Paul Horsley Acoustics Ltd
Acoustics & Noise Control Consultancy

Acoustic Report

Planning Noise Survey for the Change of Use of The Dale Inn, 408 Wakefield Road, Denby Dale For the Formation of the 2 No Ground Floor Retail Units and 3 No Residential Flat at 1st Floor Level

Planning No 2022/90901

Our Reference – J3145 - Rev 0

Survey Dates: 31st January to 2nd February 2023

Survey and Report by: Paul Horsley MIOA

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Limitations

The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at that time.

All of the comments and opinions contained in this report, including any conclusions, are based on the information obtained by Paul Horsley Acoustics Ltd during our investigations.

There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been considered by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

Any diagram or opinion of the possible configuration of the findings is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

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1.0 Agent

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2.0 Subject

Proposed change of use of The Dale Inn, No 408 Wakefield Road, Denby Dale for the alterations to form 2 No retail units at ground floor and 3 No residential flats at 1st floor.

3.0 Aims

The aim of this report is to determine the existing baseline background noise environment levels, over a typical daytime and nighttime period, affecting the proposed development location to inform Planning Application No 2022/90901 relating to noise.

Provide an assessment of the results in accordance with the recommendations laid down in the National Planning Policy Framework, NPPF, for the proposed development site with respect to noise.

Provide mitigating noise control advice relating to the achievement of an acceptable internal environment for the development as recommended within World Health Organization's "Guidance for Community Noise, 1999", BS8233:2014 and BS4142:2014+A1:2019.

4.0 Location and Description of Existing Noise Sources

The site under consideration is the former Dale Inn public house located at No 408 Wakefield Road, Denby Dale. The building is a detached 2-storey property positioned to the eastern end of Denby Dale village centre. The property consists of a basement, ground and 1st floor areas which are currently un-occupied.

The property is located on a rectangular plot of land and occupies an area approximately 23m x 16m, with the building positioned to the east. There is a small yard area to the west.

The property under consideration is bounded to the north and east by Wood Nook, a small looping road leading to residential premises beyond. The western site boundary is formed by existing residential premises. The southern site boundary is formed by the A636, Wakefield Road, the primary link road between Wakefield and Huddersfield. On the opposite side of the road are residential premises. The village of Denby Dale is located to the east of the premises and includes shops at ground floor and residential remises above along the length of the A636.

The primary noise sources within the vicinity of the site are due to pedestrian and traffic flow activity along the A636, Wakefield Road and the surrounding road network.

5.0 Guidance on the Assessment of Noise Levels

The purpose of any criterion or standard for environmental noise should be to safeguard against unacceptable levels of community response, deemed as a feeling of annoyance during daytime or disturbance at night. WHO defines annoyance as "a feeling of displeasure evoked by noise"

The main source of information relating to noise and the community response are field studies including noise measurements and social surveys. These surveys attempt to establish a correlation between the two sets of results.

In the absence of any definitive guidance and to establish suitable noise criteria, it is necessary to rely on general guidance and assessment methods used for community noise sources. Discussions on the current methods are given below.

5.1 BS4142:2014+A1:2019 'Method for Rating and Assessing Industrial and Commercial Sound'

This recently revised standard provides a method for rating and assessing sound of an industrial and/or commercial nature. The method uses outdoor sound levels to assess the effect of sound on people who might be inside or outside a dwelling or premises used for residential purposes. It is limited to applicable sounds and is not intended for noise amounting to nuisance or rating noise outside the scope of the Standard.

Unlike the previous version of the Standard, rating levels are not prescriptive, but more context based, with the following applicable to rating values:

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

The Standard introduces additional rating elements, these being subject assessments of tonality, and impulsivity of a sound source, with weighted rating values accordingly applied at the judgment of the assessor.

5.1.1 Description of Acoustic Features

If the assessed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc.), the plant should be designed or acoustically treated to reduce the appropriate output based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible.
- 2 dB where the tone is just perceptible.
- 4 dB where the tone is clearly perceptible.
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible.
- 3 dB where the impulse is just perceptible.
- 6 dB where the impulse is clearly perceptible.
- 9 dB where the impulse is highly perceptible.

For noise, which is equally both impulsive and tonal, then both features can be considered by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a +3 dB correction can be made.

If a subjective assessment is not appropriate, then an objective assessment can be made. A noise source is deemed to be tonal if the time averaged sound pressure level in a one-third octave band exceeds the level in adjacent one-third octave bands by the level differences given below:

- 15 dB in the low frequency one-third octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency one-third octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency one-third octave bands (500 Hz to 10000 Hz)

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

5.1.2 Uncertainty

The introduction of Uncertainty has been applied to the measured values; again, consideration of this is left to the professional executing the survey and assessment. However, steps are provided within the Standard for the reduction of uncertainty in both measurement and calculations of the sound source and rating value.

Actual meteorological conditions are now required to be recorded and reported upon for the survey and report.

5.2 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

The scope of British Standard 8233: 2014: *Sound insulation and noise reduction for buildings* is the provision of guidance for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations; the primary intention of these is to guide the design of new buildings or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

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

Indoor Ambient Noise Levels in Spaces When They Are Unoccupied

Activity	Typical Situations	Design Range LAeq, T dB	
		0700h to 2300h	2300h to 0700h
Resting	Living rooms	35	--
Dining	Dining Room / Area	40	--
Sleeping	Bedrooms	35	30

BS 8233:2014 states in Note 4 that:

"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. 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."

As such it has been considered appropriate to define a limit for regular maximum indoor noise levels of 45 dB(A) with sporadic events not exceeding 50 dB(A).

BS8233 also suggests noise limits for external areas or a property such as gardens or balconies. It states that:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,\ T}$, with an upper guideline value of 55 dB $L_{Aeq,\ T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centre's, or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.'

5.3 National Planning Policy Framework, NPPF.

The newly incumbent National Planning Policy Framework, NPPF, provides advice to planning authorities in England on how they must seek to minimise the adverse impact of noisy activities on noise sensitive receptors. This NPPF, replacing PPG 24, and is not prescriptive with respect to specific noise levels, and is concerned with the advising on good practice for environmental noise assessment.

In the absence of definitive noise criterion within the NPPF most Local Authorities in England default to the daytime noise levels inside dwellings not to exceed NR 35; and NR 25, to be achieved inside dwellings at night to avoid sleep disturbance, based upon ingress of external noise sources.

5.4 Noise Policy Statement for England, NPSE.

The document "Noise Policy Statement for England" sets out the following vision for ongoing noise policy:
"Promote good health and a quality of life through the effective management of noise within the context of Government policy on sustainable development."
This vision should be achieved through the following Noise Policy Aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:"
"avoid significant adverse impacts on health and quality of life;"
"mitigate and minimise adverse impacts on health and quality of life; and"
"where possible, contribute to the improvement of health and quality of life."

To achieve this vision the Noise Policy Statement sets three noise levels to be defined by the assessor:

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.

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL Noise levels, the Policy Statement requires that:

"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development…. This does not mean that such adverse effects cannot occur."

Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once noise levels are below the NOEL there will be no observable change.

5.5 World Health Organization 1999 "Guidance for Community Noise"

This document provides a review of the effects of noise and a description of the principles of the WHO health criteria and guidelines for Community Noise.

The effects of noise in dwellings are identified as sleep disturbance, annoyance, and speech interference. For bedrooms, the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30 dB

LAeq for continuous noise and 45 dB LAmax for sound events. At nighttime, outside sound levels about 1 metre from facades of living spaces should not exceed 45 dB LAeq, so that people may sleep with bedroom windows open. This value is equivalent to that specifies in the Criteria 12 document; however, it is now assumed that the noise reduction from outside to inside with the window open is 15 dB.

To enable casual conversation indoors during the daytime, the sound level of the interfering noise should not exceed 35 dB LAeq.

To protect the majority of people from being **seriously** annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being **moderately** annoyed during the daytime, the outdoor sound level should not exceed 50 dB LAeq.

Table 1 of the document summarises the guideline values for community noise in specific environments and includes the noise indices to be adopted. Significantly, the corresponding time base to be used for the assessment is also included.

The relevant extracts of Table 1 are reproduced thus:

Specific Environment	Critical health effect (s)	LAeq dB	Time Base hours	LAMax dB
Outdoor living area	Serious annoyance, daytime, and evening	55	16	-
	Moderate annoyance, daytime, and evening	50	16	-
Dwelling, Indoors	Speech intelligibility & moderate annoyance daytime & evening.	35	16	-
	Sleep Disturbance, night-time	30	8	45
Outside Bedroom	Sleep disturbance, window open (Outdoor Values)	45	8	60

5.6 Subjective Impression of Noise Changes

The following Table provides a semantic scale that may be used to "subjectively" rate changes in sound pressure level.

Table 1: Subjective effect of changes in sound pressure level

Change in sound level dB	Change in Power		Change in apparent loudness
	Decrease	Increase	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half / Twice as loud
20	1/100	100	Much quieter / louder

After Bies and Hansen

This table is taken from Professor Colin H Hansen's publication "Fundamentals of Acoustics" page 41, for the Department of Mechanical Engineering, University of Adelaide.

This table also appears in "Engineering Noise Control" by Colin Hansen and David Bies, a comprehensive reference book, amongst others.

5.7 Building Regulations AD-O, 2021 – Overheating Mitigation

The latest version of the Building Regulation 2010 includes a section 'Overheating' Approved Document O, as per 2021 edition – for use in England.

Section 3 of the Regulation relates to noise and the mitigation strategy to be considered as part of the planning and design stage of the development.

Below is the relevant section relating to noise included within Building Regulations AD-O

O1(2)(a) ONLINE VERSION

Section 3: Ensuring the overheating mitigation strategy is usable

3.1 The standards in this section may mean that the standards of the simplified method cannot be met. For example, if external noise is an issue, it is unlikely that windows would be opened by an occupant and therefore the minimum free areas of the simplified method cannot be met. In such cases, dynamic thermal modelling should be used.

Noise

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

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

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

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

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

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

Where noise is likely to be considered detrimental to opening a window, i.e., where noise exceeds those values noted above, an alternative method of ventilation is required to avoid overheating within the dwelling.

Guidance on ventilation and associated acoustic considerations is also indicated in Acoustic Ventilation and Overheating – Residential Design Guide [AVO] issued jointly by the Association of Noise Consultants and the Institute of Acoustics.

In this guide, the need for ventilation (as falls under the requirements of Approved Document F [ADF] are covered in three main requirements as follows:

- **Whole Dwelling Ventilation**

  General ventilation – continuous ventilation of rooms or spaces at a relatively low rate

- **Extract Ventilation**

  Removal of air from a space or spaces (typically stale air from bathrooms or kitchens) to outside

- **Purge Ventilation**

  Manually controlled removal of air at a high rate to eliminate fumes and odours, e.g., during painting and decorating or from burnt food. May be provided by natural or mechanical means.

Four main template systems for providing each of the above AD-F ventilation requirements are summarised in the AVO guide as shown in the table below.

Ventilation System	Method of Whole Dwelling Ventilation	Method of Extract Ventilation	Method of Purge Ventilation
System 1 [*Background ventilators and intermittent extract fans*]	Background ventilators (trickle vents)	Intermittent extract fans	Typically provided by opening windows
System 2 [*Passive Stack*]	Background ventilators (trickle vents) & passive stack	Continuous via passive stack	Typically provided by opening windows
System 3 [*Continuous Mechanical Extract (MEV)*]	Continuous mechanical extract (low rate), trickle vents provide fresh air	Continuous mechanical extract (high rate), trickle vents provide fresh air	Typically provided by opening windows
System 4 [*Continuously mechanical supply and extract with heat recovery (MVHR)*]	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)	Typically provided by opening windows

Where possible, natural forms of ventilation are typically preferred. However, in high noise areas, it may be necessary to recommend System 4, to minimise penetrations through the external building façade, which weaken the overall sound reduction performance.

Ventilation requirements will be assessed with consideration to the above systems.

6.0 Survey Equipment

6.1 Sound Insulation Testing

Svantek Sound and Vibration Analyser, SVAN 979, Type 1, Serial No 92932

Svantek Preamplifier, SV 17 Microphone Serial No 106523

GRAS Pre-Amplifier, Type GRAS 40AE, Serial No 370153

RION NC-74 Calibrator Serial No 530712

Sound Source and Dodecahedron Speaker

6.2 Remote Noise Monitoring

Castle Mirus GA117 Data-Logging Sound Level Meter, Type 1, Serial No 35779

Svantek Preamplifier SV18, Serial No 58437

7052E Microphone, serial No 67003

Castle GA607 Calibrator, Serial No 044493

Castle GA690 Barometer, Serial No 71293

Weatherproof Windshield

Tripod, Weatherproof Case, Lock and Chain

Cabling

7.0 Survey Method

A remote pre-development environmental noise assessment survey was carried out encompassing day and nighttime periods between 2nd and 6th February 2023 by the author.

LA_{eq}, $LA_{10,}$ LA_{90} and LA_{max} sound measurements were taken using the sound analyser.

The measurement indices noted above are defined as follows:

LA_{eq}, T	the "A" weighted equivalent continuous noise level of sample period T.
LA_{10}, T	the "A" weighted level exceeded for 10% of sample period T.
LA_{90}, T	the "A" weighted level exceeded for 90% of sample period T.
LA_{max}	The "A" weighted maximum level during the sample period T.

Various sound measurements were taken using the sound analyser. The meter was calibrated before and after the measurements using the calibrator to ensure accuracy of the results. No fluctuations were noted between calibrations and the results obtained can be deemed to be an accurate representation of the levels recorded.

In order to ascertain the existing typical background noise climate, sound recordings were taken over a 48-hour period, including front and rear elevations of the premises. The meter was mounted on the tripod and boom extending out of the 1st floor window of No 408 Wakefield Road for a distance of 1.5m from the facade during the monitoring sessions overlooking both the rear area and Commercial Street.

A sound insulation test was completed for the party floor between the ground and 1st floor levels.

Refer to Appendix A for a marked up locational sketch for the survey location.

8.0 Prevailing Weather Conditions

Date	Period	Temp °C	Relative Humidity Rh %	Barometric Pressure mb	Wind Speed mph	Wind Direction	Precipitation	Cloud Cover %
02.02.23	Daytime	12	66%	1027	0-5	W	None	40%
	Night	9	87%	1027	0-6	W	None	60%
03.02.23	Day	9	89%	1029	0-6	W	None	60%
	Night	8	84%	1031	0-5	WSW	None	70%
04.02.23	Daytime	8	82%	1031	0-5	WSW	None	60%
	Night	6	83%	1038	0-4	W	None	60%
05.02.23	Day	8	81%	1041	0-4	WNW	None	40%
	Night	3	89%	1037	0-5	W	None	50%
06.02.23	Morning	7	90%	1035	0-2	WSW	None	50%

All road surfaces were dry throughout the monitoring sessions.

9.0 Pre-Development Noise Survey Results

During the monitoring period separate noise samples were recorded, using a 1/1 Octave Centre Band analysis. These monitoring samples were collected from the outside the property at the western façade overlooking the yard area and Wakefield Road and the eastern façade overlooking Nook Wood and Wakefield Road during a typical 48-hour period at each location. This was to establish the general noise levels experienced externally by the site at the most exposed position available and therefore likely to experience the worst-case noise climate.

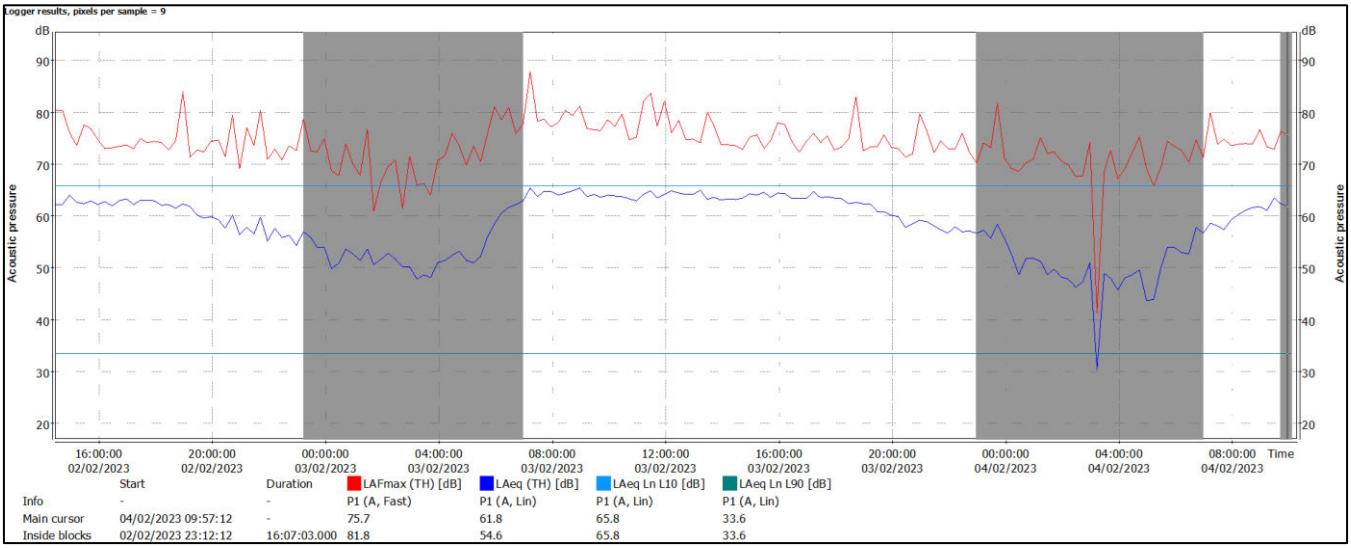
The table of results on the following pages indicate the noise levels recorded for the site location selected during the monitoring period, with a brief description of the noise sources contributing to the individually monitored noise levels recorded.

The above monitoring locations should be read in conjunction with the site layout appearing in Appendix A of this report.

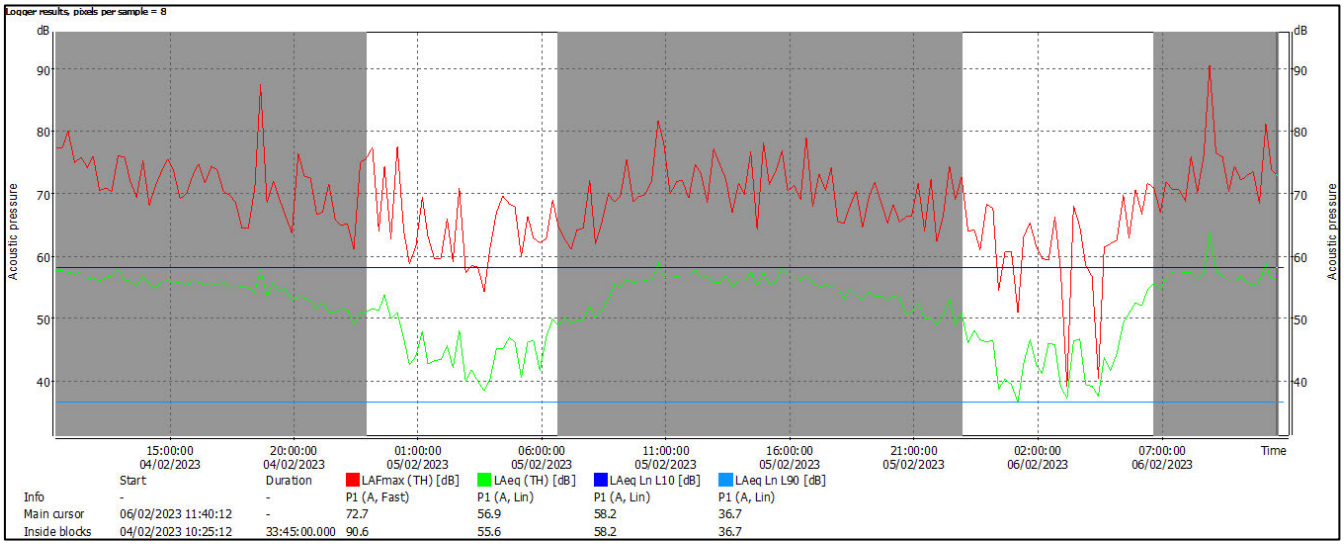
10.0 Noise Survey Results Tables

The tables below provide the details of the results collected during the noise monitoring sessions.

10.1 Remote Monitoring Results Histogram Table Western Elevation



10.2 Remote Monitoring Results Histogram Table Eastern Elevation



10.3 Results Table Overview

	Location			
	Western Façade		Eastern Façade	
Date	02-04.02.23	02-04.02.23	04-06.02.23	04-06.02.23
Period	Daytime	Nighttime	Daytime	Nighttime
LAeq dB	62	56	56	48
LA Max dB	88	72 *	90	68 *
Comment	Traffic dominant	Traffic dominant	Traffic dominant. Street activity noise	Traffic dominant

Note - * 11th highest LAmax dB value per Pro-PG recommendations.

10.4 Pre-Dev Sound Insulation Test Results Overview

Test Number	Location	Airborne Sound Insulation Achieved DnT, w (C; Ctr) dB	Pass / Fail
J3145-1	Separating Floor Between Ground and 1st Floor Areas	**58 dB (-1, -5)**	**P**

Refer to Appendix C for Sound Insulation Test Certificate.

11.0 Results Analysis

The above noise survey, carried out between 2nd and 6th February 2023, was chosen as a representative period to reflect the noise climate for the area surrounding the proposed redevelopment site.

The noise survey results obtained for the site can, therefore, be deemed to be representative of the activities for the area and will be used as the basis for analysis and assessment purposes below.

Assessments of the individual results indicate that the monitoring position selected is affected primarily by traffic noise and street activity along the A636, Wakefield Road.

From the data acquired during the various assessment periods the following exposure noise levels have been established for the external area of the site, with specific values pertaining to each of the elevations due to the varied noise climate.

Table of Calculated Worst-Case External Exposure Levels for the Site

Period	Noise Level
Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 62 dB
Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 55 dB LAmax - 72 dB (11th Highest Value)

The above values have been derived by log averaging the daytime and nighttime LAeq dB levels recorded and taking the 11th percentile nighttime LAmax dB value for the nighttime period, using the following:

Day time - 10 Log_{ave} LAeq 16 hr = 10* Log ((10^ (Value 1/10)) + (10^(Value2/10)) …. / 16)
Nighttime - 10 Log_{ave} LAeq 8 hr = 10* Log ((10^ (Value 1/10)) + (10^(Value2/10)) …. / 8)

12.0 Mitigating Circumstances

The proposal for the development site is for the change of use of The Dale Inn, No 408 Wakefiled Road, Denby Dale the and formation of 2 No ground floor retail shops and 3 No 1st floor self-contained residential flats.

The existing building envelope is of a robust stone construction and should provide adequate attenuation against the external noise sources, identified in the vicinity, to achieve comfortable internal noise levels. Being of stone construction this is likely to be the case, with the internal noise levels recorded indicating that the noise ingress was through the glazing not the structure.

There are 4 main areas to consider within the development to ensure that the building provides adequate attenuation against the ingress of external noise sources that are likely to affect the comfort and amenity of the residents.

- Building Fabric Construction
- Glazing Units
- Ventilation Considerations
- External Recreational Areas

12.1 Building Fabric Construction

The Building Regulation, relating to the minimum acoustic requirements for the various areas of the development, must be met.

Actual verification of the acoustic properties of the buildings fabric will need to be executed by pre-completion sound testing prior to occupation.

Based upon the external baseline noise levels recorded, primarily due to traffic and pedestrian noise, the minimum weighted sound reduction, Rw, of the external façades has been calculated at Rw 45 dB based upon the existing stone cavity blockwork façades providing an internal specification of up to 17 $L_{Aeq,\ 8hours}$ dB maximum within the noise sensitive dwelling areas during nighttime periods based upon ingress through the structure only, below the limit as determined within the WHO recommendations. The LAFmax of up to 72 dB will be attenuated such that the internal level will be up to a maximum value of 27 LAFmax dB, again in line with the specific requirements of WHO.

Based upon the existing wall construction, comprising an internal leaf of block, lined externally with stone and a cavity between of at least 75mm, the following performance would be expected from the external façade construction:

Frequency in Hz	63	125	250	500	1000	2000	4000
R_W of Facade	36	44	43	49	57	66	70

12.1.1 Party Floor and Walls

The party floor and walls will need to provide the minimum acoustic requirements necessary to meet with the Building Regulations, Resistance to the Passage of Sound, Approved Document E of $D_{nT,w}$ + C_{tr} 43 dB for airborne noise transmission and a maximum 62 LnTw dB impact noise when considered between all residential flats for change of use applications.

Where the dividing elements are between noise producing areas, such as the ground floor retail space and the residential areas of the development, it is recommended that a minimum sound insulation value of $D_{nT,w}$ + C_{tr} 50 dB is achieved or, at least -15 dB below the highest generated sound level centre band frequenies of concern within the source room, when considered inside the dwelling area. This is required to allow the amenity levels inside the residental dwelling to be achieved.

The sound insulation testing completed indicates that the current party dividing floor between the 2 spaces is providing adequate protection against the transmission of sound between areas, tested at 53 DnT,w Ctr dB, therefore, additional mitigation measures are not required to achieve the minimum sound insulation between the formed areas.

The final party floor and walls will, however, need to be verified following completion of the re-development of the site in accordance with the requirements of Building Regulations, Resistance to the Passage of Sound, Approved Document E.

12.1.2 Glazing Units

The primary weakness in any building envelope is usually due to windows, ventilation louvres and other apertures.

The development may be fitted with mechanical constant airflow and boost extraction units within the residential development providing the necessary ventilation requirements in accordance with Building Regulations Part E, AVO Residential Design Guide and will be attenuated accordingly whilst still providing boost facilities as necessary, therefore, the only area of concern are the proposed window systems.

The current glazing is in the form of single glazed sash or hinged type windows in the majority of the development and are in a poor state of repair.

The table below provides a summary of the design targets for the internal rooms of a residential property, a noise level internally below these values would show compliance with Building Regulations, BS8233:2014 and WHO requirements.

Period	Maximum Internal Target Level
Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 35 dB
Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 30 dB LAmax - 45 dB

Using the noise exposure levels assessed for the site at the relevant façade location the recommended Rw dB rating for the glazing systems for the site should be as follows.

Period	Noise Exposure Level	Maximum Internal Bedroom Target Level	Minimum R_w+C_{tr} dB Values Required
Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 62 dB	LAeq, 16 Hours – 35 dB	**27 dB**
Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 55 dB LAmax - 72 dB	LAeq, 8 Hours – 30 dB LAmax - 45 dB	**25 dB** **27 dB**

Based upon a standard double glazing system incorporating Insulated Glass Units, IGU's, it is possible to provide the necessary sound insulation using a glazing system consisting of the following:

6mm Float Glass – 6 to 20mm wide Argon Filled Airspace – 6.8 Pilkington Optiphon Glass.

This system has certified acoustic values of R_w 38 dB, with an R_w +C 36 dB and R_w +C_{tr} 33 dB.

This is the recommended system for all the façades of the development for the glazing units throughout.

The acoustic property of the proposed glazing is provided below for reference.

Glazing type	Frequency in Hz	63	125	250	500	1000	2000	4000
6 / 6 to 20 / 6.8	R_w dB of Glazing	24	23	24	34	42	43	52

12.1.3 Ventilation Considerations

If we consider opening a window within a dwelling room such as living space or bedroom to provide additional room ventilation, the accepted attenuation value of the partially open window is -15 dB, we can determine if the noise ingress would be within acceptable levels, when compared against the Building Regulations AD-O and BS8233:2014 limits.

Below is a table indicating the noise ingress for an open window scenario at the site location used within the noise monitoring regime.

Location	Period	Open Window Adjusted Noise Exposure Level	AD-O Internal Limit Values	BS8233 Internal Limit Values	Targets Achieved Y/N
All Elevations	Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 47 dB	45 dB	40 dB	N
	Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 40 dB LAmax - 57 dB	40 dB 55 dB	35 dB 45 dB	N N

As can be seen from the above results, noise ingress with a window open scenario results in excessive internal values above the limits set within the latest version of the Building Regulation Approved Document O and WHO, BS8233 and Pro-PG, therefore additional mitigation measures will be required for the introduced premises.

To allow for additional background ventilation for the formed dwellings, opening a window will result in excessive noise ingres, therefore, it is recommended that a forced ventilation system will be necessary.

The recommended action would be for a full MVHR, Type 4, system to be included within the dwellings to provide the necessary ventilation and comply with the latest Approved Document O of the Building Regulations.

The system will need to be attenuated such that the noise ingress through the vents or produced by the mechanical unit itself do not exceed the noise criteria for the dwelling space being served accordingly.

12.2 External Recreational Areas

There will be no external recreational areas forming part of this development, therefore, no further consideration will be necessary.

12.3 BS8233:2014 Assessment

To provide further evidence that the above recommended mitigation measures will be adequate to achieve a comfortable internal environment within the dwellings once occupied, a BS8233:2014 assessment will be completed.

This assessment will account for the daytime, nighttime and maximum nighttime values recorded for the worst-case facades of the development and compare the results against the limiting criteria necessary to demonstrate an acceptable internal environment without giving rise to any undue loss of amenity to the incumbent residents.

Below is an overview of the results of the calculations completed.

Location	Daytime	Nighttime	Nighttime Maximum	Comments
Limiting Values	**35 dBA (NR 30)**	**30 dBA (NR 25)**	**45 dBA (NR 40)**	
West and South Elevations	26 dBA (NR 22)	19 dBA (NR 15)	40 dBA (NR 39)	Design Target Met
East and North Elevation	20 dBA (NR 16)	15 dBA (NR 10)	33 dBA (NR 31)	Design Target Met

As can be seen from the above overview the mitigation recommendations will allow the internal noise criterion to be fully achieved.

Refer to Appendix D for details of the full calculation data sheets.

12.4 Shop Units Fixed Plant Considerations

Fixed plant items associated with a typical shop unit development could include refrigeration and ventilation equipment, dependent upon type of shop unit tenant.

Plant Item	Typical Location	Operational Mode
Condenser Units	Plantroom / External Area	24-Hours
General Ventilation Fans	Plantroom and Shop Floor Areas	Variable dependent upon area served. Usually operational during trading periods.

No finalised fixed plant selections have been made at present.

Therefore, to ensure the amenity of the nearby residential premises is preserved it would be prudent to provide a limiting noise output level the fixed plant.

The existing background level has been assessed as 52 LA_{90} dB daytime and 37 LA_{90} dB at night.

It is likely that the fixed plant may operate 24-hours daily on a demand basis, therefore, the nighttime background level is the primary limiting design target for the equipment.

To ensure that there is no increase in background due to the operation of the plant it is advisable to set a target of -5 dB below the recorded background level when considered at the closest external residential premises, equating to 32 dBA.

The assessment location will depend upon the positioning of the fixed plant on site, however, if we assume that the plant will be located along the northern facade of the building, the closest residents will be those at Wood Nook, approximately 30m away.

Based upon an assessment distance of 30m, to ensure that the fixed plant achieves -5 dB below the background level, the limiting output at 1m from the equipment can be up to 65 LAeq dB, equivalent to NR 60 dB.

However, if we account for the on-site premises, the location of the fixed plant is critical to the effect that the plant noise will have on the occupants.

Based upon this scenario, it would be prudent to limit the plant output to an acceptable value, where noise ingress into the dwellings is minimised, so that it does not produce any undue loss of amenity. This would require the limit to be assessed at the facade of the dwellings.

To ensure that noise is not going to give rise to loss of amenity, the fixed plant limit is set at 45 dBA, equivalent to NR 40 dB, at the façade of the dwellings.

Below is a table of limiting sound output for the cumulative operation of the fixed plant serving the public house when considered at the façade of the dwelling.

Cumulative Fixed Plant Output Limit at the Façade of the Closest Dwellings

Freq Hz	63	125	250	500	1000	2000	4000	8000	NR
Limiting Output, dB	67	57	49	44	40	37	35	33	40

Achievement of the above limiting output will ensure that the amenity of the nearby residential premises is achieved at night.

13.0 Report Summary

A remote pre-development acoustic assessment of the existing noise levels around the proposed change of use of The Dale Inn, No 408 Wakefiled Road, Denby Dale the and formation of 2 No ground floor retail shops and 3 No 1st floor self-contained residential flats.

The noise survey established the pre-existing noise climate and sources for the area, which are primarily due to traffic noise and pedestrian activity along the A636, Wakefield Road.

In order to achieve an acceptable and comfortable internal noise climate for the potential residents the WHO guidance community noise has been utilized for the acoustic target levels for the internal criteria of the dwelling areas of the development. The National Planning Policy Framework has been considered, with NR 30 daytime and NR 25 nighttime internal limits being utilized since the NPPF is not prescriptive in its noise limits.

Mandatory mitigating recommendations are necessary to provide adequate protection against intrusion from external noise sources and achieve the WHO guidelines for the internal noise climate of the residences. Recommendations have been proposed for the glazing systems to be employed on this development, to achieve the internal dwelling room design target exposure levels as determined within WHO recommendations.

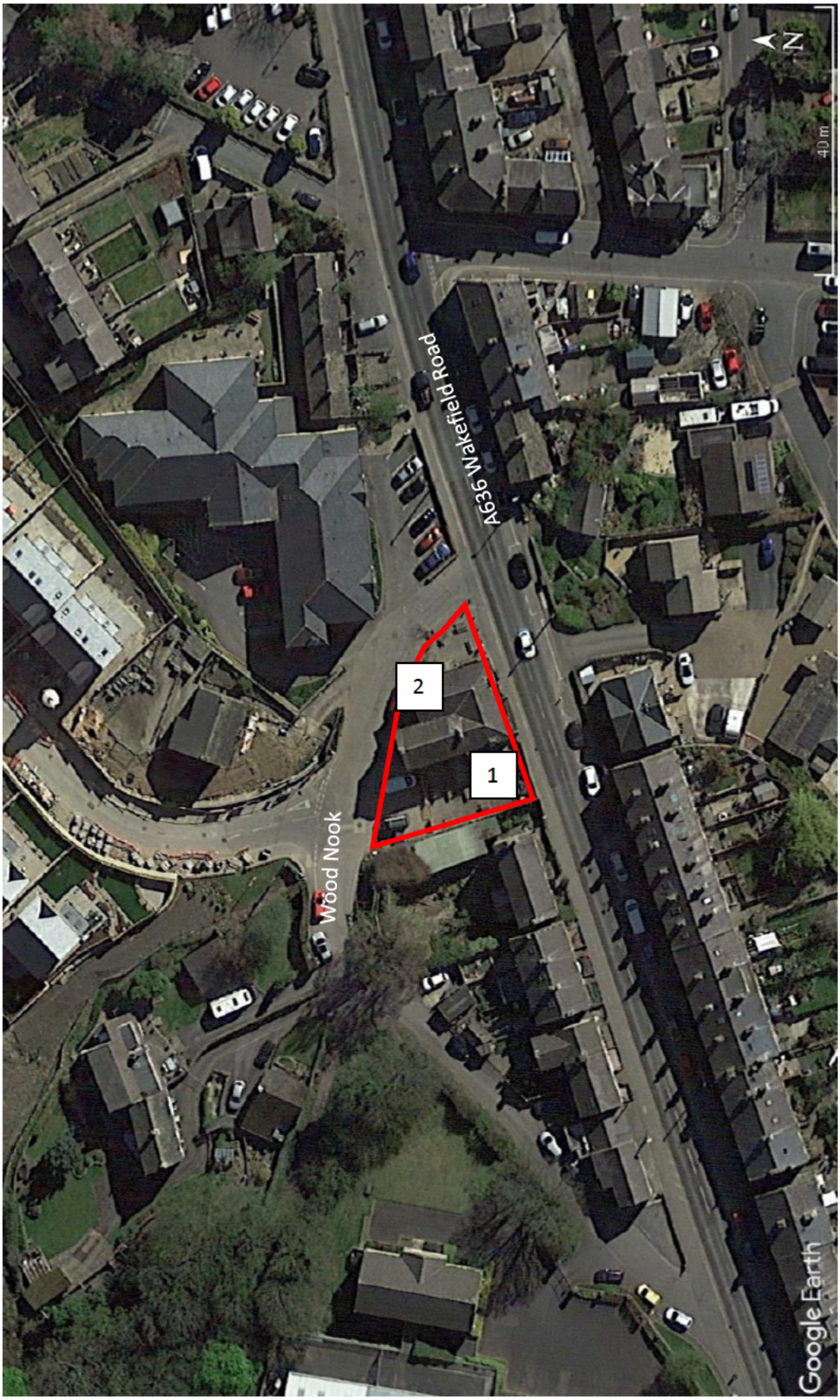
To provide background ventilation, opening windows is not acceptable and likely to result in adverse comment from the incumbent residents and result in disturbed sleep due to the external noise sources identified. It has been recommended that the dwellings are installed with a System 4 MHVR installation to maintain internal comfort with respect to ventilation and avoid overheating situations once occupied.

The development has no external recreational areas; therefore, no recommendations are necessary with respect to this scenario.

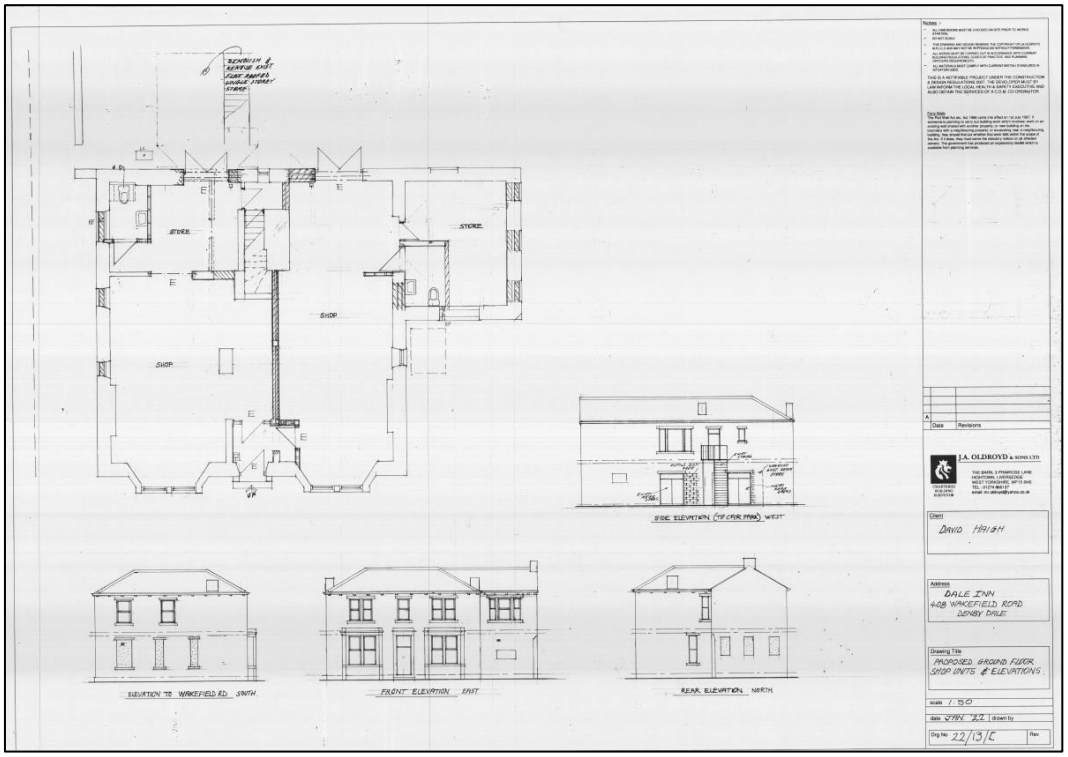
Since the development will introduce retail shops as part of the development of the site, noise associated with the possible fixed plant has been made and limiting noise values included.

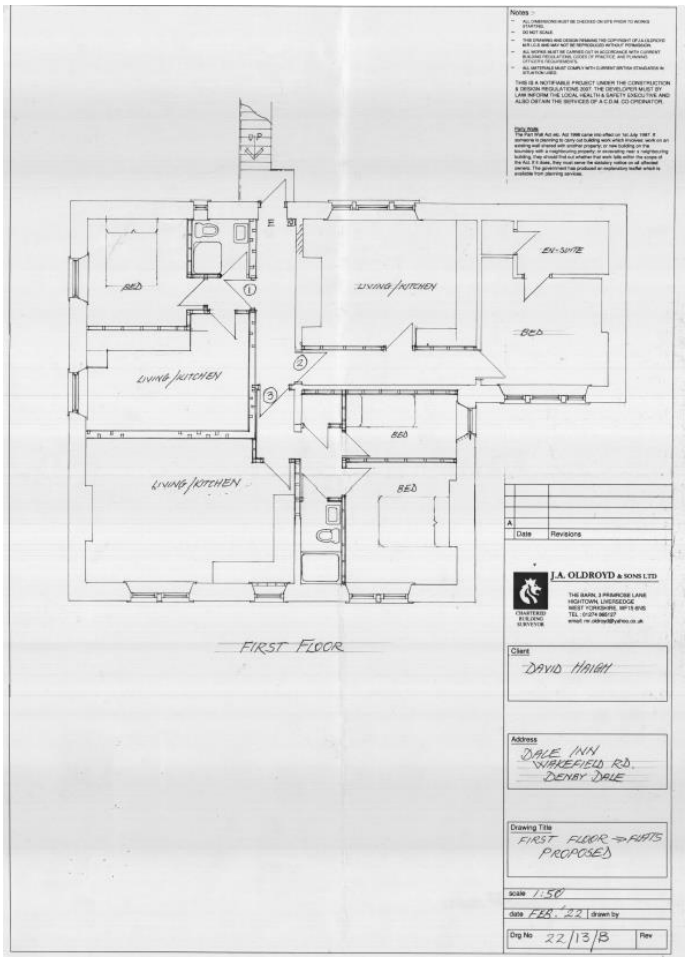
Provided that the recommended mitigation measures have been incorporated into the development of the site, the amenity of the incumbent residents will be achieved.

Appendix A Locational Outline and Monitoring Locations



Appendix B Proposed Floor Layouts





Appendix C Pre-Dev Sound Insulation Test Certificate

Standarized level difference measured in accordance with ISO 140-4

Field measurements of airborne sound insulation between rooms

Date of test: 2023-02-02

Task: J3145 Object: Pre-Development Sound Insulation Test

Client: David Haigh Construction

Description:

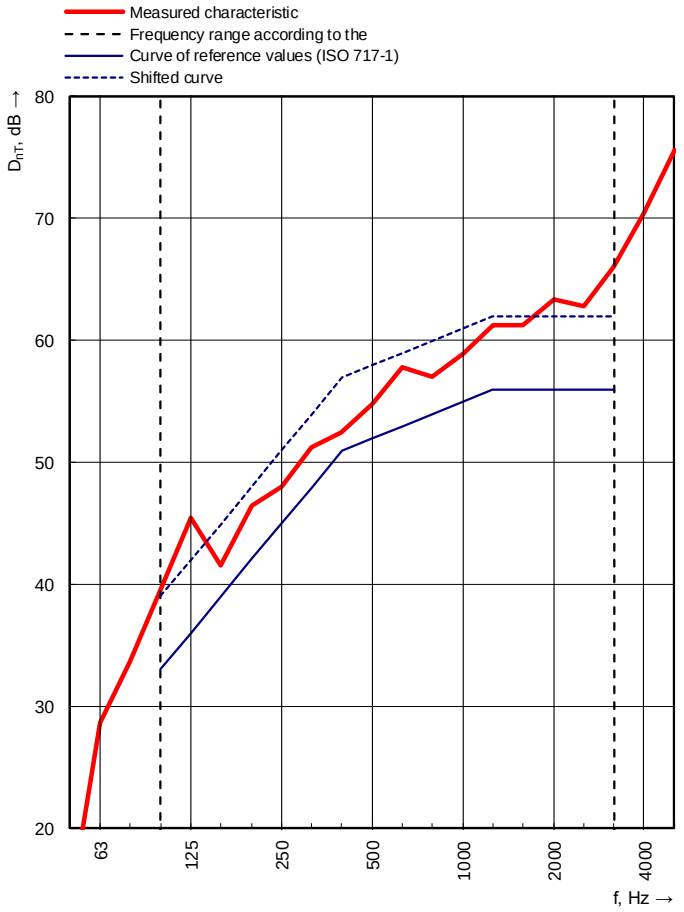
Pre Development sound insulation test between ground and 1st floor areas of The Dale inn, 408 wakefield Road, Denby Dale

Area of common partition: 50.0 m^2 Note: Party Floor / Ceiling

Receiving room volume: 150.0 m^3 Name: 1st floor Function Room

Source room volume: 165.0 m^3 Name: GF Bar Area

Frequency *f* Hz	D_{nT} (1/3 octave) dB
50	13.7
63	28.6
80	33.6
100	39.7
125	45.5
160	41.6
200	46.5
250	48.0
315	51.2
400	52.4
500	54.8
630	57.8
800	57.0
1000	58.9
1250	61.3
1600	61.2
2000	63.4
2500	62.8
3150	66.0
4000	70.4
5000	75.6



Rating according to ISO 717-1

$D_{nT,w}$(C; Ctr) = 58 (-1 ; -5) dB $C_{50\text{-}3150}$= -6 dB $C_{50\text{-}5000}$= -5 dB $C_{100\text{-}5000}$= 0 dB

$C_{tr,50\text{-}3150}$= -20 dB $C_{tr,50\text{-}5000}$= -20 dB $C_{tr,100\text{-}5000}$= -5 dB

Evaluation based on field measurement results obtained by an engineering method

No. of test report: J3145-1 Name of test institute: Paul Horsley Acoustics Ltd

Date: 2023-02-02 Signature:

Appendix D BS8233:2014 Assessments

BS8233:2014 NOISE INGRESS CALCULATION - WEST AND NORTH ELEVATIONS

Position Assessment - Living Space	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Daytime								
Average façade noise levels	68	63	63	60	60	50	39	**63**
Noise reduction through façade elements								
SRI External solid wall	-36	-44	-43	-49	-57	-66	-70	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	29	16	17	8	0	0	0	12
SRI windows - glazing (6 - 6-20 - 6.8)	-24	-23	-24	-34	-42	-43	-52	
absorption area - Window 1.2m x 1.8m	-7	-7	-7	-7	-7	-7	-7	
noise through windows	37	34	32	19	11	0	0	25
SRI acoustic ventilator - N/A	0	0	0	0	0	0	0	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	0	0	0	0	0	0	0	0
Total noise internally								
through wall	29	16	17	8	0	0	0	12
through glazing	37	34	32	19	11	0	0	25
through vent	0	0	0	0	0	0	0	0
Combined total	37	34	32	19	11	5	5	**26**
Criteria - Living Room - Daytime								**35**
NR 30 Criteria	**59**	**48**	**40**	**34**	**30**	**27**	**25**	
Variance and Actual NR Value Achieved	-22	-14	-8	-15	-19	-22	-20	**NR 22**

Position Assessment - Bedroom	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Nighttime								
Nighttime façade noise levels	58	56	55	52	52	42	28	**55**
Noise reduction through façade elements								
SRI External solid wall	-36	-44	-43	-49	-57	-66	-70	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	19	9	9	0	0	0	0	7
SRI windows - glazing (6 - 6-20 - 6.8)	-24	-23	-24	-34	-42	-43	-52	
absorption area - Window 1.2m x 1.8m	-7	-7	-7	-7	-7	-7	-7	
noise through windows	27	27	24	11	3	0	0	18
SRI acoustic ventilator - N/A	0	0	0	0	0	0	0	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	0	0	0	0	0	0	0	0
Total noise internally								
through wall	19	9	9	0	0	0	0	7
through glazing	27	27	24	11	3	0	0	18
through open window	0	0	0	0	0	0	0	0
Combined total	27	27	25	6	0	0	0	**19**
Criteria - Bedroom - Nighttime								**30**
NR 25 Criteria	**55**	**44**	**35**	**29**	**25**	**22**	**20**	
Variance and Actual NR Value Achieved	-28	-17	-10	-23	-25	-22	-20	**NR 15**

BS8233:2014 NOISE INGRESS CALCULATION - WEST AND NORTH ELEVATIONS

Position Assessment - Bedroom	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Nighttime								
MAX façade noise levels	83	80	78	67	62	61	51	**72**
Noise reduction through façade elements								
SRI External solid wall	-36	-44	-43	-49	-57	-66	-70	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	44	33	32	15	2	0	0	25
SRI windows - glazing (6 - 6-20 - 6.8)	-24	-23	-24	-34	-42	-43	-52	
absorption area - Window 1.2m x 1.8m	-7	-7	-7	-7	-7	-7	-7	
noise through windows	52	50	47	26	13	11	0	40
SRI acoustic ventilator - N/A	0	0	0	0	0	0	0	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	0	0	0	0	0	0	0	0
Total noise internally								
through wall	44	33	32	15	2	0	0	25
through glazing	52	50	47	26	13	11	0	40
through vent	0	0	0	0	0	0	0	0
Combined total	23	50	48	26	14	12	0	**40**
Criteria - Bedroom - Nighttime								**45**
NR 40 Criteria	**67**	**57**	**49**	**44**	**40**	**37**	**35**	
Variance and Actual NR Value Achieved	-44	-7	-1	-18	-26	-25	-35	**NR 39**

BS8233:2014 NOISE INGRESS CALCULATION - EAST AND NORTHERN ELEVATIONS

Position Assessment - Living Space	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Daytime								
Average façade noise levels	62	58	56	53	53	44	31	**56**
Noise reduction through façade elements								
SRI External solid wall	-36	-44	-43	-49	-57	-66	-70	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	23	11	10	1	0	0	0	8
SRI windows - glazing (6 - 6-20 - 6.8)	-24	-23	-24	-34	-42	-43	-52	
absorption area - Window 1.2m x 1.8m	-7	-7	-7	-7	-7	-7	-7	
noise through windows	31	28	25	12	4	0	0	19
SRI acoustic ventilator - N/A	0	0	0	0	0	0	0	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	0	0	0	0	0	0	0	0
Total noise internally								
through wall	23	11	10	1	0	0	0	8
through glazing	31	28	25	12	4	0	0	19
through open window	0	0	0	0	0	0	0	0
Combined total	32	28	26	13	7	5	5	**20**
Criteria - Living Room - Daytime								**35**
NR 30 Criteria	**59**	**48**	**40**	**34**	**30**	**27**	**25**	
Variance and Actual NR Value Achieved	-27	-20	-14	-21	-23	-22	-20	**NR 16**

Position Assessment - Bedroom	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Nighttime								
Nighttime façade noise levels	55	54	50	46	44	35	16	**48**
Noise reduction through façade elements								
SRI External solid wall	-36	-44	-43	-49	-57	-66	-70	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	16	7	4	0	0	0	0	7
SRI windows - glazing (6 - 6-20 - 6.8)	-24	-23	-24	-34	-42	-43	-52	
absorption area - Window 1.2m x 1.8m	-7	-7	-7	-7	-7	-7	-7	
noise through windows	25	24	20	5	0	0	0	14
SRI acoustic ventilator - N/A	0	0	0	0	0	0	0	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	0	0	0	0	0	0	0	0
Total noise internally								
through wall	16	7	4	0	0	0	0	7
through glazing	25	24	20	5	0	0	0	14
through open window	0	0	0	0	0	0	0	0
Combined total	25	24	20	7	5	5	5	**15**
Criteria - Bedroom - Nighttime								**30**
NR 25 Criteria	**55**	**44**	**35**	**29**	**25**	**22**	**20**	
Variance and Actual NR Value Achieved	-30	-20	-15	-22	-20	-17	-15	**NR 10**

BS8233:2014 NOISE INGRESS CALCULATION - EAST AND NORTHERN ELEVATIONS

Position Assessment - Bedroom	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Nighttime								
MAX façade noise levels	78	71	70	66	64	55	45	**68**
Noise reduction through façade elements								
SRI External solid wall	-36	-44	-43	-49	-57	-66	-70	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	39	24	24	14	4	0	0	19
SRI windows - glazing (6 - 6-20 - 6.8)	-24	-23	-24	-34	-42	-43	-52	
absorption area - Window 1.2m x 1.8m	-7	-7	-7	-7	-7	-7	-7	
noise through windows	47	41	39	25	16	5	0	33
SRI acoustic ventilator - N/A	0	0	0	0	0	0	0	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	0	0	0	0	0	0	0	0
Total noise internally								
through wall	39	24	24	14	4	0	0	19
through glazing	47	41	39	25	16	5	0	33
through open window	0	0	0	0	0	0	0	0
Combined total	47	41	40	25	16	8	5	**33**
Criteria - Bedroom - Nighttime								**45**
NR 40 Criteria	**67**	**57**	**49**	**44**	**40**	**37**	**35**	
Variance and Actual NR Value Achieved	-20	-16	-9	-19	-24	-29	-30	**NR 31**