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2 GLOUCESTER ROAD, LUTON

Environmental Noise Assessment

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THINKING **DIFFERENTLY**

2 GLOUCESTER ROAD, LUTON

Environmental Noise Assessment

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CONTENTS

1.0 INTRODUCTION

The purpose of this document is to outline the standards and regulations applicable to the proposed 2 Gloucester Road, Luton development and perform a façade assessment to ensure internal noise levels meet the required internal noise level criteria. The report also details plant noise limits that can be used at a future date.

The report provides details of the environmental noise surveys undertaken and the resultant predicted noise levels, assessment levels and specifications to meet the criteria.

1.1 Energy Use

In order to address the climate emergency, reducing the embodied and operational energy of new development is an important consideration. Recent changes to building regulations and local planning policies are improving the efficiency of buildings with a drive towards net zero carbon design.

One aspect of this is to design highly efficient services, maximising passive ventilation opportunities reducing the reliance upon mechanical systems particularly for cooling during warmer summertime periods.

A greater reliance upon passive ventilation systems, can however provide challenges to new residential schemes particularly were located within noisy environments, due to the introduction of specific internal noise criteria during overheating ventilation. 'Good Acoustic Design' is therefore a critical aspect in ensuring the energy aspirations for a scheme are efficiently met.

1.2 Design Approach

A 'Good Acoustics Design' approach has been adopted on this scheme through considering the principles outlined within ProPG Planning and Noise and by MACH's approach to the design of residential building for the proposed development at 2 Gloucester Road, Luton.

The following aspects of acoustics design are therefore addressed within this report.

1.2.1 Noise Ingress

Achieving appropriate Indoor ambient noise levels within residential dwellings is an important consideration as noise can have a significant effect on the health and quality of life of individuals and communities where noise exposure can lead to a range of adverse effects including sleep disturbance, annoyance and health affects.

BS8233 is typically called upon during planning process, providing indoor ambient noise requirements within dwellings. However, this document does not provide a direct correlation between internal noise and ventilation rates. Within urban environments due to noise from transport infrastructure it is not possible meet the requirements of BS8233 with windows open whilst complying with the overheating criteria within CIBSE TM59. In light of this, in 2021 the government released Approved Document O – Overheating which provides increased internal noise limits within dwellings during overheating to those outlined within BS8233, with the aim being to promote natural ventilation, while maintaining suitable internal noise requirements.

This document therefore outlines the various internal noise requirements for the various ventilation rates which are discussed in the following section and provides façade specifications such to achieve these criteria.

1.2.2 External Noise - Amenity Noise

Providing external amenity space of a good standard is considered to be good design although not always achievable where development is necessary or desirable in noisy urban environments. This report therefore outlines external amenity noise targets and provides an assessment of these areas.

2.0 PERFORMANCE DOCUMENTS

2.1 Performance Specification

The following documents have been considered in the assessment of environmental noise.

Assessment	Document	Summary
Planning Policy & Guidance	National Planning Policy Framework (NPPF) February 2019	This sets out the UK government's planning policies for England and how these are seen to be applied.
	Noise Policy Statement for England (NPSE).	This aims to provide clarity on current policies and practices to enable noise management decisions to be made and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise
Indoor Ambient Noise	ProPG – Planning & Noise	Provides guidance on the management of noise within the planning process and introduces concept of Good Acoustics Design
	BS8233:2014	Provides Internal noise requirements for living rooms and bedrooms during the background ventilation condition
	WHO Guidelines for Community Noise	Provides maximum internal noise criteria to prevent sleep disturbance
	Approved Document 0	Provides internal noise criteria during overheating during the night time
Amenity Noise	ProPG – Planning & Noise	Provides guidance on the management of noise within the planning process
	BS8233:2014	Provides guidance on noise levels within outdoor amenity spaces

Table 2.1: Performance Standards

2.2 Planning Policy

2.2.1 National Planning Policy Framework

The current National Planning Policy Framework (NPPF), December 2023, sets out the Government's planning policies for England.

With regards to noise impact, Paragraph 191 of the NPPF states the following:

"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[69];

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. "

Paragraph 193 goes on to state:

Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

2.2.2 Noise Policy Statement for England

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

Noise Policy Vision: Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

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

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

Observed Effect Level: In order to fit an objective assessment of "significant adverse" and "adverse" impacts, the NPSE introduced the concept of categorising the impact from noise pollution into different observed effect level categories. This has been expanded further within the more recent document "National Planning Policy Guidance – Noise".

2.2.3 Local Planning Policy and Guidance

At this stage of the project MACH are unable to ascertain specific planning policies relating to Luton Council. This will be required to be addressed at a later date.

2.2.4 Planning Conditions

At the time of writing MACH is not aware of any specific planning conditions applicable to the proposed development.

2.2.5 PropPG

ProPG Planning and Noise published in May 2017 by the Association of Noise Consultants (ANC) was produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. ProPG aims to encourage better acoustic design of new residential developments promoting good health and well-being through the effective management of noise. ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources.

The process described within ProPG outlines a risk-based 2-stage approach to assess the impact of noise, where an initial risk assessment of the site is undertaken, and where the site is subject to negligible risks of noise should not normally be prevented on noise grounds. Where higher levels of risk from noise are predicted a more detailed noise assessment which considers the following four key elements should be undertaken:

- Element 1 – demonstrating a "Good Acoustic Design Process";
- Element 2 – observing internal "Noise Level Guidelines";
- Element 3 – undertaking an "External Amenity Area Noise Assessment"; and
- Element 4 – consideration of "Other Relevant Issues".

2.3 Indoor Ambient Noise Criteria

2.3.1 Ventilation Modes

The table below provides a summary of different ventilation 'conditions or modes' for bedroom and living spaces which have been adopted for this scheme. Note that there is a difference in definition between 'Purge' and 'Overheating' ventilation scenarios.

Ventilation Condition	Description
Whole Dwelling / Background	Continuous low level flow rates to provide fresh air and remove smells.
Overheating	Potentially long periods of increased ventilation during the summer to maintain occupant thermal comfort.
Purge	Short periods of high flow rate ventilation to remove smoke or smells (e.g. from cooking or decorating). The acoustic impact of purge ventilation does not need to be considered as it will only occur over a short period of time.

Table 2.2: Ventilation Types

2.3.2 ProPG

With regards to internal 'Noise Level Guidelines' ProPG comments that suitable guidance on internal noise levels can be found in "BS8233:2014: Guidance on sound insulation and noise reduction for buildings". Table 4 in Section 7.7.2 of the standard suggests indoor ambient noise levels for dwellings (when unoccupied) and states that "in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values".

ProPG also advises that '*where a scheme is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition. In this case a more detailed assessment of the potential impact on occupants should be provided in the ADS'.*

2.3.3 BS8233

BS8233:2014 - Guidance on sound insulation and noise reduction for buildings provides guidance on internal noise levels within dwellings which is typically called upon in planning. BS8233 states that to achieve adequate sleeping and living conditions, the following targets should be met.

These targets are the sum of mechanical services and noise break in through the façade. Additional guidance is provided within BS 8233:2014 where a +5dB relaxation to the targets can still achieve reasonable internal conditions.

Activity	Location	Day (07:00-23:00)	Night (23:00-07:00)
Resting	Living Room	35 dB $L_{Aeq,\ 16\ Hour}$ (+5dB)	-
Dining	Dining Room	40 dB $L_{Aeq,\ 16\ Hour}$ (+5dB)	-
Sleeping	Bedroom	35 dB $L_{Aeq,\ 16\ Hour}$ (+5dB)	30 dB $L_{Aeq,\ 8\ Hour}$ (+5dB)

Table 2.3: BS 8233 Internal Noise Limits

Note 5 within BS8233 advises that 'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.' It is therefore proposed that these internal noise targets will be achieved with windows closed and means of background ventilation enabled.

BS 8233:2014 provides no definitive methodology for assessment of L_{Amax} levels. The WHO Community Noise Guidelines 1998 states that in order to avoid sleep disturbance within bedrooms during the night, the internal sound pressure level should not exceed 45 dB $L_{Amax.}$ It is widely accepted that noise events should not exceed 45 dB L_{Amax} more than 10-15 times during the night-time period (23:00 – 07:00).

2.3.4 Approved Document O

Approved Document O was released on December 15th 2021, and outlines a set of performance criteria for mitigating overheating in residential accommodation. In addition to overheating criteria, the document also outlines a requirement for internal noise levels, if noise has been considered by the local planning authority. Guidance is provided to minimise the risk of occupants closing windows (and thus overheating) by ensuring that noise levels are below a certain threshold during night-time periods. Approved Document O therefore addresses internal noise levels within bedrooms only. These internal noise criteria are outlined in the Table 2.4 below which are mandatory for this development.

Location	Time	Maximum Internal Noise Level
Bedroom	23:00 – 07:00	40 dB $L_{Aeq,\ 8\ Hour}$ 55 dB L_{AfMax} *
* Not to be exceeded more than 10 times a night		

Table 2.4: Approved Document O acoustic criteria

2.3.5 TM59

Technical Memorandum 59 (TM59) "Design methodology for the assessment of overheating risk in homes" provides a methodology for the thermal assessment of overheating within residential dwellings. To comply with these requirements the projects thermal modeller will assess overheating in accordance with TM59 providing the opening areas for windows and vents within the façade.

As a result of the low levels of attenuation offered by openings such as windows within facades, the BS8233 requirements are often not met, therefore Approved Document O has been introduced to ensure compliance with TM59 whilst providing suitable indoor ambient noise levels and encourage natural ventilation.

2.4 External Noise – Amenity

2.4.1 ProPG

Element 3 as listed within section 2.2.5 relates to the assessment of external amenity space where; the ProPG external amenity area noise assessment reflects and extends the advice contained in BS8233:2014 and the current Government guidance in PPG Noise, where full details of the external amenity area noise assessment should be included in an Acoustic Design Statement (ADS).

2.4.2 BS8233

BS8233 states, for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognized 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, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, the specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB LAeq,T or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.

3.0 DESIGN TARGET

This section provides a summary of the acoustic performance criteria which have been adopted for the proposed development.

3.1 Summary of Indoor Ambient Noise Level Requirements

The table below provides a summary of the indoor ambient noise level requirements for residential dwellings. The table includes criteria for the various the ventilation mode types of spaces. Please also note that there is a difference in definition between 'Purge' and 'Overheating' ventilation scenarios.

Ventilation Condition	Description	Acoustic Performance Criteria
Whole Dwelling / Background	Continuous low level flow rates to provide fresh air and remove smells.	• Bedrooms - 30dB $L_{Aeq,8hr}$ • Bedrooms - 35dB $L_{Aeq,16hr}$
Overheating	Potentially long periods of increased ventilation during the summer to maintain occupant thermal comfort.	• Bedrooms – 40dB $L_{Aeq,8hr}$ • Bedrooms – 55dB L_{Afmax}
Purge	Short periods of high flow rate ventilation to remove smoke or smells (e.g., from cooking or decorating). The acoustic impact of purge ventilation does not need to be considered as it will only occur over a short period of time.	• None

Table 3.1: Summary of indoor ambient noise criteria

3.2 Summary of Amenity Noise Level Criteria

As discussed within Section 1.2.2, external noise limits may not be achievable in all circumstances where development might be desirable. However, where feasible good acoustic design principles will be adopted in order to achieve lowest practicable levels and ideally provide outdoor amenity which is ≤55dB $L_{Aeq,16hr}$.

4.0 NOISE CLIMATE

To establish the existing environmental noise levels on site, a noise survey was conducted between 11:55 on the 22/11/2023 and 12:00 on the 24/11/2023. For more information on the methodology of this survey, site information and survey data, see APPENDIX A - Environmental Noise Survey

4.1 Site Description

The proposed development is located on 2 Gloucester Road, in the urban area of Luton. The surrounding buildings include a mix of residential and industrial/commercial units. The nearest noise sources are road traffic from Park Viaduct and Gloucester Road. The site is in close proximity to industrial units which include, product manufacturers, metal works, car garage and food distribution.

4.2 Site Map

The site in relation to its surroundings and nearest noise sensitive receivers is presented in Figure 4.1.

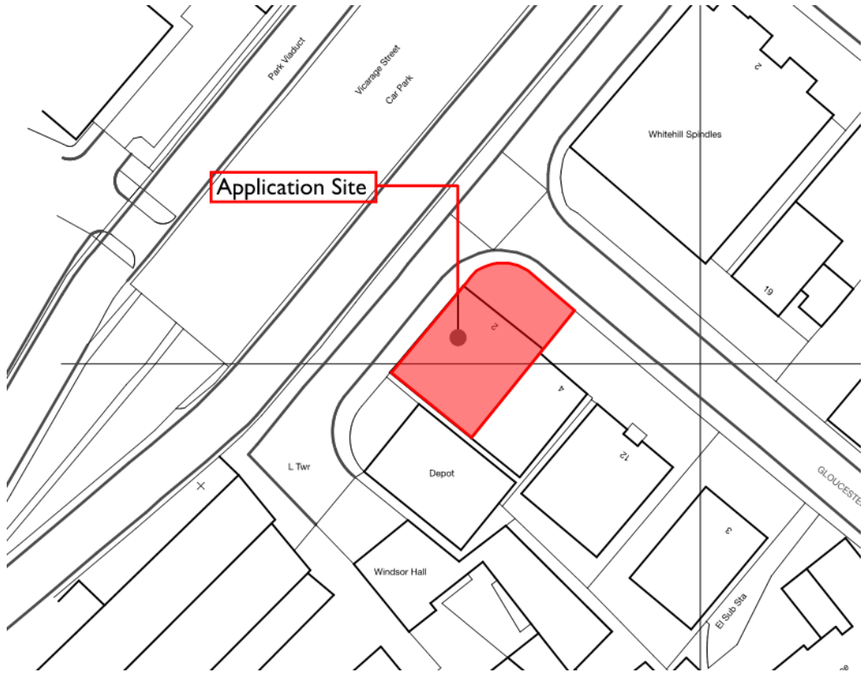

Figure 4.1 - Proposed Development (Red)

4.3 Summary of Noise Survey Results

The tables below present the noise parameters recorded at the fixed microphone position for the ambient (L_{Aeq}) and maximum (L_{Amax}) noise levels. The L_{Aeq} figures presented are the average noise levels during the stated times across the days of the survey, excluding non-representative noise. The L_{Amax} figures presented are the 10th highest measured between 23:00-07:00.

Date	Location	Period, T	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
19/01/2022 - 20/01/2022	Fixed Position 1	Day (07:00 – 23:00)	64	-
		Night (23:00 – 07:00)	60	75
19/01/2022 - 20/01/2022	Fixed Position 2	Day (07:00 – 23:00)	64	-
		Night (23:00 – 07:00)	64	74

Table 4.1 Summary of $L_{Aeq,T}$ and L_{Amax}

5.0 NOISE MODEL

To accurately predict noise levels at each façade, a 3D noise model of the site has been created using CadnaA which is an industry standard noise propagation software. The software calculates how sound travels over distance. The models take into account reflections off hard surfaces, ground absorption, geometrical spreading. The calculations are performed in accordance with ISO 9613: Attenuation of sound during propagation outdoors.

Such to correctly understand and assess the propagation of noise across the site, the model has been calibrated to the noise levels measured on-site. Table 5.1 outlines the CadnaA reference points along with the level used for calibration. Figure 5.1 shows the locations of the same reference points for further clarification.

Measurement Position	Location
F1	Park Viaduct
F2	Gloucester Road

Table 5.1: Reference Points for Model Calibration

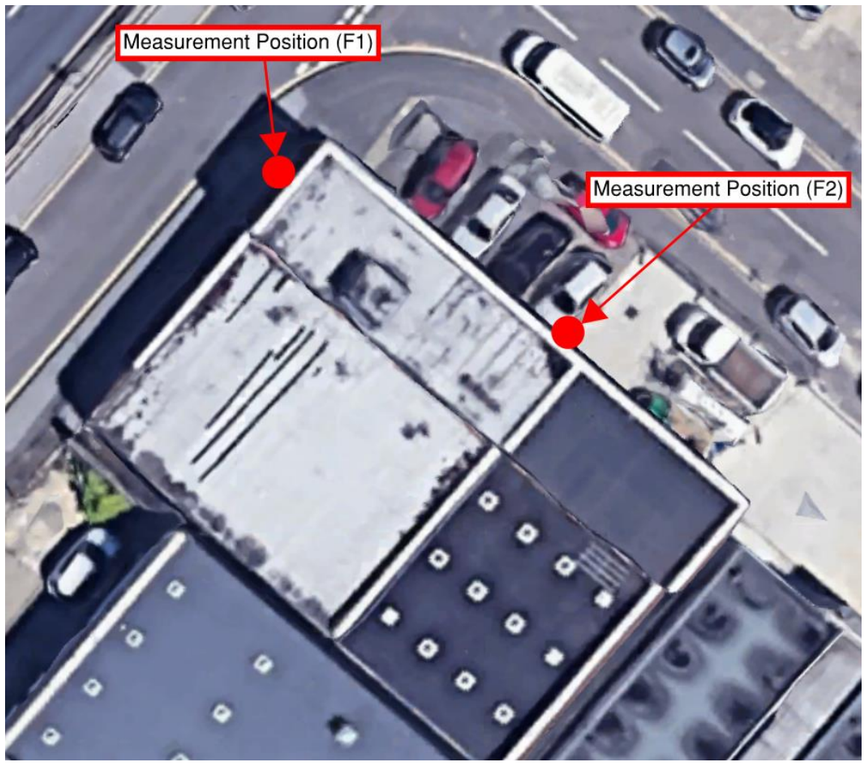

Figure 5.1: CadnaA Reference Points

It has been difficult to ascertain accurate topographical data for the site of 2 Gloucester Road. Florian Winkler (Architect) issued a site plan which is shown below. The drawing shows a small section of topographical data for the Park Road Viaduct.

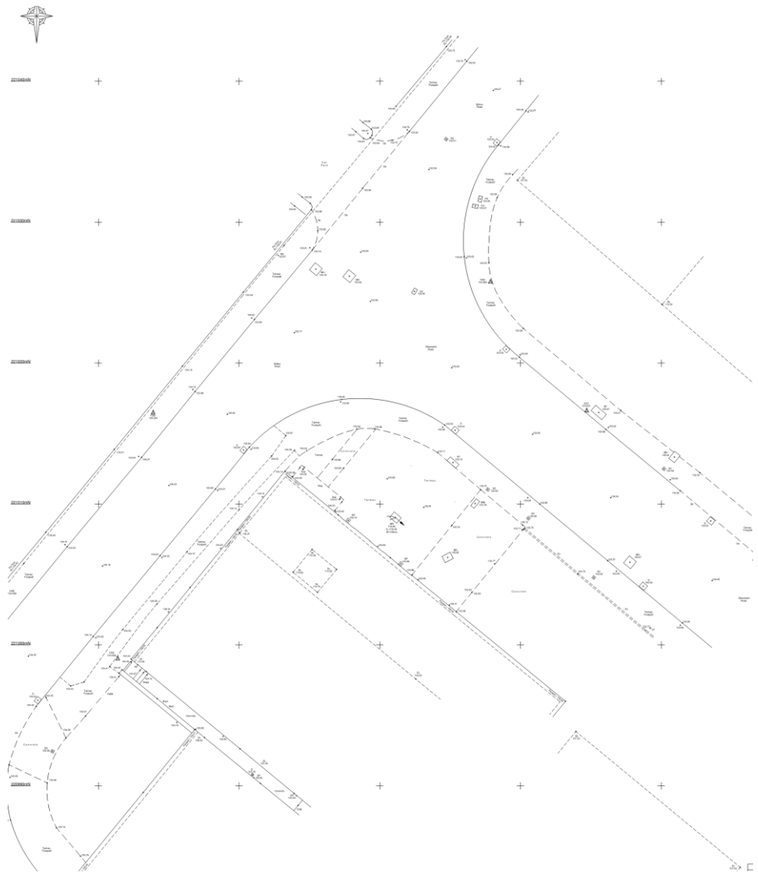

Figure 5.2 Topographical data of the site

The figure below illustrates a noise map of the predicted façade levels. At the proposed development contains different heights at different parts of the building. MACH have presented the façade noise levels for each specific façade which corresponds to each façade which contain habitable spaces on the façade.

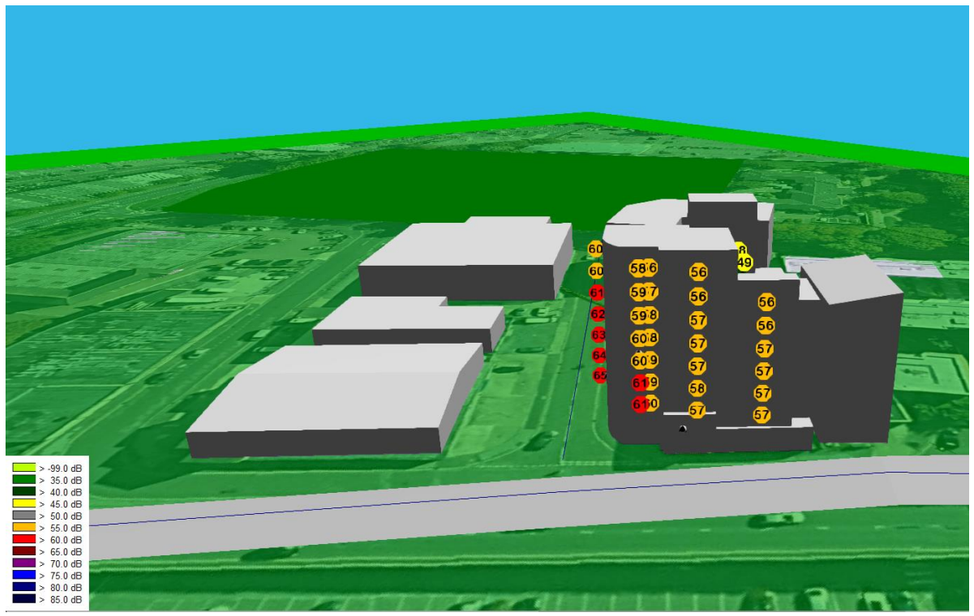

Figure 5.3 – CadnaA Noise Map Showing the Predicted Façade Level (LAeq8hrs)

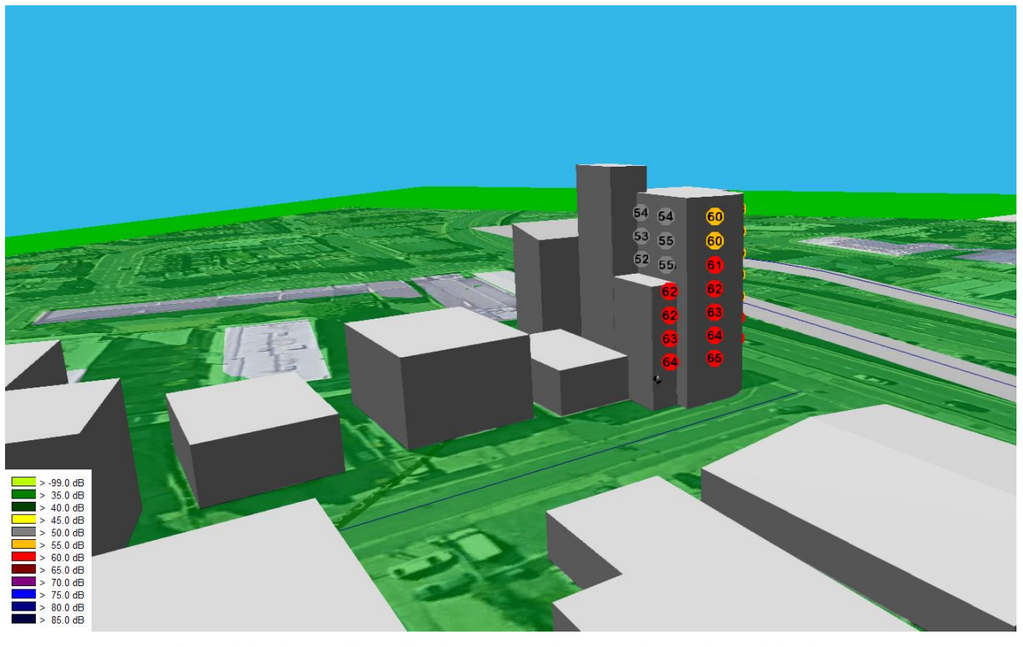

Figure 5.4 – CadnaA Noise Map Showing the Predicted Façade Level (LAeq8hrs)

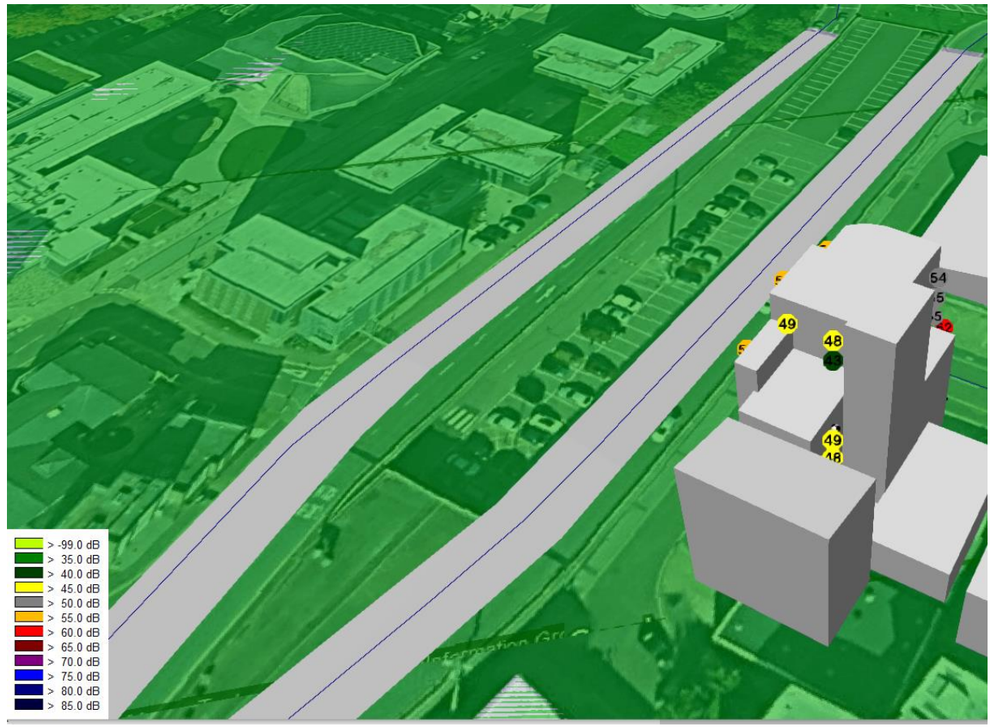

Figure 5.5 – CadnaA Noise Map Showing the Predicted Façade Level (LAeq8hrs)

6.0 FAÇADE ASSESSMENT

6.1 Dominant Acoustic Parameter

MACH have determined the dominant acoustic parameter between the the $L_{Aeq\ Day}$, $L_{Aeq\ Night}$ and L_{Max}. The calculation below shows the worst case acoustic parameter used for the façade assessment.

Microphone Position F1	dB(A)	BS8233 Requirement	Reduction
Day ($L_{Aeq\ 16\ hrs}$)	64	35	29
Night ($L_{Aeq\ 8\ hrs}$)	60	30	30
L_{Amax}	74	45	29
Microphone Position F2	**dB(A)**	**BS8233 Requirement**	**Reduction**
Day ($L_{Aeq\ 16\ hrs}$)	64	35	29
Night ($L_{Aeq\ 8\ hrs}$)	64	30	34
L_{Amax}	75	45	30

Table 2 - Dominant Acoustic Parameter Calculation

MACH have completed the façade assessment using the $L_{Aeq\ 8Hrs}$ as this is the most onerous noise level against the BS8233 Requirements.

6.2 Façade Exposure Categories

Due to the varied predicted noise levels on different facades of the proposed development, noise exposure categories have been set to allow different ventilation and façade specification assessment to be carried out.

Based on the noise survey and 3D noise modelling, spectral data has been derived which has formed the basis for the break-in calculations. The noise levels used in the assessment are shown below.

Façade Exposure Category	Time Period	Sound Pressure Level, dB (Octave Band Centre Frequency, Hz)						
		125	250	500	1000	2000	4000	dB(A)
1	L_{Aeq} Night-time	68	63	61	61	57	47	64
2	L_{Aeq} Night-time	51	45	43	43	38	27	48

Table 6.3: Façade Noise Levels

Figure 6.1: Façade Exposure Category

The figure above shows the two façade exposure categories. Due to the layout of the proposed development the heights of each section of building are different and therefore the only facades that fall under façade exposure category 1 are facades (which include habitable spaces) that are facing South when looking at the image above.

6.3 Façade Specification

The table below provide the minimum sound reduction indices for windows and solid façades, to meet the BS8233 internal noise level requirements. Note that the values presented are representative of the entire window including frames and other elements. The acoustic performance of the chosen systems should be verified via a laboratory test certificate.

MACH has not provided specific build-ups for the façade or roof, such that there can be flexibility in the design of the new build aspects of the scheme.

Façade Exposure Category	Façade Element	Minimum Required Sound Reduction Indices						
		125	250	500	1000	2000	4000	Weighted – dB
1	Solid Façade	43	42	41	49	54	55	**48** R_w
	Window	29	39	49	52	55	63	**49** R_w
	Trickle Vent	35	39	43	48	53	54	**49** D_{new}
2	Solid Façade	43	42	41	49	54	55	**48** R_w
	Window	28	29	35	38	39	44	**37** R_w
	Trickle Vent	40	36	35	31	32	37	**32** D_{new}

Table 6.4: Minimum Façade Reduction Indices Required For Residential Façades

The assessment is based on windows being closed and background ventilation being provided via trickle vents

With the minimum façade sound reduction elements specified in Table 6.4, the BS8233 internal noise level requirement of 45dB L_{Max} will be achieved. This is the most onerous target which is shown in Section 6.1 and therefore will meet requirements for $L_{Aeq\ Day}$ and $L_{Aeq\ Night}$.

6.4 Overheating Ventilation

This section provides details of the façade assessment during the overheating ventilation condition such to comply with the internal noise criteria during overheating ventilation as required by Approved Document O.

6.4.1 Openable Windows

MACH has looked at the feasibility of openable windows as noise break in through open windows needs to be considered. For natural ventilation, general guidance states the following:

"The laboratory measured airborne sound insulation of partially open single-glazed windows, or double-glazed windows with opposite opening panes is approximately 10-15 dB."

As such, it is conventional for MACH to use 13 dB for the sound reduction of an open window. Based on this, noise break into the development can be estimated as summarised below.

Time Period	Façade Exposure Category	Space	Highest Noise Level Predicted (dB $L_{Aeq,T}$)	Typical Open Window Attenuation (dB)	AVO Internal Noise Limit (dB $L_{Aeq,T}$)	Predicted Indoor Level (dB $L_{Aeq,T}$)
Night L_{Aeq8hr} (2300-0700)	1	Bedrooms & Living Rooms	64	-13	40	51
	2		47			34
Night L_{Amax} (2300-0700)	1	Bedrooms & Living Rooms	78	-13	55	65
	2		62			49

Table 6.5: Open Window Feasibility Summary

As the table shows, based on the noise levels measured, predicted indoor ambient noise levels are likely to be significantly in excess of Approved Document O indoor noise limits on façade exposure category 1 with windows open. Therefore, whilst openable windows can be provided for us at the discretion of the occupants, openable windows should not be relied upon as part of the normal ventilation strategy or as a part of the overheating strategy for this development.

Bedrooms located on exposure category 2 facades may be suitable for cooling through openable windows; however, it is important to note that this assessment is based upon typical open window areas, and an overheating assessment should be carried out to determine the risk of overheating and the open window area required to comply with ADO.

Therefore, MACH would recommend that the scheme employs mechanical ventilation to mitigate against overheating during summer months.

7.0 OUTDOOR AMENITY ASSESSMENT

As per the guidance within ProPG consideration of noise within amenity spaces should also be considered.

7.1 Assessment Criteria

Noise levels within external amenity spaces do not exceed 55dB $L_{Aeq,16hr}$ and ideally 50dB $L_{Aeq,16hr}$.

As discussed within Section 1.2.2 external noise limits may not be achievable in all circumstances where development might be desirable. However, where feasible good acoustic design principles will be adopted in order to achieve the lowest practicable levels and ideally provide outdoor amenity which is $\leq$55dB $L_{Aeq,16hr}$.

7.2 External Amenity Areas

Proposals include balconies for the majority of spaces therefore a simple assessment has been completed to determine the risk of noise issues from external balcony areas.

Figure 7.1:External Amenity Areas

7.3 Predicted Noise Levels

The figure below illustrates the predicted daytime LAeq,16hr noise climate from road and industrial noise sources.

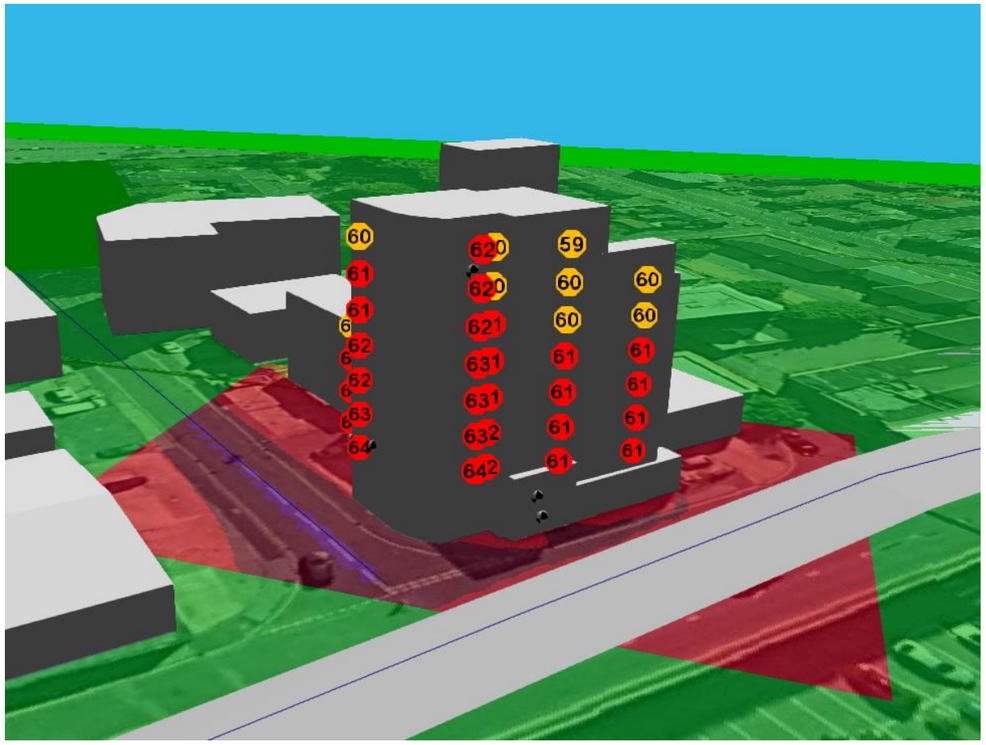

Figure 7.2: Daytime Amenity Areas

Figure 7.2 illustrates the large areas of the site, particularly to the North West and North East exceed the recommended guidance for outdoor amenity noise levels. Figure 7.2 doesn't however include contributions to noise from aircraft.

7.4 Summary

While it is possible to suggest balconies for the residences within the project, it is anticipated that these may surpass the recommended noise levels. Nevertheless, balconies offer private amenity spaces for the occupants, which is a significant benefit, especially considering the nature of the flats. Hence, the use of balconies can be left to the owner's discretion, taking into account the contextual aspects of the site.

8.0 PLANT NOISE LIMITS

The sum of all noise from any plant units should not exceed the limits in Table 8.1 at the window of any existing residential receptor. These plant noise rating level limits have been derived from fixed position F1.

Measurement Period	Average	Measured Background Noise Levels (L_{A90})
Day time (07:00 -23:00)	Modal	57
Night-time (23:00 -07:00)		46

Table 8.1 Maximum plant noise limits at existing residential receptors

APPENDIX A - ENVIRONMENTAL NOISE SURVEY

To establish the existing environmental noise levels on site, a noise survey was conducted between 11:55 on the 22/11/2023 and 12:00 on the 24/11/2023.

This site assessment was undertaken by Chase Bartlett of MACH Group.

A.1 Site Description

The site is in the urban area of Luton. The site is surrounded by noise sources which include road traffic from Park Viaduct and Gloucester Road. A mix of industrial units surround the site which include, metal fabrication, car MOT garage and food distribution.

A.1.1 Subjective Noise Climate (On-site)

Noise Type	Noise Characteristics	Sources
Dominant	A primary contributor of noise levels on the site.	Road Traffic (A505)
Other Noise Contributions	Contributors to the remainder of the noise climate on site.	Industrial Noise

Table A.1.2 Subjective Summary of the Noise Sources

A.1.2 Non-Representative Noise Sources

During the survey, no noise events occurred which would be deemed as atypical of the site location.

A.2 All Measurement Locations

To help with the understanding of the site and measurement locations all the measurement positions are presented on the map below. Photos of the locations in situ are in the following sections.

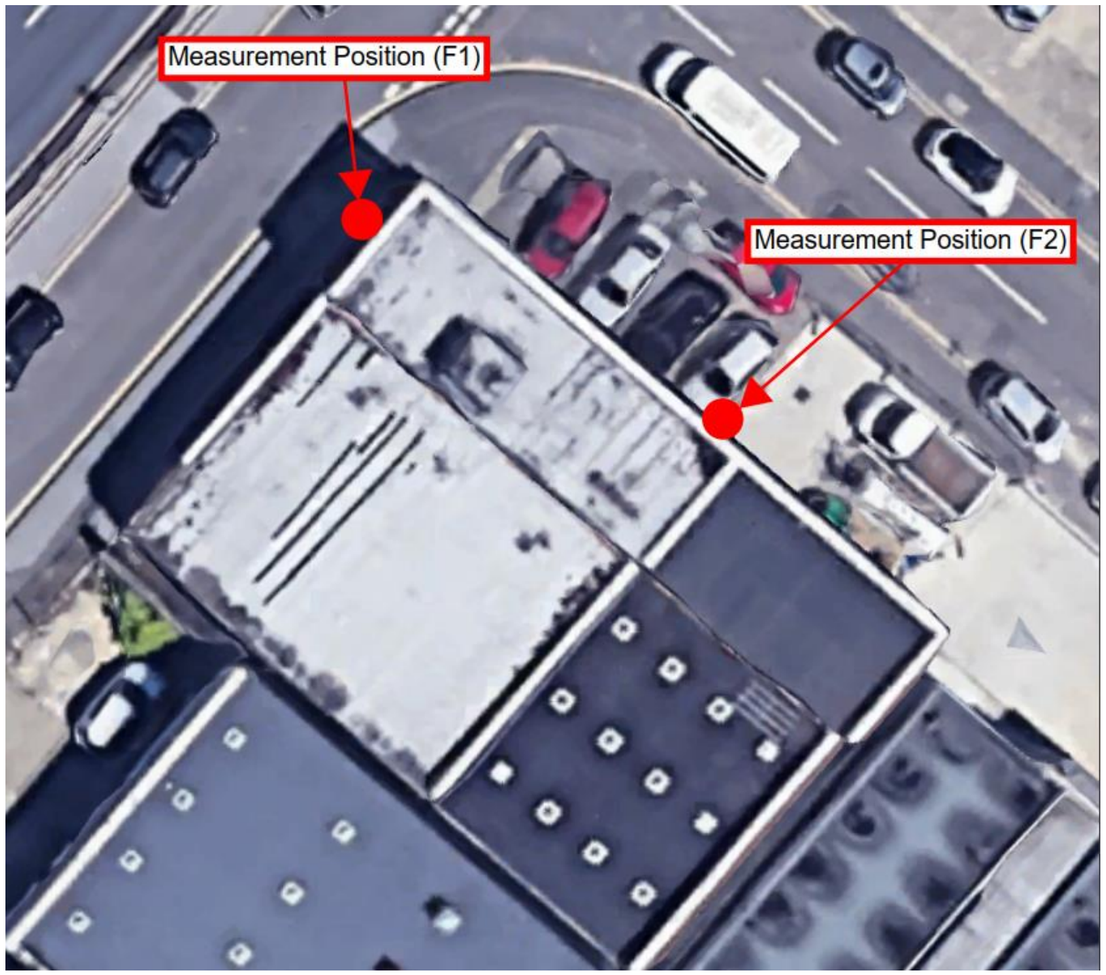

Figure A.2.1 All Measurement Locations on a Map

A.3 Fixed Measurement (F1)

A fixed microphone position was used to record noise levels between 11:55 on the 22/11/2023 and 12:00 on the 24/11/2023, where the fixed long-term meter was set to measure consecutive 'A' weighted 5-minute time samples. Measurements have been taken in free field conditions.

To help with the understanding of the site and the measurement locations, the figures below present the location of the microphone position(s) in situ.

A.3.1 Fixed Measurement Location – F1

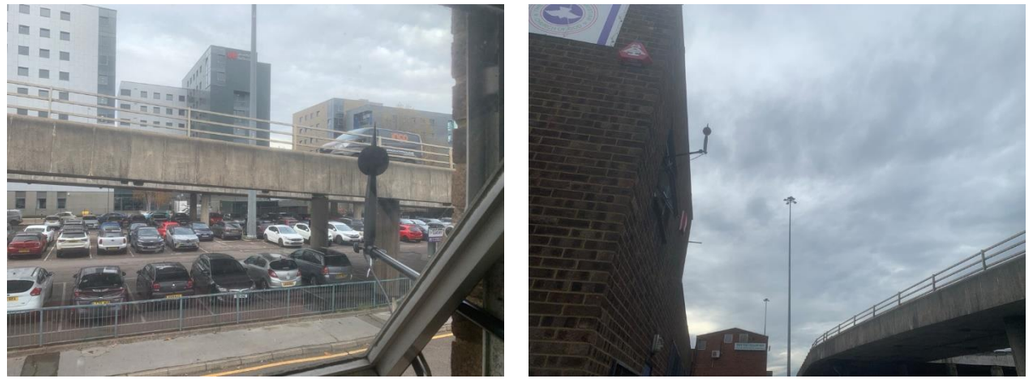

Figure A.3.2 Fixed measurement location in situ

A.3.2 Fixed Measurement Results

The following graph presents the noise levels recorded over the measurement period at the fixed location (F1).

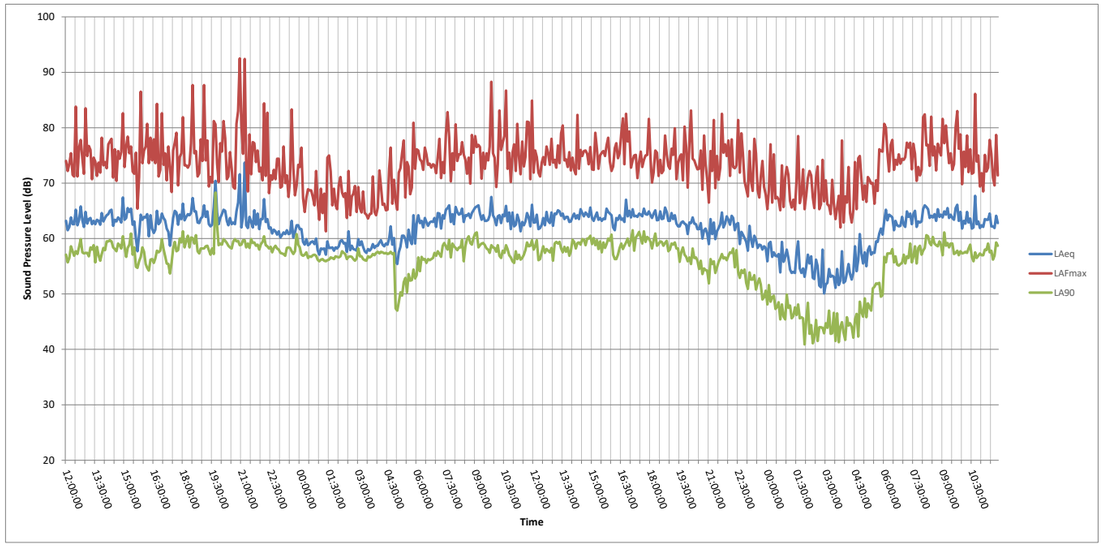

Figure A.3.3 Sound Pressure Level at fixed location, F1

A.4 Fixed Measurement (F2)

A fixed microphone position was used to record noise levels between 12:05 on the 22/11/2023 and 12:00 on the 24/11/2023, where the fixed long-term meter was set to measure consecutive 'A' weighted 5-minute time samples. Measurements have been taken in free field conditions.

To help with the understanding of the site and the measurement locations, the figures below present the location of the microphone position(s) in situ.

A.4.1 Fixed Measurement Location – F2

Figure A.4.4 Fixed measurement location in situ

A.4.2 Fixed Measurement Results

The following graph presents the noise levels recorded over the measurement period at the fixed location (F2).

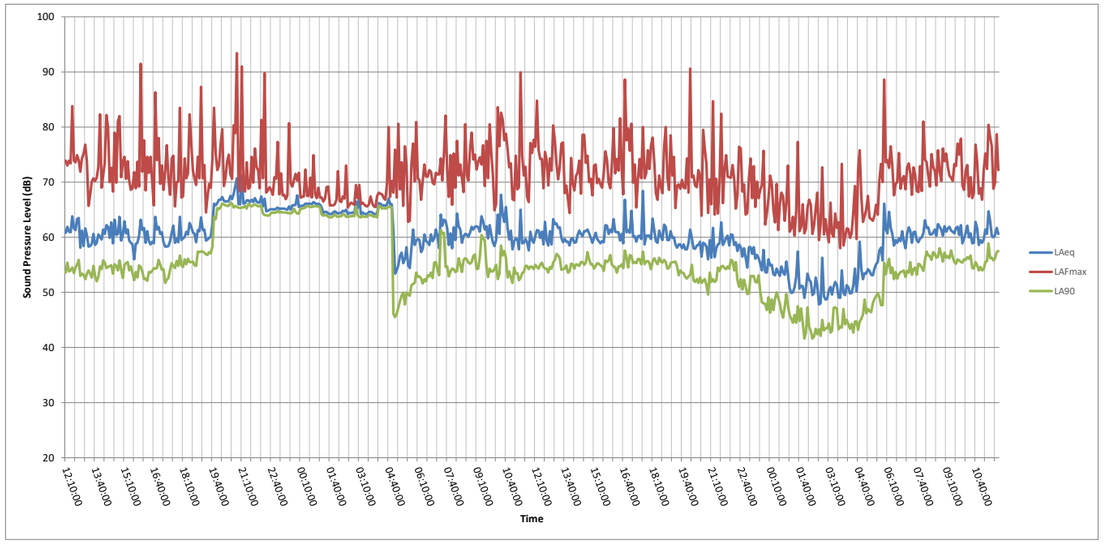

Figure A.4.5 Sound Pressure Level at fixed location, F2

A.5 Measurement Equipment

Item	Serial No.	Last Calibration	Certificate No.	Calibration Due
NTI Precision Sound Analyser XL2 TA	A2A-11002-E0	18/04/2023	190656	18/04/2025
NTI Pre-amplifier MA220	7183	18/04/2023	190656	18/04/2025
Cirrus Microphone Capsule MK:224	214341A	11/04/2023	190553	11/04/2025
Svantek Acoustic Calibrator SV33A	64138	07/06/2023	U44450	07/06/2025
NTI Precision Sound Analyser XL2 TA	A2A-15207-E0	02/02/2023	186910	02/02/2025
NTI Pre-amplifier MA220	7856	02/02/2023	186910	02/02/2025
Cirrus Microphone Capsule MK:224	215285E	02/02/2023	186889	02/02/2025
Svantek Acoustic Calibrator SV33A	64138	07/06/2023	U44450	07/06/2025

Table A.5.3 Measurement Equipment

A.6 Meteorological Conditions

Date	Time (hh:mm)	Temperature (High / Low) (°C)	Humidity (%)	Pressure (hPa)	Wind Speed (m/s)	Wind Direction	Conditions
22/11/2023	06:00	5/4	93	1010	2	SSW	Fair
	12:00	8/6	87	1009	4	WSW	Fair
	18:00	9/8	93	1007	6	W	Fair
23/11/2023	00:00	10/9	94	1007	7	W	Cloudy
	06:00	10/9	94	1005	6	WSW	Mostly Cloudy
	12:00	12/9	82	1003	10	W	Fair/Windy
	18:00	11/9	88	1002	8	W	Cloudy
24/11/2023	00:00	9/6	82	1001	6	NW	Mostly Cloudy
	06:00	8/4	76	1000	7	NW	Cloudy
	12:00	6/-2	57	1000	9	NNW	Partly Cloudy/ Windy

Table A.6.4 Meteorological Conditions