Noise impact assessment of a proposed residential development

18 Bridge Street, Caversham

Client: Changiz Fahami

Report Reference: 241025-R001A

Date: 24th April 2025

Revision:	Date:	Author:	Checked:
-	28/11/2024	Alfie Morgan BSc (Hons)	Tommy Burn BSc (Hons) MIOA
A	24/04/2025	Tommy Burn BSc (Hons) MIOA	Rob Cant MIOA MIEnvSci

This report has been prepared by ACA Acoustics Limited (ACA) with all reasonable skill, care, and diligence in accordance with generally accepted acoustic consultancy principles and taking account of the services and terms agreed between ACA and our client. Any information provided by third parties and referred to herein may not have been checked or verified by ACA unless expressly stated otherwise. Certain statements made in the report may constitute estimates or projections and even though these are based on reasonable assumptions and good industry practice, such forward-looking statements by their nature involve risks and uncertainties which could cause actual results to differ materially from the results predicted. ACA does not guarantee or warrant any estimate or projection contained in this report.

Note that consideration of non-acoustic aspects including, but not limited to structural calculations, compliance with Building Regulations and other statutory requirements, or any assessment of fire regulations are outside the scope of ACA Acoustics Limited and should be considered by others accordingly.

This report is confidential to the client and ACA accepts no responsibility whatsoever to third parties unless formally agreed by ACA. Any such party relies upon the report at their own risk. © 2025 ACA Acoustics Limited.

CONTENTS

0. SUMMARY 2
1. INTRODUCTION 3
2. ACOUSTIC CRITERIA & ASSESSMENT METHODOLOGY 3
2.1. The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order 3
2.2. National Planning Policy Framework (NPPF) and Noise Policy Statement for England (NPSE) 3
2.3. Planning Practice Guidance – Noise (PPG-N) 5
2.4. British Standard 8233:2014+A1:2019 6
2.5. British Standard 4142:2014+A1:2019 7
2.6. Operational Noise from Nearby Night Clubs and Bars - DEFRA NANR 163 7
3. REVIEW OF SITE LOCATION & DEVELOPMENT PROPOSALS 8
4. SOUND LEVEL SURVEY 9
4.1. Initial Sound Level Survey Between the 13th and 15th of November 2024 9
4.2. Sound Level Survey of The Griffin Pub 13
5. ASSESSMENT OF COMMERCIAL NOISE 14
5.1. Acoustic Assessment of Industrial and Commercial Noise Sources 14
5.2. Assessment of Operational Noise from Nearby Night Clubs & Bars 17
6. ASSESSMENT OF FAÇADE SOUND INSULATION 18
6.1. Scheme of Façade Sound Insulation 18
6.2. Ventilation Strategy 19
6.3. Calculated Internal Sound Levels 19
7. ASSESSMENT OF THE SEPARATING FLOOR BETWEEN GROUND FLOOR RETAIL AND FIRST FLOOR RESIDENTIAL 20
8. CONCLUSION 20
Appendix A ..... A

0. SUMMARY

0.1. The client is preparing an application for the Prior Approval of the conversion of the 1st and 2nd floors of 18 Bridge Street, Caversham into residential apartments.

0.2. A sound level survey was conducted at two measurement positions, one at the front of the property overlooking Bridge Street, and another at the rear of the property overlooking the car park, between the 12th and 14th of November 2024.

0.3. To the front of the site, road traffic is dominant. There is also a tyre shop across the road which was subjectively inaudible at the development site while the author was on site. There is plant associated with the dentists next door to the development, which is audible at rear and side windows of the property.

0.4. An assessment of noise from industrial and commercial sources in the vicinity of the site in accordance with BS 4142:2014+A1:2019, along with assessment of noise emissions from the nearby night club in accordance with guidance within NANR 163 indicates that without mitigation, noise from industrial/ commercial sources in the vicinity is at a level where there is a likelihood of adverse impact to future occupants. An acoustic specification of façade elements is proposed to mitigate this impact.

0.5. The outline scheme for sound insulation of the building envelope has been developed such that internal sound levels from the industrial and commercial noise sources during the daytime do not exceed LAeq 30dB within living rooms and bedrooms. This is at least 5dB more stringent than the guideline criteria in BS 8233:2014 to provide a good standard of amenity whilst considering the type of noise sources. Furthermore, sound levels from the Griffin pub to the rear shall not exceed LAeq 27dB to bedrooms. This ensures that noise intrusion from industrial and commercial sources will be low and will not be detrimental to the amenity of future occupants.

0.6. At ground floor level a retail unit is proposed. ACA Acoustics have proposed acoustic performance criteria for this floor based on relevant guidance, which may be conditioned.

0.7. In summary, ACA Acoustics considers that allowing for the noise control measures set out in this report, no noise of an industrial or commercial nature will have an adverse impact on future occupants of the dwellings and therefore in accordance with The Town and Country Planning (General Permitted Development) (England) (Amendment) Order it is recommended that the application for Prior Approval is granted.

1. INTRODUCTION

This acoustic assessment is to support an application to Reading Borough Council for the Prior Approval conversion of the current unoccupied 1st and 2nd floor commercial space at 18 Bridge Street, Caversham to form a new residential dwelling.

ACA Acoustics Limited has been commissioned by ET Planning Limited, on behalf of the client, to carry out an assessment of industrial and commercial noise sources around the development site to support the Prior Approval Application, and present recommendations for noise control treatments where appropriate.

This report presents results of the sound level survey at the development site, and acoustic assessment of results such that the application may be approved on noise grounds.

2. ACOUSTIC CRITERIA & ASSESSMENT METHODOLOGY

2.1. The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order

The application for Prior Approval is being made under The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order, Class MA (GPDO). In accordance with the Order,

> "*Before beginning development under Class MA, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to … impacts of noise from commercial premises on the intended occupiers of the development*".

It is important to consider the GPDO specifically refers to noise from commercial premises to the proposed development. Noise from other sources including traffic on nearby routes is not considered under the GPDO.

The Order does not include any assessment methodology nor criteria to be achieved and therefore it is relevant to consider guidance provided in relevant British Standards and other documents.

2.2. National Planning Policy Framework (NPPF) and Noise Policy Statement for England (NPSE)

The National Planning Policy Framework (referred to as NPPF) sets out the Government's planning policies for England and provides guidance on how these are expected to be applied, providing a framework within which Local Authorities can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

Paragraph 180 of the NPPF states that,

> "*Planning policies and decisions should contribute to and enhance the natural and local environment by … e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability*".

Paragraph 191 also talks specifically about noise and advises,

> "*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> - *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 quality of life.*
> - *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*."

The Government's long-term policy aims relating to noise are contained in the Noise Policy Statement for England (referred to as NPSE). Stated aims of the NPSE are:

> "*Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy of 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.*"

Paragraphs 2.19 to 2.24 clarify the above aims, referring to established concepts from toxicology; NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level). It also introduces a new concept relating to *"significant adverse*" of SOAEL (Significant Observed Adverse Effect Level), however noting,

> "*It is not possible to have a single objective noise-based measure that describes SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times*".

The first aim of NPPF Paragraph 191 and the second underlying aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development, as set out in the NPPF. As neither the NPPF nor NPSE includes any numerical criteria, it is necessary to consider guidance

provided in other documents to determine suitable limits that would define the LOAEL on an individual basis.
Finally, it is also of benefit to consider Paragraph 2.7, which advises that,

> "*… the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications*".

This provides clear guidance that noise must not be considered in isolation but as part of the overall scheme taking into account the overall sustainability and associated impacts of the proposed development; there is no benefit in reducing noise to an excessively low level if this creates or increases some other adverse impact. Similarly, it may be appropriate in some cases for noise to have an adverse impact if this is outweighed by the reduction or removal of some other adverse impact that is of greater significance to the development.

2.3. Planning Practice Guidance – Noise (PPG-N)

Related to the NPSE and the NPPF, The Department for Communities and Local Government has published additional guidance and clarifications within the Planning Practice Guidance – Noise (PPG-N), available at https://www.gov.uk/guidance/noise--2.

Paragraph 003 of the PPG advises,

> *"Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*
> - *Whether or not a significant adverse effect is occurring or likely to occur;*
> - *Whether or not an adverse effect is occurring or likely to occur; and*
> - *Whether or not a good standard of amenity can be achieved.*
>
> *In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure … is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."*

This guidance is like that set out in the NPPF and NPSE, however, Paragraph 005 of the PPG provides outline guidance on the definition of '*significant adverse effect*' and '*adverse effect*'. A copy of the table appended to Paragraph 005 is repeated below.

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows 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 acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Figure 1: Noise exposure hierarchy, taken from Planning Practice Guidance - Noise

Although this table provides descriptive definitions for the NOEL, LOAEL and SOAEL, as with the NPPF and NPSE there are no numerical values provided.

2.4. British Standard 8233:2014+A1:2019

The introduction to BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* confirms that,

> *"This guide suggests criteria, such as suitable sleeping/resting conditions, and proposes noise levels that normally satisfy these criteria."*

Guidance limits for internal sound levels within living rooms and bedrooms, taken from Table 4 of BS 8233:2014, are shown in Table 1 below:

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35dB LAeq, 16hr	-
Dining	Dining Room/Area	40dB LAeq, 16hr	-
Sleeping (daytime resting)	Bedroom	35dB LAeq, 16hr	30dB LAeq, 8hr

Table 1: BS 8233:2014 indoor ambient sound levels for dwellings

Where the noise sources under assessment contain acoustic characteristics which could make the source more noticeable or disturbing then it may be appropriate to achieve lower criteria than those shown. For this assessment where industrial and commercial noise sources have been identified, a correction of -5dB to the criterion is appropriate to protect the amenity of future occupants.

2.5. British Standard 4142:2014+A1:2019

The scope of BS 4142:2014+A1:2019 advises,

> "*This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature … to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*".

The assessment method of BS 4142:2014+A1:2019 corrects the specific sound level from the source under investigation to account for characteristics that could make the sound more obtrusive to obtain a rating level. This rating level is compared against the prevailing background noise outside the noise-sensitive property.

While BS 4142:2014+A1:2019 is routinely used to assess the potential for an adverse impact on residential occupants due to commercial or industrial noise, it is important to consider that the scope of BS 4142:2014+A1:2019 specifically confirms that,

> "*Sound of an industrial and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems*".

In accordance with the GPDO and BS 4142:2014+A1:2019, commercial noise does not include vehicles travelling in the vicinity.

2.6. Operational Noise from Nearby Night Clubs and Bars - DEFRA NANR 163

To the rear of the development property is The Griffin pub. Upper floor windows of the development property overlook the rear seating area of The Griffin, and as a result an assessment of noise from this is appropriate.

There is no specific methodology within British Standards or other formal government guidance to assess noise emissions from premises with amplified music/speech potentially affecting nearby residential occupiers. However, a general requirement of most Local Authorities is that any noise breakout from such premises shall not cause a nuisance to any nearby residents.

The Department for Environment, Food, and Rural Affairs (DEFRA) commissioned a study into noise from pubs and clubs affecting nearby noise-sensitive properties. The final report of the study (NANR 163 authored by BRE and Capita Symonds) concluded that the metric that provided the best overall prediction of likelihood for adverse impacts was an absolute internal LAeq noise level value within a dwelling. A level of LAeq 27dB was considered to be 'clearly acceptable' while a level of LAeq 31dB had a semantic description of 'just acceptable'. ACA Acoustics propose to use the more stringent of these values, to ensure a robust assessment.

3. REVIEW OF SITE LOCATION & DEVELOPMENT PROPOSALS

The development site is at 18 Bridge Street, Caversham, and the site is currently vacant at 1st and 2nd floor levels. MP1 was to the front (East) of the development overlooking Bridge Street, which was observed to have near-constant gridlock, and thus there is consistent noise from vehicles idling and acceleration through the traffic lights. Across the road is Tyre Pros Caversham who were observed to have a roller shutter door open while using pneumatic air tools.

MP2 was overlooking the car park to the rear of the development. To the north of the site is plant associated with Riverside Dental Care. Further to the west of the development are a pub and restaurant, however plant noise from these was not audible during visits to site, nor are there noticeable jumps in sound levels in the measurement survey results which would be expected for plant turning on/off.

The pub has a rear seating area which is overlooked by the development site. Sound levels from this during late weekend evenings include noise from patrons, with no amplified music being played outside.

An aerial photograph (taken from Google Maps) is shown in Figure 2 below.

Figure 2: Site location (avalable at www.google.com/maps)

4. SOUND LEVEL SURVEY

4.1. Initial Sound Level Survey Between the 13th and 15th of November 2024

To assess the impact of existing noise sources, a sound level survey has been conducted at the development site.

An unattended sound level survey was undertaken between the 13th and 15th of November 2024. The survey was set up by Alfie Morgan of ACA Acoustics, two long-term monitoring positions were used, with a further attended survey undertaken on the 15th of November to measure noise from Tyre Pros Caversham across the road.

Details of the survey carried out by ACA Acoustics are provided below.

Sound levels were recorded in consecutive 15-minute samples of overall LAeq, LAfmax, and LA90 values along with other statistical indices and octave band spectra.

During the survey weather remained dry and calm, and meteorological conditions are not considered to have adversely impacted the measured results.

The measurement positions are noted below.

Position Reference	Description
MP1	1st floor front (East) window overlooking Bridge Street
MP2	1st floor rear window

Table 2: Sound level survey measurement positions

The following equipment was used during the survey; the sound level meter was calibrated before the survey and checked after with no deviation noted.

Equipment	Serial Number
Svantek Class 1 sound level meter type SVAN971A, complete with MOLES weatherproof and lockable outdoor environmental kit	84045
Svantek Class 1 sound level meter type SVAN971A, complete with MOLES weatherproof and lockable outdoor environmental kit	121131
Svantek calibrator type SV33B. Compliant to IEC 60942-1:2003	83826

Table 3: Equipment used for the sound level survey

Survey results are included in Figure 3 and Figure 4 below.

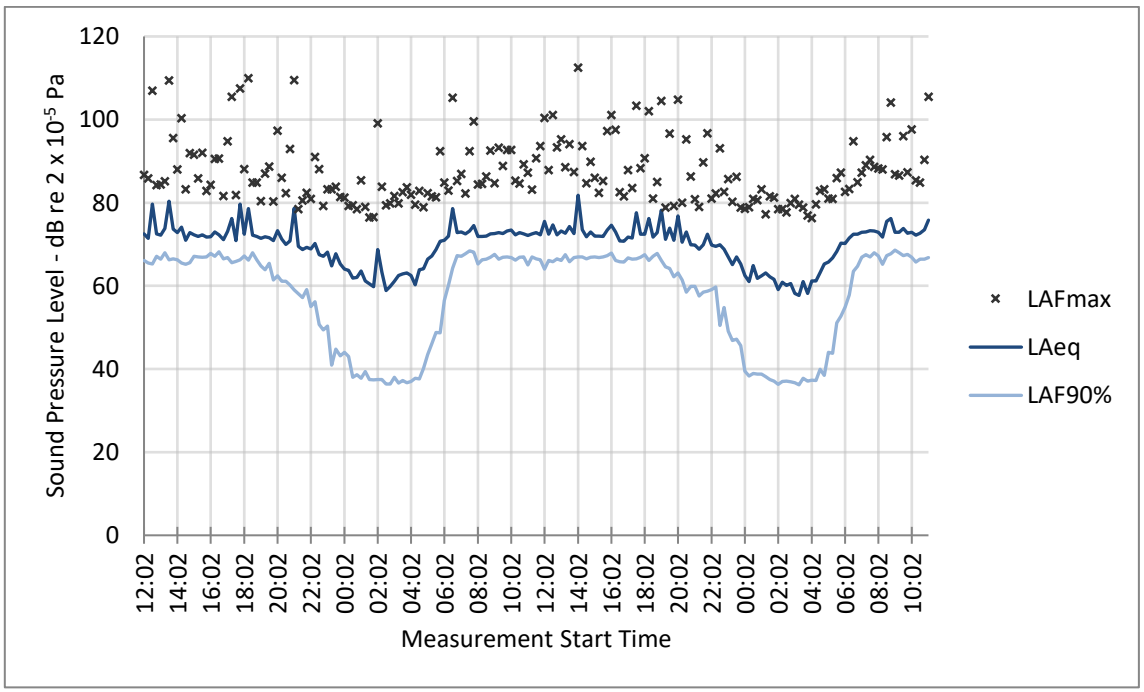


Figure 3: Survey results from measurement position 1

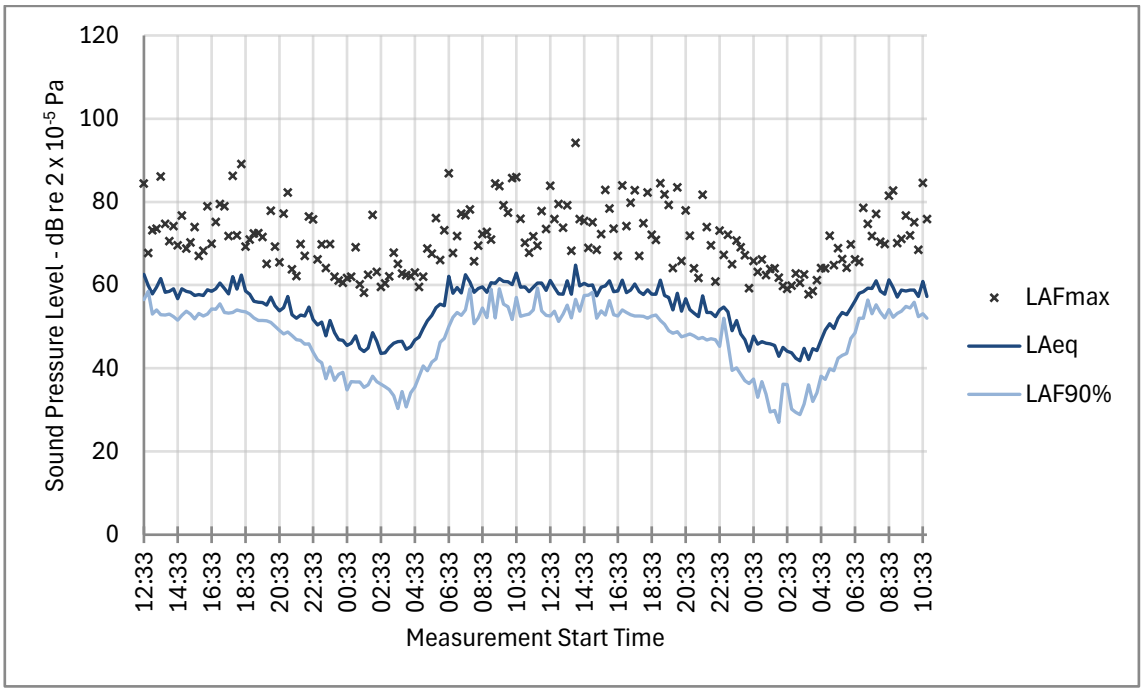


Figure 4: Survey results at measurement position 2

There are noticeable spikes in the LAF90 at MP2 in Figure 4 for example, between 7:30 and 4:30 on the 14th November during the daytime period. While on site ACA Acoustics' consultant identified these spikes as being the operation of plant, understood to be a compressor, associated with Riverside Dental Care, which is stored in a small wooden shed just north of the site.

Other than this, there are no noticeable characteristics at either measurement position which would indicate noise from commercial activity is dominant, such as a flat line in the LA90 measurements which would indicate mechanical plant or any noticeable step up/down in measured sound levels at the start and finish times of nearby commercial units. Instead there is a steady decline in sound levels into the evening, followed by a sharper increase in sound levels into the morning which is typical of a site where the dominant source is from road traffic on nearby roads.

This correlates with the subjective impression of ACA Acoustics' consultant who spent time on site undertaking observations of the acoustic climate and audible sources.

In accordance with the requirements of BS 4142:2014+A1:2019, the background sound level is not necessarily the lowest measured LA90 level, but rather is the typical background sound level when assessed in accordance with the standard.

Below in Figure 5 and Figure 6 are statistical analysis of measured L90 background sound levels during the daytime at MP1 and MP2.

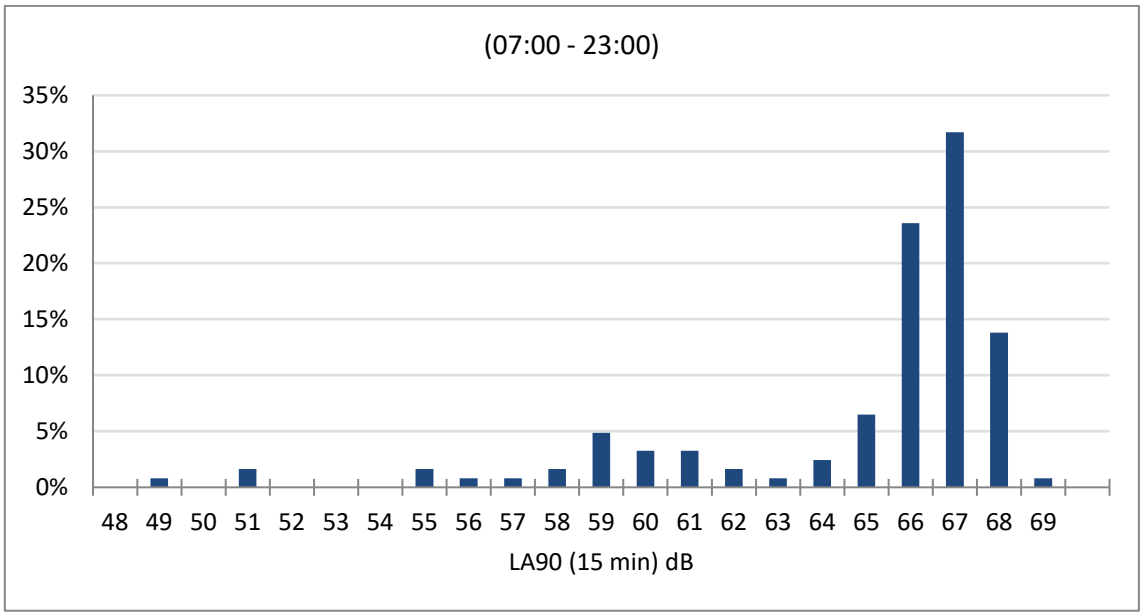


Figure 5: Statistical analysis of measured LA90 sound level during the daytime period at MP1.

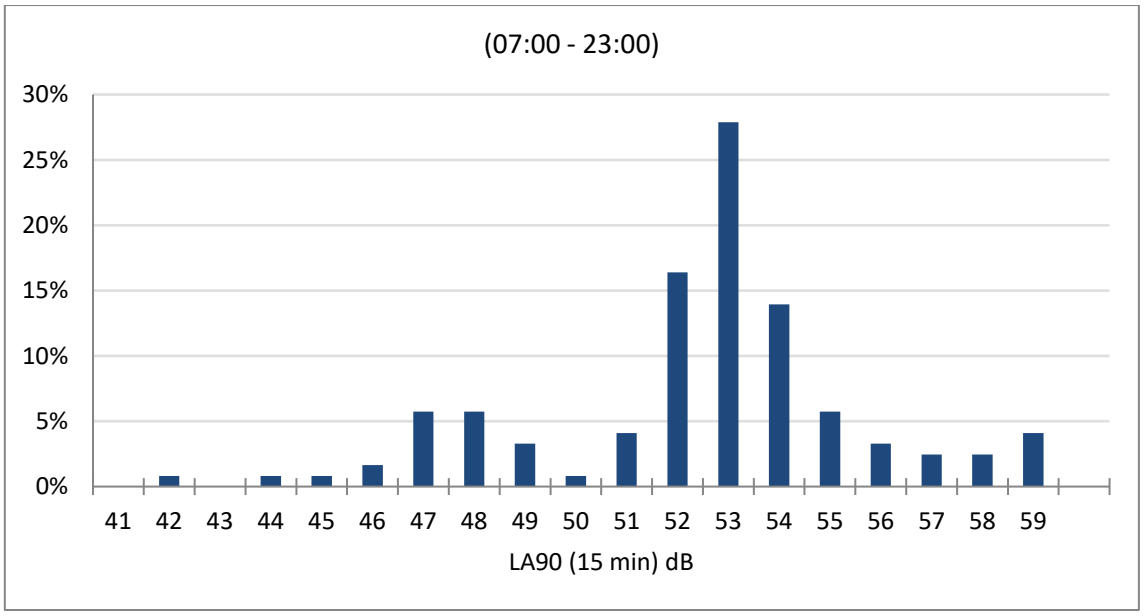


Figure 6: Statistical analysis of measured LA90 sound level during the daytime period at MP2.

Based on the above figures, a representative daytime background sound level of 67dB has been chosen for MP1, and a representative daytime background sound level of 53dB has been chosen for MP2.

Ambient sound levels used within the acoustic assessment are calculated within Section 5 below.

4.2. Sound Level Survey of The Griffin Pub

Following the first sound level survey a repeat survey over a weekend period was carried out to the rear of the development site at an upper floor window, overlooking the seating area of The Griffin pub.

The survey was conducted at MP2, and included Friday and Saturday evenings over the weekend before Easter Weekend. The weekend was warm and dry, and the pub garden was witnessed as being busy with patrons, and no music is played externally. Sound levels from the garden only comprise patrons talking.

The survey was conducted between the 10th – 14th April 2025. During the survey the weather remained dry and clear. During the day times periods the weather remained warm, cooling down into the evening and night periods.

The following equipment was used during the survey; the sound level meter was calibrated before the survey and checked after with no deviation noted.

Equipment	Serial Number
NTi Audio Class 1 sound level meter type XL2-TA complete with weatherproof and lockable outdoor environmental kit	A2A-10964-E0
Svantek calibrator type SV33B. Compliant to IEC 60942-1:2003	83826

Table 4: Equipment used for the sound level survey

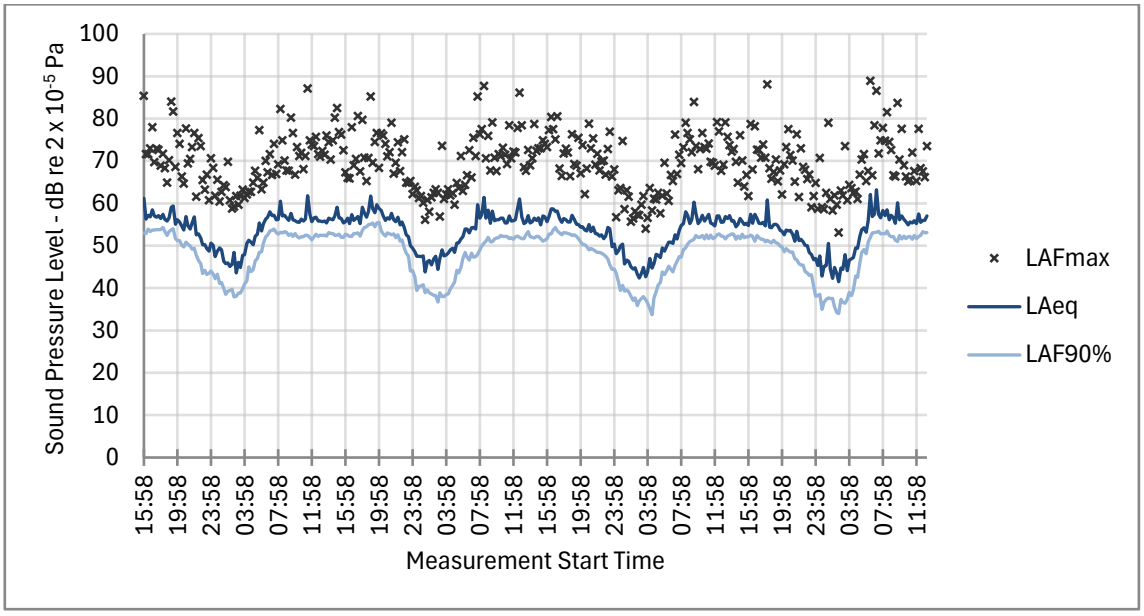


Figure 7: Survey results at measurement position 2

The Griffin Pub closes at 23:00 hours, and ACA Acoustics had a camera monitoring the pub garden for the duration of the survey. During both the Friday night and the Saturday night the pub garden can be seen and heard as being busy, and having cleared of patrons by 23:30 hours.

Summary sound level results of the survey over the busiest periods of the garden, and shortly after, are shown in Table 5 below. The specific sound level of the pub garden in isolation has been calculated through the logarithmic subtraction of the sound level with the garden open and the garden closed.

Period	Description	Sound level (LAeq, dB)
Friday, 22:30 – 23:30	Pub garden open and operating	55dB
Friday, 23:30 – 00:30	Pub garden closed and quiet	50dB
Specific sound level, Friday night	**Pub garden in isolation**	**53dB**
Saturday, 22:30 – 23:30	Pub garden open and operating	53dB
Saturday, 23:30 – 00:30	Pub garden closed and quiet	51dB
Specific sound level, Saturday night	**Pub garden in isolation**	**49dB**

Table 5: Sound level survey results from The Griffin pub garden in use over the weekend

Results shown in Table 5 show that specific sound levels from the pub garden were around 53dB during the latest busiest period of operation.

These sound levels have been included within the acoustic assessment.

5. ASSESSMENT OF COMMERCIAL NOISE

5.1. Acoustic Assessment of Industrial and Commercial Noise Sources

Industrial/commercial noise is infrequently subjectively audible at the front façade during periods of low traffic. A short term manned measurement at Tyre Pros Caversham with the use of a pneumatic air tool was undertaken to calculate sound levels from the garage back to the development.

5.1.1. Noise From the Air Compressor associated with the Dental Practice

Calculations of specific sound levels of the equipment associated with the dental practice housed within the shed (understood to be an air compressor) are shown below in Table 6.

Measurement time	Description	LAeq
16:03	Dentists shed source operating	61dBA
16:18	Dentists shed source powered off	58dBA

Table 6: Calculation of specific source sound levels from dentist plant

This equates to a specific sound level of 58dBA at the residential windows.

5.1.2. Noise From the Tyre Shop

The pneumatic air tool was used intermittently, in short bursts of a few seconds with gaps in between as the engineer goes from bolt to bolt on a wheel. In order to calculate the impact of the tyre garage at the façade, an on-time correction has been conducted, this calculation is shown below in Table 7.

Time	Noise Source	Measured Sound Level	On-time correction	Calculation
15/11/24 12:25-12:30	Pneumatic Air Tool being used at garage.	81dB LAeq at 1 meter	5 mins per hour period	$81 - 10 \times \log_{10}\left(\frac{60}{5}\right) = 70dB$ at 1 meter

Table 7: On-time correction for pneumatic air tool

Noise from industrial/commercial sources at MP2 consists of plant from Riverside Dental Care to the north. This is audible and slightly dominant over the road traffic noise at MP2. It is understood that the plant housed in the small shed behind the dental practice powers equipment in the surgery rooms, so is only operational while there is ongoing surgery. Noise from the AC unit also associated with Riverside Dental Care, was not measured on site due to the road being dominant over the unit, so manufacturers data has been to calculate the impact of the unit at the nearest window during the more sensitive hours.

5.1.3. Correction of Sound Sources to the Residential Windows

Below in Table 8 is the calculated distance corrections for sources that were unable to be measured at the long-term measurement positions.

Noise Source	Sound Level	Corrections	Calculation
Pneumatic Air Tool being used at garage.	70dBA Lp at 1 meter	25m distance	$70 - 10 \times \log_{10}\left(\frac{25}{1}\right) = 56dBA$

Panyo CR124EH(A)	68dB LwA Equating to 66dBA at 1 meter	8m distance	$66 - 20 \times \log_{10}\left(\frac{8}{1}\right) = 48dBA$

Table 8: Correction of sources to nearest window

5.1.4. BS 4142:2014+A1:2019 Assessment

A BS 41412:2104+A1:2019 assessment of industrial noise from the in the vicinity has been conducted in Table 9 below.

Description	Dentist Shed Plant	Dentist AC Unit	Tyre Shop Air Tool	Relevant Clause	Commentary
Specific sound level	LAeq 58dB	LAeq 48dB	LAeq 56dB	7.1, 7.3.6	Calculated in Table 6, Table 7, and Table 8
Background sound level	LA90 53dB	LA90 53dB	LA90 67dB	8.1.3, 8.3	Representative background sound level during the later night-time assessment period before the loading activity commenced
Acoustic feature correction	Tonality: +2dB	Intermittency +3dB	0dB	9.2	No correction for the Air Tool as it is not distinctly audible over the background sound level.
On time correction	0dB	-3dB	0dB (included within Table 7)		The dentist shed plant has the potential to operate over a full hour period, and therefore no correction is applicable. The AC unit associated with the dentist will operate typically for 50% of the time depending on the load on the system. The on-time correction for the tyre shop is included within Table 7.
Rating level	LAr 60dB	Lar 48dB	56dB	9.2	
Excess of rating level over background sound level	**+7dB**	**-5dB**	**-11dB**	**11**	**Assessment indicates likelihood of adverse impact from sources at the rear, and low likelihood of adverse impact from commercial sources at the front.**

Table 9: BS 4142:2014+A1:2019 Assessment

The initial outcome of the BS 4142 assessment from noise emissions of industrial/ commercial nature in the vicinity, is that, without mitigation, there is a likelihood of adverse impact, depending on the context.

The primary context of this assessment is that noise of industrial/ commercial nature is only subjectively audible at a very low level over road traffic in the vicinity, and is only operational during the daytime period. It is the opinion of ACA Acoustics' consultant that this reduces the overall impact of the noise due to the daytime-only operation.

Section 11 of BS 4142:2014 discusses potential aspects which may alter the initial assessment result and advises that:

> "*Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following … the sensitivity of the receptor and whether dwellings … will incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
>
> *i) Façade insulation treatment;*
>
> *ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation*", and;
>
> *iii) Acoustic screening.*

This confirms that designing the sound insulation performance of façade elements to achieve appropriate internal sound levels is required to mitigate the adverse impact.

An appropriate scheme of façade sound insulation has been developed to ensure external noise intrusion to the dwellings is lower than that stated within the guideline criteria of BS 8233:2014. The industrial and commercial noise sources only occur during daytime hours, and criteria used within this assessment is 5dB more stringent than that found within BS 8233:2014, requiring daytime sound levels to not exceed LAeq 30dB. This more stringent acoustic criteria reflects the outcome of the BS 4142:2014+A1:2019 assessment, and will ensure the amenity of future occupants is protected.

5.2. Assessment of Operational Noise from Nearby Night Clubs & Bars

As detailed within Section 2.6, based on guidance within NANR163, an internal criterion of LAeq 27dB within the proposed properties due to noise intrusion from nearby pubs and clubs is appropriate to ensure a good level of amenity.

ACA Acoustics' survey included a camera overlooking the pub seating area. This shows that the seating area does not have music, and patrons talking and laughing are the primary noise source.

An appropriate mitigation scheme to control noise intrusion to within the new flats is included below.

Results of this assessment are included in Table 11 below.

6. ASSESSMENT OF FAÇADE SOUND INSULATION

6.1. Scheme of Façade Sound Insulation

A scheme for sound insulation is necessary to ensure sound levels inside rooms of the new residential dwellings are reasonable and comply with the requirements of BS 8233:2014.

A computer model has been set up using the measured sound levels incident on the façades of the development along with façade elements outlined in the drawings from the client reference '*PS401-01-03*', as well as anticipated elements where these are not specified. The computer model is based on the calculation procedures outlined in BS EN ISO 12354-3:2000 and BS 8233:2014.

Confirmation of the acoustic performance of the building envelope elements used in the calculation model is provided in Table 10 below.

Description	**Location**	**Rw (dB)**	**Rw + C'tr (dB)**	**Typical Construction**
External façade walls	Entire development	55	51	Existing solid brick construction
Glazing	Entire Development	34	30	4-16-6 Thermal Double Glazing - RW 34
Roof	Entire development	52	44	Tile-Slate, Pitched with flat ceiling. 100mm insulation in loft cavity, 1 layer 12.5mm wall board

Table 10: Acoustic performance specification for facade elements

Note that the constructions provided are typical and variations on the specification would be acceptable, so long as the installed construction achieved the specified sound insulation performance. It is recommended the glazing supplier submit test data confirming their unit will comply with the specified performance.

6.2. Ventilation Strategy

In accordance with Approved Document O of The Building Regulations, if sound levels inside bedrooms exceed $LAeq_{,8\text{-hour}}$ 40dB or LAfmax 55dB more than 10 times per night, then it would not be appropriate to rely on open windows to mitigate overheating and a mechanical ventilation system with summer bypass mode would be appropriate. This would ensure that internal sound level criteria are achieved whilst providing the '*whole dwelling ventilation*' rate as set out in The Building Regulations Approved Document F.

Ideally the building will be designed to control heat gains, for example through the use of solar shading. However, the client has confirmed that a mechanical ventilation system with summer bypass mode will be installed to the development. Detailed thermal design, confirming the ventilation strategy, is beyond the scope of this assessment and should be considered by others accordingly.

It is important that any self-noise (i.e., noise from the fans) and external noise intrusion through the ducted system must not cause internal sound levels to exceed the design requirements. To achieve these limits, it is recommended that the overall noise from any mechanical ventilation system will need to be no higher than LAeq 25dB to allow for accumulation of noise sources.

6.3. Calculated Internal Sound Levels

Copy of acoustic calculations for daytime noise intrusion into sample rooms is provided in Appendix A.

Table 11 below includes the proposed secondary glazing and mechanical ventilation to calculate internal noise levels during the peak loading event and demonstrates that intrusive sound levels within rooms of the proposed residential units will comply with the project criteria. Sound levels over the full night-time period will be significantly lower.

Plot / Room	Description	Calculated Internal Sound Level	Criteria
1st Floor Living Room	Daytime LAeq	21dB	≤ 30dB
1st Floor Bedroom	Daytime LAeq	24dB	≤ 30dB
2nd Floor Living Room	Daytime LAeq	21dB	≤ 30dB
2nd Floor Bedroom	Daytime LAeq	25dB	≤ 30dB
1st Floor Bedroom	Patron Noise from The Griffin garden	17dB	≤ 27dB
2nd Floor Bedroom	Patron Noise from The Griffin garden	17dB	≤ 27dB

Table 11: Summary internal sound levels within sample habitable rooms

7. ASSESSMENT OF THE SEPARATING FLOOR BETWEEN GROUND FLOOR RETAIL AND FIRST FLOOR RESIDENTIAL

The future use of the ground floor commercial unit is not currently known. Separating floors between dwellings and the commercial space at ground floor level will be required to achieve the minimum sound insulation performance standards set out in The Building Regulations Approved Document E. In accordance with Paragraph 0.8 of ADE, a higher performance may be appropriate where future occupants of the commercial unit propose higher than typical retail source sound levels.

Allowing for a typical internal sound level in a restaurant on a busy weekend evening of around LAeq 80dB, then separating walls and floors between the commercial and the new residential flats would need to achieve a sound insulation performance of nominally DnT,w + C'tr 50dB to ensure the recommended criteria is achieved.

This is at least 7dB better than the minimum performance standards of the Building Regulations Approved Document E and should ensure a good standard of amenity for future residents of the flats.

It is recommended that this performance standard is controlled through a planning condition and can be verified through tests conducted on the completed structure on site, prior to occupation.

8. CONCLUSION

ACA Acoustics have been commissioned to provide a noise impact assessment at 18 Bridge Street, Caversham. In accordance with the requirements of the GDPO, the assessment is to be submitted in support of an application for permitted development.

ACA Acoustics have undertaken an external sound level survey. An assessment of noise from industrial and commercial sources has been undertaken.

An acoustic specification for façade insulation elements has been developed to control noise from nearby industrial and commercial sources.

It is the author's opinion that, allowing for an appropriate mitigation strategy as set out in this report, sound intrusion to the proposed residential dwellings should not be detrimental to the

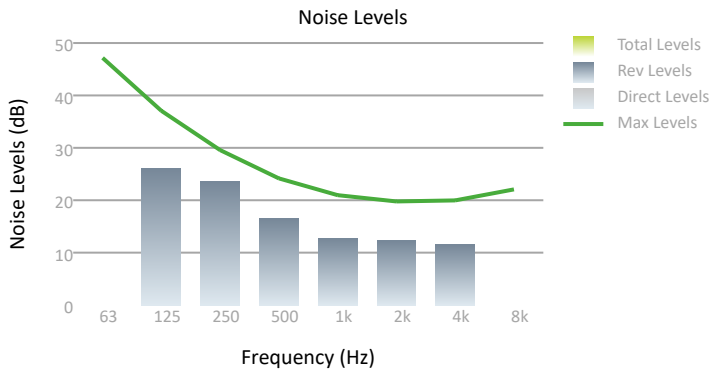
amenity of future occupants and the site is suitable for the proposed development and therefore in accordance with the GPDO it is recommended that the application for Prior Approval is granted.

Appendix A

Acoustic Calculations

18 Bridge Street, Caversham

Reference	1st Floor Living Room
Description	
Target Sound Level	-
Max Sound Level	30dB(A)
Calculated Sound Level	20.8dB(A)
Calculated Tmf T60 (s)	0.5
Volume (m^3)	62.4



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	26.1	23.6	16.5	12.7	12.2	11.5	-

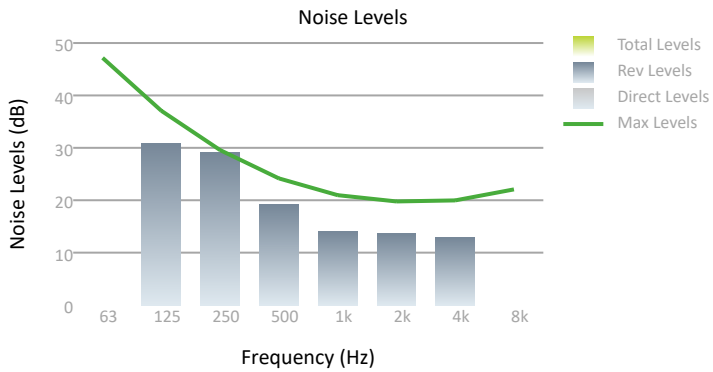
ACA Acoustics Limited

Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA
London Office: 3 Shortlands, Hammersmith, London, W6 8DA
w: www.aca-acoustics.co.uk

Tel: 01793 766 324
Tel: 0203 609 8733

18 Bridge Street, Caversham

Reference	1st Floor Bedroom 2 Daytime LAeq
Description	
Target Sound Level	-
Max Sound Level	30dB(A)
Calculated Sound Level	24.1dB(A)
Calculated Tmf T60 (s)	0.4
Volume (m^3)	39



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	30.3	28.7	17.9	11.7	11.3	10.5	-
Leq, ff (Day)	1	-	20.9	17.8	12.9	10.3	9.7	9.0	-

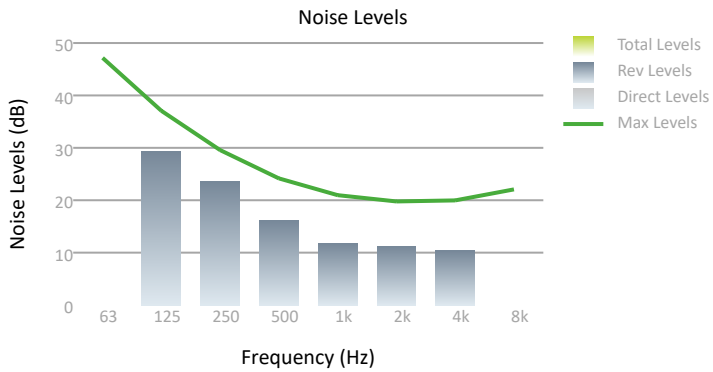
ACA Acoustics Limited

Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA
London Office: 3 Shortlands, Hammersmith, London, W6 8DA
w: www.aca-acoustics.co.uk

Tel: 01793 766 324
Tel: 0203 609 8733

18 Bridge Street, Caversham

Reference	2nd Floor Living Room
Description	
Target Sound Level	-
Max Sound Level	30dB(A)
Calculated Sound Level	20.8dB(A)
Calculated Tmf T60 (s)	0.5
Volume (m^3)	62.4



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	29.4	23.6	16.2	11.8	11.2	10.4	-

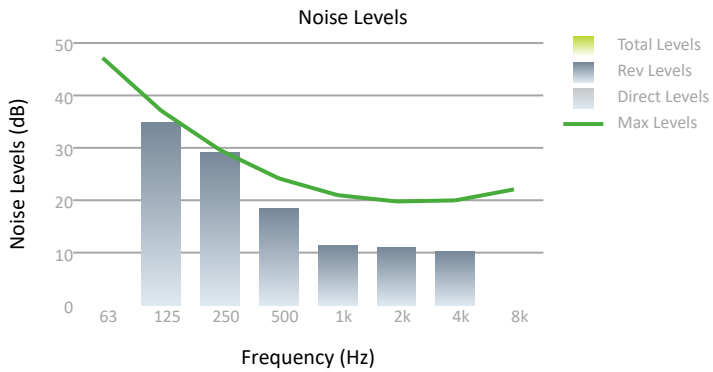
ACA Acoustics Limited

Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA
London Office: 3 Shortlands, Hammersmith, London, W6 8DA
w: www.aca-acoustics.co.uk

Tel: 01793 766 324
Tel: 0203 609 8733

18 Bridge Street, Caversham

Reference	2nd Floor Bedroom 2 Daytime LAeq
Description	
Target Sound Level	-
Max Sound Level	30dB(A)
Calculated Sound Level	24.2dB(A)
Calculated Tmf T60 (s)	0.4
Volume (m^3)	39



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	34.5	28.8	17.5	9.7	9.3	8.5	-
Leq, ff (Day)	1	-	24.0	17.4	11.2	6.8	6.1	5.4	-

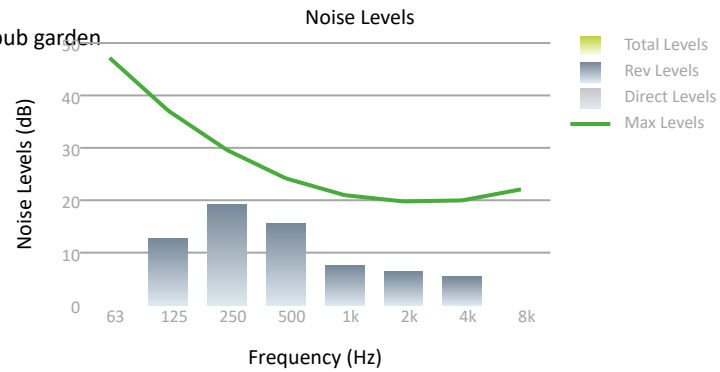
ACA Acoustics Limited

Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA
London Office: 3 Shortlands, Hammersmith, London, W6 8DA
w: www.aca-acoustics.co.uk

Tel: 01793 766 324
Tel: 0203 609 8733

18 Bridge Street, Caversham

Reference	1st Floor Bedroom 2 Noise from the pub garden
Description	
Target Sound Level	-
Max Sound Level	30dB(A)
Calculated Sound Level	16.6dB(A)
Calculated Tmf T60 (s)	0.4
Volume (m³)	39



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	12.7	19.2	15.7	7.5	6.3	5.4	-

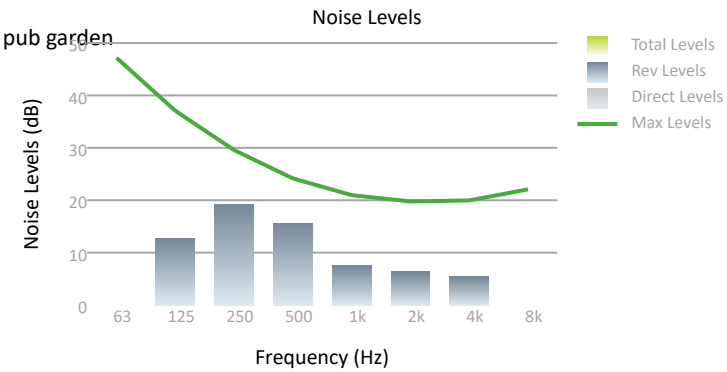
ACA Acoustics Limited

Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA
London Office: 3 Shortlands, Hammersmith, London, W6 8DA
w: www.aca-acoustics.co.uk

Tel: 01793 766 324
Tel: 0203 609 8733

18 Bridge Street, Caversham

Reference	2nd Floor Bedroom 2 noise from the pub garden
Description	
Target Sound Level	-
Max Sound Level	30dB(A)
Calculated Sound Level	16.6dB(A)
Calculated Tmf T60 (s)	0.4
Volume (m³)	39



Calculated Internal Sound Levels

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
Leq, ff (Day)	1	-	12.7	19.2	15.7	7.5	6.3	5.4	-

ACA Acoustics Limited

Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA
London Office: 3 Shortlands, Hammersmith, London, W6 8DA
w: www.aca-acoustics.co.uk

Tel: 01793 766 324
Tel: 0203 609 8733

Calculation Sheet

1st Floor Living Room

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade									
Source sound level	**53.4**	**54.4**	**48.9**	**47.2**	**49.8**	**49.0**	**48.2**	**45.5**	**Row A**
Facade Wall Element									
	-44.3	*-46.3*	*-48.3*	*-54.3*	*-60.3*	*-67.3*	*-66.3*	*-69.3*	
Facade Glazed Element									
	-	*-35.9*	*-31.9*	*-38.9*	*-52.9*	*-51.9*	*-53.9*	-	
Cumulative Lp									
Result	**-**	**19.1**	**17.4**	**10.4**	**6.6**	**6.6**	**6.3**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*6.9*	*6.1*	*6.1*	*6.1*	*5.7*	*5.2*	-	
Internal Receiver Noise									
Internal Receiver Noise - 1st Floor Living Room **Reverberant Field, LPrev:**	**-**	**26.1**	**23.6**	**16.5**	**12.7**	**12.2**	**11.5**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

1st Floor Bedroom 2 Daytime LAeq

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)									
Source dBA	**61.0**	**61.0**	**57.0**	**52.0**	**49.0**	**51.0**	**52.0**	**42.0**	**Row A**
Facade Wall Element									
	-43.7	*-45.7*	*-47.7*	*-53.7*	*-59.7*	*-66.7*	*-65.7*	*-68.7*	
Facade Glazed Element									
	-	*-39.8*	*-35.8*	*-42.8*	*-56.8*	*-55.8*	*-57.8*	-	
Cumulative Lp									
Result	**-**	**22.3**	**21.6**	**10.8**	**5.1**	**5.3**	**5.2**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*8.0*	*7.1*	*7.1*	*6.6*	*6.0*	*5.3*	-	
Internal Receiver Noise									
Internal Receiver Noise - 1st Floor Bedroom 2 Daytime LAeq **Reverberant Field, LPrev:**	**-**	**30.3**	**28.7**	**17.9**	**11.7**	**11.3**	**10.5**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

1st Floor Bedroom 2 Daytime LAeq

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)									
Source dBA	**55.0**	**53.0**	**47.0**	**46.0**	**42.0**	**39.0**	**34.0**	**33.0**	**Row A**
Facade Wall Element									
	-44.7	*-46.7*	*-48.7*	*-54.7*	*-60.7*	*-67.7*	*-66.7*	*-69.7*	
Facade Glazed Element									
	-	*-40.5*	*-36.5*	*-43.5*	*-57.5*	*-56.5*	*-58.5*	-	
Cumulative Lp									
Result	**-**	**14.0**	**11.8**	**6.9**	**4.8**	**4.8**	**4.8**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*6.9*	*6.0*	*6.0*	*5.5*	*4.9*	*4.3*	-	
Internal Receiver Noise									
Internal Receiver Noise - 1st Floor Bedroom 2 Daytime LAeq **Reverberant Field, LPrev:**	**-**	**20.9**	**17.8**	**12.9**	**10.3**	**9.7**	**9.0**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

2nd Floor Living Room

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade									
Source sound level	**53.4**	**54.4**	**48.9**	**47.2**	**49.8**	**49.0**	**48.2**	**45.5**	**Row A**
Facade Wall Element									
	-44.3	*-46.3*	*-48.3*	*-54.3*	*-60.3*	*-67.3*	*-66.3*	*-69.3*	
Facade Glazed Element									
	-	*-35.9*	*-31.9*	*-38.9*	*-52.9*	*-51.9*	*-53.9*	*-*	
Facade Roof Element									
	-17.6	*-34.6*	*-46.6*	*-54.6*	*-59.6*	*-60.6*	*-61.6*	*-62.6*	
Cumulative Lp									
Result	**-**	**22.5**	**17.5**	**10.0**	**5.7**	**5.6**	**5.2**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-*	
Room Corrections									
	-	*6.9*	*6.1*	*6.1*	*6.1*	*5.7*	*5.2*	*-*	
Internal Receiver Noise									
Internal Receiver Noise - 2nd Floor Living Room **Reverberant Field, LPrev:**	**-**	**29.4**	**23.6**	**16.2**	**11.8**	**11.2**	**10.4**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

2nd Floor Bedroom 2 Daytime LAeq

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)									
Source dBA	**61.0**	**61.0**	**57.0**	**52.0**	**49.0**	**51.0**	**52.0**	**42.0**	**Row A**
Facade Wall Element									
	-43.0	*-45.0*	*-47.0*	*-53.0*	*-59.0*	*-66.0*	*-65.0*	*-68.0*	
Facade Glazed Element									
	-	*-39.1*	*-35.1*	*-42.1*	*-56.1*	*-55.1*	*-57.1*	-	
Facade Roof Element									
	-18.9	*-35.9*	*-47.9*	*-55.9*	*-60.9*	*-61.9*	*-62.9*	*-63.9*	
Cumulative Lp									
Result	**-**	**27.2**	**22.4**	**11.1**	**3.7**	**4.0**	**3.9**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*7.3*	*6.4*	*6.4*	*5.9*	*5.3*	*4.7*	-	
Internal Receiver Noise									
Internal Receiver Noise - 2nd Floor Bedroom 2 Daytime LAeq **Reverberant Field, LPrev:**	**-**	**34.5**	**28.8**	**17.5**	**9.7**	**9.3**	**8.5**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

2nd Floor Bedroom 2 Daytime LAeq

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)									
Source dBA	**55.0**	**53.0**	**47.0**	**46.0**	**42.0**	**39.0**	**34.0**	**33.0**	**Row A**
Facade Wall Element									
	-42.8	*-44.8*	*-46.8*	*-52.8*	*-58.8*	*-65.8*	*-64.8*	*-67.8*	
Facade Glazed Element									
	-	*-38.6*	*-34.6*	*-41.6*	*-55.6*	*-54.6*	*-56.6*	-	
Facade Roof Element									
	-19.6	*-36.6*	*-48.6*	*-56.6*	*-61.6*	*-62.6*	*-63.6*	*-64.6*	
Cumulative Lp									
Result	**-**	**19.1**	**13.3**	**7.1**	**3.2**	**3.1**	**3.0**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*5.0*	*4.1*	*4.1*	*3.6*	*3.0*	*2.3*	-	
Internal Receiver Noise									
Internal Receiver Noise - 2nd Floor Bedroom 2 Daytime LAeq **Reverberant Field, LPrev:**	**-**	**24.0**	**17.4**	**11.2**	**6.8**	**6.1**	**5.4**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

1st Floor Bedroom 2 Noise from the pub garden

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)									
Source dBA	**29.0**	**40.0**	**49.0**	**52.0**	**50.0**	**45.0**	**36.0**	**23.0**	**Row A**
Facade Wall Element									
	-42.8	*-44.8*	*-46.8*	*-52.8*	*-58.8*	*-65.8*	*-64.8*	*-67.8*	
Facade Glazed Element									
	-	*-38.6*	*-34.6*	*-41.6*	*-55.6*	*-54.6*	*-56.6*	-	
Facade Roof Element									
	-19.6	*-36.6*	*-48.6*	*-56.6*	*-61.6*	*-62.6*	*-63.6*	*-64.6*	
Cumulative Lp									
Result	**-**	**7.7**	**15.1**	**11.5**	**3.9**	**3.3**	**3.0**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*5.0*	*4.1*	*4.1*	*3.6*	*3.0*	*2.3*	-	
Internal Receiver Noise									
Internal Receiver Noise - 1st Floor Bedroom 2 Noise from the pub garden **Reverberant Field, LPrev:**	**-**	**12.7**	**19.2**	**15.7**	**7.5**	**6.3**	**5.4**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk

Calculation Sheet

2nd Floor Bedroom 2 noise from the pub garden

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	
Sound Level at Facade (Daytime Leq)									
Source dBA	**29.0**	**40.0**	**49.0**	**52.0**	**50.0**	**45.0**	**36.0**	**23.0**	**Row A**
Facade Wall Element									
	-42.8	*-44.8*	*-46.8*	*-52.8*	*-58.8*	*-65.8*	*-64.8*	*-67.8*	
Facade Glazed Element									
	-	*-38.6*	*-34.6*	*-41.6*	*-55.6*	*-54.6*	*-56.6*	-	
Facade Roof Element									
	-19.6	*-36.6*	*-48.6*	*-56.6*	*-61.6*	*-62.6*	*-63.6*	*-64.6*	
Cumulative Lp									
Result	**-**	**7.7**	**15.1**	**11.5**	**3.9**	**3.3**	**3.0**	**-**	
ISO 12354-3 Lfs Correction									
	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	-	
Room Corrections									
	-	*5.0*	*4.1*	*4.1*	*3.6*	*3.0*	*2.3*	-	
Internal Receiver Noise									
Internal Receiver Noise - 2nd Floor Bedroom 2 noise from the pub garden **Reverberant Field, LPrev:**	**-**	**12.7**	**19.2**	**15.7**	**7.5**	**6.3**	**5.4**	**-**	

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733
Manchester Office: Colony, 5 Piccadilly Place, Manchester, M1 3BR Tel: 0161 327 1681
w: www.aca-acoustics.co.uk