

NOISE IMPACT ASSESSMENT

501 BARLOW MOOR ROAD, CHORLTON

REPORT REFERENCE NO. J003692-5465-RDC-01

28TH FEBRUARY 2022

Tel: 01925 759380

Email: enquiries@pdaltd.com





Document Control Sheet

Details of Assessment	
Client	Southway Housing Trust
Document Title	Noise Impact Assessment – 501 Barlow Moor Road, Chorlton
Report Reference	J003692-5465-RDC-01

Client Address:	Company Address:
Southern Gate 729 Princess Road Didsbury Manchester M20 2LT	PDA Ltd 3 Bridgewater Court Barsbank Lane Lymm WA13 0ER

Issue	Date	Author	Remark	Status
01	28/02/2022	Richard Cookson	Initial Issue	
02				

	Name	Position
Prepared By	Richard Cookson PhD, BSc(Hons) MIOA	Principal Consultant
Checked By	Chris Wright BSc (Hons) MIOA	Consultant

This document has been prepared for the client only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law.

This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.



CONTENTS

1.0	SUMMARY.....	4
2.0	BRIEF FOR CONSULTANCY.....	4
3.0	SITE DESCRIPTION	4
4.0	ASSESSMENT CRITERIA.....	5
4.1	National Planning Policy Framework.....	5
4.2	Planning Practice Guidance – Noise.....	6
4.3	BS8233:2014	7
4.3.1	Internal noise levels in domestic dwellings	7
5.0	SURVEY DETAILS	7
5.1	Measurement Procedure	8
5.1.1	Survey times.....	8
5.1.2	Measurement Equipment.....	8
5.1.3	Measurement Locations.....	8
5.2	Subjective Description of Noise Sources.....	9
5.3	Measured survey Results	9
6.0	NOISE PROPAGATION.....	10
7.0	NOISE BREAK-IN CALCULATIONS AND MITIGATION	11
7.1	Building Envelope Elements	11
7.1.1	Walls	11
7.1.2	Glazing.....	11
7.2	Design Assumptions.....	11
7.3	Calculated noise levels.....	11
7.4	Glazing.....	12
7.5	Ventilation	12
7.6	Purge Ventilation and summer cooling.....	12
8.0	CONCLUSION	13

APPENDIX A – DEFINITION OF ACOUSTIC TERMS



1.0 SUMMARY

At the request of Southway Housing Trust, Philip Dunbavin Acoustics has conducted an assessment of the ambient noise climate for the proposed residential development at 501 Barlow Moor Road, Chorlton-cum-Hardy.

Noise levels at the site are dominated by road traffic from the A5145 Barlow Moor Road / High Lane immediately to the front of the development.

Mitigation is proposed to the building envelope to ensure that internal noise levels within habitable areas are suitable for resting and sleeping and are in accordance with the requirements of the NPPF and BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings". Noise mitigation advice for the proposed residential facades is given in Section 7.0 in the form of treatment to the glazing and ventilation.

2.0 BRIEF FOR CONSULTANCY

PDA Ltd. was engaged to carry out the following:

A. Noise Survey

We will travel to the site in Chorlton and carry out an ambient noise survey to assess the level of noise incident upon the existing building. The measurement and assessment will include for noise from transportation including the surrounding roads and other local sources.

Given that the site is an existing building, we would look to undertake the noise survey with microphones mounted on poles from existing windows. This way we could measure for a full night time period to determine night and daytime levels. If this is not practical, please inform us at the earliest opportunity. During our visit to site we would also inspect the existing separating element constructions.

We will carry out all noise surveys in accordance with the provisions of BS7445 "Description and Measurement of Environmental Noise". The measurements made will include both dBA and octave band noise levels including L_{eq} , L_{max} , L_{10} and L_{90} parameters.

B. Survey Processing and Report

The results of the noise survey will be assessed in line with the requirements of the National Planning Policy Framework (NPPF). We will carry out basic calculations, based on available room data/drawings, to predict internal noise levels within the development to compare with good practice guidance criteria, e.g. BS8233:2014, and develop specifications for the building façades, glazing and ventilation elements.

We will produce a report detailing all survey procedure, measurements and results suitable for submission to the Local Authority in support of your planning application. We will suggest a scheme of sound insulation works (typically windows and ventilation openings) to ensure suitable internal noise levels within the development.

3.0 SITE DESCRIPTION

The site consists of three storey former end-terraced house which has been converted to retail at ground floor level with a flat on the first and second floor. The proposal is to convert the ground floor back to residential and form the property into three separate flats, one flat on each floor. The front of the property overlooks the busy junction of Barlow Moor Road, High Lane, Sandy Lane and Zetland Road. The rear of the property is shielded from line-of-sight sound propagation from the surrounding roads by the building itself and other buildings along Barlow Moor Road which form a continuous barrier between the road and the rear of the property.

4.0 ASSESSMENT CRITERIA

4.1 National Planning Policy Framework

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in July 2021. With regard to Noise the Framework states the following;

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *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.*

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 the 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 terms 'significant adverse impact' and 'adverse impact' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE)' which states;

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The notes also offer an explanation of the term 'adverse impacts' as follows;

... 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 taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

Although no specific noise limits for LOAEL and SOAEL have been defined, in 2014 the UK Government published a planning practice guidance document for noise which indicates where these

limits fall with relation to the perception of noise. A summary is reproduced in Section 4.2 below, and the full document is published at <https://www.gov.uk/guidance/noise--2>. It is considered that guidance from other acoustic standards may be employed to determine suitable levels within the overall principal of the National Planning Policy Framework.

The National Planning Policy Framework also states:

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

The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.

4.2 Planning Practice Guidance – Noise

In March 2014 (updated July 2019) the UK Government published further guidance on the assessment of noise for planning purposes in the form of the on-line publication, Planning Practice Guidance on noise (<http://www.gov.uk/guidance/noise--2>). This document offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL. The relevant section is reproduced in the table below;

Table 1. Planning Practice noise level guidance

Perception	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 perceived 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

It is notable from the above planning guidance that development should not normally be permitted above Significant Observed Adverse Effect Levels, and should aim to minimise Other Adverse Effect Levels (below SOAEL but above LOAEL). However, it is clear that noise is permitted to approach and/or exceed the Lowest Observed Adverse Effect Level, providing that noise is mitigated and reduced to a minimum.

4.3 BS8233:2014

BS8233 proposes acceptable noise levels for new residences. The guidance within BS8233 has been revised and updated in 2014 to take into account the most recent research and expert opinion on suitable noise levels for new developments.

4.3.1 Internal noise levels in domestic dwellings

With regard to residential development BS8233 gives the following criteria;

Table 2. BS8233:2014 indoor ambient noise levels for dwellings

Activity	Location	Design range $L_{Aeq,T}$	
		Daytime (07:00 - 23:00)	Night-time (23:00 – 07:00)
Resting	Living rooms	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom	35	30

The above criteria apply to steady external noise sources, such as road traffic. Where specific noise events are likely to occur during the night time BS8233:2014 gives the following guidance:

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.

5.0 SURVEY DETAILS

An ambient environmental noise survey was carried out at a single location on the site. The measurements were taken in at the first floor façade of the property (using a microphone extended from the first floor window) overlooking the road junction to the front. It was noted that road traffic on

Barlow Moor Road and High Lane were the dominant sources of noise affecting the site, with no other significant sources of noise observed.

5.1 Measurement Procedure

5.1.1 Survey times

The ambient noise survey measurements were made between 16:10 on Thursday 3rd February 2022 and 17:05 on Friday 4th February 2022. Measurements were taken using a sound level meter fitted with an 'all-weather' windshield, extended from the first floor window overlooking Barlow Moor Road / High Lane, set-up by Dr Richard Cookson PhD, BSc(Hons), MIOA of PDA Ltd.

5.1.2 Measurement Equipment

The noise survey was conducted using a NTi XL2 sound level meter.

The XL2 sound level meter is a Class 1 sound level meter in accordance with IEC 61672-1:2002 capable of operating as an integrating sound level meter with frequency analysis and statistical functions.

The meter was set to measure broadband sound pressure levels, octave frequency band sound pressure levels and statistical parameters.

5.1.3 Measurement Locations

Measurements were taken at single measurement positions. Position 1 was 1m from the first floor façade overlooking the junction of Barlow Moor Road and High Lane.

See Figure 1 below for the measurement location.



Figure 1. Survey Measurement Location

5.2 Subjective Description of Noise Sources

Subjectively the noise climate at the development site was dominated by continuous road traffic on Barlow Moor Road and High Lane, with lesser contributions from Sandy Lane and Zetland Road.

5.3 Measured survey Results

The noise survey results are summarised in Figure 2 below.

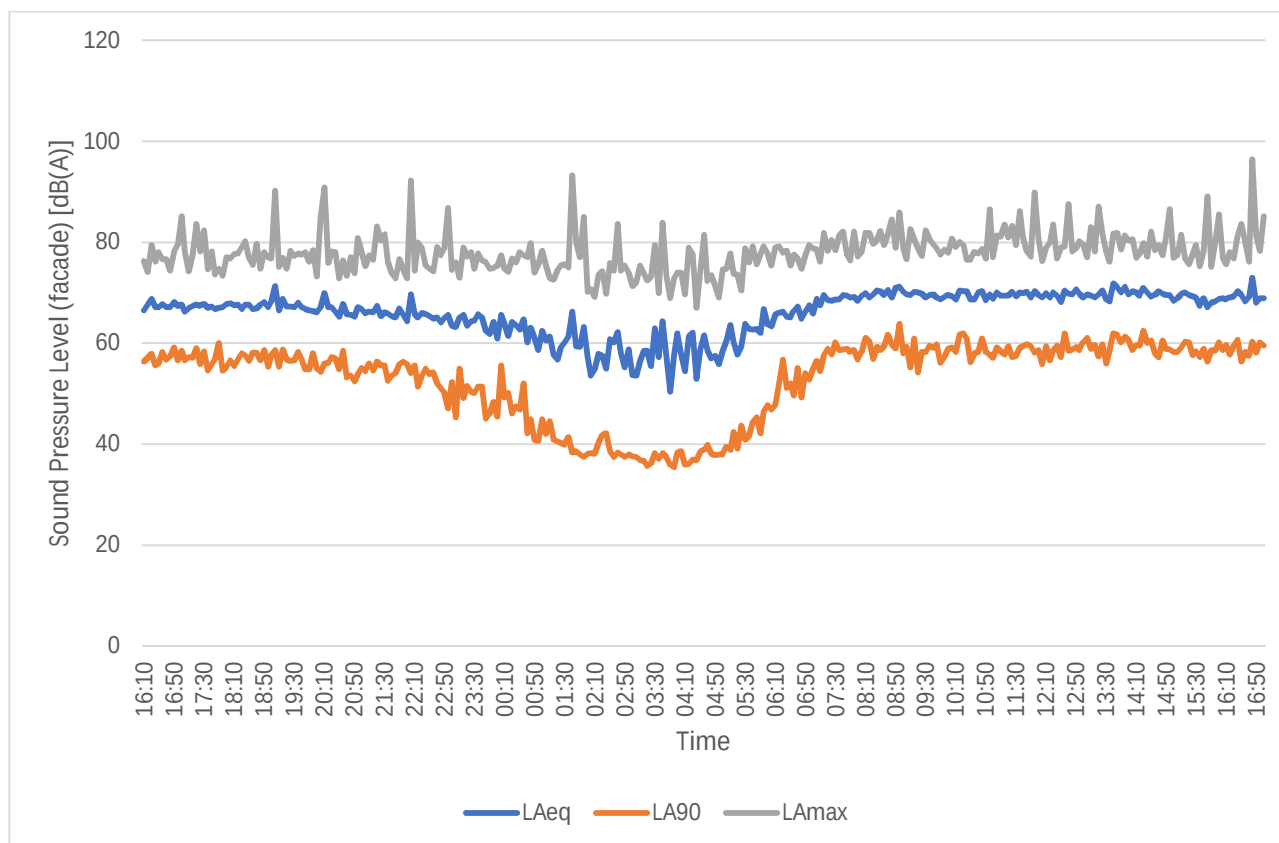


Figure 2. Survey results at measurement position 1

6.0 NOISE PROPAGATION

Measurements taken at Position 1 were at the location of the most noise exposed proposed residential façade. We would note that the layout of the proposed flats is such that all habitable rooms are on the front façade of the development, with only non-habitable bathrooms and shared circulation space to the rear. The measured noise levels have been reduced by 3dB to account for the façade reflection to obtain the equivalent free-field sound pressure levels at the residential façades.

The sound pressure levels at the developed façades are calculated as follows:

Table 3. Predicted sound levels at developed façades

Façade	Daytime noise level L_{Aeq}	Night-time noise level L_{Aeq}	Typical Night-time L_{Amax}^1
All façades	66	59	76

Notes:

¹ Typical L_{Amax} noise levels are those not exceeded more than 10 times over the whole night-time period.

We would note that the above façade levels are typical of those exposed to road traffic noise from main roads within cities. Although reasonably high the levels are not excessive and are typical of levels which would be regarded as suitable for residential development with appropriate selection of glazing and ventilation to achieve recommended internal noise levels within the dwellings.

7.0 NOISE BREAK-IN CALCULATIONS AND MITIGATION

7.1 Building Envelope Elements

Noise ingress calculations are based on room dimensions taken from Whiteley Eaves Ltd drawings of the developed flats. The following construction elements have been used to model the external building envelope of the proposed residential development:

7.1.1 Walls

49 dB R_w wall, e.g. brick external leaf with cavity and plasterboard inner frame, or existing cavity masonry.

7.1.2 Glazing

As the glazing is the acoustically weak area, the noise level incident on the façade will determine the type of glazing specified.

7.2 Design Assumptions

Assessment and specification of the acoustic performance of the building envelope and suitable glazing and ventilation, has been undertaken based on achieving the internal ambient acoustic conditions, specified in Section 4.3.1 above.

Information on the sound insulation properties for specific element details have been obtained from manufacturers test data.

For the purposes of the noise break-in calculations room dimensions have been taken from Whiteley Eaves Ltd drawings of the developed flats.

7.3 Calculated noise levels

Noise break-in through the proposed building façades have been calculated in octave frequency bands using the detailed method of BS 8233:2014 taking into account the octave band sound reduction of the façade elements, façade element areas, room volume and reverberation time in the finished rooms. For the purposes of calculation the finished reverberation time has been assumed to be 0.5 seconds in all frequencies in habitable rooms. The calculated octave frequency band internal noise levels have then been used to determine the overall A-weighted noise level in the habitable rooms which has been compared to the criteria of Section 4.3.1. Glazing and ventilation specifications have been selected to ensure that the criteria of Section 4.3.1 are achieved within the proposed dwellings.

Table 4. Glazing and ventilator schedule for habitable rooms

Flat	Room	Minimum Glazing Rating R_w dB	Minimum combined Ventilator Rating $D_{n,e,w}$ dB	Internal Noise Level Target $L_{Aeq,T}$ dB Day/Night	Calculated Internal Noise Level $L_{Aeq,T}$ dB Day/Night ¹	Internal Noise Level target L_{Amax} dB Night	Calculated Internal Noise Level L_{Amax} dB Night ^{1 2}
All flats	Bedsit / Bedroom	37	38	35/30	31-33/24-27	45	42-44

Notes

- 1 Calculated noise levels assuming closed windows and allowing for an inlet vent of specification detailed.
2 Calculated L_{Amax} noise level typically not exceeded more than 10 times per night.

7.4 Glazing

Table 5 below gives the required glazing sound insulation performance in octave frequency bands, together with typical glazing products which achieve the required sound insulation. Any alternative products should meet the given sound insulation performance in each octave frequency band to ensure that the internal noise levels specified in Table 4 are achieved.

Table 5 – Required glazing performance (minimum)

R_w	Typical example (mm glass / mm cavity / mm glass)	Frequency band [Hz]						
		63	125	250	500	1000	2000	4000
37	10/12/6	20	26	27	34	40	38	46

7.5 Ventilation

Ventilation indicated in Table 4 will be required as an alternative to open windows in order to achieve the design criterion. Our calculations have allowed for 1 of the specified vent type to each habitable room. We would note that during the daytime it is likely that the internal noise criteria will be achievable with partially opened windows.

Table 6 gives the required acoustic performance of the specified vents in octave frequency bands, together with typical products which achieve the required sound insulation. Any alternative vent should achieve the same performance or greater in each octave band.

Table 6 – Required ventilator performance (minimum)

$D_{n,e,w}$	Typical example vent	Frequency band [Hz]						
		63	125	250	500	1000	2000	4000
38	Simon Acoustic EHAS	40	40	36	34	35	44	40

Please note that the specification of vents is in terms of acoustic performance only. It should be checked by others that the ventilation requirements of the Building Regulations are also met.

Bear in mind that with any fan-assisted ventilation systems it should be ensured that the fan itself does not exceed the noise criteria as specified in Section 4.3.1.

7.6 Purge Ventilation and summer cooling

The sound insulation of the façade relies on the windows remaining closed with ventilation provided by means of the attenuated vents specified in Section 7.5 above. During times when windows are open internal noise levels are likely to exceed the criteria of Section 4.3.1.



With regard to purge ventilation BS 8223:2014 states:

“The Building Regulations’ supporting documents on ventilation recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant’s choice.”

8.0 CONCLUSION

At the request of Southway Housing Trust, Philip Dunbavin Acoustics has conducted an assessment of the ambient noise climate for the proposed residential development at 501 Barlow Moor Road, Chorlton-cum-Hardy.

Noise levels at the site are dominated by road traffic from the A5145 Barlow Moor Road / High Lane immediately to the front of the development.

Mitigation is proposed to the building envelope to ensure that internal noise levels within habitable areas are suitable for resting and sleeping and are in accordance with the requirements of the NPPF and BS 8223:2014 “Guidance on sound insulation and noise reduction for buildings”. Noise mitigation advice for the proposed residential facades is given in Section 7.0 in the form of treatment to the glazing and ventilation.

APPENDIX A – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq} . Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq} . It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB L_{An} . It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max} , dB L_{Amax} , etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq} , L_{90} , L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.