / 12 / 4	
13	25	4 / 12 / 4 / 12 / 4	
14	25	4 / 12 / 4 / 12 / 4	
15	25	4 / 12 / 4 / 12 / 4	Part O overheating assessment req.
16	32	6 / 16 / 4 / 16 / 6.8	
17	25	4 / 12 / 4 / 12 / 4	
18	25	4 / 12 / 4 / 12 / 4	
19	25	4 / 12 / 4 / 12 / 4	
20	25	4 / 12 / 4 / 12 / 4	
21	32	6 / 16 / 4 / 16 / 6.8	
22	25	4 / 12 / 4 / 12 / 4	
23	25	4 / 12 / 4 / 12 / 4	
24	25	4 / 12 / 4 / 12 / 4	

For ventilation, this assessment has assumed a Part F compliant system would be installed as standard.

For the overheating aspect, it was found that open windows were sufficient for most plots except apartments 1, 2, 8 to 10 and 15 to 24. These plots should be subject to an overheating assessment on the assumption that bedroom windows cannot be opened to mitigate overheating without exceeding the ADO internal noise level criteria at night.



7. CONCLUSIONS AND DISCUSSION

E3P were commissioned by Manchester City Council to undertake a Noise Impact Assessment for the proposed residential development at 69 Dickenson Road in Manchester. The main aim of the report was to discharge conditions 7a and 8a.

This assessment looked to determine the key noise sources impacting upon the development site and to assess their impact, if any, upon the noise sensitive use and to recommend mitigation measures, where necessary.

Noise surveys have been conducted over a full weekday and weekend period to capture all notable sources of noise and to establish baseline levels of noise at existing and proposed receptors.

In order to achieve the necessary criteria at the receptors, E3P have recommended an overheating assessment is conducted for certain apartments in addition to higher specification glazing.

Plant noise emission limits have been set for any proposed fixed plant items.

The assessment has shown that, with mitigation measures in place, no adverse impact is predicted at the receptors, externally or internally.

END OF REPORT

APPENDIX I

LIMITATIONS



GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P "Terms of Business" or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.
3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.
4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

NOISE AND VIBRATION IMPACT ASSESSMENTS

5. Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment.
6. Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance.
7. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects' responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.
8. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.
9. E3P does not warrant work/data undertaken/provided by others.

APPENDIX II

GLOSSARY



NOISE

Noise is defined as unwanted sound. Human ears are 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 noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LAeq, LA90 etc., according to the parameter being measured.

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(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 8 **Typical Sound Pressure Levels**

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20-30	Quiet bedroom at night
30-40	Living room during the day
40-50	Typical office
50-60	Inside a car
60-70	Typical high street
70-90	Inside a factory
100-110	Burglar alarm at 1 m away
110-130	Jet aircraft on take off
140	Threshold of pain



ACOUSTIC TERMINOLOGY

Table 9 Terminology

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
LAeq, T	LAeq is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
LAmx	LAmx is the maximum A-weighted sound pressure level recorded over the period stated. LAmx is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L10 and L90	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L90 is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L10 index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

APPENDIX III

MEASURED SOUND PRESSURE LEVELS



Table 10 Hourly measured sound pressure data – NMP1

Measurement start time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Measured Maximum Noise Level, $L_{Amax,fast}$ (dB)
03/05/2024 07:00	63.3	47.1	86.3
03/05/2024 08:00	64.6	52.5	78.2
03/05/2024 09:00	63.5	49.0	78.8
03/05/2024 10:00	63.1	48.6	81.2
03/05/2024 11:00	63.5	50.8	76.2
03/05/2024 12:00	63.0	50.3	77.9
03/05/2024 13:00	63.5	51.0	76.2
03/05/2024 14:00	64.0	52.2	74.1
03/05/2024 15:00	64.8	53.7	84.0
03/05/2024 16:00	65.0	53.0	88.0
03/05/2024 17:00	65.2	53.1	76.3
03/05/2024 18:00	65.7	54.2	77.4
03/05/2024 19:00	67.0	53.1	90.6
03/05/2024 20:00	65.9	53.9	76.4
03/05/2024 21:00	68.7	54.1	95.0
03/05/2024 22:00	67.9	55.6	79.7
03/05/2024 23:00	67.4	54.3	89.3
04/05/2024 00:00	67.3	50.8	95.2
04/05/2024 01:00	64.6	46.2	81.2
04/05/2024 02:00	61.8	37.7	81.4
04/05/2024 03:00	60.6	37.0	78.4
04/05/2024 04:00	59.0	36.1	78.7
04/05/2024 05:00	58.4	36.7	76.7
04/05/2024 06:00	60.7	37.9	80.5
04/05/2024 07:00	62.6	41.8	78.5
04/05/2024 08:00	64.6	48.1	80.0
04/05/2024 09:00	64.7	47.8	76.0
04/05/2024 10:00	65.1	50.3	77.8
04/05/2024 11:00	65.0	53.1	78.1
04/05/2024 12:00	65.4	51.5	80.3
04/05/2024 13:00	66.7	51.8	91.6
04/05/2024 14:00	68.7	52.7	97.8
04/05/2024 15:00	65.1	51.9	78.4
04/05/2024 16:00	65.5	53.0	76.9
04/05/2024 17:00	67.0	50.4	94.5
04/05/2024 18:00	64.8	51.1	76.6
04/05/2024 19:00	64.6	52.5	79.4
04/05/2024 20:00	66.6	51.2	94.3
04/05/2024 21:00	65.0	52.2	86.0
04/05/2024 22:00	66.3	53.4	90.6
04/05/2024 23:00	66.0	53.2	92.4
05/05/2024 00:00	64.3	49.9	79.5
05/05/2024 01:00	65.4	48.0	90.1
05/05/2024 02:00	62.1	40.9	77.3
05/05/2024 03:00	61.1	39.4	79.7
05/05/2024 04:00	58.6	38.1	75.8
05/05/2024 05:00	58.4	38.1	79.2
05/05/2024 06:00	57.1	37.8	73.5



Measurement start time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Measured Maximum Noise Level, $L_{Amax,fast}$ (dB)
05/05/2024 07:00	60.1	39.0	78.2
05/05/2024 08:00	61.0	43.0	80.8
05/05/2024 09:00	62.0	44.8	77.5
05/05/2024 10:00	63.3	44.4	84.6
05/05/2024 11:00	63.3	47.8	78.0
05/05/2024 12:00	64.5	50.1	87.2
05/05/2024 13:00	63.7	48.8	79.3
05/05/2024 14:00	63.8	49.9	85.6
05/05/2024 15:00	64.0	51.3	86.7
05/05/2024 16:00	64.1	49.1	87.1
05/05/2024 17:00	63.7	50.5	81.4
05/05/2024 18:00	63.2	50.9	82.7
05/05/2024 19:00	62.1	51.6	77.9
05/05/2024 20:00	71.3	51.2	101.5
05/05/2024 21:00	63.7	51.1	89.6
05/05/2024 22:00	65.3	52.0	92.2
05/05/2024 23:00	66.5	50.9	97.2
06/05/2024 00:00	67.0	48.0	98.9
06/05/2024 01:00	63.4	44.8	90.5
06/05/2024 02:00	60.0	36.0	81.9
06/05/2024 03:00	58.8	30.0	75.8
06/05/2024 04:00	57.2	33.2	81.2
06/05/2024 05:00	57.0	37.9	78.2
06/05/2024 06:00	57.9	38.9	77.5
06/05/2024 07:00	60.0	40.8	76.7
06/05/2024 08:00	60.3	40.4	78.1
06/05/2024 09:00	61.0	41.4	77.9
06/05/2024 10:00	62.1	45.3	81.0
06/05/2024 11:00	63.0	47.7	84.4
06/05/2024 12:00	63.2	48.7	83.0
06/05/2024 13:00	63.1	48.8	75.7
06/05/2024 14:00	63.1	50.0	76.6
06/05/2024 15:00	63.4	49.4	80.8
06/05/2024 16:00	63.3	50.2	76.3
06/05/2024 17:00	64.7	50.0	94.8
06/05/2024 18:00	66.3	49.9	97.1
06/05/2024 19:00	63.6	52.4	80.5
06/05/2024 20:00	63.5	51.8	82.6
06/05/2024 21:00	63.5	50.9	79.3
06/05/2024 22:00	64.6	48.5	93.5
06/05/2024 23:00	62.7	46.0	81.6
07/05/2024 00:00	62.1	43.0	87.0
07/05/2024 01:00	61.7	35.2	89.7
07/05/2024 02:00	58.5	37.4	82.1
07/05/2024 03:00	56.5	32.4	78.2
07/05/2024 04:00	54.1	36.3	75.5
07/05/2024 05:00	56.4	40.1	75.6
07/05/2024 06:00	59.3	41.2	74.7
07/05/2024 07:00	62.6	47.2	75.3



Measurement start time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Measured Maximum Noise Level, $L_{Amax,fast}$ (dB)
07/05/2024 08:00	64.1	52.8	81.9
07/05/2024 09:00	63.5	51.4	75.7
07/05/2024 10:00	62.9	50.4	75.3
07/05/2024 11:00	63.3	51.6	91.2
07/05/2024 12:00	70.1	50.6	100.6
07/05/2024 13:00	64.9	50.3	90.9
07/05/2024 14:00	63.6	51.1	82.0
07/05/2024 15:00	64.1	51.8	86.6

Table 11 Hourly measured sound pressure data – NMP2

Measurement start time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Measured Maximum Noise Level, $L_{Amax,fast}$ (dB)
03/05/2024 07:00	49.5	41.6	66.7
03/05/2024 08:00	49.7	43.7	62.5
03/05/2024 09:00	48.7	40.8	61.7
03/05/2024 10:00	51.7	41.2	75.3
03/05/2024 11:00	50.9	42.6	72.8
03/05/2024 12:00	52.0	43.1	71.2
03/05/2024 13:00	51.2	43.1	73.4
03/05/2024 14:00	53.5	44.8	78.6
03/05/2024 15:00	52.8	45.2	74.2
03/05/2024 16:00	52.8	45.2	67.2
03/05/2024 17:00	52.3	44.4	63.3
03/05/2024 18:00	51.9	45.3	61.2
03/05/2024 19:00	55.2	44.7	81.8
03/05/2024 20:00	52.1	45.2	63.5
03/05/2024 21:00	53.0	45.0	76.0
03/05/2024 22:00	54.0	49.6	61.8
03/05/2024 23:00	54.7	51.2	72.9
04/05/2024 00:00	53.5	48.4	76.2
04/05/2024 01:00	52.3	48.2	64.0
04/05/2024 02:00	48.7	43.4	63.9
04/05/2024 03:00	48.1	43.7	59.4
04/05/2024 04:00	50.1	43.8	63.2
04/05/2024 05:00	48.0	43.0	59.4
04/05/2024 06:00	49.0	44.1	61.8
04/05/2024 07:00	53.0	49.7	61.0
04/05/2024 08:00	51.8	46.7	62.2
04/05/2024 09:00	51.8	45.7	59.5
04/05/2024 10:00	52.5	46.3	65.7
04/05/2024 11:00	52.0	46.4	63.4
04/05/2024 12:00	51.7	45.4	61.5
04/05/2024 13:00	53.4	45.8	76.4
04/05/2024 14:00	55.6	45.6	84.3
04/05/2024 15:00	51.6	44.7	62.0
04/05/2024 16:00	51.5	44.9	63.3



Measurement start time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Measured Maximum Noise Level, $L_{Amax,fast}$ (dB)
04/05/2024 17:00	52.5	42.3	74.2
04/05/2024 18:00	51.0	42.1	72.2
04/05/2024 19:00	51.5	44.0	65.6
04/05/2024 20:00	52.6	43.5	76.0
04/05/2024 21:00	50.0	42.7	69.9
04/05/2024 22:00	51.6	44.6	72.7
04/05/2024 23:00	51.6	45.2	72.5
05/05/2024 00:00	50.6	44.3	65.1
05/05/2024 01:00	50.9	42.3	72.0
05/05/2024 02:00	47.3	38.1	59.0
05/05/2024 03:00	46.6	37.3	62.2
05/05/2024 04:00	48.5	38.8	59.9
05/05/2024 05:00	46.1	37.3	62.1
05/05/2024 06:00	46.5	37.0	61.1
05/05/2024 07:00	48.1	36.8	61.0
05/05/2024 08:00	47.4	37.9	62.1
05/05/2024 09:00	49.2	38.1	68.6
05/05/2024 10:00	50.1	38.6	70.3
05/05/2024 11:00	48.1	39.5	61.1
05/05/2024 12:00	49.7	41.2	70.3
05/05/2024 13:00	48.7	41.3	59.2
05/05/2024 14:00	49.3	41.5	65.5
05/05/2024 15:00	53.6	43.4	67.8
05/05/2024 16:00	50.0	41.3	72.4
05/05/2024 17:00	51.3	42.2	67.1
05/05/2024 18:00	49.6	42.2	65.3
05/05/2024 19:00	49.5	42.6	73.8
05/05/2024 20:00	56.1	42.9	84.6
05/05/2024 21:00	49.6	44.0	75.5
05/05/2024 22:00	50.4	43.2	74.4
05/05/2024 23:00	50.6	42.0	78.6
06/05/2024 00:00	52.8	39.7	84.1
06/05/2024 01:00	48.0	35.7	73.9
06/05/2024 02:00	44.8	31.6	65.3
06/05/2024 03:00	43.5	28.9	58.3
06/05/2024 04:00	47.7	34.2	63.4
06/05/2024 05:00	47.1	36.5	63.5
06/05/2024 06:00	48.0	37.7	59.7
06/05/2024 07:00	49.0	37.6	60.6
06/05/2024 08:00	47.7	36.7	62.2
06/05/2024 09:00	46.7	36.7	62.8
06/05/2024 10:00	47.8	38.2	62.7
06/05/2024 11:00	51.6	40.7	65.8
06/05/2024 12:00	50.8	40.9	64.9
06/05/2024 13:00	48.3	41.6	58.8
06/05/2024 14:00	49.1	41.9	65.3
06/05/2024 15:00	51.6	43.0	65.3
06/05/2024 16:00	50.7	42.3	65.4
06/05/2024 17:00	49.9	43.0	69.8



Measurement start time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Measured Maximum Noise Level, $L_{Amax,fast}$ (dB)
06/05/2024 18:00	50.0	42.6	74.5
06/05/2024 19:00	49.3	43.2	68.9
06/05/2024 20:00	52.9	44.1	68.2
06/05/2024 21:00	48.8	42.1	64.3
06/05/2024 22:00	48.6	38.9	73.7
06/05/2024 23:00	47.9	39.6	62.2
07/05/2024 00:00	46.9	37.8	67.1
07/05/2024 01:00	46.2	31.4	71.6
07/05/2024 02:00	43.7	35.1	65.0
07/05/2024 03:00	42.4	31.7	62.1
07/05/2024 04:00	48.8	36.9	63.3
07/05/2024 05:00	46.0	39.2	59.4
07/05/2024 06:00	47.5	40.5	60.2
07/05/2024 07:00	62.0	45.2	93.6
07/05/2024 08:00	62.3	47.7	81.8
07/05/2024 09:00	55.2	45.7	76.6
07/05/2024 10:00	63.8	47.3	94.1
07/05/2024 11:00	58.3	46.5	86.5
07/05/2024 12:00	56.5	45.5	84.1
07/05/2024 13:00	58.3	46.8	87.0
07/05/2024 14:00	60.1	47.2	79.2
07/05/2024 15:00	59.1	45.3	78.6

APPENDIX IV

FIGURES

Figure 3 - Daytime Grid Noise Map - Calculation at 1.5m above ground level



Project:
69 Dickenson Road,
Manchester

Project-No:
51-120

Client:
Manchester City
Council

**Daytime Noise Level,
LAeq,16hr (dB)**

...	≤ 47
47 < ...	≤ 50
50 < ...	≤ 55
55 < ...	≤ 57
57 < ...	≤ 60
60 < ...	≤ 62
62 < ...	≤ 65
65 < ...	≤ 67
67 < ...	

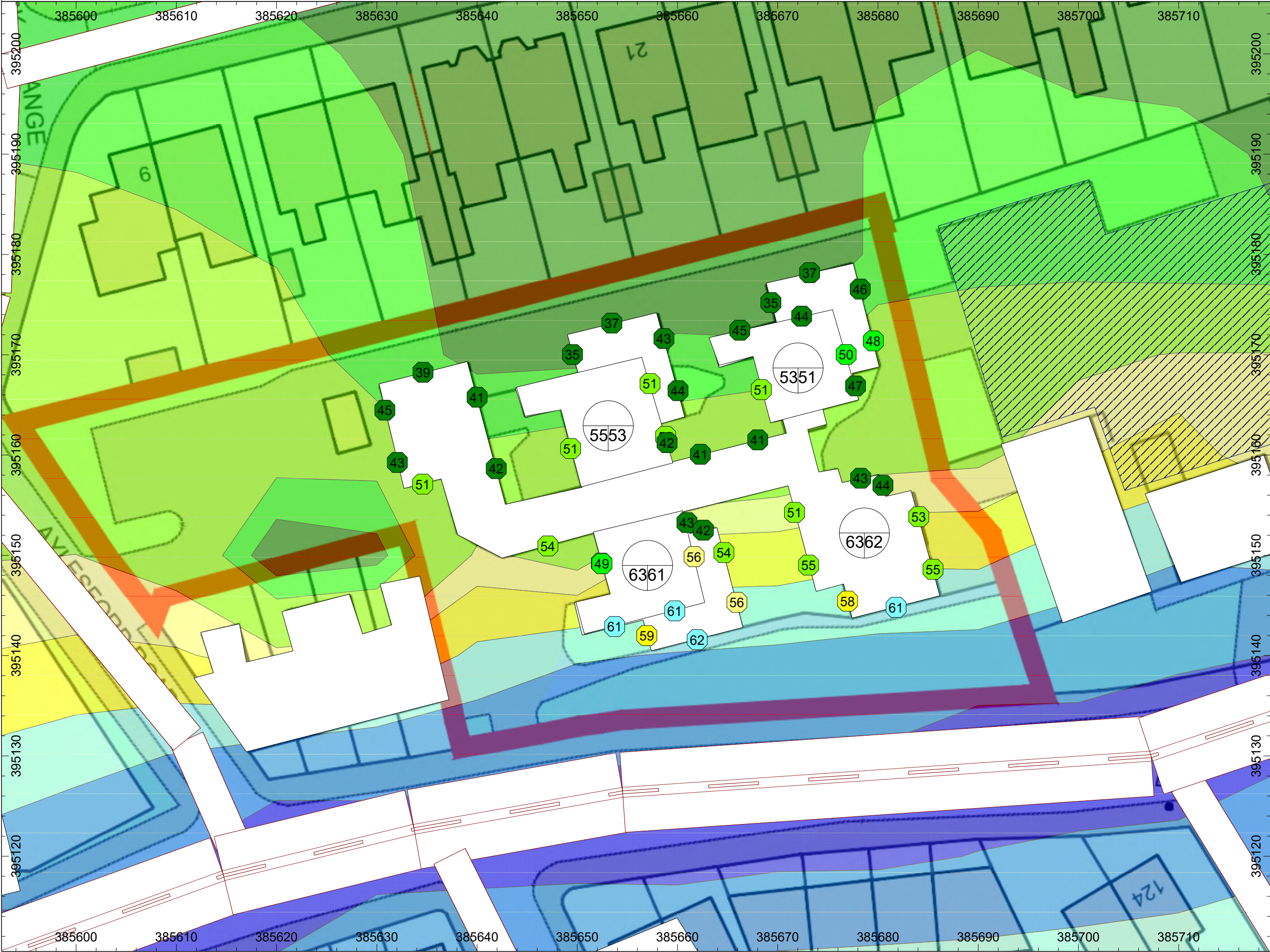
Noise Map Objects

- Area Source
- Road
- Building
- Building Evaluation
- Calculation Area

e3p

Project Engineer: L Faulkner
Date: 08/05/2024

Figure 4 - Night-time Grid Noise Map - Calculation at 4m above ground level



Project:
69 Dickenson Road,
Manchester

Project-No:
51-120

Client:
Manchester City
Council

**Night-time Noise Level,
LAeq,8hr (dB)**

...	≤ 47
47 < ...	≤ 50
50 < ...	≤ 55
55 < ...	≤ 57
57 < ...	≤ 60
60 < ...	≤ 62
62 < ...	≤ 65
65 < ...	≤ 67
67 < ...	

Noise Map Objects

- Area Source
- Road
- Building
- Building Evaluation
- Calculation Area

Project Engineer: L Faulkner
Date: 08/05/2024