

Kingsway Burnage

Environmental Noise Survey and Noise Impact Assessment Report

301112/NIA1

28 November 2023

For:
TACE
5 Cowcross Street
London
EC1M 6EL



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



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			George Grenfell Senior Consultant MSc, BSc(Hons), AMIOA	Joe Sinker Associate BEng(Hons), MSc(Res), MIOA
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1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned TACE to undertake a noise assessment for a site in Burnage, Manchester.

The site, which is located off Kingsway, is being considered for residential development. The proposals are for the demolition of existing buildings and the erection of 23no. new residential buildings, which comprise 112 new dwellings, as well as, resident amenities, and car parking.

The site is subject to road traffic noise from Kingsway, Mauldeth Road and Talbot Road, as well as railway noise from the track that runs parallel to the site and through Mauldeth Road Station. Other notable noise sources include Mauldeth Road Primary School and a small car garage/car wash.

Baseline noise conditions have been established by means of a detailed noise survey, presented herein. The findings have subsequently been used to assess the suitability of the site for residential use. Measures required to mitigate noise impacts for the proposed development (when operational) have been discussed in context with relevant national & local planning policies, design standards and good practice guides.

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings in order to identify suitable accessible locations for environmental noise measurements.

To establish by means of an unattended survey the existing L_{Amax} , L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at secure and accessible on-site positions, using fully computerised noise monitoring equipment.

To establish by means of attended measurements at select locations to assess any potential noise impact from nearby commercial/industrial premises to the development.

Measurement procedures shall be in general accordance with British Standard BS 7445 "Description and measurement of environmental noise".

The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority and/or the application of BS 4142: 2014 and to minimise the possibility of noise nuisance to neighbours.



Based on the results of the unmanned survey, to undertake a noise assessment to assess the suitability of the proposed development for residential use in accordance with the Noise Policy Statement for England (NPSE), National Planning Policy Framework (NPPF), Planning Practice Guidance (ProPG), British Standard BS8233:2014, Building Regulations Part O, and Local Authority guidance/requirements.

To present our methodology and findings in a detailed Environmental Noise Survey and Noise Impact Assessment Report to accompany the planning application.

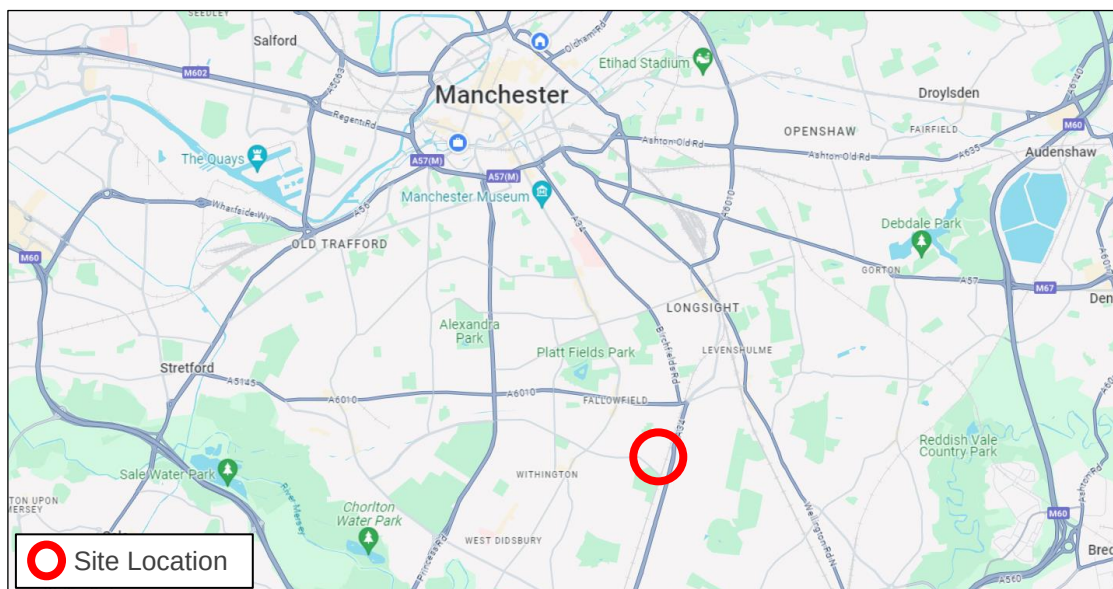
3.0 Acoustic Terminology

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

4.0 Site Description

4.1 Location

The site is located off Kingsway in Burnage. The location is shown in the Location Map below.



Location Map (Google Maps data 2023)

The site falls within the jurisdiction of Manchester City Council.

4.2 Description

The site under consideration for development is presently occupied by a large, functioning retail



unit, complete with an associated car park. A road that is used for both deliveries and public access to Mauldeth Road Train Station runs along the site's western edge. The site is enclosed by a railway track on the west and Kingsway on the east, with Talbot Road and Mauldeth Road situated to the north and south at distances of 2m and 91m from the closest site boundaries, respectively.

A Texaco garage and car wash are located just off Kingsway on the southwest boundary. A large mosque, which is currently in operation, is positioned approximately 59m south of the southern site boundary along Mauldeth Road. Adjacent to the mosque is a small nursery, and Mauldeth Road Primary School is situated about 50m from the western site boundary, on the opposite side of the railway track.

There are some small industrial units near the southern boundary, but they appear to be unoccupied currently. Small retail units are scattered along Kingsway, and the remaining surrounding area is made up of residential housing estates. The site is shown in the Site Plan below.



Site Plan (Google Earth 2023)

5.0 Proposed Development

The Site Plan and Accommodation Schedule are provided below:



Plan showing Project Proposals (c/o Triple Jersey 2023)

The proposed accommodation schedule is provided below:

Accommodation Schedule							
Name	Floor Area Sq Ft	Beds	Persons	Storeys	Accom	No.	Total
Type 1	792	2	4	2	2B	6	4752
Type 2	906	2	4	3	2B	48	43488
Type 3	1128	3	4	2	3B	16	18048
Type 4	1305	4	6	3	4B	8	10440
Type 5 - Apt	537	1	2	3	1B	2	1074
	676	2	3	3	2B	21	14196
	666	2	3	4	2B	3	1998
	667	2	3	4	2B	8	5336
Sub Total						112	99332

Accommodation Schedule (c/o Triple Jersey 2023)

6.0 Planning Policies, Standards & Guidance

6.1 Policies & Guides

In order to provide a suitable assessment a number of national planning policies have been considered, including:

- The National Planning Policy Framework (NPPF), 2023
- The Noise Policy Statement for England (NPSE), 2010
- Planning Practice Guidance – Noise (PPGN), 2019

The above documents highlight the importance of considering the potential noise effects on any new residential development and provide a qualitative approach to assessment. However, each of the above does not provide any quantitative guidance. As such, all quantitative guidance used to form a noise impact assessment is taken from various other standards, guidance, and Local Authority requirements as summarised below:



- Local Planning Policy
- World Health Organisation: 2018
- British Standard BS8233: 2014
- ProPG : Planning & Noise: 2017
- Building Regulations Approved Document O: 2021
- British Standard 4142:2014 + A1:2019

Detailed information for relevant planning policies and guidance can be found within Appendix B.

6.2 Specific Local Authority Criteria

Manchester City Council requirements are outlined in their Planning & Noise Technical Guidance document (June 2022).

6.2.1 Fixed Plant Noise Emissions

Section 3.7.1.5 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 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.”

6.2.2 Amplified Sound Egress Criteria - residential premises

Section 3.7.1.2 stipulates the following criteria regarding entertainment noise egress, which apply to nearby residential properties only:

“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.”

These are cumulative limits and consider the contributions from all areas.



6.2.3 Amplified Sound Egress Criteria – Office premises

MCC stipulate amplified noise egress criteria for residential receptors should not exceed 5 dB below the background noise level, however, there is no specific requirements to control noise egress to office developments. As such, to minimise the risk of disturbance to adjacent office developments it is advised that the cumulative noise level as a result of noise egress due to amplified music does not exceed 5 dB below the internal noise level within the office assuming a sealed façade.

7.0 Baseline Noise Survey

7.1 Procedure

Fully automated environmental noise monitoring was undertaken by George Grenfell MSc, BSc (Hons), AMIOA from approximately 12:00 hours on Friday 10th November to 10:00 hours on Tuesday 14th November 2023, to establish full daytime and night-time noise levels over a typical weekday and weekend period. Measurements were taken continuously of the A-weighted (dBA) L_{90} , L_{eq} , and L_{max} sound pressure levels over discrete 2 and 15-minute periods.

Additional attended measurements were performed between 12:00 hours and 16:00 hours on Friday 10th November with the purpose of establishing specific noise levels associated with the operation of the nearby trainline, school and carwash.

7.2 Measurement Positions

The noise level measurements were undertaken at 9no. positions as described in the table below.

Position	Type	Description
1	Unattended	To the northwest corner of the site, approx. 8m from the nearside edge of Kingsway. Microphone was secured to a lamppost, in free-field conditions approximately 3m above ground.
2	Unattended	Approximately 100m south of the southern site boundary, approx. 4m from the nearside edge of Mauldeth Road. Microphone was secured to a lamppost, in free-field conditions approximately 3m above ground.
3	Attended	To the northern side of the existing site, approximately 19m from the railway line. Microphone was secured to a tripod at a height of approximately 1.5m.
4	Attended	On the southern site boundary of the site, approximately 22m from the railway line and Mauldeth Road Station. Microphone was secured to a tripod at a height of approximately 1.5m.



Position	Type	Description
5	Attended	On the footpath approximately 3m from the nearside edge of Talbot Road. Microphone was fixed to a tripod at a height of approximately 1.5m.
6	Attended	On the footpath along Kingsway, approximately 3m from the jetwash operation at Texaco garage. Microphone was secured to a tripod at a height of approximately 1.5m.
7	Attended	On the footpath along Kingsway, approximately 3m from the vacuum operation at Texaco garage. Microphone was secured to a tripod at a height of approximately 1.5m.
8	Attended	On footpath approximately 7m from the automatic carwash machine at the Texaco garage. Microphone was secured to a tripod at a height of approximately 1.5m.
9	Attended	In the parking space approximately 1.5m from the air dispensing machine at the Texaco garage. Microphone was secured to a tripod at a height of approximately 1.5m.

The positions are shown on the plan below.



Plan Showing Measurement Positions (Google Maps 2023)

7.3 Weather Conditions

For the unattended survey, between Sunday 12th November and Tuesday 14th November 2023, local weather reports indicated some notable periods of heavy rainfall, however Friday 10th November and Saturday 11th November were clear with no rain. Temperatures ranged from ... 1°C (night) to 10 °C (day) and wind speeds less than 5m/s. During our time on site, skies were largely clear with patchy cloud cover, wind conditions were calm and from an easterly direction. and road surfaces were damp on Friday morning and were dry by the afternoon, they are believed to have stayed dry until Sunday afternoon.



During the attended survey on Friday 10th November 2023, the weather was generally clear and dry with no periods of rainfall and calm wind conditions.

7.4 Instrumentation

The instrumentation used during the survey is presented in the table below:

Position	Description	Manufacturer	Type	Serial Number	Calibration
1	Type 1 Data Logging Sound Level Meter	Larson Davis	Lxt	4568	30/05/2023
2	Type 1 Data Logging Sound Level Meter	Larson Davis	Lxt	5104	30/05/2023
3,4,5,6,7	Type 1 Data Logging Sound Level Meter	B&K	2250	3025397	05/09/2023
1,2	Type 1 Calibrator	Larson Davis	CAL200	3083	27/03/2023
3,4,5,6,7	Type 1 Calibrator	B&K	4231	2271905	05/09/2023

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.1 dB).

Each sound level meter was in an environmental case with the microphone connected to the sound level meter via an extension cable. Each microphone was fitted with a windshield.

7.5 Results

7.5.1 Unattended

The results have been plotted on Time History Graphs 31112/TH1 to 31112/TH2 enclosed presenting the 15-minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

In order to compare the results of our survey with the relevant guidelines it is necessary to convert the measured $L_{Aeq(15-minute)}$ noise levels into single figure daytime $L_{Aeq(16-hour)}$ (07:00-23:00 hours) and night-time $L_{Aeq(8-hour)}$ (23:00-07:00 hours) levels.



A summary of the unattended survey results, as used to inform subsequent assessments against current guidelines, is presented in the tables below. $L_{A_{fmax}}$ values are the '10th highest' 2-minute value in line with Approved Document O (Part O) requirements.

Position	Date	Daytime (07:00 – 23:00 hrs)		Night-time (23:00 – 07:00 hrs)		
		Period (hours)	$L_{Aeq,16hr}$	Period (hours)	$L_{Aeq,8hr}$	10 th Highest $L_{Amax,2min}$
1	10/11	11*	72 dB	8	69 dB	85 dB
	11/11	16	72 dB	8	69 dB	85 dB
	12/11	16	72 dB	8	68 dB	85 dB
	13/11	16	72 dB	8	68 dB	84 dB
	14/11	3*	73 dB	-	-	-
2	10/11	11*	73 dB	8	67 dB	87
	11/11	16	73 dB	-	-	-

*Incomplete measurement period

The L_{A90} values presented are the 'representative' levels determined through statistical analysis of the 15-minute readings in line with BS 4142, as provided in the table below:

Typical Background Noise Levels $L_{A90,15minute}$		
Position	Daytime (07:00 – 23:00 hrs)	Night-time (23:00 – 07:00 hrs)
1	63	42
2	55	44

7.5.2 Attended

The following table summarises noise levels recorded at each of the attended measurement positions.

Position	Start Time	Period	Sound Pressure Level (dB)			
			$L_{Aeq,T}$	$L_{A90,T}$	$L_{Amax,T}$	Description
3	12:35	29 sec	64	56	73	Train Pass
	12:38	1 min	56	53	62	Background
	12:39	7 sec	66	60	72	Train Pass



Position	Start Time	Period	Sound Pressure Level (dB)			
			L _{Aeq,T}	L _{A90,T}	L _{Amax,T}	Description
	12:41	8 sec	71	58	77	Train Pass
	12:46	1 min 35 sec	66	59	75	Train Pass
	12:48	5 min	60	54	78	RTN
	13:43	28 secs	72	68	78	Train Pass
4	13:00	15 min	61	50	80	Railway Logging
	14:30	15 min	62	49	80	Railway Logging
	15:30	15 min	63	50	79	Railway Logging
	13:16	1 min	61	50	80	School
	13:19	30 sec	51	49	54	School
	13:20	1 min	58	49	69	Train Pass
	13:24	11 sec	64	57	68	Train Pass
	13:25	6 sec	67	58	73	Train Pass
	15:21	1 min 17 sec	58	51	71	Train Pass
	15:25	8 sec	72	63	78	Train Pass
	15:25	8 sec	68	59	74	Train Pass
5	12:15	15 min	67	54	79	RTN
	13:45	15 min	68	54	88	RTN
	14:00	15 min	68	53	83	RTN
6	14:50	15 min	76	69	90	Jetwash/vacuum
7	15:08	32 sec	72	66	82	Vacuum
	15:10	35 sec	70	67	80	Vacuum
	15:12	9 sec	76	74	78	Vacuum
	15:14	31 sec	66	64	73	Generator
8	11:02	1 min	74	56	83	Background
	11:08	11 min 34 sec	76	63	86	Auto Car Wash
9	10:56	1 min 30 sec	72	58	79	Background
	10:51	4 min 12 sec	74	69	84	Tyre Pressure

7.6 Discussion of Noise Climate

Due to the nature of the survey, i.e. unattended, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period.



At Position 1, adjacent to the B&M car park along Kingsway, the prevalent noise source was road traffic noise (RTN) from Kingsway, with intermittent train sounds from the nearby railway bridge. Although trains were audible, the noise level was characterized more by scraping sounds in the background than any dominant screeching. Importantly, the distance from the potential HGV movements in the B&M car park ensured minimal impact on the noise measurements.

Position 2, located on Mauldeth Road, opposite the mosque, exhibited a soundscape dominated by RTN. This position was also chosen considering the prayer schedule of the mosque for potential correlation with noise events. This position was also situated closely underneath a railway bridge, where trains passing caused a sharp increase in low frequency noise as the bridge rumbled.

The attended positions (positions 3 to 9) provided insights into the noise sources impacting the site.

Position 3 and 4, positioned near the railway line, recorded dominant road noise, occasional train passes and announcements, and sounds from children playing during school hours. Notably, the survey also considered the influence of aircraft, acknowledging their occasional presence in the area, although they were not noted to be dominant.

Position 5 was positioned on Talbot Road and recorded dominant road noise, and occasional train passes. Much like position 2, trains rumbled over a nearby railway bridge, causing an uplift in low frequency noise.

Position 6 and 7, situated near a hand car wash service, captured noise from a generator, jetwash, vacuum cleaner, car idling, and sporadic music.

Position 8 and 9 situated near an automatic car wash machine and tyre pressure machine respectively, captured the operation of each piece of equipment over the duration of a single car service.



8.0 Existing Industrial Noise Impacts (Texaco Garage)

8.1 Assessment Assumptions

8.1.1 Noise Sources

The Texaco service station operates on a 24-hour basis, providing unrestricted public access to various amenities including an automatic car wash machine (Position 8), tyre pressure machine (Position 9), water dispenser, and vacuum cleaner.

However, it should be noted that the vacuum cleaner and water dispenser were non-operational at the time of the survey. Consequently, the noise levels attributed to the vacuum cleaner are projected to be comparable to those measured previously by Hann Tucker at a similar car garage (Shell), and the noise from the water dispenser is expected to be well below the background noise levels, which are dominated by road traffic noise from Kingsway.

The operation of petrol pumps, which were inaudible at an approximate distance of 10m, is assumed to be consistent. Despite their inaudibility, the pumps have been incorporated into the assessment for thoroughness, utilizing data previously collected by Hann Tucker at a comparable Shell garage.

The following table presents the source noise levels (distance corrected to 5m) for each item:

Petrol Station Event	Single Event Duration (seconds)	Source Sound Pressure Level (dBA) at 5m
Petrol Pump	60	64*
Professional Jet-Wash	240	80
Professional Vacuum Cleaner	240	78
Generator	600	69
Self Service Vacuum Cleaner	240	65*
Self Service Air Pressure	240	60
Automatic Car Wash	690	80
HGV entering site	10	73*
HGV manoeuvring, reversing & door slam	15	72*
General Loading/Unloading	600	61*
HGV departing site	10	73*

*Levels taken from Hann Tucker data library, already corrected for background noise.

8.1.2 Operating Times

The hand car wash, located at positions 6 and 7, operates daily from 09:00 to 18:45 hours. The rest of the garage, including the self-service machines, are open 24hrs.



Based on observations onsite, the following assumptions have been made regarding the number of events occurring during each measurement period:

- **Petrol Pumps** - Based on the observations on site, **20 fuel refills** are likely to occur during any given hour of the day (07:00-23:00). Additionally, **2 fuel refills** have been accounted for during any 15-minute interval at night (23:00-07:00).
- **Jetwash** - During a 15-minute observational period, it was noted that four vehicles were serviced with the professional jetwash. This data suggests that, under maximum operational conditions, up to **16 vehicles could be jet washed** within a one-hour daytime assessment period.
- **Vacuum** - During a 15-minute observational period, it was noted that four vehicles were serviced with the professional vacuum. This data suggests that, under maximum operational conditions, up to **16 vehicles could be vacuumed** within a one-hour daytime assessment period.
- **Generator** - During a 15-minute observational period, it was noted that the generator ran for once for 10 minutes. This data suggests that, under maximum operational conditions, up to **4 generator events** are likely to occur within a one-hour daytime assessment period.
- **Self Service Vacuum** - During the daytime site visit, it was observed that within a one-hour timeframe, only a single vehicle utilized the self-service vacuum. This data suggests that a maximum of **one vehicle would likely utilize the self-service vacuum** during any given 1-hour daytime assessment period or 15-minute nocturnal assessment period.
- **Self Service Air Pressure** - During the daytime site visit, it was observed that within a one-hour timeframe, only a single vehicle utilized the self-service air pressure. This data suggests that a maximum of **one vehicle would likely utilize the self-service air pressure** during any given 1-hour daytime assessment period or 15-minute nocturnal assessment period.
- **Automatic Car Wash** - During the daytime site visit, it was observed that within a one-hour timeframe, only a single vehicle utilized the automatic car wash. This data suggests that a maximum of **one vehicle would likely utilize the automatic car wash** during any given 1-hour daytime assessment period or 15-minute nocturnal assessment period.
- **HGV Deliveries/petrol refill** – Based on previous assessments, HGV deliveries/refuelling will typically take place during night-time periods. It is expected that no more than **1no. HGV delivery/refuelling event** would take place in any given 15-minute nocturnal assessment period.



8.2 Assessment

This section considers the potential noise impact of the existing adjacent commercial premises and associated activities on proposed residential receptors. The assessment follows methodology set out within BS 4142:2014.

Our assessment has been carried out to 1 m from the worst affected window of the proposed development and is based on the latest drawings from STEN Architecture (Jan 2023) and the survey results from Section 7.5.2.

The BS4142 noise assessment for the Texaco garage has been divided into distinct sections to account for the different sources of noise and their impact on the surrounding area. One section focuses on the professional car wash area, where employees use a jet wash, generator, and industrial vacuum cleaner to clean vehicles. This area can generate significant noise due to the use of these powerful tools.

The other section of the assessment deals with the self-service area, which includes a large automatic car wash machine, tyre pressure, water, and vacuum machines. These machines are also likely to contribute significantly to the overall noise levels at the site.

Furthermore, the professional car wash and self-service areas are located at opposite ends of the site. This means that the worst affected receptor, or the area most impacted by the noise, will vary depending on the source of the noise. Therefore, it is crucial to assess these areas separately to ensure a comprehensive understanding of the noise impact from the Texaco garage.

8.2.1 Professional Car Wash

The residential block highlighted in the image below is identified as the worst affected noise-sensitive receptor to the professional car wash at the Texaco garage.



BS4142 Assessment of Professional Car Wash during Daytime Periods						
Results	Jet wash	Pro Vac	Gen	Petrol Pump	Relevant Clause	Commentary
Source sound pressure Level dBA at measurement distance $L_{Aeq,T}$	76 at 8m	76 at 6m	66 at 6m	64 at 5m*	7.3.2	Sound source on.
Measured Residual Level dBA $L_{Aeq,T}$	72	72	62	n/a	7.3.3	Representative level during times the source was not operating.
Assessment made during the daytime, so reference period is 1 hour					7.2	
Specific Sound Level at 5m dBA over 1hr assessment period $L_{Aeq,1hr}$	78	75	65	59	7.3.8 7.3.9 7.3.10	Specific level of source corrected for residual level, on time and number of events.
Specific Sound Level at receptor dBA over 1hr assessment period	68	56	46	48		
Cumulative Sound Pressure Level at Receptor dBA over 1hr assessment period $L_{Aeq,1hr}$	68					Cumulative sound pressure level at receptor
Acoustic feature correction	+7				9.2	The noise is tonal in nature and considered intermittent.
Rating level $L_{Ar,Tr}$	75				9.2	Calculated by adding acoustic feature corrections to the specific sound level.



BS4142 Assessment of Professional Car Wash during Daytime Periods						
Results	Jet wash	Pro Vac	Gen	Petrol Pump	Relevant Clause	Commentary
Background sound level	63				8.1.1 8.1.3 8.3	Typical background sound level measured at the proposed development site during the night.
Excess of rating over background sound level	+12				11	-
Assessment indicates likelihood of a significant adverse impact to residents without noise mitigation measures.					11	The excess of the rating level over the background level is very high, mitigation measures must therefore be assessed further to ensure good internal acoustic conditions.
Uncertainty of the assessment	Low				10	The background sound level is based on repeatable measurements made over the duration of a number of days. The measurements of noise from the garage remained consistent throughout measurement period.

*Historical Noise Levels from Hann Tucker Data Library

8.2.2 Self Service Car Wash, Air, Water and Vacuum

The residential block highlighted in the image below is identified as the worst affected noise-sensitive receptor to the automated car service area at the Texaco garage.





The following table provides a BS4142 assessment of these areas during daytime periods:

BS4142 Assessment of Self-Service Car Wash, Air, Water and Vacuum during Daytime Periods						
Results	Petrol Pump	Auto Car Wash	Air	Self Vac	Relevant Clause	Commentary
Source sound pressure Level dBA at measurement distance $L_{Aeq,T}$	64 at 5m*	76 at 8m	74 at 1m	65 at 5m*	7.3.2	Sound source on.
Measured Residual Level dBA $L_{Aeq,T}$	n/a	74	74	n/a	7.3.3	Representative level during times the source was not operating.
Assessment made during the daytime, so reference period is 1 hour					7.2	
Specific Sound Level at 5m dBA over 1hr assessment period $L_{Aeq,1hr}$	59	69	44	53	7.3.8 7.3.9 7.3.10	Specific level of source corrected for residual level, on time and number of events.
Specific Sound Level at receptor dBA over 1hr assessment period $L_{Aeq,1hr}$	45	65	34	43		
Cumulative Sound Pressure Level at Receptor dBA over 1hr assessment period $L_{Aeq,1hr}$	65					Cumulative specific noise level at receptor
Acoustic feature correction	+7				9.2	The noise is tonal in nature and considered intermittent.
Rating level dBA $L_{Ar,Tr}$	72				9.2	Calculated by adding acoustic feature corrections to the specific sound level.
Typical Background sound level $L_{A90,15min}$	63				8.1.1 8.1.3 8.3	Typical background sound level measured at the proposed development site during the night.
Excess of rating over background sound level	+9				11	-



BS4142 Assessment of Self-Service Car Wash, Air, Water and Vacuum during Daytime Periods						
Results	Petrol Pump	Auto Car Wash	Air	Self Vac	Relevant Clause	Commentary
Assessment indicates likelihood of a significant adverse impact to residents without noise mitigation measures.					11	The excess of the rating level over the background level is very high, mitigation measures must therefore be assessed further to ensure good internal acoustic conditions.
Uncertainty of the assessment	Low				10	The background sound level is based on repeatable measurements made over the duration of a number of days. The measurements of noise from the garage remained consistent throughout measurement period.

*Historical Noise Levels from Hann Tucker Data Library

The following table provides a BS4142 assessment of these areas during night-time periods:

BS4142 Assessment of Self-Service Car Wash, Air, Water and Vacuum during Night-time Periods						
Results	Petrol Pump	Auto Car Wash	Air	Self Vac	Relevant Clause	Commentary
Source sound pressure Level dBA at measurement distance $L_{Aeq,T}$	64 at 5m*	76 at 8m	74 at 1m	65 at 5m*	7.3.2	Sound source on.
Measured Residual Level dBA $L_{Aeq,T}$	n/a	74	74	n/a	7.3.3	Representative level during times the source was not operating.
Assessment made during the daytime, so reference period is 15 minutes					7.2	
Specific Sound pressure Level at 5m dBA over 15 min assessment period $L_{Aeq, 15min}$	55	75	50	59	7.3.8 7.3.9 7.3.10	Specific level of source corrected for residual level, on time and number of events.
Specific Sound Pressure Level at receptor dB over 15 min assessment period $L_{Aeq, 15min}$	41	71	40	49		



BS4142 Assessment of Self-Service Car Wash, Air, Water and Vacuum during Night-time Periods						
Results	Petrol Pump	Auto Car Wash	Air	Self Vac	Relevant Clause	Commentary
Cumulative Sound Pressure Level at Receptor dBA L _{Aeq, 15min}	71					Cumulative specific noise level at receptor
Acoustic feature correction	+7				9.2	The noise is tonal in nature, and considered intermittent.
Rating level L _{Ar,Tr}	78				9.2	Calculated by adding acoustic feature corrections to the specific sound level.
Background sound level	42				8.1.1 8.1.3 8.3	Typical background sound level measured at the proposed development site during the night.
Excess of rating over background sound level	+36				11	-
Assessment indicates likelihood of a significant adverse impact to residents without noise mitigation measures.					11	The excess of the rating level over the background level is very high, mitigation measures must therefore be assessed further to ensure good internal acoustic conditions.
Uncertainty of the assessment	Low				10	The background sound level is based on repeatable measurements made over the duration of a number of days. The measurements of noise from the garage remained consistent throughout measurement period.

*Historical Noise Levels from Hann Tucker Data Library

8.2.3 HGV Deliveries/Refuelling

The worst effected receptor by HGV movements is thought to be the same as highlighted in Section 8.2.2.



The following table provides a BS4142 assessment of these areas during night-time periods:

BS4142 Assessment of HGV movements during Night-time Periods						
Results	Enter	Reverse	Unload	Leave	Clause	Commentary
Source sound pressure Level dBA at measurement distance $L_{Aeq,T}$	73 at 5m*	72 at 8m	61 at 1m	73 at 5m*	7.3.2	Sound source on.
Measured Residual Level dBA $L_{Aeq,T}$	n/a	n/a	n/a	n/a	7.3.3	Representative level during times the source was not operating.
Assessment made during the daytime, so reference period is 15 minutes					7.2	
Specific Sound pressure Level at 5m dBA over 15 min assessment period $L_{Aeq, 15min}$	53	54	59	53	7.3.8 7.3.9 7.3.10	Specific level of source corrected for residual level, on time and number of events.
Specific Sound Pressure Level at receptor dB over 15 min assessment period $L_{Aeq, 15min}$	41	37	42	41		
Cumulative Sound Pressure Level at Receptor dBA $L_{Aeq, 15min}$	47					Cumulative specific noise level at receptor
Acoustic feature correction	+6				9.2	The noise is impulsive in nature and considered intermittent.
Rating level $L_{Ar,Tr}$	53				9.2	Calculated by adding acoustic feature corrections to the specific sound level.
Background sound level	42				8.1.1 8.1.3 8.3	Typical background sound level measured at the proposed development site during the night.
Excess of rating over background sound level	+11				11	-



BS4142 Assessment of HGV movements during Night-time Periods						
Results	Enter	Reverse	Unload	Leave	Clause	Commentary
Assessment indicates likelihood of a significant adverse impact to residents without noise mitigation measures.					11	The excess of the rating level over the background level is very high, mitigation measures must therefore be assessed further to ensure good internal acoustic conditions.
Uncertainty of the assessment	Low				10	The background sound level is based on repeatable measurements made over the duration of a number of days. The measurements of noise from the garage remained consistent throughout measurement period.

8.2.4 Summary

The above indicates a likelihood of a *significant adverse impact* to proposed residents without noise mitigation measures, however, the context of the site must be considered to enable a full assessment.

Where the initial estimate of the impact needs to be modified due to the context, BS 4142:2014 states that all pertinent factors should be taken into consideration, including the following:

- The sensitivity of the receptor and whether dwellings will already incorporate design measures that secure good internal acoustic conditions.

Clearly, therefore, an initial estimate of a significant adverse impact does not imply that development may not be permitted, provided that proposed dwellings can incorporate design measures (ie imbedded mitigation) that secure good internal acoustic conditions.

In light of the above, we recommend that appropriate mitigation measures are incorporated into the design of proposed dwellings to control noise from the proposed facilities to a suitable level.



9.0 Existing Noise Impacts (Khanka Naqshbandia Mujaddadia Mosque)

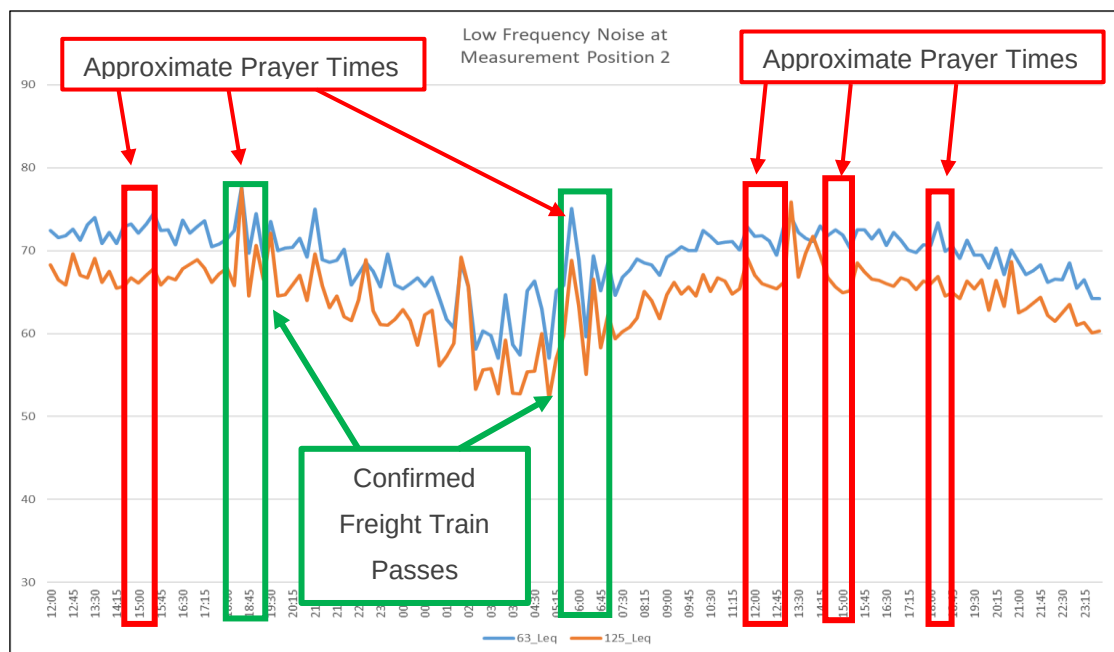
9.1 Overview

We understand the Mosque to be used 5No. times a day for prayer. This Section contains our high-level assessment of any potential impact from the operation of the Mosque on the proposed development.

Our assessment is on the basis of the data collected at Measurement Position 2 along with additional information obtained from the Mosque's website and rail traffic data from Raildar.

9.2 Assessment

The following plot outlines the low frequency $L_{Aeq, 15mins}$ data collected during the survey period at Measurement Position 2. Also highlighted on the plot are the approximate prayer times stated on the Mosque website.



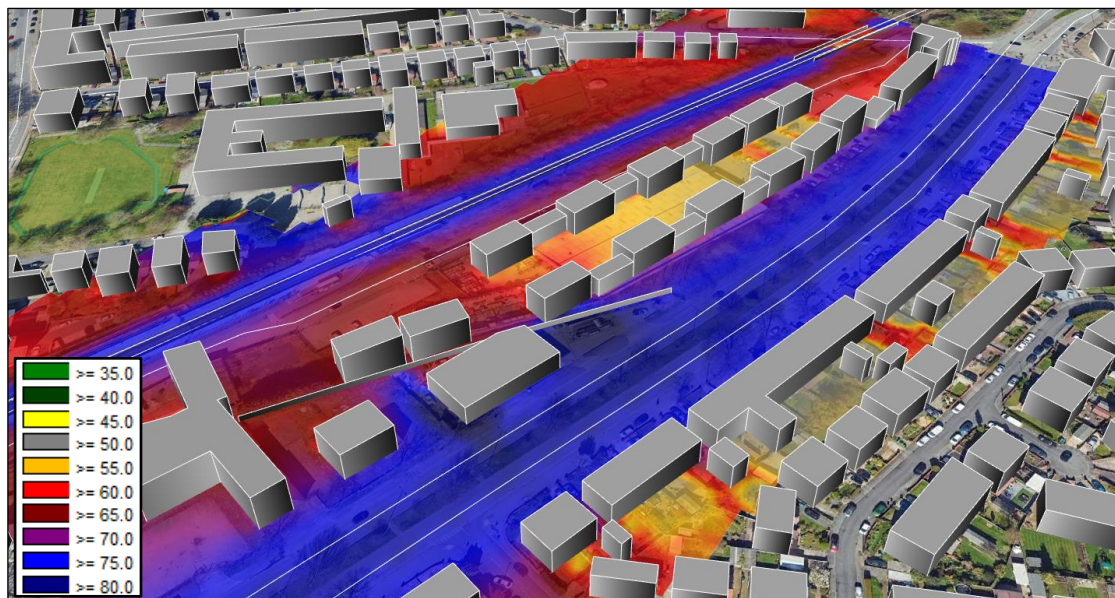
The graph above illustrates that there is generally no significant escalation in low-frequency noise during prayer times. However, significant spikes in low-frequency noise levels were observed at 18:45 on November 10, 2023, and at 05:45 on November 11, 2023. These spikes were corroborated by data from 'Raildar', which confirmed that they coincided with the passing of freight trains. It's also noteworthy that during a prayer session when Hann Tucker was conducting the survey on-site, no noise emanating from the mosque could be detected from the immediate exterior.



Based on the analysis of the plot, it can be inferred that the noise emanating from the Mosque is unlikely to significantly affect the proposed development. Therefore, a detailed assessment may not be necessary as any potential noise impacts from this source can be effectively managed using standard methods.

10.0 Incident Noise Levels

Using the survey data, we have created a 3D noise model in CadnaA® to predict the incident noise levels upon each elevation of the proposed development. A screenshot of the model is provided below.



Using the above model, the following table and associated mark-ups outline the free-field incident noise levels across the development. For purposes of any subsequent assessment, these zones are the “Façade Zones”.

Façade zone	Calculated incident noise levels		
	Daytime $L_{Aeq,16h}$ (dB)	Night $L_{Aeq,8h}$ (dB)	10 th Highest Night $L_{max,2min}$ (dB)
A	71-74*	71	85
B	68-74	63-71	82
C	63-65	59	74
D	60	56	65

*The incident levels upon this façade are also subject to the automated car wash located in proximity.



Façade Zone Markup

11.0 Achieving Internal Noise Levels

There are 3 No ventilation conditions applicable to proposed residential dwellings. These are Background Ventilation as described in Approved Document F (Part F), Overheating as described in Approved Document O (Part O), and Purge Ventilation (odour and smells).

11.1 Purge Ventilation

It should be noted that the internal noise level guidelines are generally not applicable under “*purge ventilation*” conditions as defined by Part F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

As such, acoustic conditions are generally not a concern during purge ventilation.

11.2 Background Ventilation Condition

11.2.1 Criteria

With reference to the acoustic standards and guidelines as reviewed in Appendix B, the external noise intrusion levels from environmental sources should be controlled so as to not exceed the following criteria.



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 $L_{Aeq,8hour}$ 45 dB ^[1] L_{Amax}

[1] regular noise events such as trains, aircraft (10th highest)

Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target noise levels may be relaxed (subject to the requirements of any planning conditions) by up to 5 dB and reasonable internal conditions still achieved.

Section 8.0 considers existing industrial use impacts in line with BS 4142 and advises that adverse impacts on future occupants could be avoided with suitably specified façade elements to secure suitable internal noise levels. Where existing industrial/commercial noise could 'contribute' to incident external noise levels on a given façade but do not 'dominate', the BS8233 internal noise level targets should be met. However, where the industrial noise has the potential to dominate the external noise climate, that industrial noise intrusion should achieve limits 5 dB lower than the BS8233 levels.

11.2.2 Outline Specifications

Based on the prevailing noise climate at the site, open windows as a means of background ventilation would not be suitable on façades overlooking Kingsway. As such, alternative ventilation measures would be required.

Allowance should be made to provide appropriate sound insulation solutions as required including, where necessary, suitably specified glazing and attenuated ventilators/mechanical ventilation systems. Preliminary calculations have been carried out to determine the likely façade sound insulation performance requirements for each façade. Calculation methods follow those outlined in BS 8233:2014 Section G.2 and are based on the following:

- Insulated SFS with rainscreen cladding/brick slip
- 30m³ approximate typical room volume
- 3.8m² approximate window area
- Reverberation time of 0.5 seconds.



From the results of the assessment, the following minimum preliminary acoustic performance specifications are recommended. These are intended for planning use only, and detailed design stage octave band acoustic specifications will need to be developed for tender.

Façade Zone	Façade Element	Preliminary Minimum Sound Reduction Specification
A	Window	43 dB $R_w + C_{tr}$
	Ventilator	49 $D_{new} + C_{tr}$
B	Window	38 dB $R_w + C_{tr}$
	Ventilator	44 $D_{new} + C_{tr}$
C	Window	35 dB $R_w + C_{tr}$
	Ventilator	41 $D_{new} + C_{tr}$
D	Window	30 dB $R_w + C_{tr}$
	Ventilator	36 $D_{new} + C_{tr}$

11.2.3 Example Glazing Configurations

Example glazing configurations commensurate with achieving the sound insulation specifications noted in Section 11.2.2 are given below.

Glazing Specification, $R_w + C_{tr}$ (dB)	Example Configuration
43	Acoustic secondary glazing system e.g 6/150/8mm
38	High Performance Acoustic double-glazed system e.g. 10/16/8.8 mm
35	Up-rated double glazed system e.g. 6/16/8.8 mm.
30	double glazed system e.g 10/16/4 mm.

11.2.4 Example Ventilation Solutions

Example ventilation solutions commensurate with achieving the elemental sound insulation performances noted in Section 11.2.2 are discussed below.



Ventilator Specification, $D_{new} + C_{tr}$ (dB)	Example Configuration
49	mechanically assisted supply & extract solution (e.g. local MVHR).
44	mechanically assisted supply & extract solution (e.g. local MVHR).
38	1 x 2,500mm ² acoustic hit-miss trickle vent per habitable room, or a mechanically assisted supply & extract solution (e.g. local MVHR).
33	1 x 2,500mm ² standard hit-miss trickle vent per habitable room, or a mechanically assisted supply & extract solution (e.g. local MVHR).

The preliminary performance specifications included above are based on the provision of either full MVHR for rooms or 1no. ventilator only per habitable room as required. If additional numbers of ventilators are required to achieve the ventilation rates, the performance requirement for the individual ventilators will need to increase.

The table below provides guidance on the increase in performance specification required for additional numbers of ventilators.

Number of Ventilators	Performance Increase on Ventilator Specifications Stated Above
1	+0 dB
2	+3 dB
3	+5 dB
4	+6 dB

11.2.5 Assessment of Industrial Noise Break-in

Professional Car Wash

The worst affected facade subject to noise from the professional car wash is highlighted in Section 8.2.1.

We would propose High performance in-wall acoustic ventilator, or a mechanically assisted supply & extract solution (e.g. local MVHR) for all dwellings in the **Orange zone** as a form of mitigation to achieve suitable internal noise levels and ventilation requirement. On the basis the MVHR shall achieve BS 8233 acceptable internal ambient daytime noise level of 35dB $L_{Aeq,16hr}$, an internal noise limit for industrial noise events of 30dB $L_{Aeq,1hr}$ should be achieved (ie 5dB below the internal ambient noise level) within dwellings to minimise any impact of the industrial units to residents.



For reference, we have presented a sample calculation for the following assumptions:

- worst-case noise levels (i.e. highest predicted external noise level)
- Room dimensions of 4m x 3m x 2.4m for habitable rooms.
- Highest ratio of glazing/facade area to room volume, façade area of 9.6 m² with 40% glazing.

We have calculated the resultant internal daytime noise level using the following equation

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

(Equation G.1) contained within BS 8233:2014:

The parameters used within our assessment are presented below, for reference:

The parameters used within our assessment are presented below, for reference.

Term	Derivation	Value (m ²)
S _f	Façade area (including window)	9.6
S _{wi}	Window area	3.8
S _{ew}	S _f - S _{wi}	5.8
A ₀	Reference absorption area given in BS EN ISO 10140-2	11

For the purpose of our assessment, we have considered the following pessimistic sound reduction performances for critical façade elements.

Element	Sound Reduction Index (R dB) at Octave Band Centre Frequency (Hz)						Guidance Overall
	125	250	500	1k	2k	4k	
External Wall (SFS)	33	42	45	50	50	55	41 dB R _w + C _{tr}
Glazing (to bedroom)	28	31	42	45	50	58	38 dB R _w + C _{tr}

The results of our assessment (in accordance with the more rigorous method contained within BS 8233:2014) are presented below.



Description	Octave Band Centre Frequency (Hz)						Overall
	125	250	500	1k	2k	4k	
External noise level $L_{eq,ff}$	60	59	63	64	64	65	71dBA
External wall R_{ew}	33	42	45	50	50	55	41 dB $R_w + C_{tr}$
Glazing to bedroom R_{wi}	28	31	42	45	50	58	38 dB $R_w + C_{tr}$
Equivalent absorption area A	11	11	11	11	11	11	11
Internal noise level SPL	33	28	22	20	17	13	26 dBA

Self-Service Car Wash

The worst affected facade subject to noise from the self-service car wash is highlighted in Section 8.2.2

We would propose mechanically assisted supply & extract solution (e.g. local MVHR) for all dwellings in the **Red zone** as a form of migration to achieve suitable internal noise levels and ventilation requirement. On the basis the MVHR shall achieve BS 8233 acceptable internal ambient daytime noise level of 35dB $L_{Aeq,16hr}$ (daytime) and 30dB $L_{Aeq,8hr}$ (night-time), an internal noise limit for industrial noise events of 30dB $L_{Aeq,1hr}$ (daytime) and 25dB $L_{Aeq,15 min}$ (night-time) should be achieved (i.e., 5dB below the internal ambient noise level) within dwellings to minimise any impact of the industrial units to residents.

We understand from conversations with the Texaco employees, the self-service car wash could be useable 24 hours a day, as such must be considered during both daytime and night-time periods. Some effective solutions to mitigate noise from the self-service car wash would be as follows:

- To have no bedrooms situated on the eastern facade overlooking the petrol station.

We understand the above may not be deemed feasible for this scheme, and on this basis, we would recommend the following:

- Any Red Zone bedroom on the eastern façade is to have a minimum dimension of 4m (width) x 5m (depth) x 2.4m (ceiling height) and a maximum window size of 2.5m².



The parameters used within our assessment are presented below, for reference:

Term	Derivation	Value (m ²)
S_f	Façade area (including window)	20
S_{wi}	Window area	2.5
S_{ew}	$S_f - S_{wi}$	17.5
A_0	Reference absorption area given in BS EN ISO 10140-2	11

For the purpose of our assessment, we have considered the following sound reduction performances for critical façade elements.

Element	Sound Reduction Index (R dB) at Octave Band Centre Frequency (Hz)						Guidance Overall
	125	250	500	1k	2k	4k	
External Wall (SFS)	33	42	45	50	50	55	41 dB $R_w + C_{tr}$
Glazing (to bedroom)	31	40	45	49	49	54	43 dB $R_w + C_{tr}$

- The results of our assessment (in accordance with the more rigorous method contained within BS 8233:2014) are presented below.

Description	Octave Band Centre Frequency (Hz)						Overall
	125	250	500	1k	2k	4k	
External noise level $L_{eq,ff}$	69	66	64	67	64	60	71dBA
External wall R_{ew}	33	42	45	50	50	55	41 dB $R_w + C_{tr}$
Glazing to bedroom R_{wi}	31	40	45	49	49	54	43 dB $R_w + C_{tr}$
Equivalent absorption area A	11	11	11	11	11	11	11
Internal noise level SPL	37	26	20	18	15	6	25 dBA

If the proposed room dimensions for bedrooms in the 'Red Zone' are deemed suitable for the scheme to mitigate noise from the carwash, the finalised layout should be reviewed by Hann Tucker.



HGV movements

As the resulting noise levels from the HGV movements are below the levels predicted from the professional car wash, the specification defined for the **Orange Zone** (See Section 11.2.5) is expected to be capable of suitably mitigating noise ingress from HGV movements at the petrol station.

11.3 Overheating Condition

Approved Document O 'Overheating' (ADO) was released in December 2021 and came into effect in England on 15 June 2022. It sets out the suitable methodologies to limit unwanted solar gains in summer and provide adequate means to remove heat from the indoor environment. Requirement O1(2)(a) contains criteria relating to noise with Sections 3.2 to 3.4 of ADO stating the following:

"In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a) 40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- b) 55 dB L_{AFmax} , more than 10 times a night (between 11pm and 7am)."

Further to the above, the acoustic requirements of ADO relates to bedrooms and night and does not consider daytime hours or other living spaces.

To assess overheating ADO sets out 2 ways this can be done: These are by either using the simplified method or through dynamic thermal modelling (ie a TM59 assessment). For an acoustic assessment suitable to accompany a Planning Application, the simplified method is often used as it splits England into "Moderate" and "High" risk zones depending on the location of the site and provides "minimum free areas" for window openings in bedrooms. These are as follows:

- 13% of the floor area for "High Risk" locations
- 4% of the floor area for "Moderate Risk" locations



Based on the minimum free areas noted above, the IoA & ANC guidance note “Demonstrating Compliance with the Noise Requirements of Approved Document O” sets out the external noise levels above which the simplified method cannot be used and alternative overheating strategy should be developed. These are shown below:

Zone	Risk Category	Incident Noise Level (dB)		Notes
		$L_{Aeq,8h}$	$L_{AFmax,2min}$	
Red	High	>44	>59	Open windows based on simplified model not suitable. Detailed modelling via TM59 assessment advised. Limited area opening windows or closed windows may be required to comply with AD-O
	Moderate	>49	>64	

The site is located in Manchester and therefore falls into the “Moderate” risk category.

Based on the table above, the following figure shows the locations in which the external noise is above the point at which the simplified ADO model can be used and detailed modelling thermal modelling and a subsequent acoustic assessment is advisable to show compliance with Requirement O1(2)(a). Where a facade is not highlighted opening windows as a means of overheating control should be suitable from an acoustic perspective without a more detailed assessment.



At this stage, bedrooms should be designed to avoid or severely restrict the reliance on opening windows to satisfy overheating targets in the **Red** zones highlighted above (all facades). This can be achieved by use of solar rated glazing, external shutters, or fenestration design. In addition, mitigation measures in the form of attenuated or plenum windows, attenuated louvres or vents for overheating and sound attenuating balconies may be suitable.



These methods for reducing solar gains can be assisted with mechanical ventilation, such as MVHR with a manual summer boost function.

Air conditioning can also be considered. However, the introduction of mechanical solutions should be considered carefully, not only with regard to cost and maintenance, but sustainability and the environment.

12.0 External Amenity Area

Private balconies are noted on a number of elevations of the scheme. Whilst an ideal noise level of 55 dB $L_{Aeq,16hr}$ is unlikely to be achieved in private balconies, in addition to outlining dispensation towards exceedances at the outer edge of balconies, BS 8233 also states the following with regards to small private balconies:

“Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses.”

Also, ProPG states that where despite following a good acoustic design, adverse noise impacts remain on any private external amenity space (ie garden or balcony), the impact may be partially off-set if residents are provided through the design of the development or the planning process, with access to:

“a relatively quiet, protected, publicly accessible, external amenity space (eg a public park or local green space designated because of its tranquillity) that is nearby (eg within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.”

Considering that the scheme is located approximately a 3m walk from Ladybarn Park, we would suggest that noise within external amenity areas should not be a reason for refusal.

13.0 Operational Noise Impacts

13.1 Fixed Plant & Equipment

Based on the results of the noise survey and the requirements of the Local Authority, we propose that the following plant noise emission criteria be achieved incident at the nearest noise sensitive residential windows, in free-field conditions, with all plant operating simultaneously.



Location	Plant Noise Emission Criteria ($L_{Aeq,T}$, dB)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
1	58	37
2	50	39

Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality. The above limits shall be subject to the final approval of the Local Authority.

14.0 Conclusions

An extensive environmental noise survey has been conducted to determine the existing noise environment surrounding the site. The potential noise impact on the proposed residences has been evaluated in accordance with building regulations, as well as national and local planning policies.

Suitable target internal noise levels have been suggested, which can be achieved using enhanced façade solutions. Preliminary acoustic performance specifications for the external building fabric elements have been provided to ensure the achievement of appropriate internal noise levels.

These specifications are intended for *planning purposes only*, and detailed design stage octave band acoustic specifications will need to be developed for tender.

The assessment indicates that the site is generally suitable for residential development in terms of noise, provided appropriate noise reduction measures are implemented.

Assessments have been carried out on the operational Texaco garage and associated carwash operations and the noise impacts have been quantified on worst case facades. The Noise from the Texaco garage, Kingsway and the railway line should be manageable with enhanced facade solutions and mechanical ventilation.

Furthermore, an assessment of the mosque has been conducted through low-frequency analysis. The noise impact from the mosque has been deemed insignificant.

Appendix A

Acoustic Terminology

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} L₉₀ 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*.

L_{max} L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

L_p Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

L_w Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Appendix B

Planning Policies, Standards & Guidance

B.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of 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.”

That vision is supported by the following NPSE noise policy aims which are reflected in three of the four aims of planning policies and decisions in paragraph 123 of the NPPF (see paragraph 8.2 (b) below):

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

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

LOAEL – Lowest Observable Adverse Effect Level

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

SOAEL – Significant Observed Adverse Effect Level

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

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *“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.”* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

B.2 National Planning Policy Framework (NPPF)

The following paragraphs are from the NPPF (published September 2023):

185. 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 life;
- 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.

187. 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.”

Paragraph 185 also references the Noise Policy Statement for England (NPSE). This document does not refer to specific noise levels but instead sets out three aims:

- “Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

B.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
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	

Perception	Examples of Outcomes	Increasing effect level	Action
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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.	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
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 hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

B.4 World Health Organisation

The current Environmental Noise Guidelines 2018 for the European Region (ENG) supersede the Guidelines for Community Noise from 1999 (CNG). Nevertheless, the ENG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) remain valid.

A summary of the guidance from the ENG and CNG is shown in the table below.

Source	CNG guideline indoors all sources	ENG guideline outdoors noise from specific source only
Road traffic noise	35 L _{Aeq} , 16h	53 dB L _{den}
	30 L _{Aeq} , 8h	45 dB L _{night}
Railway noise	35 L _{Aeq} , 16h	54 dB L _{den}
	30 L _{Aeq} , 8h	44 dB L _{night}
Aircraft noise	35 L _{Aeq} , 16h	45 dB L _{den}
	30 L _{Aeq} , 8h	40 dB L _{night}

With regard to single-event noise indicators, Section 2.2.2 of the WHO Environmental Noise Guidelines 2018 state:

“In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to

explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ($L_{A,max}$) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by $L_{A,max}$. Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.”

B.5 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

Internal Areas

BS8233:2014 Section 7.7.2 titled “Internal ambient noise levels for dwellings” states:

“In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 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 $L_{Aeq,8hour}$

Note 1 The above table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

Note 2 The levels shown in the above table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the above table.

Note 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.

Note 4 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.

Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.

Note 6 Attention is drawn to the Building Regulations.

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

External Amenity Areas

BS8233:2014 Section 7.7.3.2 titled “Design criteria for external noise” states:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}^1$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens, and terraces, which might be intended to be used for relaxation. In high-noise areas consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

B.6 ProPG : Planning & Noise : 2017

The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. It is applicable to noise

from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is “not dominant”.

This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- Element 1 – demonstrating a “Good Acoustic Design Process”;
- Element 2 – observing internal “Noise Level Guidelines”;
- Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
- Element 4 – consideration of “Other Relevant Issues”.

The ProPG considers suitable guidance on internal noise levels found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.

Activity	Location	07:00 – 23:00 Hours	23:00 – 07:00 Hours
Resting	Living Room	35dB LAeq,16hr	-
Dining	Dining Room / Area	40dB LAeq,16hr	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hr	30dB LAeq,16hr 45dB LAmax,F

NOTE 1 the Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 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. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed

the internal L_{Aeq} target levels by more than 5dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10dB, they are likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (See Section 3.D).

B.7 Building Regulations Approved Document O

Building Regulations Approved Document O relates to setting standards for overheating in new residential buildings. It aims to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

Requirement O1 of Approved Document O is met by designing and constructing the building to achieve both of the following:

- a. Limiting unwanted solar gains in summer.
- b. Providing an adequate means of removing excess heat from the indoor environment.

Sections 3.2 to 3.4 of this document relate to noise and state the following:

“In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- b. 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).

Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants’ Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the *National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021)* and the *Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020)*.

B.8 British Standard 4142:2014 + A1:2019

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 *“Methods for rating and assessing industrial and commercial sound”*.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains “a tone, impulse or other characteristic” then various corrections can be added to the specific (source) noise level to obtain the “rating level”.

BS 4142 states that: *“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.”*

The determination of the “rating level” and the “background level” are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014+A1:2019. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to “No Observed Effect Level” as defined in the Noise Policy

Statement for England. It is also reasonable to infer from the above that if the plant noise rating level does not exceed the existing background noise level outside any noise sensitive residential window then the plant noise is of "low impact".

Appendix C

Time History Graphs

Kingsway Burnage

Position 1

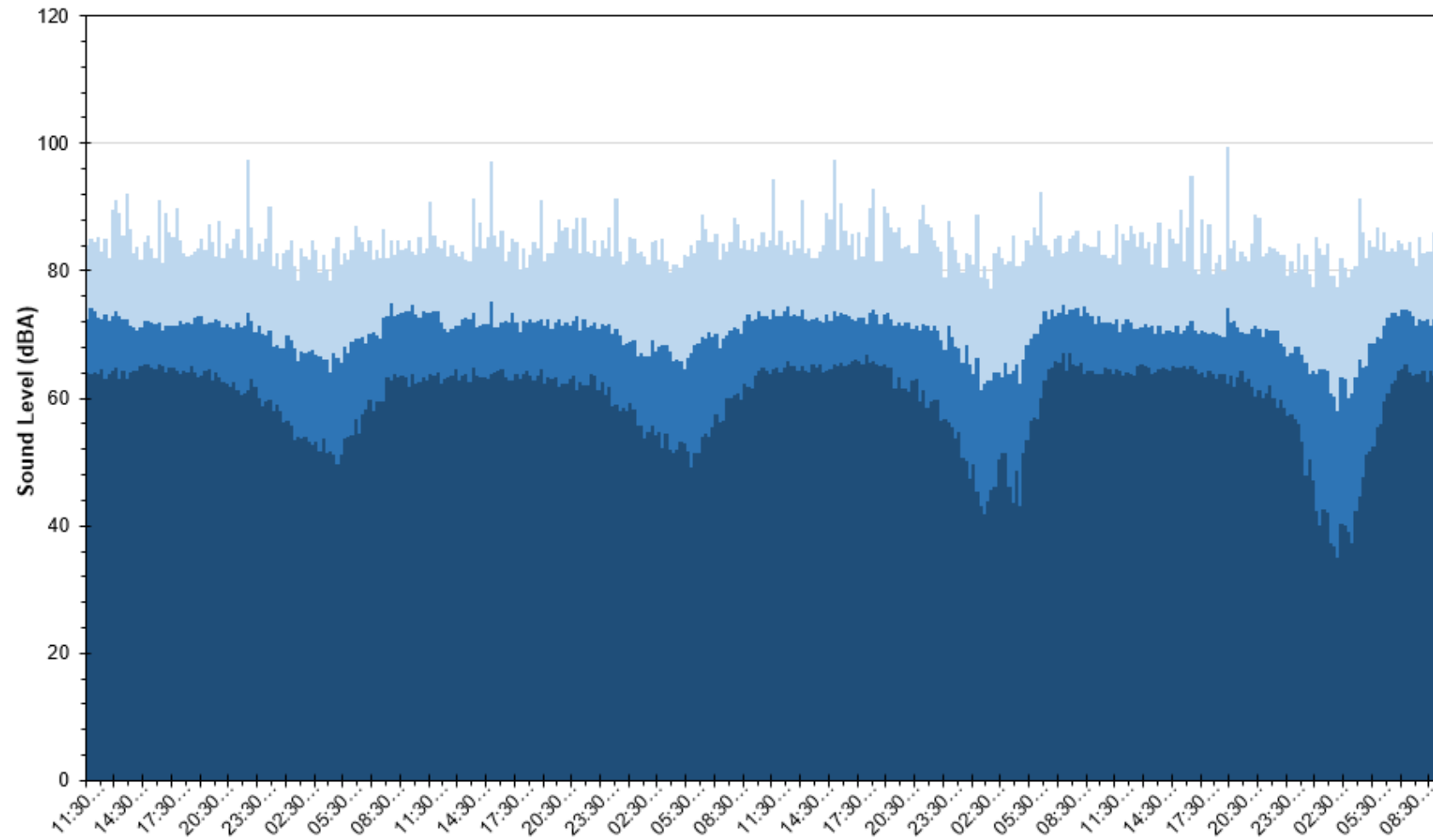
L_{eq} , L_{max} and L_{90} Noise Levels

Thursday 9 November 2023 to Tuesday 14 November 2023

■ L_{Amax}

■ L_{Aeq}

■ L_{A90}



Date and Time

31112/TH1.1

Kingsway Burnage

Position 2

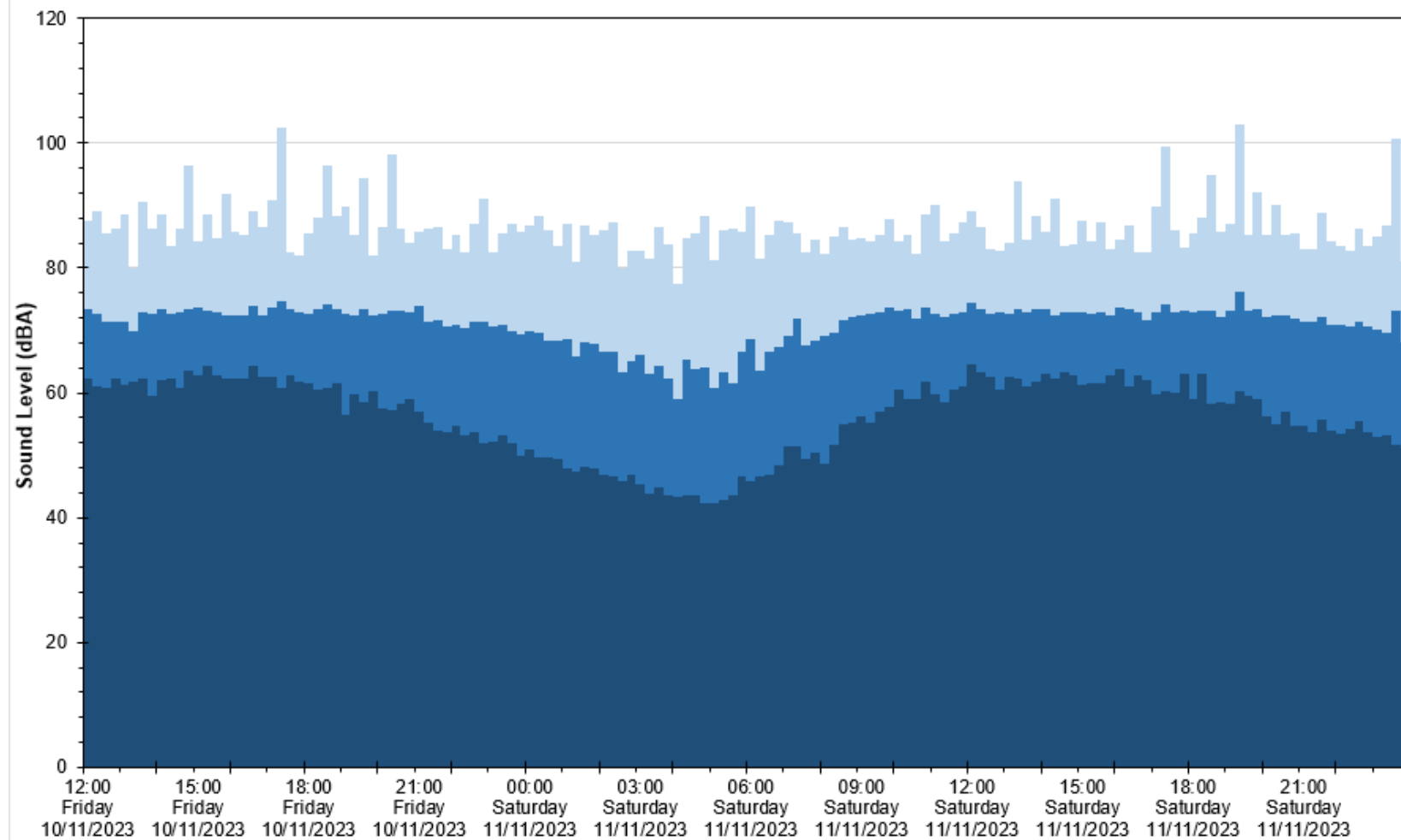
L_{eq} , L_{max} and L_{90} Noise Levels

Friday 10 November 2023 to Saturday 11 November 2023

LAmax

LAeq

LA90



Date and Time

31112/TH2.TH2