MZA ACOUSTICS

49 – 51 COLNE ROAD, HUDDERSFIELD

Noise Impact Assessment Report

Document History

Project Document Reference: 1700779-RP-NIA-001

Rev	Date	Comment	Author	Checked
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Contents

1. INTRODUCTION

MZA Acoustics has been appointed by Kishan Capital Ltd, to undertake a noise impact assessment in relation to discharge of conditions relating to planning approval notice 2021/62/91205/W with respect to 'Change of use and alterations to two dwellings to form (Class E) shop and (sui generis) Hot Food Take-away on Ground floor and two first floor single bedroom flats' at 49-51 Colne Road, Huddersfield.

The premises is located within the Local Planning Authority (LPA) of Kirklees Metropolitan District Council (Kirklees).

The Conditions addressed within this report are reproduced below for ease of reference.

> 3.The takeaway use hereby permitted shall not begin until details of the installation and/or erection of any kitchen extract ventilation system, including details of the methods of treatments of emissions and filters to remove odours and control noise emissions has been submitted to and approved in writing by the Local Planning Authority. The takeaway shall not be brought into use until the works specified in the approved scheme have been installed. Such works shall thereafter be retained, operated at all times when the takeaway is in use and maintained in accordance with the manufacturer's instructions.
> **Reason**: To ensure that premises in the vicinity of the application site do not suffer loss of amenity arising from odours, and to accord with the aims of Policies LP24(b) and LP52 of the Kirklees Local Plan, Principle 6 of the Council's adopted Housebuilders Design Guide SPD and Chapter 12 of the NPPF.
>
> 4. Before development of the proposed takeaway commences, a noise assessment report by a suitably competent person shall be submitted to and approved in writing by the Local Planning Authority. The report shall include:-
>
> a) an assessment of all of the noise emissions from the proposed development
> b) details of existing background and predicted future noise levels at the boundary of Flat 1-43 47A Colne Road Huddersfield HD1 3AY, 53 Colne Road Huddersfield HD1 3AY, and the two new flats forming part of this development.
> c) a written scheme of how the occupants of the above-mentioned noise sensitive premises will be protected from noise from the proposed development including details of all necessary noise attenuation.
>
> The development shall not be brought into use until all works comprised within the measures specified in the approved report have been carried out in full and such works shall be thereafter retained.
> **Reason**: This is imposed as a pre-commencement condition to ensure that any noise attenuation measures, where required, are incorporated into the building during the development process and to ensure that future occupants of the flats and existing or future occupants of neighbouring residential properties do not suffer loss of amenity arising from noise disturbance and to accord with the aims of Policies LP24(b) and LP52 of the Kirklees Local Plan. Principle 6 of he Council's adopted Housebuilders Design Guide SPD and Chapter 12 of the NPPF

The following report details the assessment of likely noise impact from the approved development of the Site, in respect of the assessment criteria of Kirklees Council, and referencing all relevant technical guidance.

1.1 Consultation

Kirklees have previously issued a design guide advice note as part of the "West Yorkshire Planning Consultation Guidance (condensed Version) – Noise & Vibration" - May 2016 and this document provides the basis of this assessment approach.

1.2 Scope

The following scope of works is therefore considered within this report:

- A noise measurement survey undertaken at the rear façade of the first-floor representative of future and existing residential premises identified in the planning condition.
- Preparation of a noise impact assessment in accordance with BS4142:2014+A1:2019 and based upon criteria set by Kirklees Council, and, where appropriate recommendations for mitigation to protect existing and future occupiers from the development.

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

2. SITE DESCRIPTION

2.1 Site Location & Environment

The Site is located in the Folly Hall area of Huddersfield, the administrative town within the Kirklees Metropolitan District. Colne Road is located between the Huddersfield Narrow Canal and the River Colne, close to its confluence with the River Holme.

The area is mixed use, primarily commercial / light industrial, with increasing conversion of old warehouse buildings, and regeneration of brownfield Sites to provide student accommodation for the nearby university and colleges.

The proposed development is indicated approximately in **Figure 1** below, and in more detail in **Figure 2**.

Figure 1 – General Site Location

The Site is just off the ring road and the key environmental noise sources in the vicinity of the Site are fluctuating road traffic noise, with other commercial and community sounds typical of a town centre location observed. To the immediate rear of the Site are numerous heating/cooling/extraction infrastructure serving local businesses.

The key concern for the proposed development of the Site to include a residential unit, are the numerous fixed plant associated with the various hot food businesses operating locally.

The Site development (red line) boundary is approximately identified on the arial imagery from taken from Google Maps in **Figure 2** below, and shows the approved development premises with courtyard / car park to the rear of the Site.

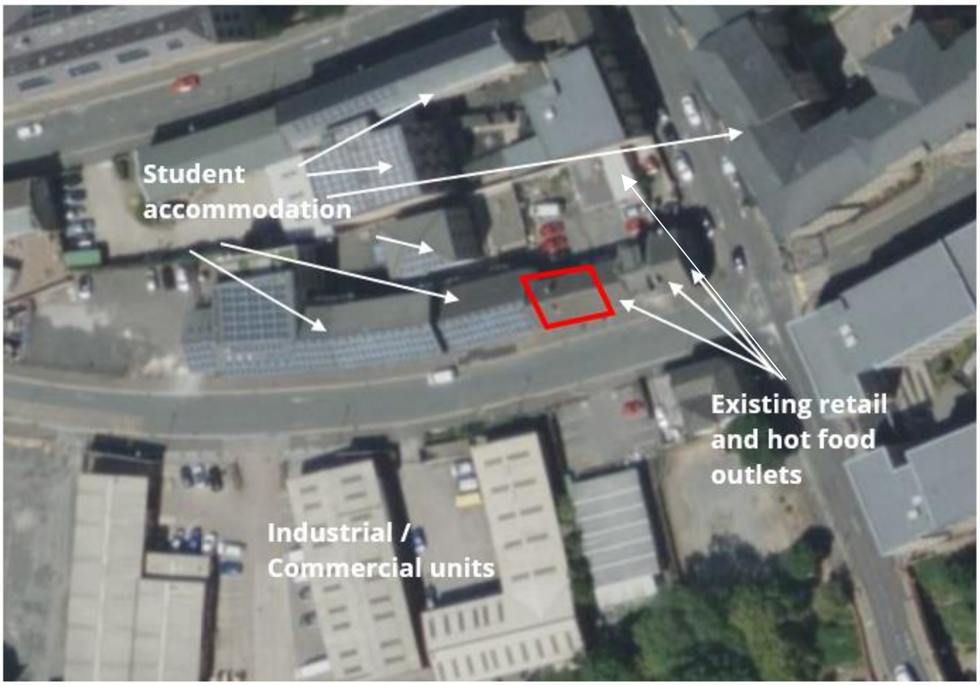


Figure 2 – Approved Development Site and surrounds

Affixed to the rear surrounding buildings are numerous items of existing cooling and extraction plant, the nearest to the development are shown in **Figure 3**. Further images of the rear layout are shown in Appendix C.

Figure 3 – Rear kitchen extract at 53 Colne Road

2.2 Approved Development

The approved development is to create 2no. first floor flats with ground floor space allocated to commercial space, including a hot food take away at 51 Colne Road, with extraction plant and associated duct work affixed to the building terminating above eaves height, as per approved plans presented below in **Figure 4**, and in **Appendix B** which indicate a much smaller scale duct is proposed than the current systems serving neighbouring premises.

The specific equipment is yet to be selected and finalised and the following assessment is undertaken to propose a maximum sound level for the external plant required to maintain suitable residential amenity for the approved first floor residential elements of the development, and those nearby existing sensitive premises.

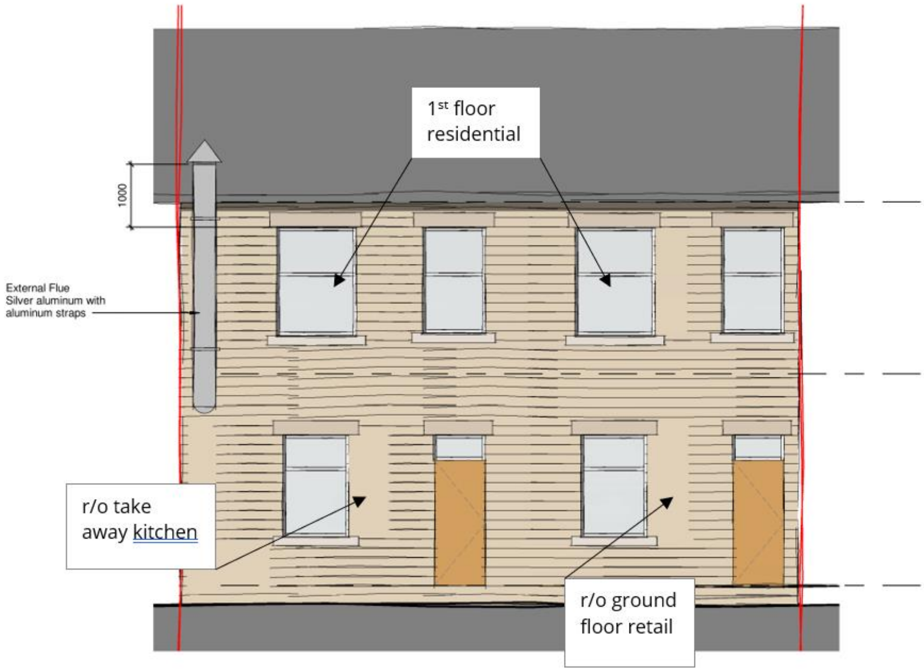


Figure 4 – Approved Rear Elevation

3. PLANNING POLICY GUIDANCE

3.1 Introduction

Within the following section of the report, detail is presented relating to the relevant national and local planning policies and guidance applicable to the proposed development.

3.2 National Planning Policy Framework (NPPF), December 2023

The NPPF determines the government's planning policy for England. The document was first published in March 2012, revised in July 2018, updated in 2019, 2021 and 2023.

In response to the 'Levelling-up and Regeneration Bill: reforms to national planning policy consultation' the NPPF has been completely revised and the version published on 19 December 2023 completely replaces the previous NPPF document.

Planning policy, in relation to noise is considered in Chapter 15 – 'Conserving and enhancing the natural environment', specifically in terms of pollution.

Paragraph **191** states that:

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 by doing so they should:

*a) **mitigate and reduce to a minimum** potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*

*b) **Identify and protect tranquil areas** which have remained relatively undisturbed by noise and are prized for their recreational 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.

Furthermore, Paragraph **193** continues:

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.

The guidance contained within the NPPF reference the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).

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

The NPSE attends to three types of noise;

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

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

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

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

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

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

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

3.4 Planning Practice Guidance - Noise

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

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

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

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

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

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

Table 1 - PPG Observed Effect Levels

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

Perception	Example of Outcomes	Increasing Effect Level	Action
	closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.		
Noticeable and very disruptive	Extensive and regular changes in behaviour and/ or an ability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

3.5 West Yorkshire Planning Consultation Guidance (condensed Version) – Noise & Vibration" - May 2016

Kirklees is one of five Local Planning Authorities in the West Yorkshire Area to contribute to the planning consultation document which clearly sets out the objectives for developers both in terms of existing and proposed noise sensitive receptors. This resolves the need to undertake direct consultation in the majority of cases, as the guidance for representative planning situations is clearly described.

MZA is not aware that the document has been updated since first publication in 2007 and where reference to rescinded guidance is made, MZA will substitute the most recent national guidance and methodology as summarised below e.g. BS4142:1997 becomes BS4142:2014.

In terms of fixed plant noise, the guidance states that:

1 New Industrial or Commercial Use near to Residential Use

1.1 *This advice aims to protect the present and future occupiers of residential properties from your new industrial or commercial noise.*

Developers should carry out an assessment in accordance with BS4142 to determine the rating level of the new development. It is recommended that during normal daytime hours (0700 to 2300 hours), the BS4142 rating level, measured over 1 hour, should be 5dB below the background (L_{A90}). During the night-time period (2300 to 0700 hours), the BS4142 rating level, measured over 5 minutes should be 5dB below the background (L_{A90}).

The assessment should be carried out at the site boundary or at the nearest noise sensitive premises, depending on the circumstances. These noise levels are intended to ensure that existing noise sensitive premises and land which may be used for noise sensitive development in future does not become blighted by noise.

To aid regeneration, in certain circumstances, a higher rating level **may** be accepted provided the need is justified.

In addition, the levels specified in Appendix 1 should not be exceeded. These should be calculated assuming windows in noise sensitive premises are open for ventilation (see Appendix 1)

Based on the above, the cumulative rating noise level ($L_{Ar,Tr}$) from any new fixed plant at the Site shall not exceed the measured daytime and night-time typical background noise level ($L_{AF90,T}$) when measured 1m from window of the NSR.

In line with NPSE and NPPF, it is stated that the Planning Authority will normally recommend conditions to mitigate noise impacts where noise levels exceed the LOAEL but are lower than the SOAEL criterion. Recommended maximum LOAEL sound levels are presented, based upon an Absolute Criteria:

Table 2 – Recommended Maximum, LOAEL sound levels based upon an Absolute criterion

Location	Time Period	Ambient Level (dB $L_{Aeq,T}$)	Maximum noise Level (dB L_{AFmax})
		LOAEL	LOAEL
External Amenity areas	0700-2300	55	-
External Amenity areas	2300-0700	45	60
Habitable room	0700-2300	35	-
Bedroom	2300-0700	30	45
Dining Room	0700-2300	40	-

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

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

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

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

The guidance provided includes appropriate internal and external noise level criteria, which are applicable to dwellings exposed to steady external noise sources. It is stated that it is desirable for internal ambient noise levels not to exceed the criteria set out in **Table 3** below.

Table 3 – Summary of Internal Noise Level Criteria for Habitable Rooms from BS 8233:2014

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

With regards to individual noise events, BS 8233 states that:

'A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values'.

The superseded version of the standard (1999 version) suggested a night-time level of 45dB $L_{Amax, fast}$ which should not 'normally' be exceeded, which concurs with current World Health Organisation guidelines. As such, this level will be considered in the subsequent assessments of noise impact during the night for the typically highest occurring L_{Amax}, fast noise events.

It is recognised within the standard that where development is desirable 'these criteria may be relaxed by up to 5dB and reasonable internal conditions still achieved'.

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

3.8 BS 4142:2014 Methods for rating and assessing industrial and commercial sound

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

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

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

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

BS 4142 further states that “where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact” again depending upon the specific context of the site. The Standard further qualifies the assessment protocol by outlining conditions to the comparative assessment and stating that “not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”, thus implying that all sites should be assessed on their own merits and specifics.

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

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

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

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

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

Table 4 - BS 4142 Subjective Method Rating Correction

Level of Perceptibility	Tonal Correction dB	Impulsivity Correction dB	Correction for ‘other sound characteristics’ dB	Intermittency Correction dB
No Perceptibility	+0	+0		

Just Perceptible	+2	+3	Where neither tonal nor impulsive but clearly identifiable +3	If intermittency is readily identifiable +3
Clearly perceptible	+4	+6		
Highly perceptible	+6	+9		

This standard and methodology will only be used to assess the impact of sound from any fixed plant.

3.9 Applied Assessment Methodology

A Site noise survey was undertaken to quantify prevailing sound levels during the operation of existing plant located at the rear vicinity of 49-51 Colne Road and other specified nearby existing sensitive receptors.

The target assessment outcome will be an external rating level during the operation of the extract for the approved take away kitchen do not exceed the prevailing background sound level during operation.

This value by interpretation will fall between the definitions of ‘No Observed Effect Level’ (NOEL) and the ‘Lowest Observed Adverse Effect Level’ (LOAEL) thresholds referenced in NPSE.

This would be expected to satisfy the requirements of the LPA in terms of managing the impact at nearby receptors specified in the Condition 4 of the decision notice.

Internal noise levels within the noise sensitive areas of 49-51 Colne Road will be designed to meet the internal noise criteria specified in BS8233.

4. ENVIRONMENTAL NOISE SURVEY

4.1 Overview

A noise survey has been undertaken by MZA to quantify the typical background sound level at the Site and the adjacent sensitive premises, as identified by the planning Condition, and this will form the basis of the noise impact assessment in accordance with the methodology of BS4142:2014.

4.2 Noise measurement Equipment

Noise measurements were undertaken using the Class 1 specification noise measurement equipment detailed in **Table 5**.

Table 5 - Details of Sound Measurement Equipment

Item	Make & Model	Serial Number	Calibration Due Date
Sound Level Meter	01dB Metravib FUSION	11703	23/06/2024
Pre-amplifier	Integrated with meter	n/a	
Microphone	GRAS 40CD 1/22" Pre-polarised free-field	470866	
Calibrator	01dB Metravib CAL31	82793	20/06/2024

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

All equipment was field calibrated before and after the measurement survey and no significant drift was noted.

The microphone was mounted on a pole and fixed to a position extending 1m from the façade via the rear first floor window nearest to the approved kitchen extraction flue.

4.3 Weather Conditions

The weather conditions varied significantly during the survey, and the following summary is provided.

At installation on 30/01/24, the weather was dry, and calm with typical windspeed measured to be below 5 m/s at the rear of the building. As none of the existing kitchens were operational, the equipment was left and a remote data check in made during the evening, but no obvious equipment start-up was noticeable on the trace.

Weather conditions from 6am on Wednesday 31st January included very strong winds, and later very heavy rain which lasted until around 21:00 hours. Whilst the microphone position was well sheltered by the surrounding buildings, due to the excess weather conditions in the locality, no noise data obtained during this period is considered suitable for the purposes of the assessment and has been removed from the dataset in analysis following download of data.

A physical check in to the measurement location was made at 14:10 hours on 1st February. Weather conditions were once more noted to be suitable for the measurement of sound being dry, with low windspeed. At this time, the existing kitchen extracts were still not operating, however a chiller unit associated at the rear of 55-57 Colne Road was visually confirmed to be operating but only just audible beneath the unit and not at 49-51 Colne Road.

It was decided to leave the installation for a further evening to ensure a full data set could be obtained. Equipment was removed from Site on 2nd February 2024 at approximately 14:30 hours during a light rain shower.

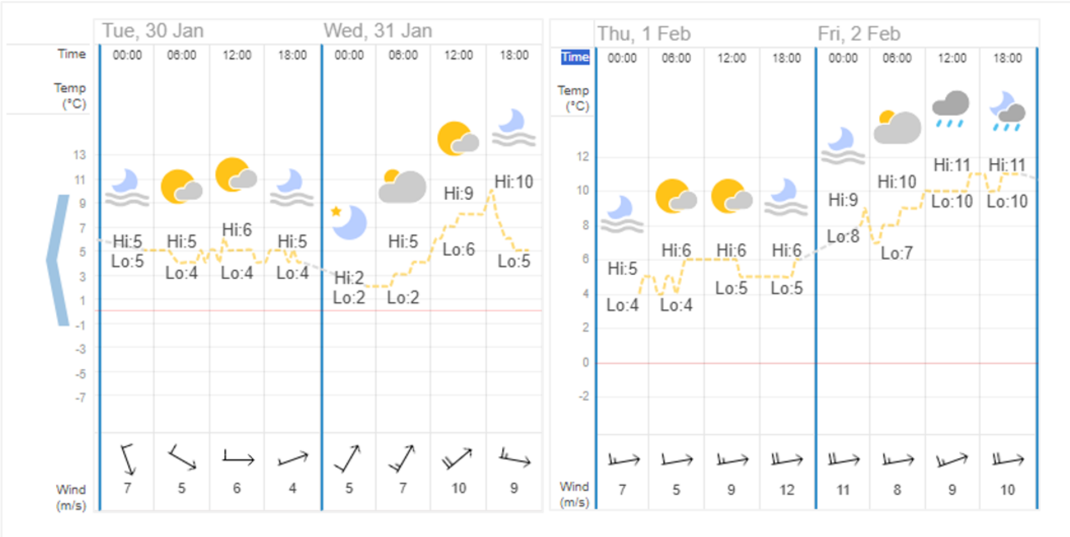


Figure 4 – Summary of historic weather conditions

4.4 Existing noise climate

Existing external duct work is mounted to the rear of 53 Colne Road as illustrated in Figure 5 below and in further photographs taken during the noise survey of the rear of the premises, included in Appendix C.

The existing duct is a significant diameter with visible in-line silencers and fan unit. The ductwork passes under the sensitive windows of the residential upper floor space identified by the planning condition to be assessed for the approved development as a nearby sensitive receptor, and the terminus of the duct is above eaves height.

Further existing mechanical plant is located at the rear of Top Taste Indian take away at 57 Colne Road in the form of kitchen extract ducting. Condenser units understood to be associated with Top News at 55 Colne Road were the only plant observed to be operational during visits to Site, and was barely audible.

4.5 Measured Sound Levels

A summary of average measured sound pressure levels at **ML1** are presented in **Table 6** below. Full survey results are presented in **Appendix C**.

The full measured data has been analysed for as a complete dataset, and furthermore as a modified dataset with wind affected data removed, although due to the relatively sheltered nature of the measurement position, the elevated wind speeds did not appear to have significant impact on the overall ambient noise climate. Finally, the most sensitive period of operation was selected in order to undertake the assessment, based upon the publicised operating times of the adjacent premises. When viewing the time histogram presented in Appendix C, it is clearly identified where associated plant turns off at around midnight and 02:15 hours for premises at 53 and 57 respectively.

Operating times for the two existing hot food take away premises has been obtained from Google maps information. The typical background sound level for the assessment presented in **Table 6** has been determined for these night time operating hours, including the existing plant operation, as the operation of the new plant is not likely to operate outside the period where existing plant / neighbouring businesses already operates. The target criteria for the new plant will be determined such that the new plant does not adversely contribute to the existing night time noise climate.

Table 6 - Summary of Measured Sound Levels at ML1

Scenario	Time Period	Measurement Duration	Average Measured Sound Levels, dB			
			$L_{Aeq,T}$	L_{AFmax}	$L_{A90,T}$	$L_{A10,T}$
Full data	14:05 30/01/24 – 14:30 02/02/24	72h 25m	58.3	100.6	46.4	61.1
Full data excluding poor weather conditions	Ex. 06:00 – 21:00 on 31/01/24	57h 25m	58.3	100.6	51.9	58.6
Night time weekday opening hours	23:00 – 02:15	3h15m	54.6	88.3	49.0 - 49.9[1]	55.5

Table notes:

[1] Statistically typical range $L_{A90,1min}$ – lowest value used for assessment.

5. NOISE IMPACT ASSESSMENT

5.1 Overview

This section presents the details and results of the noise impact assessment to demonstrate the maximum operating sound level for externally mounted plant associated with the kitchen extraction system approved for development at 51 Colne Road.

5.2 Noise Impact Assessment

The ambient sound level measured at the 1st floor façade is deemed to be representative of the sound level at all the noise sensitive receptors identified in the planning conditions.

In order to determine the impact of the proposed mechanical plant, a recommended maximum Rating level is calculated following the methodology of BS4142. Based upon the existing, typical background sound level during the sensitive operating time period of 23:00 to 02:15 hrs of 49dBA, the Rating Level of any new fixed plant at 51 Colne Road, should aim to achieve a rating level of at least 5dB below the prevailing background sound level, or **44dBA** at the receptor. In all cases, the assessment location is 1m from the sensitive façade opening (1st floor bedroom window at 49, 51 and 53 Colne Road, and the external balcony at 47a Colne Road). It is assumed that where the Rating Level can be achieved at the closest receptor, the rear bedroom/study of 51 Colne Road, the recommended criteria would also be achieved at more distant assessment locations.

The proposed Rating Level assumes that any tonal or character correction is included, but ideally plant free from these characteristics should be selected to avoid over burdensome specification of external emissions.

Furthermore, the plant procured should correctly installed to avoid structural transfer of sound and vibration by including antivibration mounts when affixing to the party wall. Plant should also be regularly and appropriately maintained to maintain the performance of the plant for the life of the equipment.

In real terms, plant sound which is rated to be 5dB below the background sound level would be described as inaudible at the receptor and will operate well below the prevailing ambient sound level during the most sensitive operating period. The strict night time requirements would also ensure that daytime sound levels are also compliant with the Kirklees development control policy for noise from new commercial premises.

In terms of the local context the site is in an urban location with numerous existing items of plant and equipment operating in close proximity. As such the impact of new plant complying with the above noise levels is considered to be of negligible impact.

5.2.1 Internal sound at the new dwelling

In order to be complete, the internal sound levels within rear facing sensitive rooms are considered. Based upon the operation of the existing plant and local road traffic contributing most significantly to the existing ambient sound level at the 1st floor window, a worst case night time sound level of 55dB $L_{Aeq,T}$ is considered. This would indicate an internal sound level of 30 dB $L_{Aeq,T}$ could be achieved, in accordance with BS8233 for a bedroom, providing that the windows remain closed. In reality, the rear habitable room is indicated as a Study on the plans which would attract a less arduous internal criteria, however, as a worst case, it has been assumed that the room might be used as an occasional space for overnight visitors.

As such it is recommended that a suitable acoustic rated trickle vent (minimum D_{new} + C_{tr} 25dB) is included to the new glazing specification for the rear bedroom windows to ensure adequate background ventilation is achieved without the need to open the windows. Windows would still be openable for fast purge of internal air, or at times when the nearby extraction units cease to operate around 02:25am on week nights and 02:45 on Fridays and Saturdays.

Considering the above impact assessment outcomes and based upon the target rating level guidance of Kirklees Council, noise from the future fixed plant is not considered to result in adverse noise impact within the existing or proposed noise sensitive premises.

6. CONCLUSIONS

6.1 Summary of findings

An assessment of noise impact has been undertaken based on the measured sound levels obtained by MZA Acoustics Ltd between 30th January and 2nd February 2024, and following the assessment guidance in BS4142 and BS8233 led by the design requirements of Kirklees Council identified from planning condition 4 included in the decision notice for the development.

During the worst-case operating conditions assessed, external and internal sound levels during the relevant assessment period are found to be within the LOAEL threshold identified as acceptable by the Local Planning Authority, via the Environmental Protection team design criteria.

The rating level of proposed mechanical plant at 51 Colne Road should not exceed a Rating Level of 44dB. At this level, appropriate internal ambient conditions within rear habitable rooms will be achieved by closing windows. Where necessary, existing bedroom windows should be upgraded with standard thermal double glazing to achieve a minimum 25 dB $R_w + C_{tr}$ and acoustic trickle ventilation achieving a minimum $D_{new} + C_{tr}$ 25dB.

Where a plant noise emission of 44dB L_{Aeq} cannot be confidently achieved by the selection of plant with associated silencers and other attenuation means, the available system should be reassessed by a suitably qualified acoustician, and further advice given to the performance rating of glazing and trickle ventilation required to achieve the same outcome at the nearest sensitive receptor.

APPENDICES

Appendix A – Glossary of Acoustic Terminology

Acoustics and Noise

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

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

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

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

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

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

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

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

Airborne Sound	Sound that reaches the point of interest by propagation through air.
Ambient Sound:	Sound from all sources at any given time, form both near and far. Usually measured in terms of L_{Aeq}.
A-Weighting	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Background Sound Level	The A-weighted sound pressure level that can be considered the baseline in the absence of any noise from a specific source of sound under assessment. Measured in terms of $L_{A90, T}$.
Calibration	The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short-term measurements, and periodically for longer term monitoring.
Class 1	The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard IEC 60651 referred to the grade as "Type", whereas the new standard IEC 61672 refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however, MZA use Class 1 (or Type 1) meters by default, as required by BS 4142:2014, for example.
Decibel	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds (s1 and s2) is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 Pa.
Fast time Weighting (F)	Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 Electroacoustics. Sound level meters. Pattern evaluation tests.
Free-field / Façade	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
IoA	The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British Acoustical Society (a daughter society of the Institution of Mechanical Engineers). It is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels. MZA is a Sponsor Member of the Institute of Acoustics, and all our consultants/ engineers are individual Members.
$L_{AF90, T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T,

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

Appendix B – Development Information

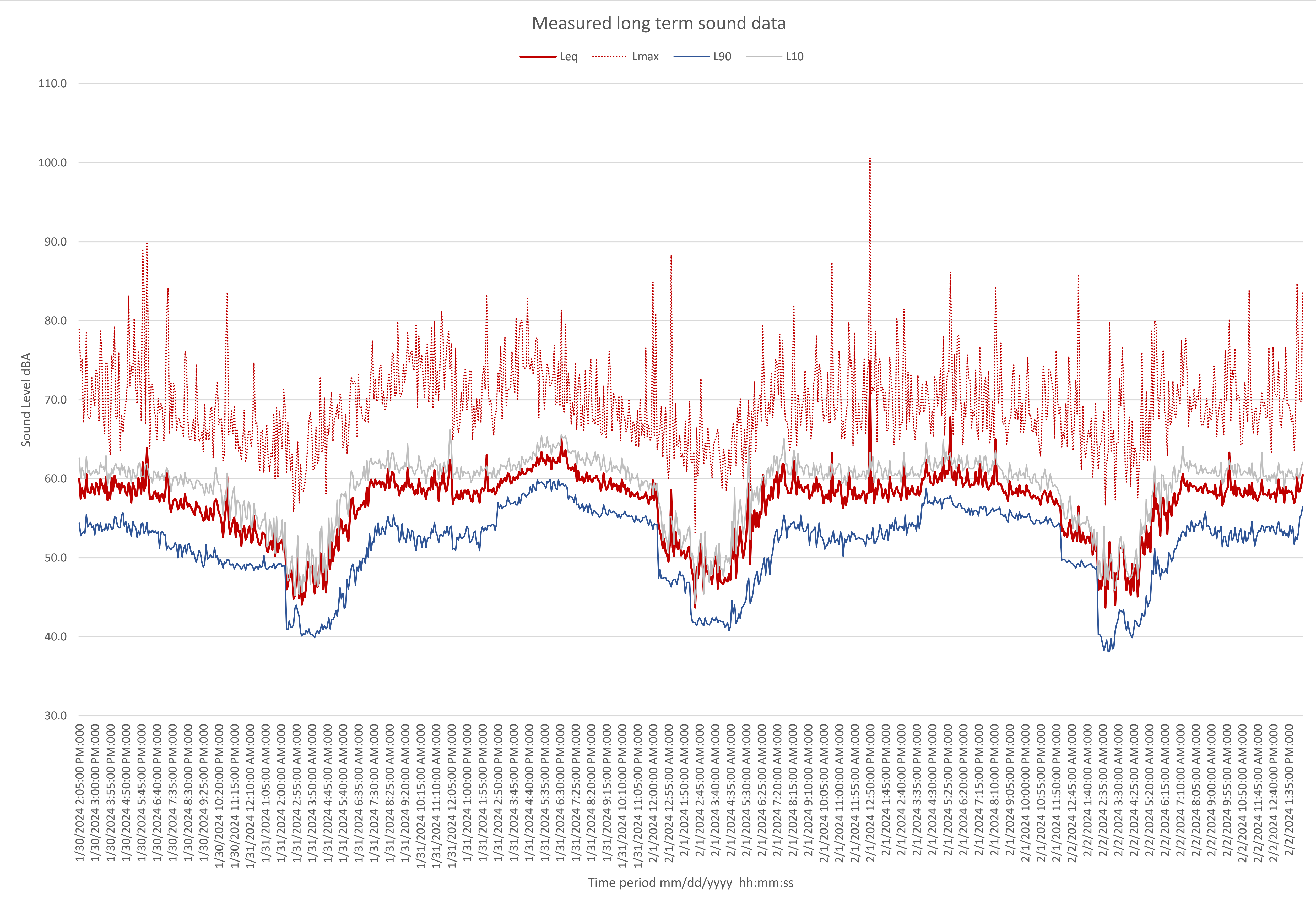
Figure B: Approved Site Layout

Site location plan:

Approved Layout:

Appendix C – Baseline Noise Survey

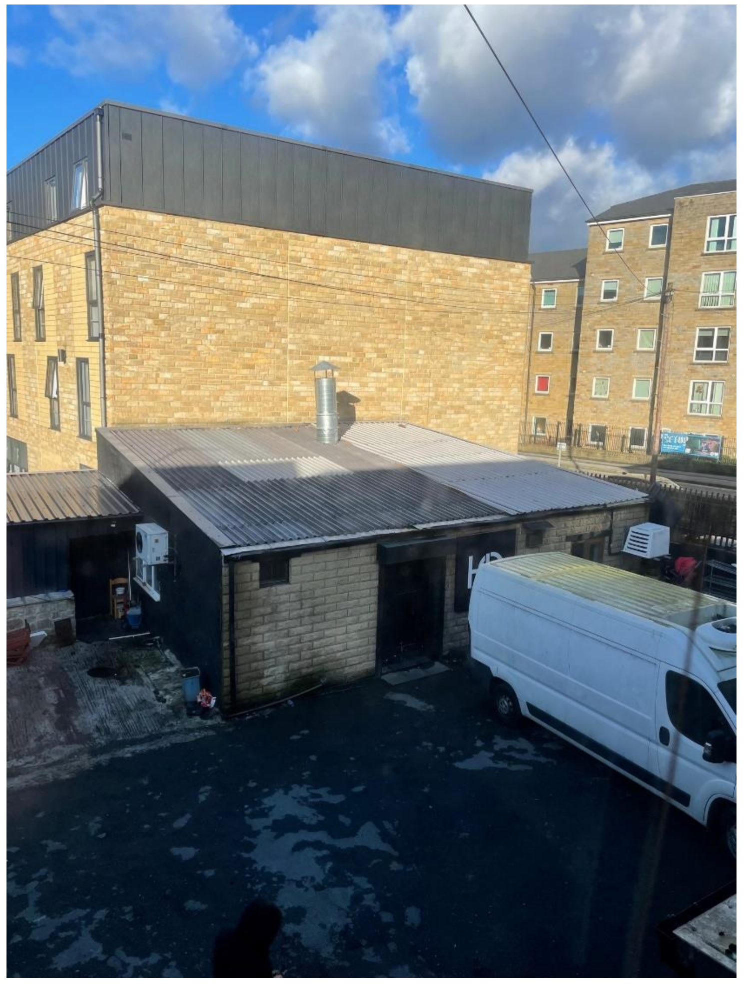
Figure C.1: Measured Sound Levels



Existing rear elevation

Existing glazing

Existing rear plant



Measurement Installation

Appendix D – Uncertainty & Report Limitations

Uncertainty

Uncertainty is an unavoidable feature of measurements in the field, which can be subject to many factors; the weather typically being the most significant of which with respect to the measurement of sound. Uncertainty is also unavoidable in the prediction of sound levels, where naturally, before the scenario being considered becomes a reality, a number of assumptions need to be relied upon. There is also the uncertainty of people's reactions, which can be influenced by a number of factors, not just the magnitude or character of the sound in question.

In keeping with the scale of each project, therefore, it is the aim of MZA Acoustics to minimise uncertainty at each stage as far as reasonably practicable. With this is mind, and where it is within the control of MZA Acoustics, the control measures listed in the following table are followed, which have been derived from the guidance within BS 4142:2014 and the experience of MZA Acoustics.

Crucially, it has been determined that environmental noise measurements have been undertaken by suitably qualified staff, using in calibration equipment, in a number of locations, over a period of at least 24 hours, and avoiding adverse weather conditions.

The predictions have also been undertaken by suitably qualified staff, whilst using the best available information, an industry standard calculation method, and the most applicable calculation procedures.

Notwithstanding this, naturally some uncertainty remains. Given the sheer number of factors involved, however, it is not feasible to place a value on the level of uncertainty, without resulting in an unhelpful range of possible outcomes. It is the professional position of MZA Acoustics that uncertainty has been kept to a realistic minimum and that the outcome of this assessment is sufficiently representative.

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Measurement		
Only use in calibration Type/Class 1 equipment and check (and record) calibration level before and after measurements	✓	Yes
Measurements were taken using the time and frequency weighting specified by the relevant standard	✓	Yes
Detailed notes were made, including details of the equipment, weather, survey positions (including approximate distances), contributing noise sources, presence of screening etc.	✓	Yes
Take photographs, and record survey locations using GPS if possible	✓	Yes
Avoid standing waves/interference – listen for effects, take spatial average from several locations or conduct a sweep	×	N/A
Take measurements at different distances to establish propagation	×	N/A
Take measurements at different heights where relevant	×	N/A
Don't just measure at the "noisiest" parts of site, but establish how "quiet" it is, too, where relevant to the assessment	×	N/A
Measure under different operating conditions relevant to your assessment / adopt worst case if known	×	N/A
Measure more than one cycle/ event (ideally at least three)	×	N/A
Determine state of repair of any associated source, where relevant	×	N/A
Use a windshield and avoid windy conditions (i.e. gusts regularly exceeding 5 m/s)	✓	Yes – data screened
Avoid wet conditions (particularly in terms of rain on the windshield/mic and on neighbouring surfaces)	✓	Yes – all weather kit employed and data screened
Avoid electrical and electromagnetic interference (such as from power cables and radio transmitters)	✓	Yes
Avoid extreme temperatures – traffic conditions can be different in freezing conditions, whilst meters can overheat and fail in a case when in direct sunlight during the summer.	✓	Yes

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Make measurements during different weather conditions (particularly relevant in terms of wind direction for sites affected by aircraft movements, but also for sites affected by other distant, but significant, sources of noise, in different directions	×	N/A
Where one source is dominant (such as a main road), as a minimum, measure during conditions favourable to propagation (i.e. when wind direction is within +/-45º of the line between the source and receiver or during temperature inversion, such as on clear calm nights)	×	N/A
Avoid tree/leaf (movement) sound where possible – ideally take measurements the same distance from sources of such sound as any receptors of interest	×	Yes
Avoid dawn chorus sound where possible – ideally take measurements the same distance from trees and bushes as any receptors of interest	×	N/A
Measure outside the receptor in question where possible; however, it is worst case typically to measure under free-field conditions and apply +3 dB correction to convert to "façade" where applicable – for most planning (new residential development) assessments, free-field is preferable	✓	Yes
Where it is not possible to install a meter outside the receptor in question, install a meter elsewhere and undertake additional attended measurements, either outside the receptor or at a representative location (when not adequately covered by the installed meter)	✓	N/A
Avoid atypical traffic conditions (such as during school holidays and road works – road traffic incidents can significantly affect flows, but which can't be predicted, and their occurrence can't always be established after the survey – check the data for anomalies)	✓	Yes
Avoid presence of you and/or the microphone resulting in atypical conditions (e.g. people stopping to talk, workers on site adjusting their way of working, etc.)	✓	Yes
Data Handling		
Download data immediately after survey and process promptly whilst details are fresh in your head	✓	Yes
Use digital transfer methods wherever possible, double check data read-off manually	✓	Yes

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Look at the time-history (in as fine a resolution as possible) for any unexpected events – preferably with active spectral data (i.e. in dBTRAIT)	✓	Yes
If removing any data (due to an atypical event, for example), 'save as' a new file and provide a note to the data within the corresponding Excel file	✓	Yes
Prediction		
Use measurement data at different distances to verify propagation	×	N/A
Use measurements at different heights to verify screening effects, where relevant	×	N/A
Use propagation calculation procedure relevant to source and distance	x	N/A
Use detailed traffic flow data applicable to the assessment methodology	×	N/A
Use detailed sound source data (including octave-bands levels), accounting for size, height and directivity, where known	×	N/A
Use detailed topographical data and base mapping	×	Not modelled
Identify different ground types	×	Not modelled
Apply an order of reflections of at least one	×	Not modelled
Use 3D view feature of the modelling software to check the accuracy of the model	×	Not modelled
Produce contour plots as a further means of identifying any abnormalities or errors in the model	×	Not modelled

Report Limitations

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

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

MZA ACOUSTICS

Unit A, Second Floor, Bridge Mills,
Huddersfield Rd, Holmfirth HD9 3TW

M: +44 (0)7769 676 097
T: +44 (0)113 426 9783
ahornby@mzaconsult.co.uk
www.mza-acoustics.co.uk