Report for:

P20 Group Ltd

20 Church Street, Twickenham

Noise Impact Assessment

Status: Final **Date: 11.10.2024**

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1. INTRODUCTION

1.1. Background

ACCON UK Limited (ACCON) has been commissioned by P20 Group Ltd to undertake a noise impact assessment in respect of an application for prior approval for the proposed change of use at 20 Church Street, Twickenham, TW1 3NJ.

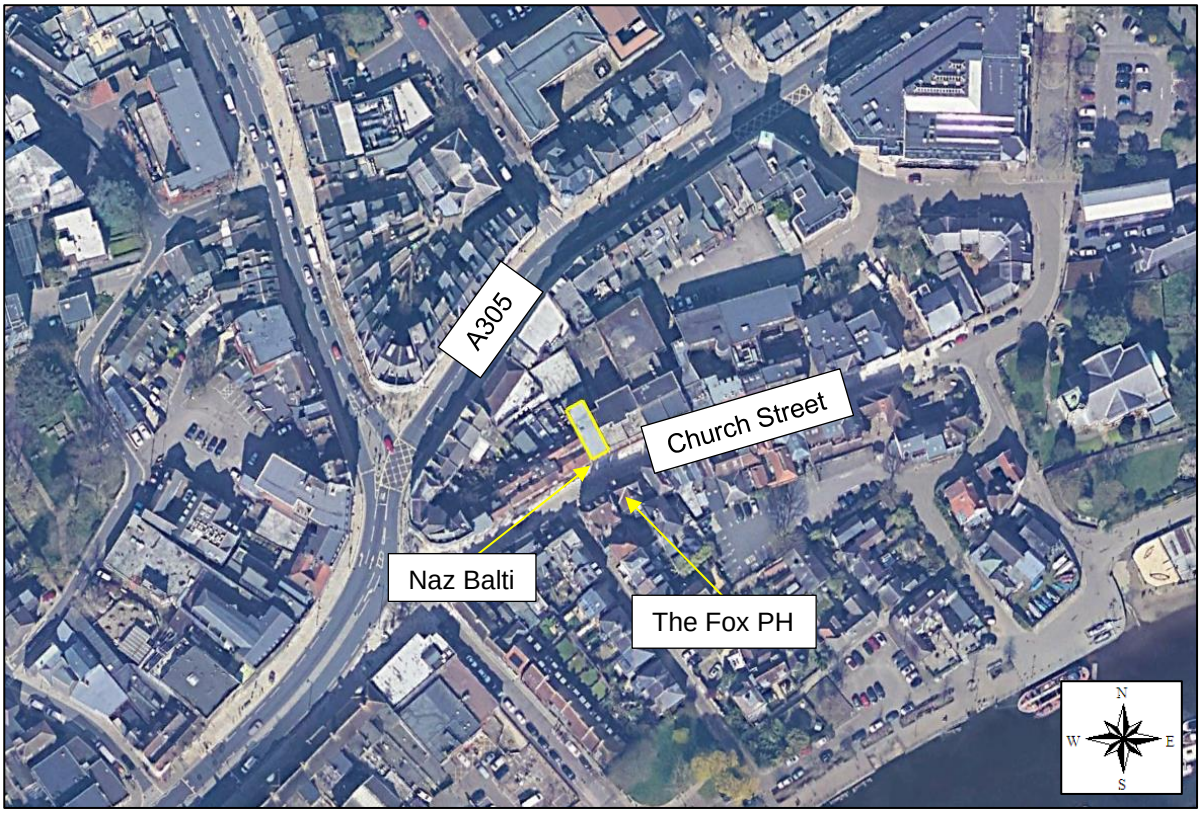
The change of use will comprise of the conversion of the first floor Pilates Studio (Class E) and second floor offices (Class E) to four residential units (Class C3) in total. The existing floor plan is identified in **Figure F.1.1**.

The site is situated within an existing commercial area on Church Street, which predominantly consists of retail shops. The Naz Balti Indian Takeaway is located on the ground floor below the proposed conversion, and The Fox Public House (PH) is located immediately to the south of the property. The A305 is located to the north of the site.

The site is located within the administrative boundary of the London Borough of Richmond upon Thames (LBRuT).

Figure 1.1 provides the site location with the site boundary outlined in yellow.

Figure 1.1: Site Location



This noise assessment is required to determine the impact of existing commercial noise sources on the proposed change of use residential development. Appropriate recommendations for noise mitigation are provided.

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2. THE NATURE, MEASUREMENT AND EFFECT OF NOISE

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to characterise the loudness of that noise. '*Loudness*' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels, for example from 60 dB(A) to 70 dB(A), would represent a doubling in 'loudness'. Similarly, a 10 dB(A) decrease in noise, for example from 70 dB(A) to 60 dB(A), would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible[1]. **Table 2.1** provides typical noise levels of common sources.

Table 2.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

A Glossary of Acoustic Terminology is provided in **Appendix 1.**

[1] Institute of Environmental Management and Assessment (2014). Guidelines for environmental noise impact assessment.

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3. NOISE ASSESSMENT CRITERIA

This section of the report identifies relevant National and Local Authority policy and guidance. Additionally, appropriate British Standards and guidance documents are also referenced.

3.1. National Planning Policy Framework

The revised National Planning Policy Framework (NPPF as amended in December 2023) supersedes the 2012, 2018, 2019 and 2021 versions of the NPPF. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; and as part of this, make effective use of land, help to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate to adapt to climate change including moving to a low carbon economy.

One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser value, where consistent with other policies in the Framework. The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 191 of the NPPF states:

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

a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food and Rural Affairs, 2010));

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."

Additionally, Paragraph 193 states:

"*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.*"

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3.2. Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) aims to "*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*".

Based on concepts from toxicology, it introduces three 'Effect Levels' relevant to the assessment of noise. These are:

- NOEL: No Observed Effect Level: This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
- LOAEL: Lowest Observed Adverse Effect Level: This is the level above which adverse effects on health and quality of life can be detected; and
- SOAEL: Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.

3.3. Planning Practice Guidance

The Planning Practice Guidance for Noise (PPG-N) was published in March 2014 and most recently updated in July 2019. The PPG-N suggests that the most appropriate and cost-effective solutions to potential noise issues are best identified when good acoustic design is considered early in the planning process.

The PPG-N provides the following advice on how to determine the noise impact on development:

"*Plan-making and decision making need to 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.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever 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. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy." (Paragraph 003 Reference ID 30-003-20190722)

The document goes on to acknowledge the levels of noise exposure at which an effect may occur as provided in the NPSE and introduces a fourth effect level:

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- UAE: Unacceptable Adverse Effect: Extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise lead to psychological stress or physical effects.

Where residential development is proposed in the vicinity of existing businesses, community facilities or other activities that produce noise, the PPG-N advises that the applicant (or 'agent of change') need to clearly identify the effects of the existing businesses that may cause a nuisance (including noise) and clearly define the mitigation measures being proposed to address any potential significant adverse effects that are identified. The agent of change needs to not only consider the current activities of the business, but the permitted activities too, even if they are not occurring at the time of the application being made. The PPG-N acknowledges that "*It can be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints.*" (Paragraph 009 Reference ID 30-009-20190722).

It is important to understand that as the PPG-N does not specifically provide any advice with respect to noise levels/limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment and the PPG-N signposts a number of appropriate guidance documents.

3.4. Local Authority Policy and Guidance

3.4.1. London Borough of Richmond upon Thames Local Plan (2018)

London Borough of Richmond upon Thames Local Plan (2018 – 2033) was adopted in July 2018. Relevant sections of the Local Plan have been reproduced below.

Policy LP8: Amenity and Living Conditions

"All development will be required to protect the amenity and living conditions for occupants of new, existing, adjoining and neighbouring properties. The Council will:

1. ensure the design and layout of buildings enables good standards of daylight and sunlight to be achieved in new development and in existing properties affected by new development; where existing daylight and sunlight conditions are already substandard, they should be improved where possible;

2. ensure balconies do not raise unacceptable overlooking or noise or disturbance to nearby occupiers; height, massing or siting, including through creating a sense of enclosure;

3. ensure that proposals are not visually intrusive or have an overbearing impact as a result of their height, massing or siting, including through creating a sense of enclosure;

4. ensure there is no harm to the reasonable enjoyment of the use of buildings, gardens and other spaces due to increases in traffic, servicing, parking, noise, light, disturbance, air pollution, odours or vibration or local micro-climatic effects.

Applicants are expected to have regard to the guidance set out within the Council's SPDs relating to design, including Village Planning Guidance, SPDs on extensions, infill and

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backland developments, housing mix and standards as well as residential development standards."

The relevant supporting paragraphs for Policy LP8 state:

4.8.1 This policy covers all development, including extensions, alterations and changes of use. The aim is to protect the living conditions and amenity of occupants of new, existing, adjoining and neighbouring buildings as far as possible from the unreasonable impacts of new development.

Policy LP10*: Local Environmental Impacts, Pollution and Land Contamination* states:

A. The Council will seek to ensure that local environmental impacts of all development proposals do not lead to detrimental effects on the health, safety and the amenity of existing and new users or occupiers of the development site, or the surrounding land. These potential impacts can include, but are not limited to, air pollution, noise and vibration, light pollution, odours and fumes, solar glare and solar dazzle as well as land contamination.

Developers should follow any guidance provided by the Council on local environmental impacts and pollution as well as on noise generating and noise sensitive development. Where necessary, the Council will set planning conditions to reduce local environmental impacts on adjacent land uses to acceptable levels.

…

Noise and Vibration

C. The Council encourages good acoustic design to ensure occupiers of new and existing noise sensitive buildings are protected. The following will be required, where necessary:

1. a noise assessment of any new plant and equipment and its impact upon both receptors and the general background noise levels;

2. mitigation measures where noise needs to be controlled and managed;

3. time limits and restrictions for activities where noise cannot be sufficiently mitigated;

4. promotion of good acoustic design and use of new technologies;

5. measures to protect the occupiers of new developments from existing sources.

The relevant supporting paragraphs for Policy LP 10 state:

4.10.2 In addition, where there are already significant adverse effects on the environment, amenity or living conditions due to pollution, sensitive uses should ideally be steered away from those areas. However, given the limited availability of land for development in this borough, this will not always be possible. Therefore, new developments, including changes of use, should mitigate and reduce any adverse impacts resulting from air and light pollution, noise, vibration and dust to acceptable levels.

4.10.3 The Council will be preparing SPDs and/or Advice Notes to provide additional guidance on local environmental impacts, pollution, air quality, noise and construction

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management, which will contain further guidance and clear requirements, including methodologies, for the various assessments that may need to be submitted as part of certain types of planning applications.

Noise and Vibration

4.10.7 "Noise and/or vibration arise from a variety of sources, such as major roads, railways and aircraft, as well as industrial and commercial sources. This can have a significant effect on health, quality of life, amenity, living conditions and the environment in general. Therefore this needs to be considered when new developments may create noise and vibration, and also when new developments would be sensitive to existing conditions."

4.10.8 "Applicants need to consider acoustic design at an early stage of the planning process to ensure occupiers of new and existing noise sensitive buildings are protected."

4.10.9 "The Council is in the process of developing a SPD for Noise Generating and Noise Sensitive Development. This sets out guidance intended to help protect the local occupiers of new or existing noise sensitive buildings from existing or introduced noise sources, and, where possible, improve amenity and living conditions. The SPD will assist applicants, decision makers, agents, occupiers and others to identify issues to be addressed in any planning application in which noise and/or vibration will be an important consideration."

4.10.10 "The Council will protect existing businesses and industrial uses in line with the Employment policies set out in this Plan. Businesses should not have unreasonable restrictions put on them because future noise sensitive uses are subsequently permitted adjacent to the business or within the surrounding area; this also includes changes of use. Therefore, proposed new noise sensitive developments should follow good acoustic design principles and incorporate adequate mitigation measures to ensure appropriate acoustic conditions in new developments."

3.4.2. Supplementary Planning Document: Noise Generating and Noise Sensitive Development

The relevant sections of the supplementary planning document adopted September 2018 state that:

5.2 Stage 2 – Internal Design Noise Levels

The Borough will normally expect applicants to achieve the design noise levels contained in Table 4 of BS8233:2014 (and to consider the impact and effect of any noise events) in all noise-sensitive rooms. It should be noted that the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, typically reducing the insulation to no more than 10 to 15 dB(A). Most residents value the ability to open windows at will, for a variety of reasons, and the Borough normally requires that designers principally aim, through the use of good acoustic design, to achieve the internal noise level guidelines in noise-sensitive rooms with windows open. On certain sites the Borough may agree to assess the proposal assuming windows are closed.

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7.0 Places of Entertainment (Clubs, Pubs and Bars)

The Borough recognises that clubs, public houses, bars and other places of entertainment help to achieve wider sustainable development goals. However, places of entertainment can also cause significant levels of noise disturbance and pose particular noise issues, not least because associated activities are often at their peak in the evening and late at night. Developers will need to bear in mind and incorporate noise mitigation at the design stage.

The Borough intends to apply the IOA Good Practice Guide on the Control of Noise from Places of Entertainment when this is published. The Guide is expected to contain details of the entertainment noise standards that will normally be applied in situations where entertainment noise exposure is likely to arise as a result of new development in the Borough. These noise standards will normally be applied to any proposals that may generate new noise from entertainment sources within a mixed use area and for noise sensitive development that is proposed in a mixed use area containing entertainment establishments.

Proposed developments will be assessed on a case by case basis and the design criteria may be modified depending on the nature of the business, frequency, time, duration and number of entertainment events and sensitivity of the area. It is expected that any likelihood of structure borne sound (and vibration) transmission problems will be separately assessed and that effective control measures will be included in proposals. Developers are encouraged to enter into pre-application discussions with the Borough to discuss these issues at an early stage.

In addition to noise from entertainment activities applicants will also be expected to consider noise from patrons, the wider use of indoor and outdoor areas, deliveries and collections and the use of car parks and access roads.

Annex 1: Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016

The Government introduced a new clause of 'noise impacts' in the Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016 Schedule 2, Part 3, Class O. In particular condition O.2 (1)(d). Therefore when an applicant proposes a prior approval change of use from office to residential, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to:

a) transport and highways impacts of the development,

b) contamination risks on the site,

c) flooding risks on the site, and

d) impacts of noise from commercial premises on the intended occupiers of the development. ("commercial premises" means any premises normally used for the purpose of any commercial or industrial undertaking which existed on the date of application and includes any premises licensed under the Licensing Act 2003 or any other place of public entertainment")

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Scope

With regard to noise LPAs can only consider noise impacts from existing commercial premises on the proposed residential development and cannot consider general transportation noise impact (However, if there is traffic noise associated with a commercial actively it is considered that this can be taken into account.

With regard to commercial noise impact the following general areas should be considered by the applicant:

i. Noise generating plant and equipment associated with existing commercial uses i.e. air conditioning, refrigeration, kitchen extraction systems etc. which impact on amenity space areas and internal spaces

ii. Any structural noise transmission associated with adjoining commercial business (not B1)

iii. Any permitted delivery noise associated with existing commercial uses

iv. Music/Entertainment noise breakout and structure borne noise impact

v. Builders merchants/yards with significant external noise impacts

vi. Regard to use outside normal office hours

3.5. Noise Guidance

3.5.1. British Standard BS 8233:2014

BS 8233 *Guidance on sound insulation and noise reduction for buildings* has a number of design criteria for intrusive external noise without a specific character. The guidelines, in relation to this development, are designed to achieve good listening conditions in rooms.

Whilst the internal noise levels suggested in BS 8233 *Guidance on sound insulation and noise reduction for buildings* at Section 7 of the BS relate to noise without a specific character, they provide useful guidance where no local authority guidance exists for internal noise levels from commercial noise sources. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms. The most appropriate noise levels for the residential environment are reproduced in **Table 3.1**.

Table 3.1: Indoor Ambient Noise Levels for Dwellings

Activity	Location	Daytime 0700 hrs to 2300 hrs	Night-time 2300 hrs to 0700 hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

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3.5.2. British Standard BS 4142:2014+A1:2019

BS 4142 *Methods for rating and assessing industrial and commercial sound* provides a method for the measurement and rating of industrial and commercial type noise sources and background noise levels outside dwellings. The rating level (defined in the BS) is used to rate the noise level of the source (this is defined as the 'specific sound level') outside residential dwellings.

The rating level is determined by assessing the character of the noise and applying an acoustic feature correction, if appropriate, to the specific sound level. Corrections are applied for the tonality, impulsivity and intermittency of the noise source which can all increase the impact of noise.

The initial assessment described in BS 4142 to determine whether an adverse impact is likely is based on establishing the difference between the rating level and the background noise level outside the residential property of interest. The British Standard states that the following points should be considered:

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

Where it is considered that the initial assessment of the impact needs to be modified due to the context in which the noise is occurring, BS 4142 suggests that all pertinent factors are taken into consideration, including:

1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

   Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

   Where residual sound[2] levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating

[2] The residual sound is defined as the ambient sound level at the assessment location in the absence of the specific sound source.

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level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*

i. facade insulation treatment;

ii. ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

iii. acoustic screening.

There is also a requirement within BS 4142:2014 to consider the uncertainty in the measurement and assessment procedure.

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4. NOISE MEASUREMENT SURVEY

A noise measurement survey was carried out in order to determine the extent to which the site is currently affected by plant noise associated with the Naz Balti Indian Takeaway, and entertainment noise emanating from The Fox P.H.

Noise measurements were carried out over an extended period between 1335 hrs on Friday 4th October 2024 and 1230 hrs on Monday 7th October 2024. Two semi-permanent noise monitoring positions were utilised. The noise measurement positions have been identified in **Figure 4.1**.

4.1. Methodology

The noise measurements utilised two Svantek 971 Class 1 Sound Level Meters (SLM). Both SLM's that were used hold current certificates of calibration, that are available upon request. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment has remained within reasonable calibration limits (± 0.5 dB).

Table 4.1 provides the location of the noise survey measurements which is identified on **Figure 4.1.**

Table 4.1 Noise Survey Locations

Location Reference	Location Description	Measurement Duration	Observed Noise Sources
MP1	Located out of a first floor window on the southern façade of 20 Church Street, facing The Fox PH at a height of 4m.	71 hours.	Commercial and retail noise arising from Church Street, road traffic noise from the A305, and Entertainment noise from The Fox P.H from 2100 hrs to 2300 hrs on the Friday and the Saturday. Aircraft noise was also audible.
MP2	Located on the flat roof of the ground floor at the rear of 20 Church Street, approximately 1.5m from the northern façade of the first floor at a height of 4m.	71 hours.	The kitchen extract fan from Naz Balti Indian Takeaway was the dominant noise source, road traffic noise from the A305 and aircraft noise was also audible.

At the start of the noise measurement period the weather was dry with 30% cloud cover, a daytime temperature of 16°C and a south-westerly wind with speeds of up to 1.0 m/s. At the end of the measurement period the weather was dry with 80% cloud cover, a daytime

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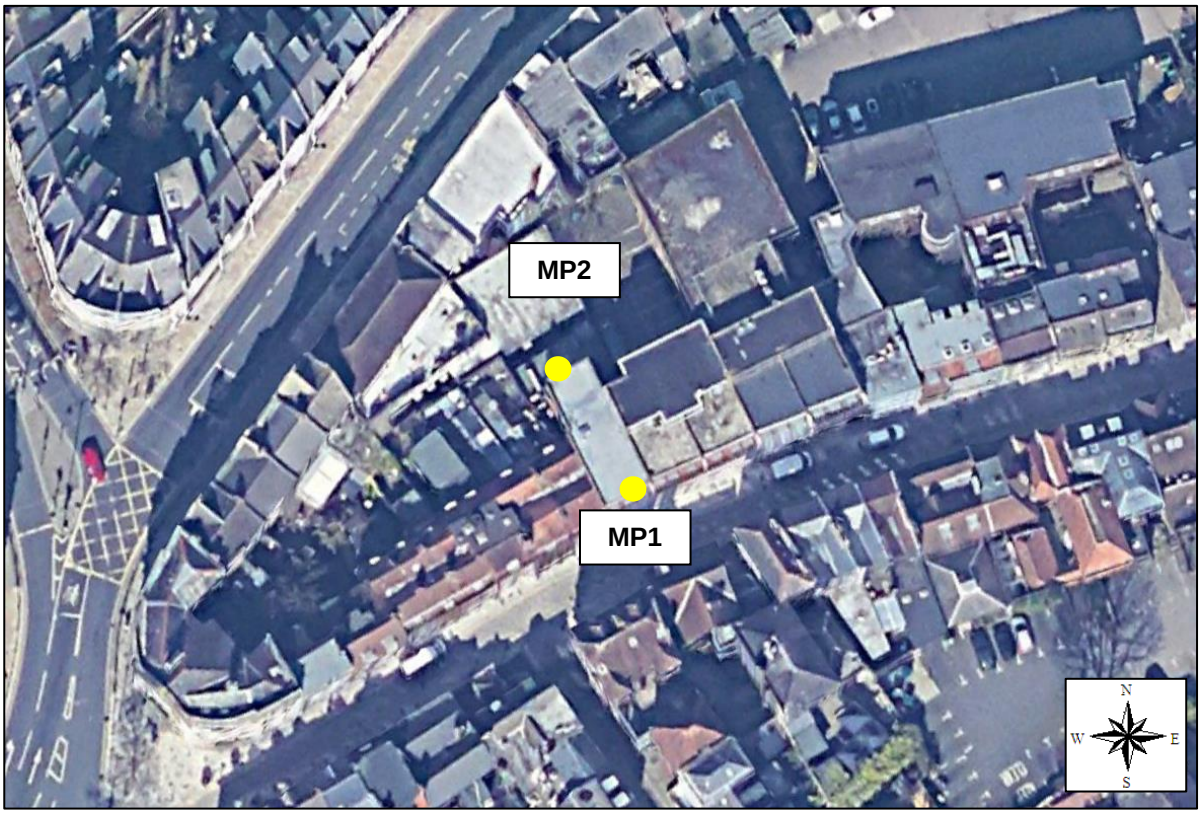
temperature of 18°C and a south-westerly wind is speeds of up to 1.6 m/s. Weather conditions throughout the noise survey were suitable for noise measurements.

Figure 4.1: Noise Measurement Positions



4.2. Results

A summary of the unattended noise measurements is presented in **Table 4.2**. The free-field noise levels have been calculated by applying a correction of – 3 dB to convert the measured façade noise levels to free-field noise levels. The free field façade noise measurement results for **MP1** and **MP2** are provided in **Appendix 2**.

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Table 4.2 Unattended Noise Measurement Summary – Free Field

Position	Date	Period	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{A10,T}$ (dB)	Mean $L_{A90,T}$ (dB)	Modal $L_{A90,T}$ (dB)
MP1	04/10/2024	1340 hrs to 2300 hrs	68	90	63	53	52
		2300 hrs to 0700 hrs	62	91 (81)	52	40	33
	05/10/2024	0700 hrs to 2300 hrs	64	94	62	51	51
		2300 hrs to 0700 hrs	59	85 (78)	50	38	31
	06/10/2024	0700 hrs to 2300 hrs	57	87	57	46	46
		2300 hrs to 0700 hrs	49	83 (70)	46	34	31
MP2	04/10/2024	1340 hrs to 2300 hrs	51	93	50	46	43
		2300 hrs to 0700 hrs	43	77 (63)	44	36	33
	05/10/2024	0700 hrs to 2300 hrs	54	95	54	44	45
		2300 hrs to 0700 hrs	45	73 (61)	44	36	35
	06/10/2024	0700 hrs to 2300 hrs	52	51	51	43	43
		2300 hrs to 0700 hrs	42	68 (55)	43	38	36

Note: The levels stated are logarithmic averages for $L_{Aeq,T}$ and arithmetic averages for $L_{A10,T}$ and mean $L_{A90,T}$. The L_{AFmax} is the average of the highest hourly maximum sound levels measured during the measurement period, measured with a fast time-weighting. The L_{AFmax} levels in brackets are the tenth highest L_{AFmax} noise levels measured during the measurement period. The typical background sound level has been determined from assessment of the lowest regularly occurring $L_{A90,T}$.

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Figures 4.2 and **4.3** identify the time history for the $L_{Aeq,T}$, L_{AFmax}, $L_{A10,T}$ and $L_{A90,T}$ at **MP1** and **MP2** during the noise measurement survey.

Figure 4.2 Noise Measurement Time History: MP1 – Front Façade

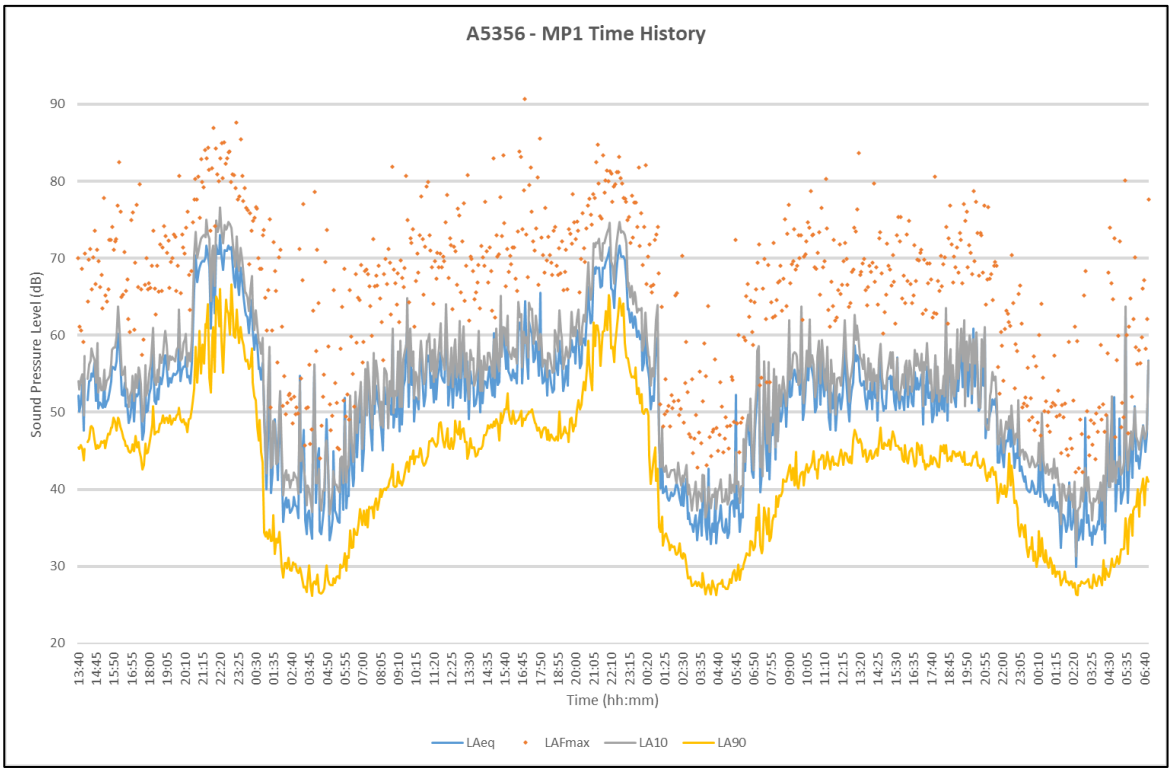
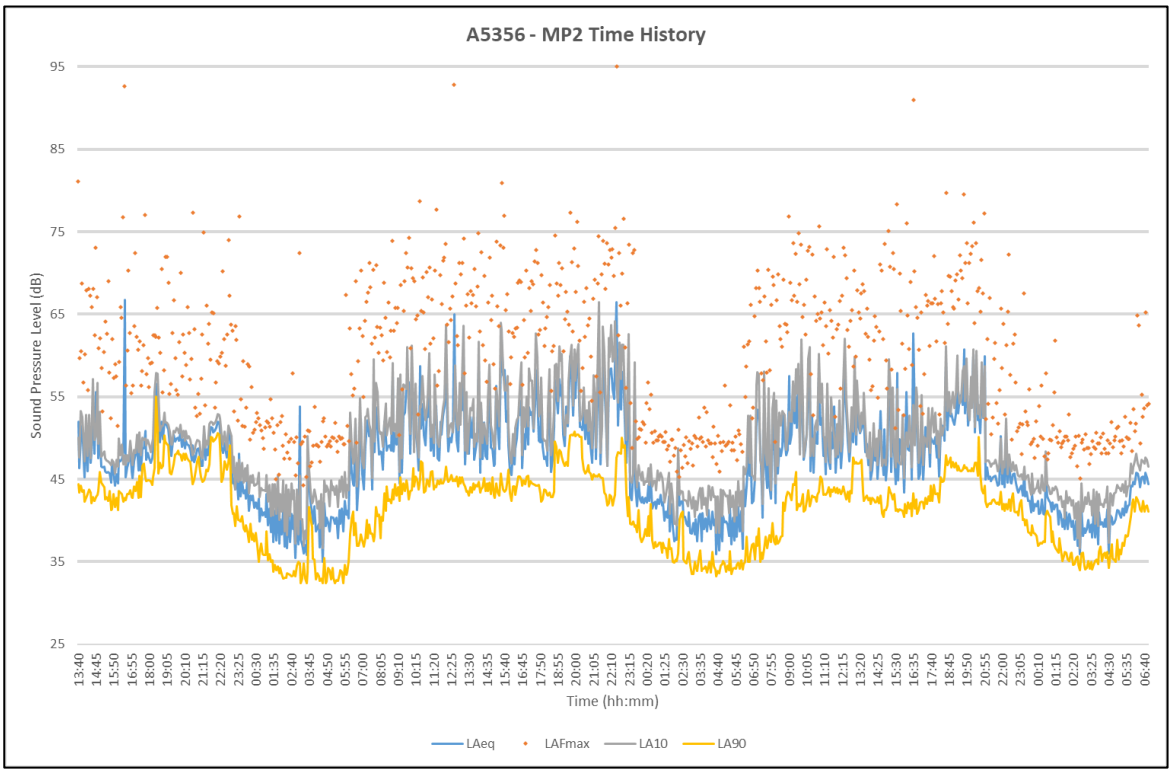


Figure 4.3 Noise Measurement Time History: MP2 – Rear Façade



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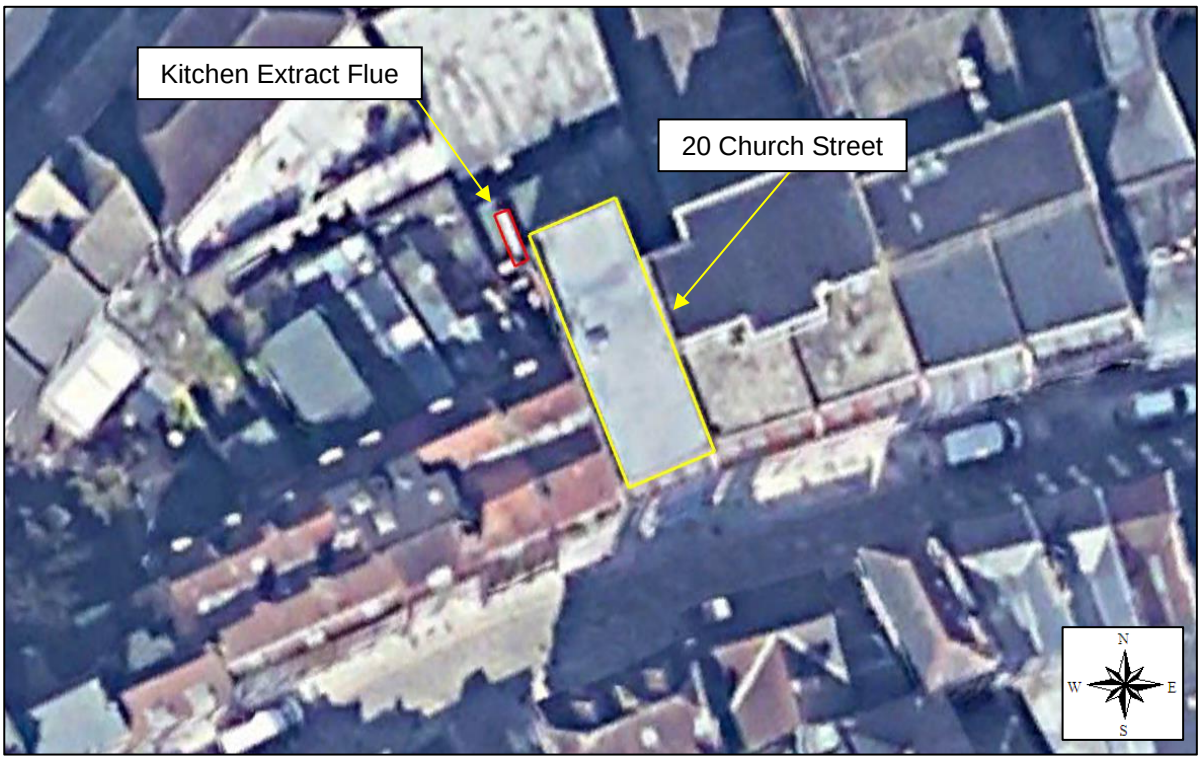
5. NOISE IMPACT ASSESSMENT

5.1. Noise from Fixed Plant

A noise impact assessment in accordance with BS 4142:2014+A1:2019 has been carried out to consider the potential impact on the proposed development from the existing fixed plant associated with the surrounding hospitality and retail uses. The data from the noise measurement survey has been utilised to inform the assessment. The Naz Balti Indian Takeaway operates from 1730 hrs to 2200 hrs Mondays to Thursdays, and from 1730 hrs to 2300 hrs on Fridays. On Saturdays, it operates from 1100 hrs to 1430 hrs, and then reopens from 1700 hrs to 0000 hrs. **Figure 5.1** identifies the location of the kitchen extract flue (outlined in red) from the Naz Balti Indian Takeaway relative to the proposed change of use development. The kitchen extract flue is located approximately 1.5 m west of the closest affected windows on the north façade of the proposed change of use development.

Figure 5.1: Location of the Naz Balti Indian Takeaway Kitchen Extract Flue



5.1.1. Background Sound Levels

Background sound levels measured at **MP2** when the fixed plant is not operating, have been utilised as the background sounds levels at the nearest affected window to habitable rooms on the northern façade. For the night-time period, as Naz Balti only operates for one hour in the night-time period (2300 hrs to 0000 hrs), this time period has been utilised for the BS 4142 assessment. ACCON personnel have identified representative background sound levels from the recorded audio files at **MP2** when the kitchen extract flue is not operating.

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5.1.2. Specific Sound Levels

Specific sound levels from the plant noise sources at the Naz Balti Indian Takeaway have been calculated by logarithmically subtracting the residual sound level as measured at **MP2** at the northern façade of the building from the ambient sound level.

5.1.3. BS 4142 Assessment

The BS 4142 assessment has been carried out for the northern façade of the building, which is the façade primarily affected by plant noise sources during the daytime and night-time period. The daytime BS 4142 assessment has considered plant noise originating from the Naz Balti Indian restaurant. The noise measurement results from the Saturday have been utilised for the daytime and night-time assessments, as this is the day when the Naz Balti Indian Takeaway operates for the longest period, from 1100 hrs to 1430 hrs and from 1700 hrs to 0000 hrs.

Table 5.1: Daytime BS 4142 Assessment – Northern Facade

Results	Noise Level at the Façade (dB)	Relevant Clauses of BS 4142:2019	Commentary
Background Sound Level $L_{A90,T}$ (dB)	43	8.1, 8.2	The background sound level measured at **MP2** (**Table 4.2**)
Specific Sound Level $L_{Aeq,1hr}$ (dB) (Maximum Operating Speed)	52	7.3	The specific sound level from plant operating at Naz Balti is the calculated difference between the ambient sound level and the residual sound level (L_{Aeq})
Acoustic Feature Correction (dB)	+2	9.1, 9.2, 9.3	An Acoustic Feature Correction has been applied for +2 dB for Just Perceptible Tonality
Rating Sound Level $L_{Aeq,1hr}$ (dB)	54	9.2	(Specific Sound Level + Acoustic Feature Correction)
Excess of Rating Sound Level over Background Sound Level	+11	9.2	
Initial Estimate of Impact	Significant Adverse Impact	11	

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The night-time BS 4142 assessment has taken into consideration plant operating from the Naz Balti Indian Takeaway from 2300 hrs to 0000 hrs.

Table 5.2: Night-time BS 4142 Assessment – Northern Facade

Results	Noise Level at the Façade (dB)	Relevant Clauses of BS 4142:2019	Commentary
Background Sound Level $L_{A90,T}$ (dB)	42	8.1, 8.2	The background sound level measured at **MP2** when no plant is operating between 2300 hrs to 0000 hrs (**Table 4.2**)
Specific Sound Level $L_{Aeq,15min}$ (dB)	39	7.3	The specific sound level from plant operating at Naz Balti is the calculated difference between the ambient sound level and the residual sound level (L_{Aeq}) and takes into account a correction for plant on-time operating at 47%
Acoustic Feature Correction (dB)	+5	9.1, 9.2, 9.3	An Acoustic Feature Correction has been applied for +2 dB for Just Perceptible Tonality, and +3 dB for Just Perceptible Intermittency.
Rating Sound Level $L_{Aeq,15min}$ (dB)	44	9.2	(Specific Sound Level + Acoustic Feature Correction)
Excess of Rating Sound Level over Background Sound Level	+2	9.2	
Initial Estimate of Impact	Low Impact	11	

The BS 4142 initial assessment in **Table 5.1** and **5.2** identifies that there would be a significant adverse impact on the proposed change of use development during the daytime period and a low impact during the night-time period.

Due to the initial estimate of impact, mechanical ventilation is recommended for the development to reduce the need to open windows to provide adequate ventilation.

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5.1.4. Discussion of Uncertainty

ACCON carried out noise measurements on a weekend to obtain typical background sound levels representative of the noise sensitive receptor. It is considered that the noise measurement period was carried out on a reasonably typical day for background sound levels.

The assessment has incorporated acoustic feature corrections for tonality. There was no intermittency or impulsivity associated with the plant noise sources.

The noise measurements were carried out in accordance with BS 7445 Part 1 *Description and measurement of environmental noise* during weather conditions suitable for noise measurements.

The calculation of specific sound levels has utilised the noise measurement data and has been carried out using standard acoustic formulae in line with BS 4142. It has been assumed that the sources of plant sound can be reasonably represented by point sources based on their location relative to the noise sensitive receptors, the orientation of the plant sources and any intervening screening structures.

On the basis of the above, it is considered that the effects of uncertainty have been minimised as far as possible.

5.1.5. Discussion of Context

When considering the impact of plant noise in a BS 4142 assessment it is necessary to consider the context. The proposed change of use development is situated in a mixed area of commercial, hospitality and residential use.

Plant noise was audible only at **MP2**. Therefore, a BS 4142 assessment was conducted solely for the northern façade of the proposed development, as this is the only façade potentially affected by fixed plant noise from the Naz Balti Indian Takeaway.

The night-time assessment utilised the additional hour that the Naz Balti Indian Takeaway operates on Saturday nights, from 2300 hrs to 0000 hrs. This is the only period that the Naz Balti Indian Takeaway is open during the night-time assessment period (2300 hrs – 0700 hrs) throughout the week. ACCON personnel, after reviewing the audio recording from **MP2**, also noted that the fixed plant noise associated with the Naz Balti Indian Takeaway was not consistently running during this period and therefore has taken into account a correction for on-time percentage of 47% during any 15 minute period.

The initial assessment has indicated a significant adverse impact during the daytime period and a low impact during the night-time period for the northern façade.

During the daytime period, the noise climate compromised of distant road traffic noise from the A305 and aircraft noise. It should be noted that the existing ambient noise climate is in the order of 51 dB to 54 dB $L_{Aeq,16hr}$ and the specific sound level is 52 dB.

As the change of use development is not proposing any external amenity areas, residents will be within their dwelling during both the daytime and night-time period and therefore it is appropriate to consider the sound insulation provided by the building envelope. Allowing for a 15 dB reduction for windows partially open for ventilation, the noise impacts on residents

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will be reduced further such that internal noise levels due to the plant noise would be 37 L_{Aeq} dB during the daytime period and 24 L_{Aeq} dB during the night-time period.

These considerations indicate, that when context is taken into account, the operational noise during the daytime from the existing plant is not considered to result in a significant adverse noise impact and it can therefore be concluded that the noise impact would be low.

5.2. Entertainment Noise from The Fox PH

The Fox PH hosted two live music events over the course of the noise measurement survey, one on Friday 4th October 2024 from 2100 hrs to 2300 hrs, and another on Saturday 5th October 2024 from 2100 hrs to 2300 hrs.

The measured octave band noise levels, where noise break-out from entertainment noise were perceptibly high, are presented in **Figure 5.2**. The one-third octave band noise levels are compared against a five minute period without music (2025 hrs) prior to when the music event started at the Fox P.H. These levels present the likely worst-case noise levels emanating from The Fox P.H.

Figure 5.2: Comparison of 1/3rd Octave Noise Levels With and Without Music: Friday 4th October 2024

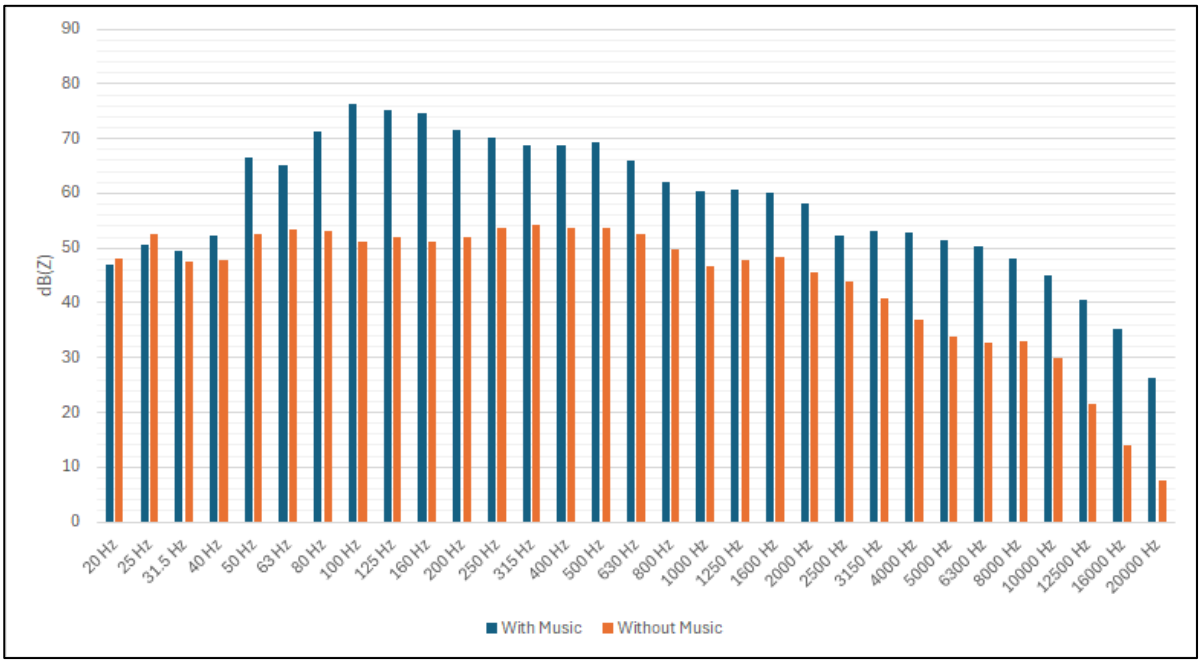

Table 5.3 identifies the measured external unweighted noise levels between 31 Hz and 16 kHz. It can be determined that the music noise results in an increase of between 0.8 dB and 24.0 dB when compared against the external unweighted noise levels without entertainment noise.

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Table 5.3: Measured Noise Levels from Entertainment Noise

Octave Band (Hz)	Unweighted External Noise Level with Music Noise	Unweighted External Noise Level without Music Noise	Difference (dB)
31 Hz	55.7	54.8	**0.8**
63 Hz	73.2	57.8	**15.4**
125 Hz	80.2	56.2	**24.0**
250 Hz	75.2	58.2	**17.0**
500 Hz	73.1	58.1	**15.0**
1 kHz	65.9	53.1	**12.8**
2 kHz	62.7	51.1	**11.7**
4 kHz	57.4	42.8	**14.6**
8 kHz	53.1	36.9	**16.2**
16 kHz	41.7	22.4	**19.3**

ACCON has worked on numerous sites which are affected by entertainment noise situated in Basingstoke and Deane Borough Council (BDBC). BDBC adopted "*Noise Assessments and Reports for Planning Applications: Guidance Note for Developers and Consultants"* which identifies a target noise criterion of a noise rating curve of NR35 in habitable rooms during the daytime period (0700 hrs to 2300 hrs). Therefore, it is ACCON's professional judgement that the same target noise level is acceptable for 20 Church Street, Twickenham.

Table 5.4 presents the noise level measured in octave bands at **MP1** when music was audible, the NR35 curve and also the sound reduction required to achieve NR35 within the property.

Table 5.4: Target Sound Reduction Indices

	Octave Band Frequency (dB)							
	31.5 Hz	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**
Noise Level Measured at MP1	56	73	80	75	73	66	63	57
NR35 Curve	68	56	47	39	33	29	26	24

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Target Sound Reduction	Note 1	17	33	36	40	37	37	33

Note 1: No sound reduction is required.

5.3. Noise Transfer from Ground Floor Premises

When ACCON personnel attended the site, it was observed that Naz Balti on the ground floor was open and operational. However, there was no audible noise transfer observed from the ground floor to the first floor.

Although there was no noise transfer observed during the site visit, it is recommended that the airborne sound insulation between the ground floor commercial unit and the proposed first floor dwellings should achieve a minimum sound reduction of 53 dB $D_{nT,W} + C_{tr}$.

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6. MITIGATION

The proposed change of use site currently has a single glazed sash window system installed.

Table 6.1 identifies the octave band sound reduction of the current window system and the required octave band sound reduction in order to comply with the NR35 target in all habitable rooms on the south façade which is affected by entertainment noise from The Fox P.H. **Table 6.1** also identifies the margin of exceedance of the required performance, with a negative value indicating that the required sound reduction value has not been met.

Table 6.1: Current Window System

Glazing System	Octave Band Frequency (dB)							
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
Required Reduction	-12	17	33	36	40	37	37	33
Standard Single Glazing (4mm Thickness)	Note 1	Note 2	17	20	26	32	33	26
Margin of Exceedance	-	-	-16	-16	-14	-5	-4	-7

Note 1: No requirement for acoustic performance to achieve NR35.
Note 2: Likely to exceed performance requirement however no data available.

It can be seen from **Table 6.1** that the current windows (when closed) would not achieve the required sound reduction performance, and therefore the installation of a secondary double glazing window system is recommended.

6.1. Glazing Specification

In order to specify a secondary glazing window system, the existing single glazed windows need to be taken into account as part of the overall sound reduction. As a worst-case scenario it has been assumed that the existing single glazed windows will provide an additional 5 dB reduction for each octave band frequency as part of the overall sound reduction. **Table 6.2** identifies the required reduction to meet the NR35 criterion, the reduction required for the secondary glazing system which takes into account the contribution of the existing single glazed window. Additionally, two example glazing specifications are identified in **Table 6.2**.

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Table 6.2: Glazing Specifications

Glazing System	Octave Band Frequency (dB)							
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
Required Reduction	-	17	33	36	40	37	37	33
Pilkington 12.8 mm Optiphon Laminated Glass with existing single glazed window system.	Note 1	Note 2	34	37	41	46	47	56
Margin of Exceedance	-	-	+1	+1	+1	+9	+10	+23
AGC 10 mm Glass/ 16 mm Air Gap/ 66.2 st Thermobel Stratophone Acoustic Laminated Glass with existing single glazed window system.	Note 1	Note 2	36	39	51	51	54	67
Margin of Exceedance	-	-	+3	+3	+11	+14	+17	+34

6.2. Ventilation

As demonstrated in **Table 6.1**, the target internal noise levels of NR35 cannot be achieved by relying on open windows for ventilation. The BS 4142 assessment in **Section 5.1** has also demonstrated the requirement for an alternative ventilation strategy which obviates the requirement to open windows, which would otherwise result in an adverse noise impact upon future residents.

Therefore, it is recommended that an alternative ventilation strategy is installed such as, acoustic trickle vents, or a Mechanical Heat Recovery System (with cool air bypass) in order to comply with the ventilation requirements of Approved Document F of the Building Regulations.

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7. SUMMARY

A noise assessment has been carried out at the site in order to determine the extent to which the site is currently affected by commercial noise from the surrounding uses. The assessment has been informed by a noise measurement survey carried out across a typical weekend at 20 Church Street, Twickenham.

An assessment in line with BS 4142:2014+A1:2019 has been carried out to determine the impact of commercial noise on the proposed residential development use of 20 Church Street, Twickenham. The BS 4142 assessment has demonstrated that there would be a low impact from plant noise emanating from the Naz Balti Indian Takeaway during the daytime and night-time periods when context is taken into account.

Target façade octave band sound reductions have been identified specifically in respect of mitigating entertainment noise from the entertainment noise sources on the southern façade of the development. The target octave band sound reductions are based on achieving the noise rating curve NR35 in habitable rooms with suggested secondary glazing specifications suitable for meeting these requirements provided.

Achievement of the target noise criteria will ensure compliance with the overall aims of paragraphs 191 and 193 of the NPPF and the PPG in that noise is not expected to result in any significant adverse effects on health or quality of life for future occupants of the proposed development or result in any restrictions on businesses operating in the immediate area.

7.1. Recommendations to the Decision Maker

On the basis of the above, it is recommended that there should be no objection to granting consent for the proposed change of use development on noise grounds.

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ADDITIONAL FIGURES

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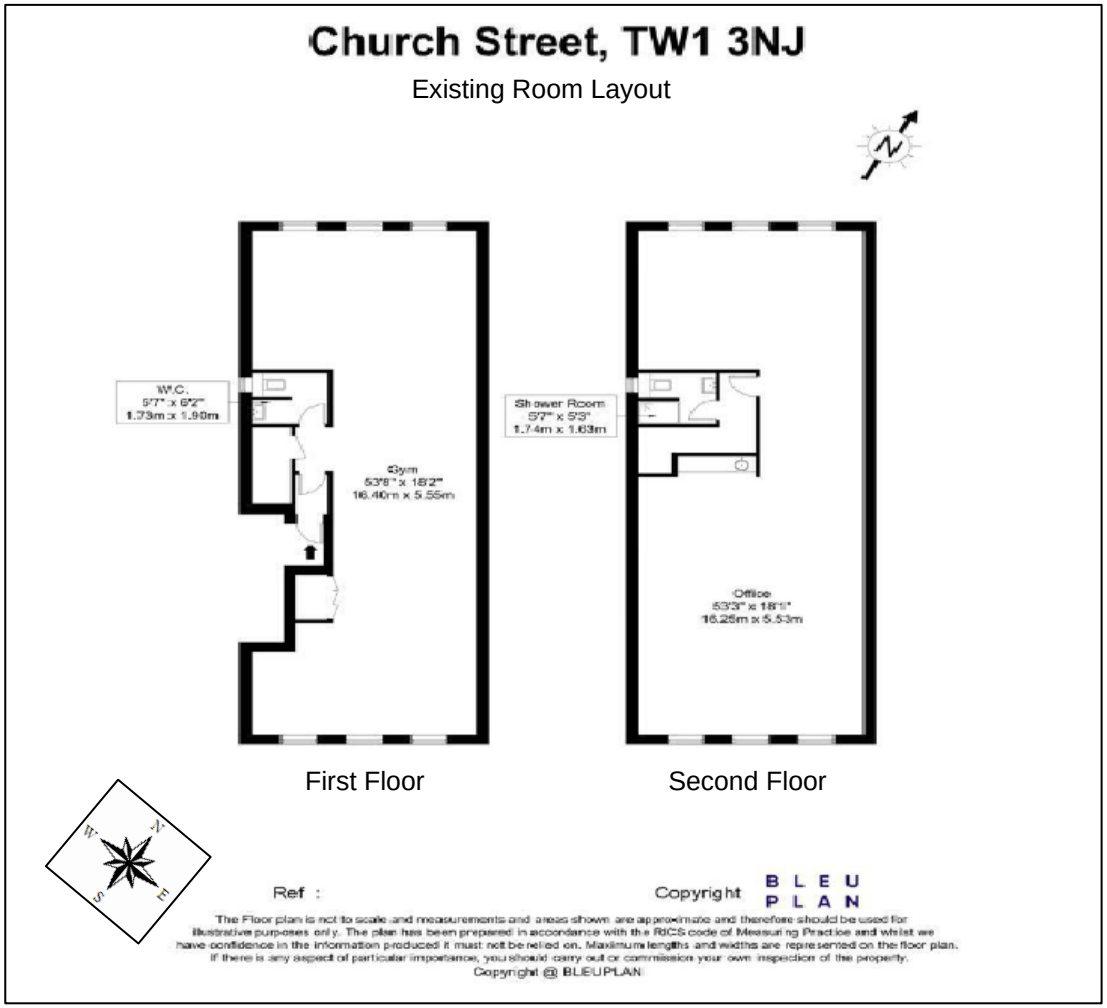
Figure F.7.1: Site Layout



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APPENDICES

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Appendix 1
Glossary of Acoustic Terminology

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Term	Description
'A'-Weighting	*This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.*
Decibel (dB)	*This is a tenth (deci) of a bel. Decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.*
$L_{Aeq,T}$ *(Ambient/Period Sound Level)*	*The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location.* $L_{Aeq,T}$ *can be measured directly with an integrating sound level meter.*
$L_{A90,T}$ *(Background Sound Level)*	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time. The* $L_{A90,T}$ *is used to describe the background noise levels at a particular location.*
L_{Amax}	*The 'A'-weighted maximum sound pressure level measured over a measurement period. Typically measured with 'fast' weighting (125 ms) or 'slow' weighting (1 s).*
Rating Level, $L_{Ar,\ Tr}$	*The specific sound level plus any adjustment for the characteristic features of the sound.*
Residual Sound Level, $L_r = L_{Aeq,T}$	*Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.*
Specific Sound Level, $L_{Aeq,Tr}$	*The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.*

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Appendix 2
Noise Measurement Results

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Table 1: Hourly Noise Measurement Results at MP1

Time	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
04/10/2024				
13:00-14:00	55	73	57	48
14:00-15:00	71	103	59	49
15:00-16:00	56	81	58	50
16:00-17:00	58	85	59	50
17:00-18:00	55	83	56	48
18:00-19:00	58	77	60	51
19:00-20:00	59	84	61	52
20:00-21:00	66	83	65	54
21:00-22:00	72	90	75	62
22:00-23:00	74	88	76	64
23:00-00:00	71	91	73	63
00:00-01:00	63	80	65	54
01:00-02:00	52	78	50	37
02:00-03:00	45	74	46	33
03:00-04:00	48	80	45	31
04:00-05:00	50	82	46	31
05:00-06:00	46	72	44	32
06:00-07:00	51	72	51	37
05/10/2024				
07:00-08:00	54	76	55	40
08:00-09:00	56	85	56	43
09:00-10:00	59	84	59	45

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Time	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
10:00-11:00	57	82	59	47
11:00-12:00	58	83	61	50
12:00-13:00	59	81	60	50
13:00-14:00	57	84	59	49
14:00-15:00	57	80	59	50
15:00-16:00	61	86	62	52
16:00-17:00	62	94	62	52
17:00-18:00	63	89	64	52
18:00-19:00	58	80	60	50
19:00-20:00	60	81	62	51
20:00-21:00	64	81	66	56
22:00-23:00	71	88	74	63
23:00-00:00	72	86	75	65
00:00-01:00	67	85	69	58
01:00-02:00	60	85	62	50
02:00-03:00	53	77	48	37
03:00-04:00	43	73	45	34
04:00-05:00	39	62	42	31
05:00-06:00	40	67	42	30
06:00-07:00	46	75	43	31
06/10/2024				
07:00-08:00	53	75	53	38
08:00-09:00	54	78	55	42

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Time	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
09:00-10:00	58	80	59	45
10:00-11:00	58	82	59	46
11:00-12:00	56	83	57	47
12:00-13:00	56	75	59	47
13:00-14:00	58	87	60	49
14:00-15:00	56	83	58	48
15:00-16:00	57	78	58	49
16:00-17:00	56	78	58	48
17:00-18:00	56	84	58	47
18:00-19:00	57	80	57	47
19:00-20:00	59	80	60	47
20:00-21:00	60	82	60	47
22:00-23:00	52	80	53	44
23:00-00:00	49	73	51	43
00:00-01:00	46	69	48	37
01:00-02:00	44	67	47	34
02:00-03:00	40	60	44	32
03:00-04:00	39	64	41	30
04:00-05:00	43	71	42	31
05:00-06:00	48	77	45	32
06:00-07:00	55	83	49	36

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Table 2: Hourly Noise Measurement Results at MP2

Time	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
04/10/2024				
13:00-14:00	50	81	51	44
14:00-15:00	51	73	51	43
15:00-16:00	47	69	48	43
16:00-17:00	56	93	48	43
17:00-18:00	48	77	49	45
18:00-19:00	52	70	53	47
19:00-20:00	50	72	51	48
20:00-21:00	49	77	50	47
21:00-22:00	49	75	50	47
22:00-23:00	50	74	51	48
23:00-00:00	45	77	46	40
00:00-01:00	42	59	45	37
01:00-02:00	40	55	43	35
02:00-03:00	39	58	42	33
03:00-04:00	45	72	42	35
04:00-05:00	40	54	42	34
05:00-06:00	40	52	44	33
06:00-07:00	48	70	48	37
05/10/2024				
07:00-08:00	51	71	52	39
08:00-09:00	51	74	52	42
09:00-10:00	53	74	54	44

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Time	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
10:00-11:00	53	79	54	45
11:00-12:00	52	78	53	45
12:00-13:00	57	93	54	45
13:00-14:00	53	74	53	44
14:00-15:00	52	75	52	44
15:00-16:00	56	81	55	44
16:00-17:00	50	69	51	44
17:00-18:00	54	73	56	44
18:00-19:00	52	75	53	45
19:00-20:00	56	77	57	49
20:00-21:00	54	76	54	48
22:00-23:00	55	74	55	45
23:00-00:00	59	95	60	46
00:00-01:00	51	73	50	41
01:00-02:00	43	57	45	38
02:00-03:00	42	51	44	37
03:00-04:00	41	51	43	37
04:00-05:00	39	54	42	34
05:00-06:00	39	53	42	34
06:00-07:00	40	56	43	35
06/10/2024				
07:00-08:00	50	70	51	37
08:00-09:00	50	70	51	39

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Time	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
09:00-10:00	54	77	54	43
10:00-11:00	53	76	53	43
11:00-12:00	50	73	51	44
12:00-13:00	52	73	52	44
13:00-14:00	51	70	52	45
14:00-15:00	48	74	48	42
15:00-16:00	52	78	51	42
16:00-17:00	54	91	50	42
17:00-18:00	49	72	51	43
18:00-19:00	53	80	52	45
19:00-20:00	55	80	56	46
20:00-21:00	56	77	55	46
22:00-23:00	46	67	47	42
23:00-00:00	46	72	47	42
00:00-01:00	43	68	45	40
01:00-02:00	42	58	44	39
02:00-03:00	41	62	43	37
03:00-04:00	39	53	41	35
04:00-05:00	39	51	42	35
05:00-06:00	40	52	42	36
06:00-07:00	42	53	44	38

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