Co-operative Store
Angel Street
Manchester

Noise Impact Assessment Report

24903/NIA1

6 August 2018

For:
Henry Riley LLP
5th Floor
Hadrian House
Higham Place
Newcastle Upon Tyne
NE1 8AF

Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk

Hann Tucker Associates

Noise Impact Assessment Report
24903/NIA1

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	06/10/17	-		
			Simon Everett Assistant Consultant BSc(Hons), MSc, AMIOA	Lewis Stonehouse Senior Consultant BA(Hons), MSc, MIOA, MFB
1	25/01/18	Updated upon receipt of CR3		
			Simon Everett Assistant Consultant BSc(Hons), MSc, AMIOA	Lewis Stonehouse Senior Consultant BA(Hons), MSc, MIOA, MFB
2	06/08/18	Amended following confirmation of party floor build-up		
			Joseph Sinker Consulting Engineer BEng(Hons), MSc(Res), AMIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA

This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

Hann Tucker Associates

Noise Impact Assessment Report
24903/NIA1

Contents

		Page
1.0	Introduction	1
2.0	Objectives	1
3.0	Site Description	1
4.0	Acoustic Terminology	2
5.0	Planning Policy/Guidance	2
6.0	Plant Noise Emission Criteria	5
7.0	Plant Noise Impact Assessment	6
8.0	Operational Noise Impact Assessment	7
9.0	Conclusions	11

Attachments

Appendix A – Acoustic Terminology

This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

1.0 Introduction

A new Cooperative Food store is proposed on the ground floor of this site. Hann Tucker Associates have previously undertaken a detailed environmental noise survey of the site, and have now been commissioned to undertake a noise impact assessment of the proposed store to support the planning application.

2.0 Objectives

To undertake a detailed noise impact assessment of the store including:

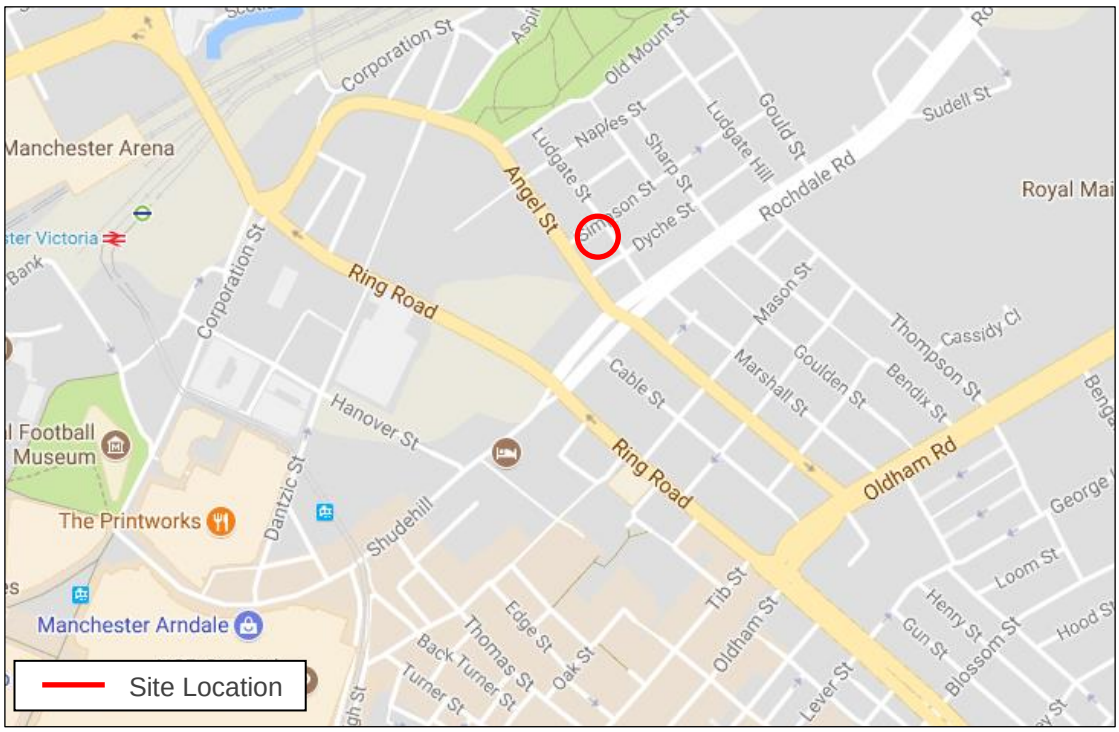
- Noise transfer via the slab (based on historic noise data from a similar store)
- Environmental noise emissions from new items of building services plant

If required, to recommend mitigation measures to control noise transfer from the store to the flats above.

3.0 Site Description

3.1 Location

The site is located on Angel Street in Manchester as shown on the Location Map below.

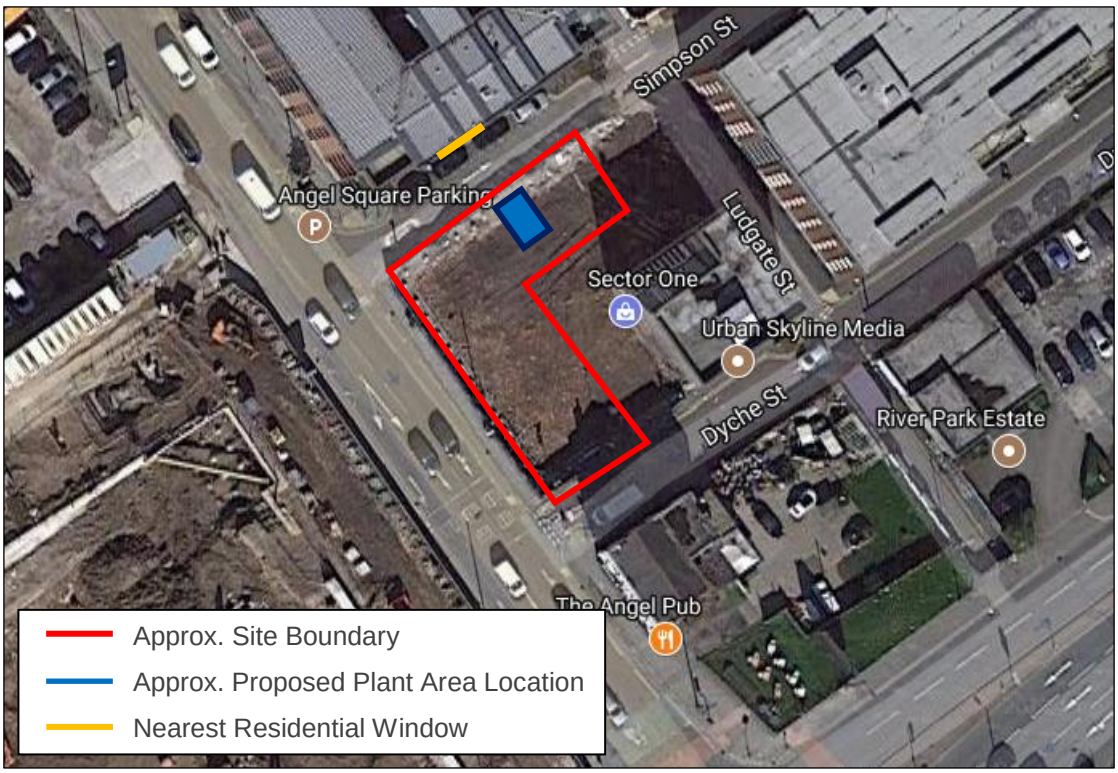


Location Map (maps.google.co.uk)

3.2 Description

The site is bounded by Angel Street to the south west, Simpson Street to the north west, Ludgate Street to the north east and Dyche street to the south east. The nearest residential window is believed to lie approximately 14m to the north west of the proposed plant area.

See Site Plan and floor plans below.



Site Plan (maps.google.co.uk)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Planning Policy/Guidance

5.1 Noise Policy Statement for England

The Government's Noise Policy Statement for England (NPSE, March 2010) sets out the long term vision for Government noise policy, which is to "*Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*".

The NPSE includes three primary aims to be achieved through effective management of environmental, neighbour and neighbourhood noise; (1) avoid ”significant adverse” impacts on health and quality of life, (2) mitigate and minimise ”adverse” impacts on health and quality of life, and (3) where possible, contribute to the improvement of health and quality of life.

5.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF, March 2012) sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

The planning system should prevent both new and existing development from contributing to, or being put at, unacceptable risk from environmental factors including noise.

Planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development. Conditions may be used to mitigate and reduce noise to a minimum so that adverse impacts on health and quality of life are minimised.

Reference is made to the Government's Noise Policy Statement for England (NPSE, March 2010) which sets out the long term vision for Government noise policy, which is to "*Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*"

5.3 Local Authority Requirements

Manchester City Council requirements are outlined in Section 3.0 of Manchester City Council's Planning & Noise Technical Guidance document (December 2015)

5.3.1 Noise From Fixed Building Services Plant.

Section 3.6.1.5.1 outlines that the noise assessment for fixed plant should be based on BS 4142:2014 and the assessment must demonstrate that:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

5.3.2 Achieving Suitable Internal Noise Levels

Section 3.6.1.1 sets out the following noise levels to be achieved for residential developments:

"BS 8233 and the World Health Organisation (WHO) have recommended specific limits for internal noise levels inside residential properties to allow appropriate living and sleeping conditions. MCC has adopted the following internal noise limits for residential properties:

- *Bedrooms (Night time - 23:00 to 07:00): 30dB LAeq and individual noise events should not normally exceed 45 dB (LAmax).*
- *Living Rooms (Day time 07:00 to 23:00): 35 dB (LAeq).*
- *Gardens and terraces (daytime) 55 dB (LAeq).*

5.4 BS 4142: 2014

BS 4142: 2014 '*Method for Rating industrial noise affecting mixed residential and industrial areas*' describes methods for rating and assessing the effects of outdoor sound levels, of an industrial and/or a commercial nature, *"on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident".*

The impact of a specific sound is indicated by subtracting the existing background noise level from the rating level (i.e. noise level from the proposed items of plant/machinery/etc. plus any acoustic feature corrections).

The noise from the new development is expressed in terms of a rating level and given as a $L_{Aeq,T}$ noise level. The existing background noise level is expressed in terms of a $L_{A90,T}$ noise level. T is the assessment time interval, which is 1-hour for operations during daytime hours (07:00 to 23:00 hours) and 15-minutes for operations during night-time hours (23:00 to 07:00 hours).

A penalty should apply to plant emitting noise of a tonal, irregular or impulsive nature.

To determine impact, BS 4142 states:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*

The lower the rating level is relative to the measured background sound level, the less likely it

is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

5.5 BS 8233: 2014

British Standard 8233: 2014 "Sound insulation and noise reduction for buildings" recommends design criteria for internal ambient noise levels for dwellings providing a reasonable or good level of protection from external noise. It states that it is desirable that internal ambient noise levels do not exceed the following guidelines:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 – 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

For sites subject to scheduled impulsive events at night-time (such as train or aircraft passbys), BS 8233 would suggest peak noises during the night-time (23:00-07:00) should not regularly exceed 45 dB L_{Amax} in affected bedrooms.

The document goes on to state that all of the above target levels may be relaxed by 5 dB and "reasonable" internal conditions would still be achieved.

6.0 Plant Noise Emission Criteria

An environmental noise survey of the site has previously been undertaken by Hann Tucker Associates, the full details of which can be found in our report dated 17 September 2015 (Ref: 21196/NVIA1revA). Plant noise emission limits have been specified in the aforementioned report to be achieved at 1 m from residential windows (including those associated with the development itself), and these are as follows.

Plant Noise Emission Criteria (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
43 dBA	38 dBA

If plant contains tonal or impulsive characteristics the external design criteria should be reduced by 5dBA.

It should be noted that the above are subject to the final approval of the Local Authority.

7.0 Plant Noise Impact Assessment

We have undertaken an assessment of atmospheric plant noise emissions based upon the information we have currently received from AB Group, in line with the current CR3 plant drawing and the Architects site plan accompanying this report.

Description	Manufacturer	Qty	Plant Model	Sound Pressure Level (dBA)	Plant Location
Shop Floor A/C unit	Mitsubishi	2	PUHZ-RP250YKA	62@1m (equating to 46dBA @10m)	External
Refrigeration Condenser	Hubbard-Kelvion	1	RF-NB-102L3H-091A-ALMG	35 @10m Daytime 25 @10m Night-time	External
Refrigeration Pack	Hubbard	1	R448A	32@10m	Internal

For ease of comparison, where the manufacturer's noise data for the A/C units is quoted at 1m, the above table shows the equivalent noise level of the A/C units at a distance of 10m in brackets. The following table summarises our predictions of atmospheric noise emission from the proposed plant to the nearest noise sensitive residential window, for the daytime and night-time periods.

	Sound Pressure Level (dBA)	
	Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
Shop Floor A/C units	46@10m	Not running
Refrigeration Condenser	35@10m	25@ 10m
Cumulative Noise Level	46@10m	25@10m
Distance Correction (14m)	-3	-3
Calculated Noise Level at Receptor	**43 dBA**	**22 dBA**
Local Authority Criteria	**43 dBA**	**38 dBA**
Compliant	✓	✓

8.0 Operational Noise Impact Assessment

8.1 Overview

The proposed store with 06:00 – 23:00 operational hours. Our assessment considers noise generated at the front of house within the store at the stores busiest period during lunch-time.

In order to inform our assessment, we attended an existing store at Vimto Gardens, Salford (which we understand to be comparable in size to the proposed store), to undertake a series of measurements of noise levels in the store. The loudest $L_{Aeq,T}$ and L_{Amax} noise levels measured at the front of house are presented in the table below.

Metric	Typical Highest Reverberant Noise Level (dB $L_{eq,15\text{-}min}$) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
$L_{Aeq,T}$	58	60	61	60	62	57	57	49	66
L_{Amax}	64	62	68	69	78	63	64	54	79

We understand the proposed construction of the party floor between the store and flats comprises a minimum of 250mm reinforced concrete slab on profiled metal deck (50mm profile).

On this basis, the floor can be expected to provide the following conservative sound reduction performance.

Calculated Approximate Sound Reduction, R (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
35	38	42	49	53	55	55	55

8.2 Assessment Criteria

Manchester City Council's standard documents do not outline specific guidance for assessing commercial noise propagating through building elements, however in our experience a suitable approach is to ensure that noise levels from commercial operations are controlled to a level at least 10dBA below the targets outlined in BS 8233:2014. We would therefore propose operational noise transfer from the store and plant room is controlled to achieve the following levels within the first floor residential units:-

Period	Internal Noise Limit
Night-time (23:00 – 07:00)	$L_{Aeq,T}$ 20dB L_{Amax} 35dB*
Daytime (07:00 – 23:00)	$L_{Aeq,T}$ 25dB

*Not to be exceeded regularly

It should be noted that the above are subject to the final approval of the Local Authority.

8.3 Noise Transfer Assessment

Noise transfer from store activity

A quick review of the reverberant source noise level data for front of house activities (Section 10.1) indicates that L_{Amax} events are less than 15dB higher than measured $L_{Aeq,T}$ levels. Our assessment therefore considers $L_{Aeq,T}$ noise levels only.

Based on the above, the latest drawings for the scheme and reverberant source noise levels for front of house activities (Section 10.1), we have assessed operational noise transfer to flats using in-house calculation software. The results are summarised below and compared against the proposed assessment criteria (Section 10.2).

Description	Sound Level L_{eq} (dB) at OCBF (Hz)								Broadband, dBA
	63	125	250	500	1k	2k	4k	8k	
Source Room Level	58	60	61	60	62	57	57	49	66
Calculated Receive Room Level	**24**	**23**	**20**	**12**	**10**	**3**	**3**	**0**	**16**

These levels meet the proposed criteria for daytime and night-time hours. We were therefore conclude that an adverse impact is unlikely.

8.4 Delivery Noise Impact Assessment

8.4.1 Delivery Vehicle Movements

We understand the deliveries entrance is located to the south east of the site, and that delivery vehicles will unload from Dyche Street and the residential properties worst affected are located on the eastern façade of the first floor of the development, approx. 4m from the worst affected noise sensitive windows.

From our experience of stores of a similar type that deliveries are generally scheduled such that one rigid HGV and two transit van deliveries every morning. In addition, there is likely to be another transit van type delivery vehicle during the day and three other HGV deliveries per week.

As such we have assessed the number of proposed delivery movements for the worst case hour of the early morning (06:00 - 07:00 hours), morning (07:00 - 09:00 hours) daytime (09:00 – 19:00 hours) and evening (19:00 – 21:00 hours).

The worst case scheduled vehicle information for different periods is shown below;

Assessment Period	Worst Case Goods Vehicle Movements	
	HGV	Transit
Early Morning (06:00 – 07:00hr)	1	2
Morning (07:00 – 09:00hr)	1	2
Day (09:00hr – 19:00hr)	1	1
Evening (19:00hr – 21:00hr)	1	1
Late Evening (21:00hr – 23:00hr)	0	0

Our calculations consider attenuation provided by distance and screening loss between the noise sources and receptors.

8.4.2 Delivery Vehicle Noise Levels

In order to inform our assessment of noise generated by vehicle movements, we have considered historical noise levels measured from similar delivery vehicle movements undertaken by Hann Tucker at another store. These are considered to be representative of 'worst-case' noise levels.

Noise levels for each activity measured are detailed below.

Event	Duration (seconds)	Specific Sound Level (dB) at 5m*
HGV entering site	5	73
HGV manoeuvring, reversing & door slam	15	72
General Loading/Unloading	600	61
HGV departing site	5	73
Transit entering site (incl. door slam)	5	62
General Loading/Unloading	15	61
Transit departing site	5	62

*Corrected for prevailing background noise levels at time of measurement

8.4.3 Noise Impact Assessment

The following table summarises the results of our assessment of delivery vehicle noise to the nearest residential window during the worst case hour of each assessment period. Fully detailed calculation sheets are available upon request.

Assessment Period	Rating Level (dBA)	Existing Background Noise Level, $L_{Aeq,T}$ (dBA)	Difference (dBA)	Significance
Early Morning (06:00 – 07:00hr)	67	60	**-7**	No Impact
Morning (07:00 – 09:00hr)	72	60	**-12**	No Impact
Day (09:00hr – 19:00hr)	70	60	**-10**	No Impact
Evening (19:00hr – 21:00hr)	68	60	**-8**	No Impact
Late Evening (21:00hr – 23:00hr)	-	-	**-**	-

Our assessment indicates that based on a worst-case scenario of an HGV and a transit van arriving simultaneously, there should be no impact on the nearest noise sensitive residential window.

Hence, based on the information provided, no additional vehicle noise mitigation measures should be required for this site.

8.4.4 Best Practice Guidance

Whilst the assessment indicates that specific mitigation measures are not required, the following best practice management measures should be employed in order to ensure that noise impact from deliveries are minimised:

- Vehicle reversing alarms should be set to the minimum required for safe and efficient operations (white-noise alerts preferred to beeps).
- Vehicle engines should be turned off whilst stationary for prolonged periods.
- Restrict drop heights during lorry loading to the minimum required for safe and efficient operations.
- Care should be taken to ensure the surface of the site used by vehicles is as smooth as possible. E.g. no raised manhole covers, maintenance of surface to ensure no pot holes or similar steep changes in surface level.
- Playing of radios and undue shouting should be prohibited.
- The setup of lines of communication between the Client and sensitive neighbours to avoid/deal with possible complaints should be considered.

Rapid and thorough investigation of any noise complaint regarding the deliveries, identification of the causes, and implementation of remedial measures to rectify the situation.

9.0 Conclusions

An environmental noise survey has been previously undertaken by Hann Tucker in order to establish the currently prevailing environmental noise climate.

A detailed noise impact assessment has been undertaken, including noise transfer via the slab and environmental noise emission from new items of building services plant.

Potential plant noise emissions have been reviewed and limits/measures have to control these have been set.

Our assessment indicates there should be no need for further mitigation measures with regards to noise transfer to residential units above and noise associated with vehicle delivery movements.

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*