auricl
acoustic consulting

Union Park
Block 4

Plant Noise Assessment Report

26 February 2025

For

HDR

240 Blackfriars Road

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Contents

SUMMARY

A fourth data centre with energy centre and ancillary office floorspace is proposed on the Union Park site to the north of North Hyde Gardens in Hayes, as an extension to a permitted (partly under construction and partly occupied) data centre campus.

The proposals will involve new items of external building services plant, therefore **auricl** has undertaken a noise survey at the site, to assess background noise levels representative of the nearest noise sensitive properties, so that limits for plant noise emissions can be proposed.

The background noise levels measured during daytime and night-time periods are considered to be reasonable, taking into account the site location and lack of noise sources nearby.

The nearest noise sensitive properties to the site are considered to be the recently-constructed residential properties at the north-eastern corner of the Hayes Village development (located to the south-west of the data centre site).

A noise assessment has been undertaken to predict noise emissions associated with the proposed plant at the nearest commercial and noise sensitive properties.

The noise levels are predicted to achieve the noise limits at the nearest noise sensitive properties.

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1.0 Introduction

A fourth data centre with energy centre and ancillary office floorspace is proposed on the Union Park site to the north of North Hyde Gardens in Hayes, as an extension to a permitted (partly under construction and partly occupied) data centre campus.

The proposals will involve new items of external building services plant, which will be subject to the local authority's requirements for external plant noise emissions.

auricl has been instructed to undertake a noise survey at the site, to assess background noise levels affecting the site and its surroundings, so that limits for plant noise emissions can be proposed and the plant assessed against these limits.

This report presents the methodology and results of a noise survey to determine background noise levels that are representative of the nearest noise sensitive properties, as well as an acoustic assessment of the plant in relation to the local authority requirements.

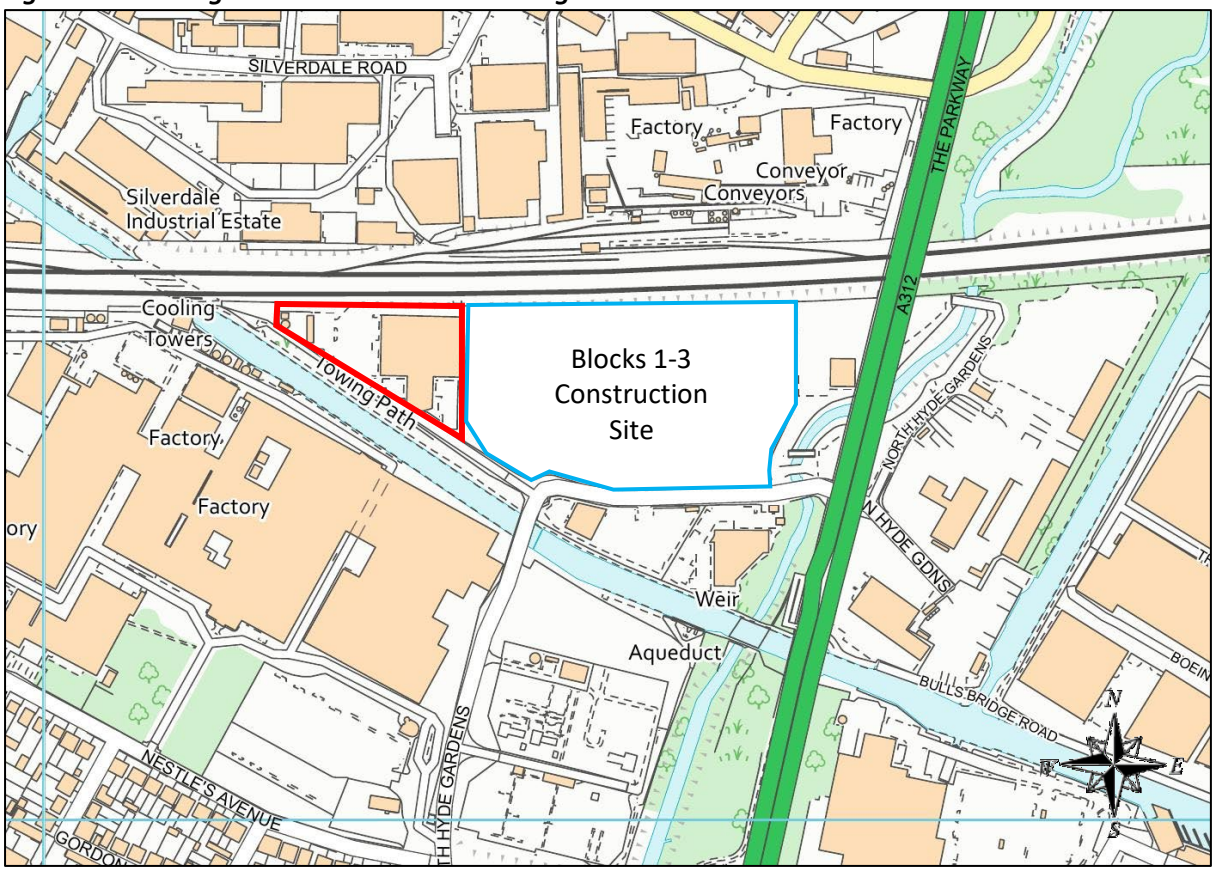
2.0 Description of Site

The site is located to the north-west of North Hyde Gardens in Hayes and is currently occupied by a commercial office building and open car park. The site is bounded to the north by a railway line, to the south-west by a river and to the east by a construction site for Blocks 1-3.

The site surroundings are predominantly industrial.

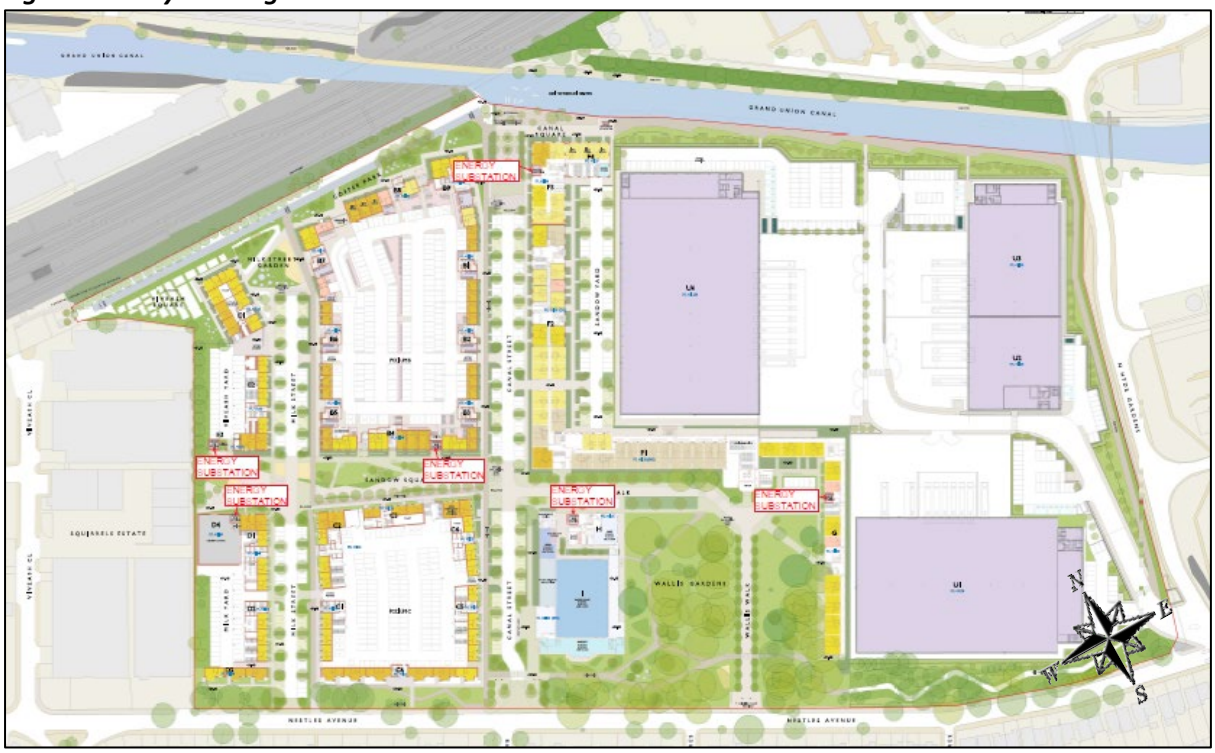
Figure 2.1 shows the approximate existing site extent in **red** and the surrounding properties.

Figure 2.1 Existing Site Extent and Surroundings



A residential development (Hayes Village) has recently been construction to the south-west of the site (to the south-west of the river). The proposed site plan for this development is shown in Figure 2.2.

Figure 2.2 Hayes Village Site Plan



The proposed residences at the north-eastern corner of the Hayes Village development site are considered to represent the nearest noise sensitive properties to the proposed data centre site.

3.0 Acoustic Criteria

The following acoustic criteria are proposed, which have been agreed with London Borough of Hillingdon for the three data centres on the wider Union Park campus.

3.1 Normal Operating Plant

It is understood that London Borough of Hillingdon's requirements for external plant noise emissions are as follows:

"*The rating level of noise emitted from the plant and/or machinery hereby approved shall be at least 5 dB below the existing background noise level. The noise levels shall be determined at the nearest residential property. The measurements and assessment shall be made in accordance with British Standard 4142 "Method for rating industrial noise affecting mixed residential and industrial areas""*.

The above is taken from London Borough of Hillingdon's document "*Supplementary Planning Document – Development Control for Noise Generating and Noise Sensitive Development*" (2016).

British Standard (BS) 4142: 2014+A1: 2019 provides a procedure for the measurement and rating of noise levels form industrial and commercial noise sources. A methodology for predicting the likelihood of adverse impact is provided in the document.

The rating level ($L_{Ar,Tr}$) is defined in BS 4142 and is used to rate the industrial source (known as the specific noise source) at the assessment location. This level is obtained by adding a correction of

between 0 and 6 dB, for tonal noise sources, and a correction of between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of the noise source.

The method for predicting the likelihood of complaints is based on differences between the rating level and the background $L_{A90,T}$ noise level. The standard states that:

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

3.2 Emergency Plant

For the rare, short-term operation of emergency plant (such as standby power generators) during an emergency, noise emissions shall not exceed a 'significant adverse impact' when assessed in accordance with BS 4142: 2014.

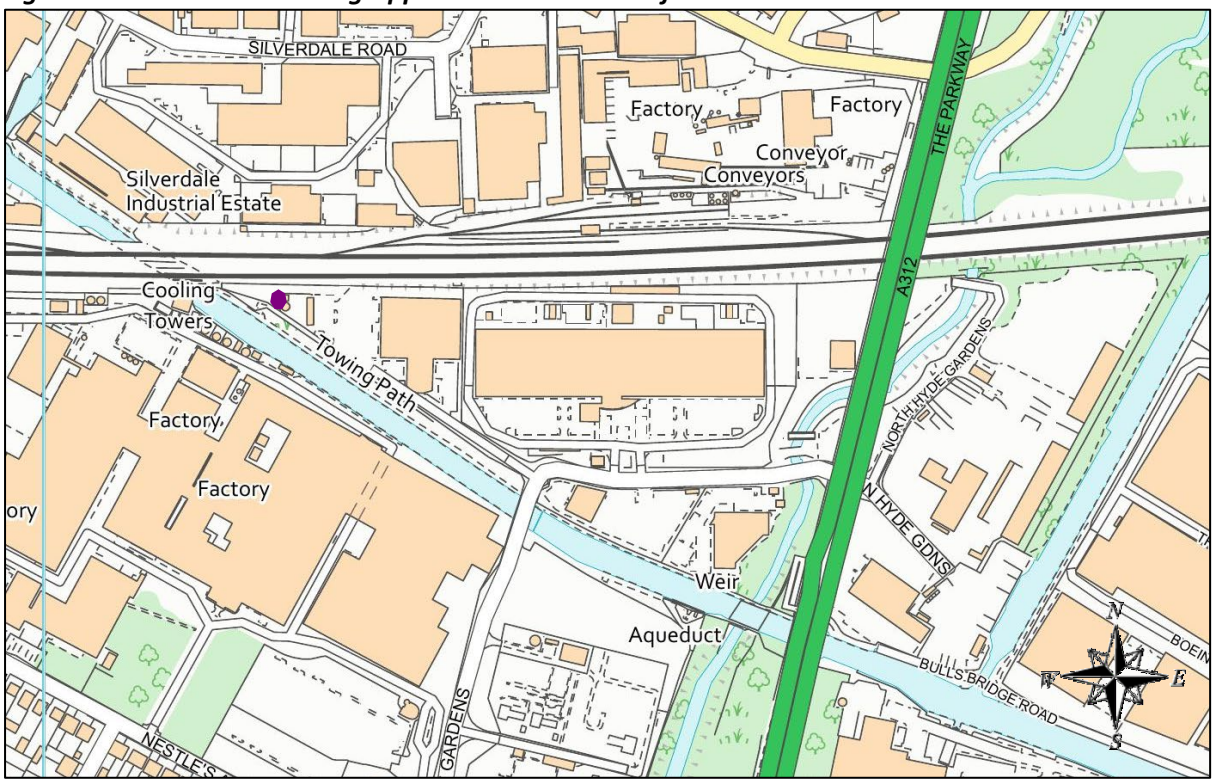
This approach has been agreed previously with London Borough of Hillingdon for Blocks 1-3.

4.0 Noise Survey Methodology

An unmanned environmental noise survey was undertaken at one measurement position over a 4-day period between Friday 1 November 2024 and Tuesday 5 November 2024. This period was selected to assess daytime and night-time background noise levels over weekday and weekend periods, when the site will be operational.

The measurement microphone was attached to a pole protruding from the site fencing at the western corner of the site, approximately 2m above ground level in free-field, as indicated in **purple** on Figure 4.1.

Figure 4.1 Site Plan Indicating Approximate Location of Measurement Position



The measurement position was selected as being representative of background noise levels at the nearest noise sensitive properties to the south-west.

The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	01dB FUSION	15995
Type 1 ½" microphone	GRAS 40CD	625997
Calibrator	Cirrus CR:515	105381

L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over contiguous 125-millisecond intervals.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period. However, at the beginning and end of the survey period, there was noted to be no rainfall, a clear sky and only light wind. We understand these weather conditions are representative of the whole noise survey period and are considered appropriate for environmental noise measurements.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

5.0 Noise Survey Results

Appendix B presents a time history graph showing the L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels measured throughout the noise survey (shown as 15-minute periods).

The typical measured background (L_{A90}) noise levels during daytime and night-time periods are shown in Table 5.1.

Table 5.1 Typical Measured Background Noise Levels

Typical Measured $L_{A90,T}$ Background Noise Level (dB)	
Daytime (07:00 – 23:00 hours, T = 1 hour)	**Night-time (23:00 – 07:00 hours, T = 15 min)**
50	49

We would consider the measured levels to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

Due to the nature of the unmanned noise survey we are unable to comment on the exact noise climate throughout the entire survey period. However, at the beginning and end of the survey period the daytime noise climate at the measurement position was noted to be affected by distant road traffic and frequent train pass-bys on the nearby tracks.

The measurement position was located a significant distance from the construction site of Blocks 1-3 to the east, with screening from an intervening building. As such, construction noise was not noted to be audible at the measurement position.

6.0 Building Services Plant Noise Emissions

6.1 External Noise Limit – Normal Operating Plant

Based on the measured background noise levels and the London Borough of Hillingdon requirements, the noise limits for normal operating plant are shown in Table 6.1.

Table 6.1 Noise Limits – Normal Operating Plant

Maximum Noise Level (dB) at Nearest Noise Sensitive Property	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
45	44

The noise limit for Blocks 1-3 was 39 dB, based on the night-time noise levels. As such, by logarithmic subtraction, **the night-time noise limit for Block 4 would be 42 dB**.

The noise limit is not to be exceeded at a distance of 1m from the nearest noise sensitive property and applies to the cumulative total noise level due to all Block 4 normal plant operating during the relevant period.

As noted in Section 2 above, the nearest noise sensitive properties to the site are considered to be the residential properties at the north-eastern corner of the Hayes Village development (located to the south-west of the data centre site).

6.2 External Noise Limit – Emergency Plant

Based on the measured background noise levels and the previous approach agreed with London Borough of Hillingdon, the noise limit for emergency plant would be 60 dB.

This is based on daytime operation, as testing of the emergency plant would only take place during the daytime.

The emergency plant noise limit for Blocks 1-3 was 55 dB, therefore by logarithmic subtraction, **the emergency plant noise limit for Block 4 would be 58 dB**.

The noise limit is not to be exceeded at a distance of 1m from the nearest noise sensitive property and applies to the cumulative total noise level due to all Block 4 emergency plant operating.

As noted in Section 2 above, the nearest noise sensitive properties to the site are considered to be the residential properties at the north-eastern corner of the Hayes Village development (located to the south-west of the data centre site).

6.3 Proposed Plant

The proposed items of external building services plant are described in Table 6.2, as well as the manufacturer's noise data used in our assessment.

Table 6.2 Plant Description

Building	Plant Type	Description	Plant Noise Level (dB)
UP4	Direct Fresh Air (DFA) Units	18 units along north façade on gantries, levels 2-4	37 dB L_{pA} at 15m
		2 units on north façade on levels 3 and 4	35 dB L_{pA} at 15m
		18 units along south façade on gantries, levels 2-4	37 dB L_{pA} at 15m
		2 units on south façade on levels 3 and 4	35 dB L_{pA} at 15m
	LV Switchroom Extract Fans	1 unit, South West, Level 0	76 dB L_{pA} at 3m*
		1 unit, South East, Level 0	76 dB L_{pA} at 3m*
		1 unit, North West, Level 0	76 dB L_{pA} at 3m*

Building	Plant Type	Description	Plant Noise Level (dB)
		1 unit, North East, Level 0	76 dB L_{pA} at 3m*
	Smoke Extract Fan	1 unit, West, Level 0	83 dB L_{pA} at 3m*
		1 unit, East, Level 0	83 dB L_{pA} at 3m*
		1 unit, North, Level 0	83 dB L_{pA} at 3m*
	VRF	1 unit, North East, Level 0	91 dB L_{wA}*
	LV Switchroom Evaporative Cooling	1 unit, South West, Level 1	89 dB L_{wA}*
		1 unit, South East, Level 1	89 dB L_{wA}*
		1 unit, North West, Level 1	89 dB L_{wA}*
		1 unit, North East, Level 1	89 dB L_{wA}*
	AHU 01	1 unit, South West, Level 1	71 dB L_{wA}*
	AHU 02	1 unit, South East, Level 1	71 dB L_{wA}*
	Condenser Units	Two units, South East, Level 1	91 dB L_{wA}*
		Three units, North West, Level 1	91 dB L_{wA}*
		Three units, North East, Level 1	91 dB L_{wA}*
	Smoke Extract Fan	1 unit, Level 5	83 dB L_{pA} at 3m*
AB5	AHU North	1 unit, Level 5	55 dB L_{wA}
	AHU South	1 unit, Level 5	55 dB L_{wA}

Building	Plant Type	Description	Plant Noise Level (dB)
	Toilet Extract Fan	1 unit, Level 5	45 dB L_{wA}
	Teapoint Extract Fan	1 unit, Level 5	46 dB L_{wA}
	Condenser Units	1 unit, North	76 dB L_{wA}*
		1 unit, South	76 dB L_{wA}*
	VRF Condensers	Four Units, North	91 dB L_{wA}*
EC4	Generators	13 units	See Table 6.4 below
	Chillers	Three Units (One Standby), Level 4 Roof	75 dB L_{pA} at 1m*

Note: L_{pA} = sound pressure level at specified distance, L_{wA} = sound power level
** = attenuation required to reduce noise levels in Table 6.2 – see Table 6.3 below*

Our calculations include the following:

- No visual or acoustic line of sight from the nearest noise sensitive properties to the external AB5 plant and chillers, due to intervening structures
- Sound power levels for fans/AHUs are <u>total</u> levels including casing and inlet/outlet noise – attenuators/casing upgrades/acoustic lagging to be specified by manufacturer so as not to exceed the specified total sound power level (taking into account any additional attenuation specified in Table 6.3 below)
- The plant items indicated with a * in Table 6.2 are to be fitted with attenuation to reduce manufacturer's standard noise level, as specified in Table 6.3.

Table 6.3 Plant Attenuation Requirements

Building	Plant Type	Description	Additional Attenuation Required (dB)
	LV Switchroom Extract Fans	South West, Level 0	30
		South East, Level 0	30
		North West, Level 0	25
		North East, Level 0	25

Building	Plant Type	Description	Additional Attenuation Required (dB)
	Smoke Extract Fan	West, Level 0	30
		East, Level 0	30
		North, Level 0	20
	VRF	North East, Level 0	20
	LV Switchroom Evaporative Cooling	South West, Level 1	15
		South East, Level 1	15
		North West, Level 1	15
		North East, Level 1	15
	AHU 01	South West, Level 1	5
	AHU 02	South East, Level 1	5
	Condenser Units	Two units, South East, Level 1	20
		Three units, North West, Level 1	20
		Three units, North East, Level 1	20
	Smoke Extract Fan	Level 5	20
AB5	Condenser Units	One Unit, North	15
		One Unit, South	20
	VRF Condensers	Four Units, North	15

Building	Plant Type	Description	Additional Attenuation Required (dB)
EC4	Chillers	Three Units (One Standby), Level 4 Roof	20

Note: The overall noise level of fans and air handling units shall be reduced by the levels specified in Table 6.3 – this is likely to require atmospheric side attenuators and measures to reduce casing radiated noise e.g. upgraded casing constructions and/or acoustic lagging/panels/enclosures.

Noise levels for the generators are based on data from the manufacturer (AVK). The noise levels used in our calculations are shown in Table 6.4 and have been verified with AVK.

Table 6.4 Generator Noise Levels

Sound Pressure Level (L_{pA} dB) at 1m		
Outlet	**Casing**	**Inlet**
65	68.5	68.8

6.4 Nearest Noise Sensitive Properties

We have considered the nearest noise sensitive properties to be the proposed residences at the north-eastern corner of the Hayes Village development.

6.5 Plant Noise Predictions

Our calculations to predict the total plant noise level at the nearest noise sensitive properties are summarised in Table 6.4.

Table 6.4 Plant Noise Emission Calculations – Summary

Parameter	Level (dB)	
	Normal	Emergency
Predicted Noise Level at Receptor	42	58
Limit	**42**	**58**

It can be seen that the noise levels associated with the plant are not predicted to exceed the noise limits at the nearest noise sensitive properties.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L_{Amax}	The A-weighted maximum noise level measured during the measurement period.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T. This is the sound level that is equivalent to the average energy of noise recorded over a given period.
$L_{A90,\ T}$	The A-weighted noise level exceeded for 90% of the time (also referred to as the background noise level), measured over the time period T. BS 4142: 2014 specifies that T= 1 hour for daytime periods and T = 15 minutes for night-time periods.

Appendix B – Time History Graph