



TENPIN HARPURHEY

Noise Impact Assessment

Reference: 13980.RP01.NIA.2

Prepared: 8 November 2024

Revision Number: 2

Planning Potential

Magdalen House

148 Tooley Street

London

SE1 2TU

Noise Impact Assessment



TENPIN HARPURHEY

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	29 October 2024	James Melville	Helen Sheldon
1	Update to reflect Client comments	8 November 2024	James Melville	Helen Sheldon
2	Minor wording changes	8 November 2024	James Melville	Helen Sheldon

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The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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1. INTRODUCTION

A new Tenpin venue is proposed at Harpurhey District Centre. We understand that Tenpin are seeking to extend the operational hours of the unit and this report provides an assessment to determine whether this new operation will cause any adverse impact on nearby noise sensitive receptors.

It is understood that allowable opening hours under the existing consent are 7am to 7pm.

The proposed opening hours are Sunday to Thursday 8am until half past midnight the following morning and Friday and Saturday 8am until 1.30am the following morning. It is also proposed to open on Bank Holidays from 8am until 01.30am the following morning.

Deliveries are currently permitted from 7.30am to 7pm Monday to Friday, and 8am to 5pm on Saturdays. It is proposed to extend these hours to 7am to 11pm daily, including bank holidays.

2. ENVIRONMENTAL NOISE SURVEY

2.1 Survey Methodology

Monitoring of the prevailing background noise was undertaken over the following period:

11:00 Friday 11th October to 08:00 Monday 14th October 2024.

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

Measurements were made of the L_{A90} , L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes.

2.2 Measurement Location

To determine the existing noise climate around the site measurements were undertaken at the following locations:

Measurement Position 1 – The microphone was positioned on a flat roof overlooking Rochdale Road (A664). The microphone was attached to an extension pole and position approximately 2m above the flat roof level to ensure that any screening from the balustrade around the flat roof was minimised, additionally the microphone was positioned away from any reflective surfaces and is therefore considered to be free-field. The noise climate at the measurement position was dominated by Road Traffic noise from Rochdale Road.

The measurement position is also illustrated on the site plan attached in Figure 1 (Appendix C).

2.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix B.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

2.4 Results

The noise levels measured are shown as time-histories on the attached Graphs 1-3 (Appendix C).

The typical L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 1, along with typical L_{AFmax} levels measured during the night time.

Table 1 – Measured Levels

Measurement Period	Typical $L_{A90,15min}$ (dB)	L_{Aeq} (dB)	Typical $L_{AFmax,15min}$ (dB)
Daytime (07:00 – 23:00)	48	56	N/A
Night-time (23:00 – 07:00)	40	54	77

3. ATTENDED MEASUREMENTS

In order to determine suitable noise levels for use in our assessments, measurements of the existing Tenpin facility in Parrs Wood was undertaken by James Melville (MSc, BSc_{hons}, AMIOA) of RBA Acoustics on Friday 11th October.

The results of the measurements are detailed in Table 2 below.

Table 2 – Measured Levels

Area	Entertainment Noise Level $L_{Aeq,1\text{ minute}}$ (dB) at Octave Band Centre Frequency (Hz)								Overall (dB)
	63	125	250	500	1k	2k	4k	8k	
Pin Setter Area	81	83	87	85	83	76	72	66	87
Bowling Lanes and Rest of Unit									
1	75	76	76	77	75	71	65	54	79
2	81	99	90	90	90	83	77	71	93
3	78	85	81	84	81	79	77	71	87

4. CRITERIA

Entertainment Noise

Manchester City Council's Planning and Noise Technical guidance, Section 3.7.1.2 for Entertainment Venues states:

"A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open.

The criterion here is: 'Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location'"

Based on our environmental noise survey, the following criteria would apply at the nearest residential noise sensitive locations:

Table 3 – Entertainment Noise Criteria

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Daytime	39	38	38	34	35	28	14	10	38
Night-time	35	35	35	31	30	22	12	10	33

4.1 Delivery and Patron Noise

National Planning Policy Framework

The current National Planning Policy Framework (NPPF), July 2021, sets out the Government's planning policies for England. In respect of noise, Paragraph 185 of the NPPF states the following:

"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:

- a) 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 life⁶⁵;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation. "*

WHO Environmental Noise Guidelines

To put the predicted levels into context, it is important to consider the recommendations stated in the World Health Organisation (WHO) document "Environmental Noise Guidelines for the European Region" 2018. This document sets out to define "recommended exposure levels for environmental noise in order to protect population health". The guidance documents relate specifically to external noise levels and recommends that "all CNG (WHO Community Noise Guidelines, 1999) indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid". We therefore make reference to the WHO Community Noise Guidelines for recommendations on internal noise levels.

The WHO document “Guidelines for Community Noise” describes guideline levels that are “essentially values for the onset of health effects from noise exposure”. A table of guideline values is included, relating to adverse health effects, referred to as any temporary or long-term deterioration in physical, psychological, or social functioning that is associated with noise exposure. The following is an extract from Table 4.1: Guideline values for community noise in specific environments, as stated in the WHO document.

Table 4 – Guideline Values for Community Noise

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (hours)	$L_{Amax,t}$ (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-times	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

Noise Policy Statement for England (NPSE)

The NPSE seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

The statement sets out the long-term vision of the government’s noise policy, which is to “promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development”.

This long-term vision is supported by three aims:

- 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 improvements of health and quality of life.

The long-term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

The Explanatory Note within the NPSE provides further guidance on defining “significant adverse effects” and “adverse effects” using the following concepts:

- No Observed Effect Level (NOEL) – the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

The three aims can therefore be interpreted as follows:

- The first aim is to avoid noise levels above the SOAEL;
- The second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- The third aim considers situations where noise levels are between the LOAEL and NOEL. In these circumstances, where possible, reductions in noise levels should be sought through the pro-active management of noise.

The NPSE recognises that it is not possible to have single objective noise-based measures which define the SOAEL, LOAEL and NOEL and that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

Planning Practice Guidance (2014)

The national Planning Practice Guidance (PPG) “advises on how planning can manage potential noise impacts in new development” and provides guidelines that are in line with the NPPF.

The PPG states that local planning authorities should take account of the acoustic environment and 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.

(Paragraph: 003 Reference ID: 30-003-20190722 Revision date: 22 07 2019)

This guidance introduced the additional concepts of NOAEL (No Observed Adverse Effect Level), and SOAEL (Significant Observed Adverse Effect Level) which can be seen in Table 3 below.

Factors to be considered in determining whether noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise and cumulative effects (004 Reference ID: 30-004-20190722 Revision date: 22 07 2019).

With particular regard to mitigating noise effects on residential development the PPG highlights that effects may be partially offset if residents have access to a relatively quiet façade as part of their dwelling or a relatively quiet amenity space (private, shared or public) (011 Reference ID: 30-011-20190722 Revision date: 22 07 2019).

Table 5 – Planning Practice Guidance

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. 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			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up the volume of a 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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 through use of appropriate mitigation whilst taking into account the social and economic benefit
Unacceptable Observed Adverse Effect Level			
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent through use of appropriate mitigation

Institute of Environment Management & Assessment (IEMA) and Institute of Acoustics Guidelines on Noise Impact Assessment

When assessing the subjective impact of any development it is important to consider the specific circumstances of the site. The characteristics of the various sources must therefore be considered in addition to factors common to all noise impact assessments such as existing background noise level comparisons.

The Institute of Environmental Management and Assessment (IEMA) document “Guidelines on Noise Impact Assessment” gives guidance as to how basic noise changes may be categorised.

Table 4 has been adopted to categorise the difference between the measured levels as identified in the guidelines published jointly by the IOA and IEMA. This identifies the impact of different levels of noise above the prevailing background noise.

Table 6 - Significance of Noise Level Change

Noise Change [dBA]	Category
0	No Impact
0.1-2.9	Slight Impact
3.0 – 4.9	Moderate Impact
5.0 – 9.9	Substantial Impact
10.0 and above	Severe Impact

Subjective Impact

In addition to the comparison of the difference in background noise levels in line with the above guidelines, it is important to understand the potential subjective effect of such changes in the noise level. Table 7 compares the generally accepted subjective response of typical subjects to variations in sound pressure level.

Table 7 – Subjective Response to Noise Levels

Change In Sound Level [dB]	Change in Power		Apparent Change in Loudness
	Decrease	Increase	
3	1/2	2	Just Perceptible
5	1/3	3	Clearly Noticeable
10	1/10	10	Half or Twice as Loud
20	1/100	100	Much Quieter or Louder

Summary

Based on the above guidance, we consider it appropriate that the following increases of the existing measured background noise levels due to delivery or patron noise as a result of the extended hours use of the premises will fall in the following effect level categories.

Table 8 – Categorisation of Effect Level Categories

Background Noise Level Increase $L_{eq,T}$ (dBA)	Effect(s)	NPSE Assessment	Subjective Response
0.1 – 2.9	Slight/Not Significant	No Observed Adverse Effect	Imperceptible
3.0 – 4.9	Moderate	Lowest Observed Adverse Effect	Perceptible
5.0 – 9.9	Substantial	Significant Observed Adverse Effect	Clearly Noticeable
10.0 and above	Very Substantial	Unacceptable Adverse Effect	Twice as Loud

5. ENTERTAINMENT NOISE BREAKOUT ASSESSMENT

5.1 Receptors

The nearest and most exposed residential receptor to the proposed site is assumed to be at 11 Coningsby Drive which is approximately 75m Northwest of the site. The approximate receptor location is shown in Figure 1 at the end of this document.

5.2 External Façade

Airborne sound insulation testing of the external façade of the unit was undertaken in general accordance with BS EN ISO 16283-1:2014+A1:2017 "*Acoustics. Field measurement of sound insulation in buildings and of building elements. Airborne sound insulation*" and the results have been rated in accordance with BS EN ISO 717-1:2013 "*Acoustics. Rating of sound insulation in buildings and of building elements*" in order to determine the single figure D_w performance.

The following sound insulation performances were measured:

- Ground Floor External Façade – D_w 27dB
- 1st Floor External Façade – D_w 39 dB

The full results of the sound insulation tests are shown in the certificates in Test Certificates 1-2, Appendix C

5.3 Assessment

The predicted entertainment noise breakout at the nearest noise sensitive receptor is based upon the measured façade performance, along with the high level proposed layout.

At the ground floor and first floor level, the western façade of the development is buffered by an internal wall, however the north facing façade is not. Due to the proposed location of the pin setter, and the measured noise levels, it does not impact on the noise impact assessment.

Where appropriate, the calculations assume a basic performance for the separating walls and doors, and used this to calculate the likely noise level in the corridor. This has then been used in combination with the measured façade sound insulation as the basis of the noise break out.

Based on an assessment of the sound insulation of the existing facade sound insulation with the expected increase in sound insulation due to the internal buffer wall applied as well as distance loss (as per line source theory) applied to the internal noise levels, the following noise from the bowling alley are predicted at the nearest noise sensitive receptor.

Table 9 – Noise Breakout Assessment - Location 1

Receptor	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Receive Level 1m from Residential windows due to Location 1	34	26	22	22	21	17	4	0	25
Night-time Criteria Level	35	35	35	31	30	22	12	10	34
Exceedance to Night-Time Criteria	0	0	0	0	0	0	0	0	-

Table 10 – Noise Breakout Assessment – Location 2

Receptor	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Receive Level 1m from Residential windows due to Location 2	10	18	13	8	9	7	0	0	14
Night-time Criteria Level	35	35	35	31	30	22	12	10	34
Exceedance to Night-Time Criteria	0	0	0	0	0	0	0	0	-

Table 11 – Noise Breakout Assessment – Location 3

Receptor	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Receive Level 1m from Residential windows due to Location 3	10	4	4	2	0	2	0	0	8
Night-time Criteria Level	35	35	35	31	30	22	12	10	34
Exceedance to Night-Time Criteria	0	0	0	0	0	0	0	0	-

The assessment indicates that even during the nighttime period (which the proposed extended hours fall into), all noise from the proposed bowling alley will be significantly below the local authority criteria.

6. OTHER NOISE SOURCES

The key other noise sources associated with the development are expected to be deliveries and patrons. Each of these is discussed below.

6.1 Deliveries

It is understood that that it is proposed to extend the hours of deliveries as part of the application for this site, a noise assessment has been carried out for completeness. As noted in the introduction, deliveries would be kept to daytime hours only (7am to 11pm).

As part of the survey work, noise measurements of an existing delivery at the shopping centre were captured.

In addition to this, the unattended survey was set up in a location where any noise from deliveries being taken was captured.

Attended noise measurements of a delivery to another unit is presented below.

Table 12 – Measured Delivery Noise

Area	Delivery Noise Level (dB) at Octave Band Centre Frequency (Hz)								Overall (dB)
	63	125	250	500	1k	2k	4k	8k	
Delivery Noise $L_{Aeq,T}$	64	60	55	55	54	52	49	42	59
Delivery Noise L_{Max}	91	88	79	79	78	78	75	70	84

The results of the assessment of the effect on the background noise level during the worst-case operational period.

Table 13 – Noise Impact Assessment – Delivery Noise (L_{Aeq})

Receptor	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Delivery Noise $L_{Aeq,T}$	64	60	55	55	54	52	49	42	59
Screening From Buildings	5	5	5	5	5	17	20	20	
Distance Loss	38	38	38	38	38	38	38	38	
Receive Level 1m from Nearest Residential Window	22	18	12	12	11	0	0	0	14
Worst Case Delivery Period Background Noise Level (18:00–19:00)	58	53	51	50	53	48	38	28	55
Change to Night-Time background noise level	0	0	0	0	0	0	0	0	-

An assessment of the measured L_{Aeq} noise level from the captured delivery is substantially below the existing background noise level during the worst-case daytime delivery period and therefore will result in no change to existing background noise level at the receptor.

Based on the above assessment there is not expected to be a significant noise impact as the result of the extended hours to deliveries.

6.2 Patron Noise

When considering Patron Noise from the site, attention should be given to the usage of the site, the routes patrons are likely to take when leaving the site as well as the number of Patrons leaving the site at one time.

Given the site will operate as a bowling alley it is unlikely that patrons will all leave the site at the same time at closing time, as would be the case for a bar or pub. It is more likely that patrons will trickle from the venue.

In terms of routes from the venue, it's highly likely that the majority of patrons will leave the site east or north towards the carpark of the wider shopping centre. However, it is assumed that some patrons may leave on foot and gather at the bus stop directly outside the western façade of the venue.

Given the above, an assessment of a group of four patrons, speaking at raised voice, leaving towards the bus stop west of the venue is considered a reasonable assumption. Noise levels for a raised voice are presented below.

Table 14 – Sound Power Level of 1 Person Speaking with Raised Voice

Measurement	Sound Power Level (dB) at Octave Band Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Raised Voice Level	48	59	70	75	72	64	57	48	76

The result of the patron noise assessment is shown below and takes into account four patrons speaking with raised voices, and distance attenuation between the bus stop and the residential premises.

Table 15 – Patron Noise Assessment

Source	Predicted external noise level (dB)	Resultant Overall Noise Level (dB)	Noise change (dB)
Existing Average Level (00:30-01:30)	54	N/A	N/A
Raised Voices	44	54	0

As can be seen no change in the existing ambient noise level is expected at the receptor during the worst-case period. As such, it is considered that noise from patrons associated with the premises is unlikely to result in a noise impact on the nearby noise sensitive premises.

6.3 General Comments

It should be noted that the proposed venue is sited on a busy road, in a vibrant area with 24-hour activities occurring in the vicinity. The majority of noisy activity proposed is housed within the unit and protected by internal walls to prevent noise emission from the premises to noise sensitive premises.

On the basis that patrons and deliveries are appropriately managed as proposed, it is considered that there will be no significant impact as a result of noise from the proposed development on the nearby noise sensitive premises.

7. CONCLUSION

RBA Acoustics have undertaken an environmental noise survey as well as sound insulation testing of the existing external façade at the proposed Tenpin site at Harpurhey Shopping Centre.

Assessment of entertainment noise breakout from the unit concludes that entertainment noise will be below the criteria set out by Manchester City Council and therefore is considered to be acceptable.

Based on the assessments outlined within the above sections, we can conclude that noise impact from the extended hours of use is not expected to have any notable impact on nearby residential receptors and therefore is considered to be acceptable from an acoustic perspective.

Appendix A - Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
L_{eq}	The level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10} , L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
NR	Noise Rating – A single figure term to describe a measured noise level which considers the frequency content of the noise, generally used for internal noise level measurements (particularly mechanical services plant).

Appendix B - Instrumentation

The following equipment was used for the acoustic measurements.

Table B1 - Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1405945	U44502	15 June 2025
Norsonic Pre Amplifier	1209	15314		
Norsonic ½" Microphone	1225	208218	44501	15 June 2025
Norsonic Sound Calibrator	1251	34057	U44500	15 June 2025
Norsonic Type 1 Sound Level Meter	Nor140	1406969	U45341	12 September 2025
Norsonic Pre Amplifier	1209	21204		
Norsonic ½" Microphone	1225	285599	45340	12 September 2025
Norsonic Sound Calibrator	1251	34966	U45339	12 September 2025

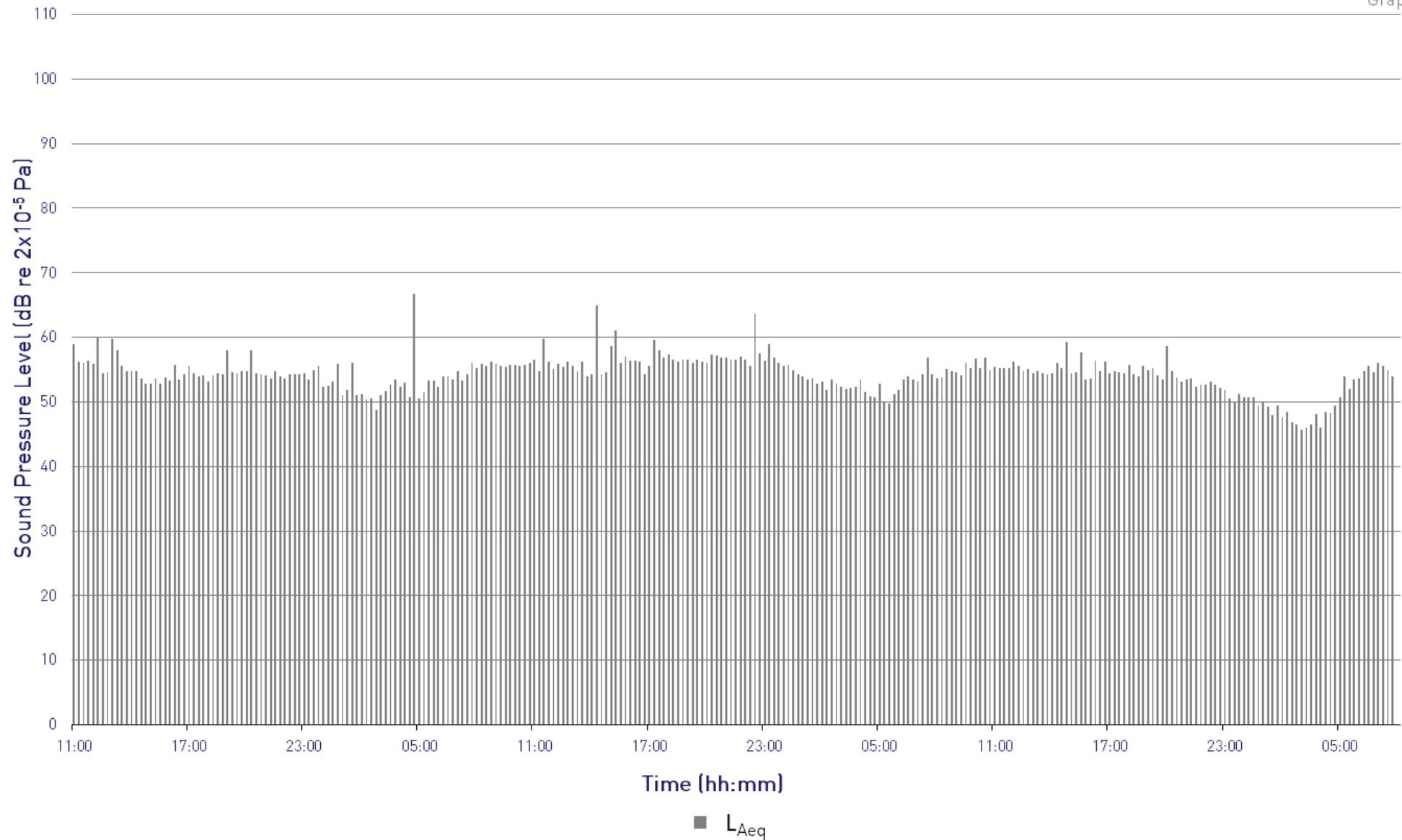
Standardised Level Difference According to BS EN ISO 16283-1:2014																																																																															
Field Measurements of Airborne Sound Insulation Between Rooms																																																																															
Client : Tenpin / Planning Potential	Date of Test : 11 October 2024																																																																														
Operative : James Melville	Construction Details & Test Arrangement : Existing External Façade - Ground Floor																																																																														
Test Methodology : BS EN ISO 16283-1:2014																																																																															
Test Type : Airborne Party Wall																																																																															
Source Room :																																																																															
Receive Room :																																																																															
Equipment Details : See Appendix B																																																																															
Source Room Volume: m³	m³																																																																														
Receive Room Volume:																																																																															
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No. of test report : Test 2	Name of test company : RBA Acoustics																																																																														
Date of Test Report : 11 October 2024																																																																															

Tenpin, Harpurhey
L_{Aeq} Time History
Measurement Position 1



Project: 13980

Graph 1



Tenpin, Harpurhey

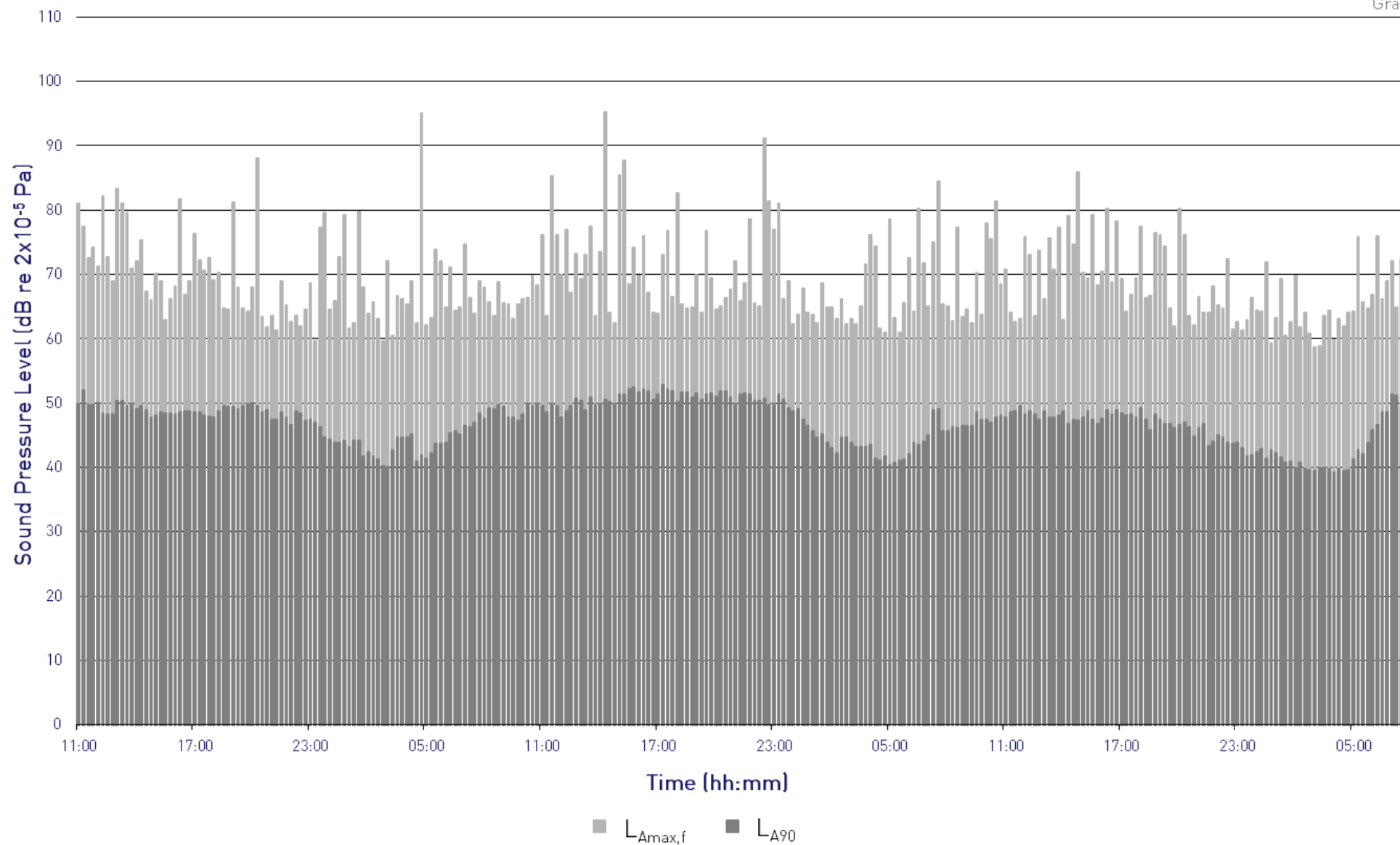
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1

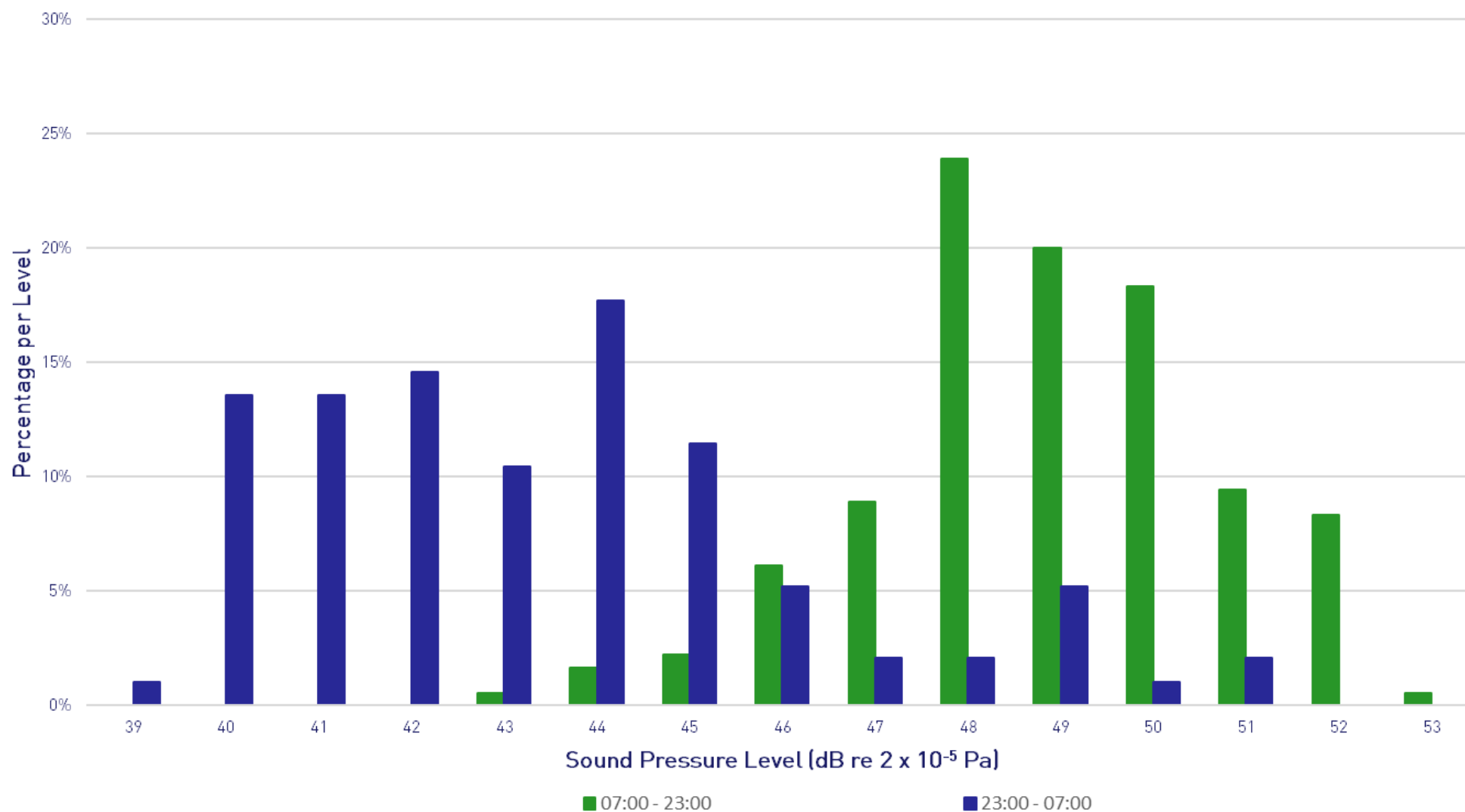


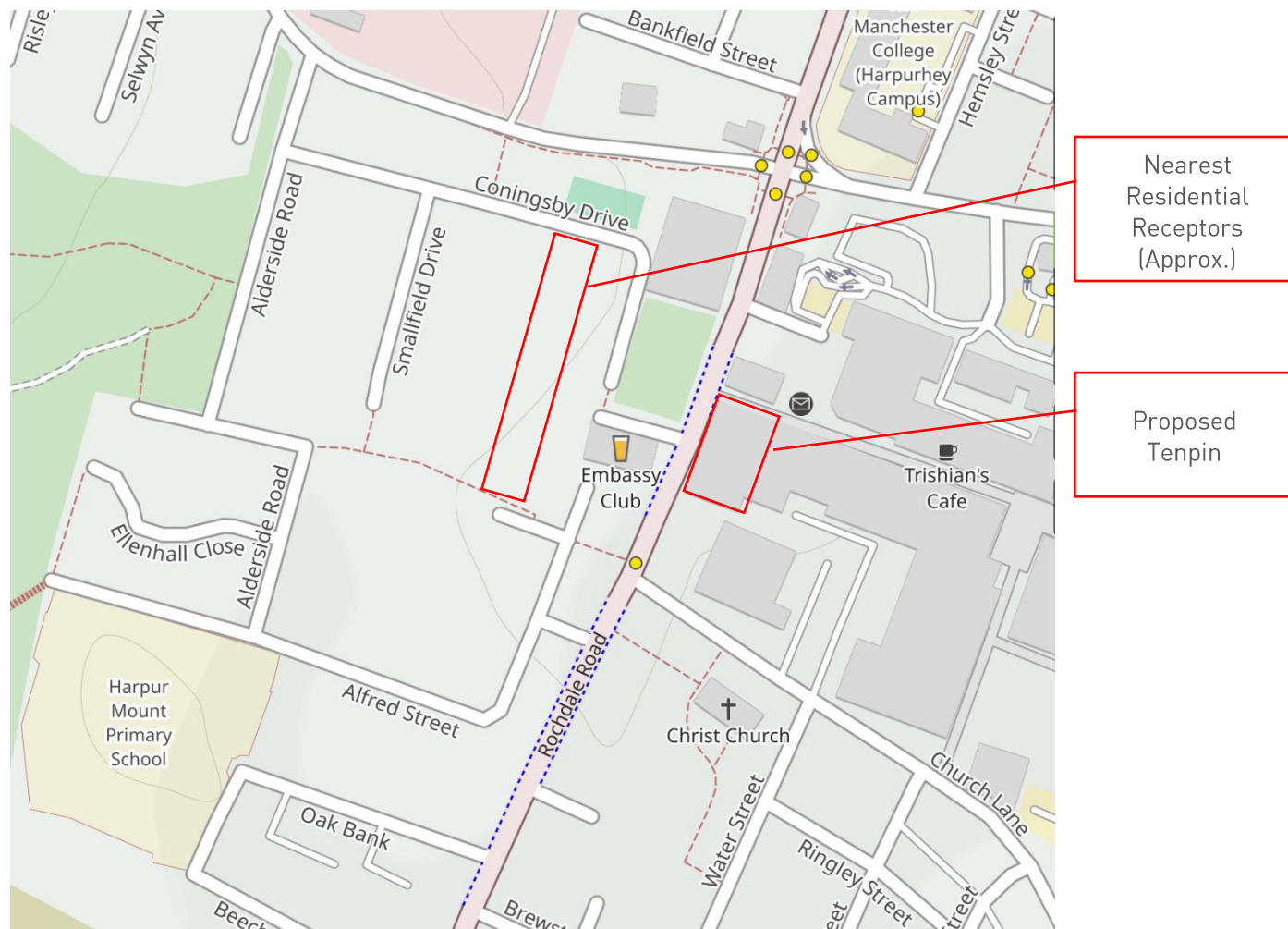
Project: 13980

Graph 2



Tenpin, Harpurhey
L_{A90,15 minutes} Histogram
Measurement Position 1





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Figure 1 – Site and Surroundings

Tenpin Harpurhey

Project 13980

8 November 2024

Not to Scale



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