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Proposed Residential Development
Land to the South of Barrow Road, Barton-upon-Humber

Noise Impact Assessment

For:
Strata

18th December 2025

Ref: NIA-10832-23-10964-v6 Barrow Road, Barton
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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions has been commissioned by Strata to carry out a noise impact assessment for a proposed new residential development at land to the south of Barrow Road, Barton-upon-Humber (hereafter referred to as 'the site').

The objectives of the noise impact assessment were to:

- Determine external noise levels at the site
- Assess the potential impact of the external noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed residential development from a loss of amenity due to noise

This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation) and boundary treatments. It has been prepared to accompany Planning Application ref: PA/2023/1607 submitted to North Lincolnshire Council.

The report has been prepared for Strata for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Strata and ENS as to the extent to which the findings may be appropriate for their use.

The author of this report is a Member of the Institute of Acoustics (MIOA) and ENS is a specialist acoustic consultancy and a corporate member of the Association of Noise Consultants.

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description and Proposed Development

The site is located in a mixed-use location on the south-eastern fringe of Barton-upon-Humber, as shown in Figure 1.1 below.

Figure 1.1: Location of Development

The site is bound by:

- The A1077 Barrow Road to the north
- Existing residential properties to the west
- Agricultural land to the south and east

The noise environment at the site is dominated by road traffic on the A1077 Barrow Road, with regular HGVs associated with the Wren Kitchens factory (approx. 330 metres to the north-east) and the wider Humber Bridge Industrial Estate (approx. 750 metres to the north).

A new link road is to be constructed directly through the site leading from the A1077 Barrow Road whereby a new roundabout is also to be formed. This link road is to be delivered by the Council in accordance with planning permission PA/2023/1981.

Development proposals are for 196 no. dwellings with associated access roads and landscaping (see Appendix 4 for site layout plan). The layout plan indicates that the residential development footprint is set back circa **10 metres** from the nearside kerb of the A1077 Barrow Road. The nearest proposed dwelling façades are also set back at least **7 metres** from the nearside kerb of the link road.

2 Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[1] was updated in February 2025 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 187 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of.....noise pollution'.

Paragraph 198 advises that:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should.....mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England[2] (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life

The NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur

According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'....all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.'

1 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2023)
2 Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. March 2010.

2.3 Planning Practice Guidance on Noise

Planning Practice Guidance[3] (PPG) is an online resource which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- 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
- Whether or not a good standard of amenity can be achieved

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL.

The PPG also provides general advice on the typical options available for mitigating noise, suggesting that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

'Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed'.

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. The following guidance documents provide some meaningful context.

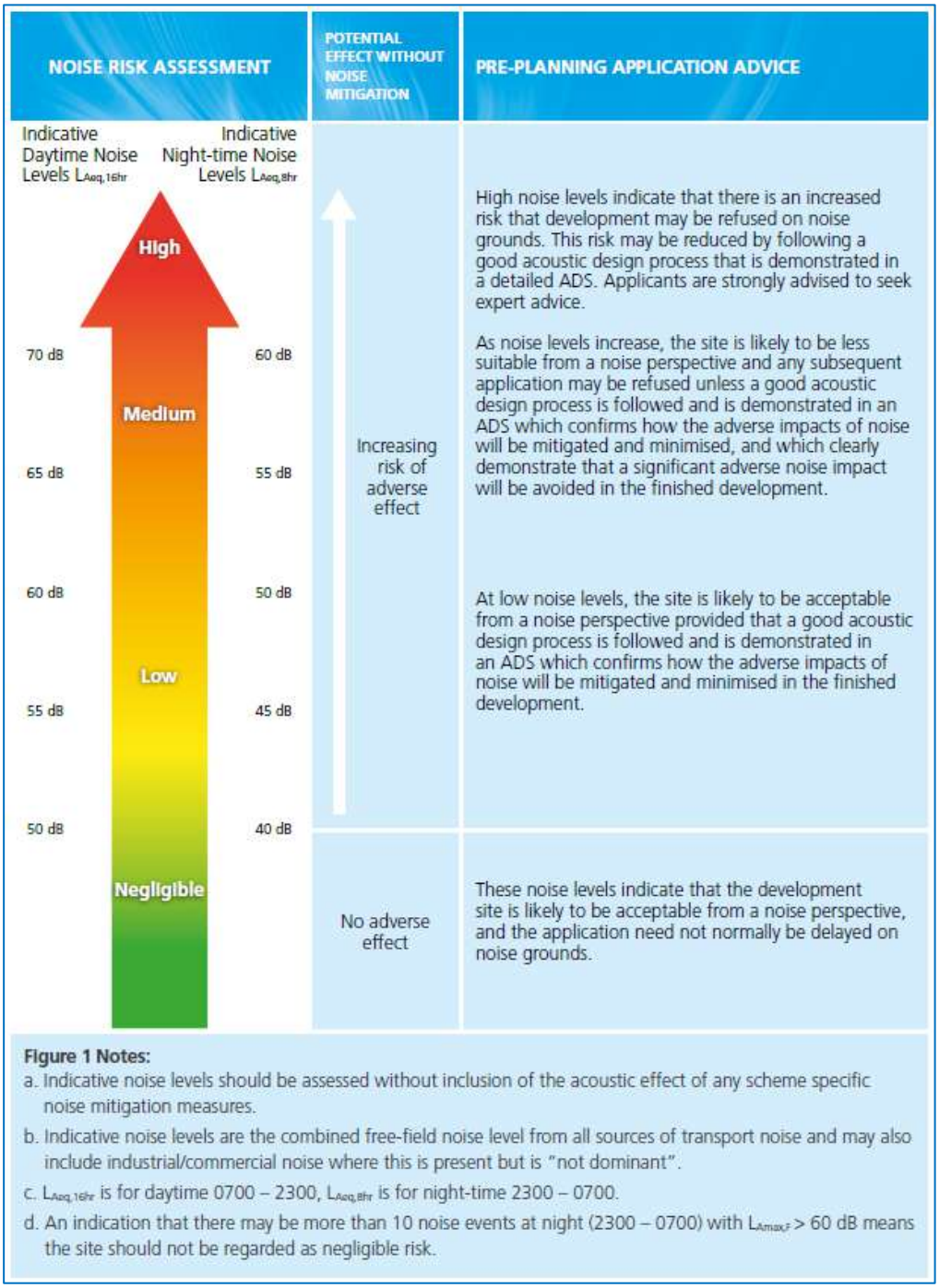
3 Planning Practice Guidance on Noise: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

2.4 ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)[4] promotes a systematic two-stage, risk-based approach to noise assessments that inform planning applications for new residential developments.

Stage 1 consists of an initial noise risk assessment, as summarised in Figure 2.1 below.

Figure 2.1: ProPG Initial Site Noise Risk Assessment



[4] 'ProPG Planning and Noise: New Residential Development (ProPG)', 2017. Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH)

Stage 2 requires consideration of four key elements, as follows:

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

With regard to Element 1, ProPG requires evidence that a good acoustic design process has been followed, and that the following aspects have been considered:

- Check the feasibility of relocating, or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.
- Assess the viability of alternative solutions.
- Assess external amenity area noise.

Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233), as summarised below.

Table 2.1: Indoor Ambient Noise Levels for Dwellings

Activity	Location	Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700\text{-}2300)}$	30 dB $L_{Aeq\ (2300\text{-}0700)}$ 45 dB $L_{AFMax\ (2300\text{-}0700)}$

Note 4 to the above table states: *'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.'*

Note 5 to the above table states: *'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'.*

This is consistent with the guidance contained within the PPG, which states that:

'... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations'.

On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the site:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ in habitable rooms during the daytime
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ in bedrooms during the night-time
- 45 dB L_{AFMax} not regularly exceeded in bedrooms during the night-time

With regard to external amenity (Element 3), ProPG reflects the advice given in BS 8233 as follows:

'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.'

'These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.'

2.5 Approved Document O

Approved Document O, 2021 is written in support of Part O of Schedule 1 to the Building Regulations 2010. The approved document details methods of addressing overheating of residential dwellings and is applicable only across England.

The approved document has the following relevant guidance in Section 3 regarding noise ingress into buildings:

'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.

- *40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)*
- *55dB L_{Amax}, more than 10 times a night (between 11pm and 7am)'*

3 Noise Survey

3.1 Overview

In order to establish external noise levels at the site, baseline noise surveys were undertaken on Wednesday 19th November through to Tuesday 25th November 2025.

For the purpose of the assessment, the following noise monitoring positions were adopted (the approximate locations of the noise monitoring positions are shown in Appendix 2 for reference):

- MP1 was located at the north-eastern corner of the site at circa 5 metres back from the nearside kerb of the A1077 Barrow Road, at 4 metres above ground level (AGL)
- MP1A was located at the north-eastern corner of the site at circa 10 metres back from the nearside kerb of the A1077 Barrow Road, at 4 metres AGL
- MP1B was located at the north-eastern corner of the site at circa 10 metres back from the nearside kerb of the A1077 Barrow Road, at 1.5 metres AGL
- MP2 was located at the north-western corner of the site at circa 10 metres back from the nearside kerb of the A1077 Barrow Road, at 4 metres AGL
- MP3 was located at the western boundary of the site, at 1.5 metres AGL
- MP4 was located at the southern boundary of the site, at 1.5 metres AGL
- MP5 was located to the east of the site, in the vicinity of Options Barton School, at 1.5 metres AGL
- MP6 was located to the east of the site, in the vicinity of Cornhill Cottages, at 1.5 metres AGL
- MP7 was located to the north of the site, in the vicinity of residential dwellings on Bayleaf Lane, at 1.5 metres AGL

Noise measurements were made in a free field environment using Bruel & Kjaer 2250 and NTi XL3 Type 1 integrating sound level meters. Each meter was connected to a windshield covered microphone positioned at the locations detailed above. The calibration of each measurement system was verified immediately before and after the survey using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted.

Measurements consisted of A–weighted broadband parameters, together with linear octave band L_{eq} levels.

See below for weather summary. Whilst some days were subject to intermittent showers/sprinkles, this does not appear to have impacted the measurements, with noise levels very consistent between days.

Table 3.1: Weather Summary

Date	Average Wind Speed (m/s)	Wind Direction	General
Wed 19/11/2025	3.8	NNW	Sprinkles, scattered showers
Thu 20/11/2025	3.1	NW	Light rain 1130-1300 hours
Fri 21/11/2025	1.8	SW	Cloudy, dry
Sat 22/11/2025	2.5	SSW	Drizzle, fog
Sun 23/11/2025	4.0	WSW	Rain 0700-0900, 1330-1530, 1900-2100
Mon 24/11/2025	2.9	N	Sprinkles, scattered clouds
Tue 25/11/2025	2.8	NW	Sprinkles, scattered showers
19-20/11/2025	3.3	WNW	Clear
20-21/11/2025	1.6	W	Clear
21-22/11/2025	3.8	SSW	Clear, light rain from 0500 hours
22-23/11/2025	1.8	SSW	Fog
23-24/11/2025	3.1	SSW	Clear
24-25/11/2025	2.6	NW	Passing clouds

3.2 Summary

Table 3.2 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel. Appendix 6 contains the full raw data for the long-term measurement at MP1, and Appendix 7 contains equipment calibration details.

Table 3.2: Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFMax} (dB)	Comment
MP1	19/11/2025	0700–2300	70	77	-	A1077 traffic dominant
	20/11/2025	0700–2300	70	77	-	
	21/11/2025	0700–2300	69	76	-	
	22/11/2025	0700–2300	69	75	-	
	23/11/2025	0700–2300	69	76	-	
	24/11/2025	0700–2300	70	76	-	
	25/11/2025	0700–1534	70	76	-	
	19-20/11/2025	2300–0700	64	71	83*	A1077 traffic dominant, regular HGVs
	20-21/11/2025	2300–0700	65	70	83*	
	21-22/11/2025	2300–0700	63	70	84*	
	22-23/11/2025	2300–0700	59	63	82*	
	23-24/11/2025	2300–0700	65	56	84*	
	24-25/11/2025	2300–0700	65	70	84*	
MP1A	19/11/2025	1323–1345	66	69	78	A1077 traffic dominant
		1404–1419	65	69	77	
	25/11/2025	1139–1154	66	70	76	
MP1B	25/11/2025	1316–1332	62	66	74	A1077 traffic dominant
MP2	19/11/2025	1427–1443	66	69	77	A1077 traffic dominant
	25/11/2025	1048–1116	66	70	78	
	19/11/2025	2303–0003	60	65	78	15 no. HGVs, distant road traffic on A15, no audible plant noise
	20/11/2025	0122–0223	56	56	76	6 no. HGVs, distant road traffic on A15, no audible plant noise
MP3	25/11/2025	1504–1519	48	49	59	Distant road traffic
MP4	25/11/2025	1445–1500	49	51	57	
MP5	20/11/2025	0011–0026	61	61	-	Circa 39 dB(A) during lulls in traffic, faint plant noise audible from Wren
MP6	20/11/2025	0030–0045	57	44	-	Circa 35 dB(A) during lulls in traffic, no audible plant noise from Wren
MP7	20/11/2025	0052–0107	43	43	-	Circa 39 dB(A) during lulls in traffic, very faint distant plant noise audible from industrial estate
		0244–0259	44	45	-	
** 11th highest maximum noise level during the night-time*						

3.3 Analysis

Noise Associated with the A1077 Barrow Road

The noise environment at the site is controlled by road traffic on the A1077 Barrow Road.

Daytime and night-time ambient noise levels at MP1 were measured at up to **70 dB $L_{Aeq\ (0700–2300)}$** and **65 dB $L_{Aeq\ (2300–0700)}$** respectively. Typical (11th highest) maximum noise levels were measured at up to **84 dB L_{AFMax}** during the night-time at MP1.

Ambient noise levels reduced with increasing distance to the A1077 Barrow Road, with comparative simultaneous measurements at MP1 and MP1A illustrating a 4 dB decrease in ambient noise levels and a 6 dB decrease in maximum noise level events due to distance.

This equates to daytime and night-time ambient noise levels of **66 dB $L_{Aeq\ (0700–2300)}$** and **61 dB $L_{Aeq\ (2300–0700)}$** respectively at MP1A (10 metres from the A1077 Barrow Road), with typical maximum noise levels of **78 dB L_{AFMax}** during the night-time.

Environmental Protection at NLC have previously questioned the use of measurements at 4 metres above ground level with cognisance to the recommended height of 1.2–1.5 metres as defined in BS7445.

To clarify, ground levels at the northern boundary of the site are slightly below the road surface of the A1077 and therefore measurements at 1.2-1.5 metres do not have fully unobstructed line-of-sight to the road. As a consequence, comparative noise measurements at MP1B (1.5 metres above ground level) are circa 3-4 dB **lower** than at MP1A (4 metres above ground level). The higher levels have been robustly adopted as worst-case to represent upper floor bedrooms.

Dwellings Fronting Towards the Proposed Link Road

Phase 1 of the proposed link road will run north to south through the site. Following consultation with the Environmental Protection Team at NLC, it was agreed that the measured data of the existing A1077 Barrow Road would be utilised for the prediction of noise associated with the proposed link road.

A transport assessment produced by Arup in support of the link road planning application (report ref: 293824/TA001, dated 29 March 2024) provided trip generation and distribution for the link road. Robustly assuming all heavy vehicles are redistributed from the A1077 to use the link road instead, Section 5 of the report details the following vehicle movements:

- **26** no. two-way trips in the AM peak hour from redistributed HGVs
- **41** two-way trips in the AM peak hour from PCUs (cars) of existing residential dwellings in the vicinity which may opt to use the link road
- **125** two-way trips in the AM peak hour from PCUs resulting from the proposed residential development

This equates to **192** two-way trips in the AM peak hour in total (13.5 % HGV).

For reference, the 2023 base flows contained in the Transport Assessment produced by Local Transport Projects for the site (report ref: LTP/25/5136, dated April 2025) states a total of **706** two-way trips in the AM peak hour (5.7 % HGV) along the existing A1077 to the north of the site.

Using the methodology described in the Department of Transport's Memorandum on the Calculation of Road Traffic Noise (CRTN) the noise level correction from **706** two-way trips (5.7 % HGV) to **192** two-way trips (13.5 % HGV) on a 30 mph road is a reduction of **4 dB**. This correction is applied to the link road ambient noise levels. Maximum noise levels from passing HGVs are unaffected by the number of vehicles and therefore the measured discrete event maxima are not corrected for traffic flow.

Noise Associated with Commercial Uses

In order to quantify whether the site is impacted by commercial noise associated with the nearby Wren Kitchens site (or units on the Humber Bridge Industrial Estate), manned monitoring was undertaken from 2300 hours on Wednesday 19th November to 0300 hours on Thursday 20th November 2025.

Noise levels at MP2 (at the junction of Falkland Way and Barrow Road) are dominated by road traffic on the A1077 Barrow Road, with regular HGVs associated with Wren Kitchens noted during the night-time. For reference, maximum noise levels associated with HGVs accelerating from the junction were measured at up to **77 dB L_{AFMax}**, which is consistent with typical maximum noise levels associated with HGV passes at MP1A.

No plant noise was audible at the northern boundary of the site, so additional measurements were undertaken outside the site boundary to identify any potential noise sources.

At MP5, in the vicinity of Options Barton School, plant noise from Wren was faintly audible but not significant, with plant noise appearing to originate from the south-eastern corner of the factory building.

At MP1 (the north-eastern corner of the development site) and at MP6 (in the vicinity of Cornhill Cottages), plant noise was no longer audible. See Figure 3.1 for monitoring locations.

Figure 3.1: Commercial Noise Monitoring Locations

At MP7, in the vicinity of residential dwellings on Bayleaf Lane, some faint distant plant noise was audible from the Humber Bridge Industrial Estate, but this was not audible at the northern boundary of the site.

4 Noise Assessment

4.1 Propagation

In order to assess the propagation of noise from the A1077 Barrow Road and the link road across the proposed site, noise level predictions have been performed using CadnaA acoustic modelling software. This is a software program specifically developed for the prediction and assessment of environmental noise.

The model calculates noise levels on horizontal and vertical grids with a user defined spacing of receiver points. From these levels, calculated at thousands of points, contour lines of constant noise levels are generated and printed as noise maps. All scaling was based on direct import from Google Earth, with 2nd order reflections considered and absorption coefficients based on the CadnaA default for brick-built structures.

The results of the modelling are contained in Appendix 3.

Design noise levels for habitable rooms fronting towards the A1077 Barrow Road and the proposed link road are as follows:

- **≤ 67 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 62 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 81 dB L_{AFMax}** during the night-time

Noise levels throughout the remainder of the site reduce with increasing distance from the roads and will reduce further once the development is built out due to screening afforded by the dwellings themselves.

4.2 Initial Site Risk Assessment

Daytime and night-time ambient noise levels at the development footprint are **≤ 67 dB $L_{Aeq\ (0700–2300)}$** and **≤ 62 dB $L_{Aeq\ (2300–0700)}$** respectively. With respect to Figure 2.1, this equates to a medium to high risk site in accordance with ProPG. At these levels ProPG requires a detailed assessment of the noise.

4.3 ProPG Detailed Stage 2 Assessment

Element 1 – Good Acoustic Design Process

Paragraph 2.23 of ProPG provides a checklist of 7 aspects which should be considered with regard to good acoustic design. These aspects are listed in Table 4.1 overleaf, along with acoustic considerations with respect to the site.

Table 4.1: ProPG Good Acoustic Design Aspects

Aspect	Preliminary Considerations
Check the feasibility of relocating, or reducing noise levels from relevant sources.	The dominant noise sources are Barrow Road and the link road of which is to be delivered within the remits of the site by North Lincolnshire Council. Barrow Road itself, is permanent infrastructure of which cannot be feasibly relocated and the link road is a planning approved piece of highways infrastructure of which its location has been granted planning permission by the Local Planning Authority and therefore is now permanent in its location. In relation to reducing noise levels from the relevant sources, whilst the level of traffic utilising such highways cannot be controlled by Strata, noise measures are proposed within the remits of the development in order to mitigate any potential associated impact upon residential dwellings.
Consider options for planning the site or building layout.	The site layout has been designed in order to ensure that whilst the proposed development takes into consideration the acoustic context of the local area, built form is still respectful of the character of the local area in line with Policy H5 and is a positive extension to Barton upon Humber from an urban design perspective. <u>Barrow Road</u> Dwellings have been set back from Barrow Road and consideration of the layout adjacent to Barrow Road has ensured that suitable acoustic mitigation can be provided in order to deliver an acceptable acoustic environment for the dwellings. <u>Link Road</u> Whilst consideration has been made to fence lines fronting this link road from an acoustic perspective, this would not constitute sustainable settlement growth; isolating and enclosing the development from the existing settlement of Barton upon Humber. An active facade and streetscene is to be provided along the link road to ensure the creation of a place which respects and enhances the existing built environment and enables the delivery of a pleasant living environment thus supporting Policy H5 of the Local Plan.
Consider the orientation of proposed building(s).	As outlined within the section above, the location of all dwellings has been suitably considered balancing the acoustic context of the site with urban design principles to enable sustainable settlement growth. In relation to orientation, dwellings are predominantly fronting onto the surrounding highway network from a streetscene perspective with lounges largely facing the rear of properties. The location of built form provides additional mitigation protecting the acoustic environment of private amenity spaces.
Select construction types and methods for meeting building performance requirements.	Glazing/ventilation options are considered in Element 2.
Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.	Typical noise control measures (glazing/ventilation and boundary screening) are usually acceptable in terms of ventilation, fire regulation, health & safety, cost and CDM.
Assess the viability of alternative solutions.	Given the context of the site and the site's existing viability constraints (supported by the submission of a financial viability appraisal) tied with the need to deliver a high quality development which is respectfully designed, this assessment considers the integration of the most suitable and viable acoustic mitigation measures.
Assess external amenity area noise.	External amenity is considered in Element 3.

Element 2 – Internal Noise Level Guidelines

Design noise levels for habitable rooms fronting towards the A1077 Barrow Road and the proposed link road are as follows:

- **≤ 67 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 62 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 81 dB L_{AFMax}** during the night-time

Design noise levels at the road-facing habitable rooms of Plot 1, Plots 92–94, Plots 128–130 and Plot 185 (set back from but still exposed to the roads) are as follows:

- **≤ 60 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 56 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 74 dB L_{AFMax}** during the night-time

Design noise levels at remaining habitable rooms (including the rears of road-fronting plots) are as follows:

- **≤ 59 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 55 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 70 dB L_{AFMax}** during the night-time

In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, typical room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFMax} in this case).

Plots Adjacent to Barrow Road and the Link Road

Due to elevated noise levels from the existing and proposed highway infrastructure, it is recommended that dwellings within 40 metres of the A1077 Barrow Road or the link road are provided with a system of decentralised mechanical extract ventilation (dMEV) using continuously-running kitchen and bathroom extracts on a 'trickle' rate.

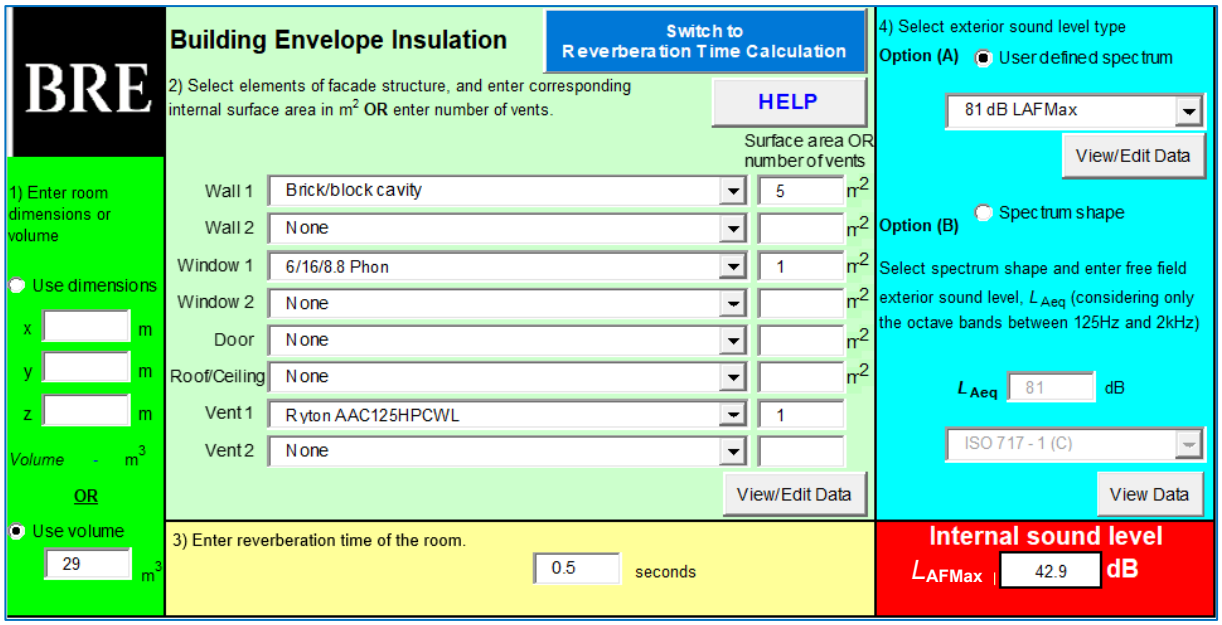
Approved Document F 'Ventilation' (ADF) states that where dMEV is used, background ventilators of at least 4000 mm² EA must be provided to each habitable room, with 1 no. ventilator required per bedroom and 2 no. ventilators required in living rooms. Background ventilators are not required where an MVHR system is employed.

Bedrooms fronting towards the roads should be fitted with enhanced laminated glazing rated at least **35 dB R_w+C_{tr}** (such as 6 mm glass / 16 Argon / 8.8 mm Pilkington Optiphon) in conjunction with 1 no. acoustic wall vent rated at least **41 dB $D_{n,e,w}+C_{tr}$** per 4000 mm² EA (vent open), such as the Ryton AAC125HPCWL, or equivalent.

As evidenced in the calculation sheet overleaf, this configuration will provide circa 38 dB(A) sound insulation from external to internal at the site.

Note: It is the control of discrete event maxima from passing vehicles during the night-time which governs the glazing/ventilation requirements in road-fronting bedrooms.

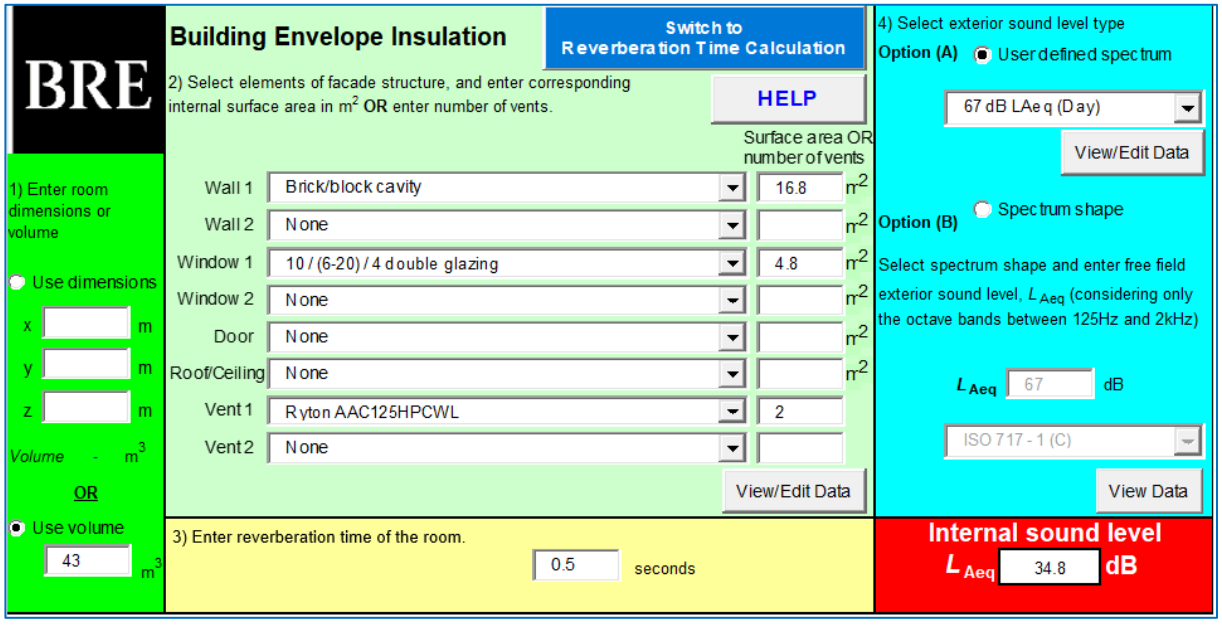
Figure 4.1: BRE Calculation Spreadsheet (road-fronting bedrooms)



Road-fronting ground floor habitable rooms should be fitted with enhanced glazing rated at least **30 dB R_w+C_{tr}** (such as 10 mm glass / 6–20 mm cavity / 4 mm glass) in conjunction with acoustic wall vents rated at least **41 dB $D_{n,e,w}+C_{tr}$** per 4000 mm² EA (vent open).

As evidenced in the calculation sheet below, this configuration will provide circa 32 dB(A) sound insulation from external to internal at the site.

Figure 4.2: BRE Calculation Spreadsheet (road-fronting lounges)



Road-fronting habitable rooms of Plot 1, Plots 92–94, Plots 128–130 and Plot 185 (set back from the roads) should be fitted with glazing rated at least **28 dB R_w+C_{tr}** (such as 6 mm glass / 6–20 mm cavity / 4 mm glass) in conjunction with acoustic wall vents rated at least **41 dB $D_{n,e,w}+C_{tr}$** per 4000 mm² EA (vent open).

As evidenced in the calculation sheets below, this configuration will provide circa 34 dB(A) sound insulation to bedrooms and circa 30 dB(A) sound insulation to lounges.

Figure 4.3: BRE Calculation Spreadsheet (bedrooms set back from the roads)

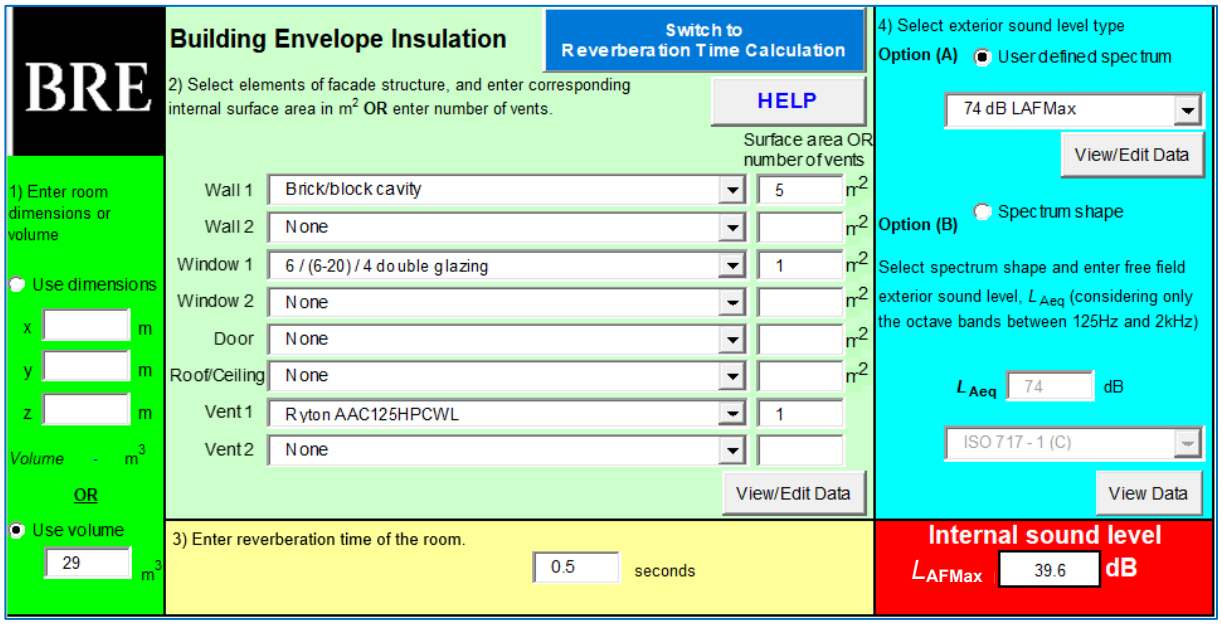
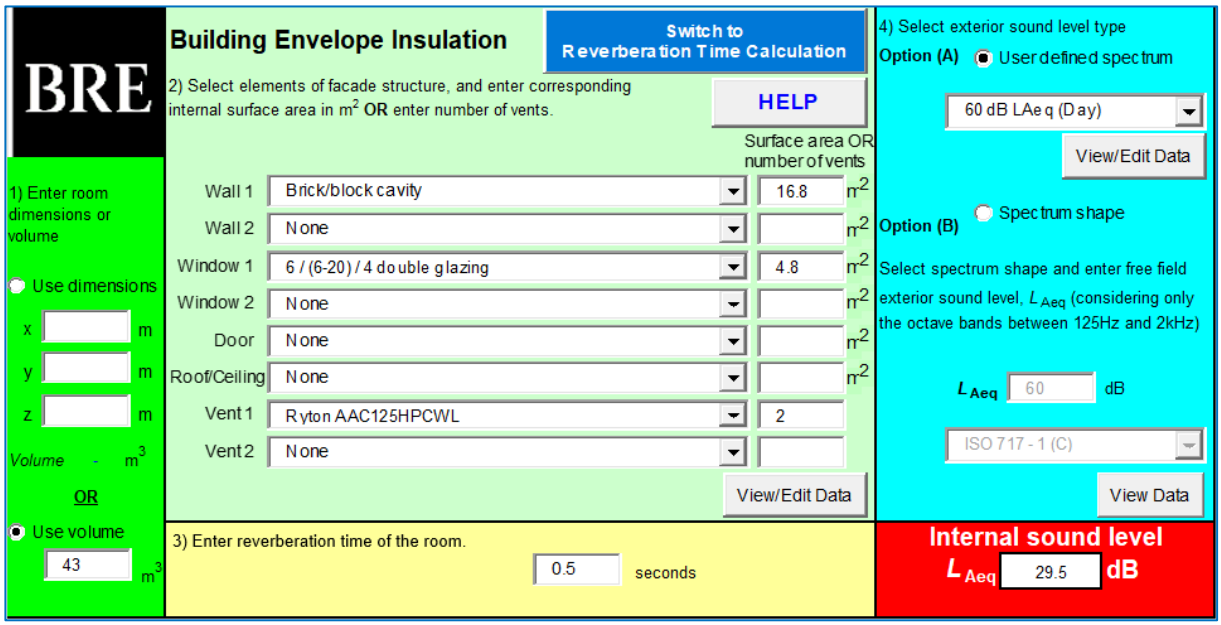


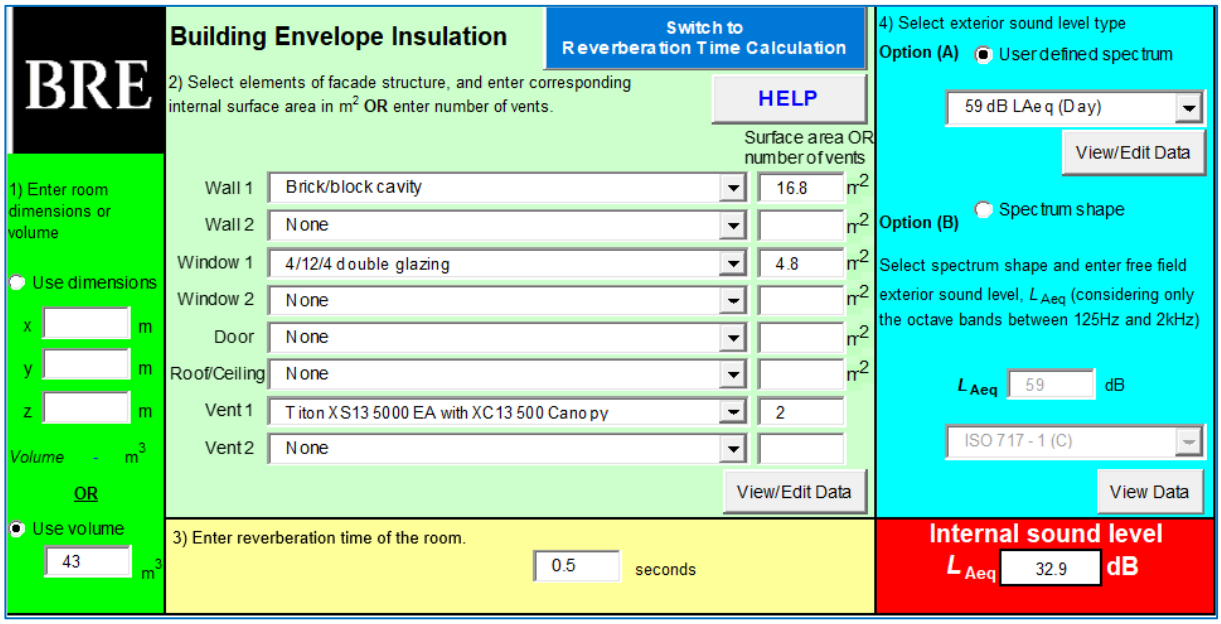
Figure 4.4: BRE Calculation Spreadsheet (lounges set back from the roads)



Habitable rooms on the rears of plots within 40 metres of the A1077 Barrow Road or the link road may be fitted with standard glazing rated at least **25 dB R_w+C_{tr}** in conjunction with standard wall vents or trickle vents rated at least **32 dB $D_{n,e,w}$** per 4000 mm² EA (vent open) such as the Titon Trimvent Select Xtra S13 with XC13 canopy.

As evidenced in the calculation sheet below, this configuration will provide at least 26 dB(A) sound insulation from external to internal at the site.

Figure 4.5: BRE Calculation Spreadsheet (rear facing habitable rooms)



Remaining habitable rooms throughout the site may be fitted with double glazing rated at least **25 dB R_w+C_{tr}** in conjunction with standard trickle vents or wall vents rated at least **33 dB $D_{n,e,w}$** per 5000 mm² EA (vent open).

The resultant internal noise levels are set out in the table below. See Appendix 4 for annotated scheme of sound attenuation.

Table 4.2: External Noise Levels and Resultant Internal Noise Levels

Location	External Noise Level	Reduction	Resultant Internal Level
Bedrooms adjacent to/fronting towards the A1077 and link road	≤ 67 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 62 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 81 dB L_{AFMax}	–38 dB	≤ 29 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 24 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 43 dB L_{AFMax}
Living rooms adjacent to/fronting towards the A1077 and link road	≤ 67 dB $L_{Aeq\ (0700\text{-}2300)}$	–32 dB	≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$
Bedrooms set back from but exposed to the roads	≤ 60 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 56 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 74 dB L_{AFMax}	–34 dB	≤ 26 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 22 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 40 dB L_{AFMax}
Living rooms set back from but exposed to the roads	≤ 60 dB $L_{Aeq\ (0700\text{-}2300)}$	–30 dB	≤ 30 dB $L_{Aeq\ (0700\text{-}2300)}$
Remaining habitable rooms	≤ 59 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 55 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 70 dB L_{AFMax}	–26 dB	≤ 33 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 29 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 44 dB L_{AFMax}

General Points

The ceilings (and side cheeks to the dormer windows) in any room-in-roof bedrooms requiring enhanced glazing should be double boarded, with 100 mm (minimum) mineral wool insulation above. The glazing requirements are also applicable to 'Velux' windows.

The following points should be noted:

- The glazing recommendations apply to the window within a sealed unit. It is the responsibility of the window supplier to ensure that the window frame does not compromise the performance of the glazing.
- When selecting a glazing system to satisfy the requirements outlined above, it is important to ensure that the $R_w + C_{tr}$ value is achieved (rather than simply the R_w value). Published R_w values tend to be higher than corresponding $R_w + C_{tr}$ values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels.
- The opening and free area of the ventilation units should be checked by a mechanical service engineer before designs are finalised. Should the equivalent open area be insufficient to meet the minimum requirements of ADF, it may be necessary to increase the number of units per habitable room. Where this applies, the required sound reduction of the ventilation units may need to be increased accordingly
- Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms

Element 3 – External Amenity Area Noise Assessment

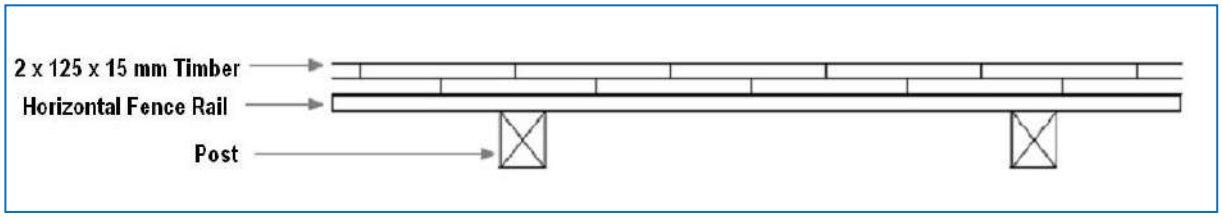
The site layout indicates that the majority of dwellings adjacent to the A1077 and the link road will 'front onto' the roads, such that gardens of these plots will be screened by the dwellings themselves.

In order to reduce garden levels as low as practicable, where gardens are still exposed to existing and proposed highway infrastructure, it is recommended that they are provided with circa 2400 mm high solid timber fences or brick walls (see Appendix 4 for barrier locations).

A brick wall of any construction is appropriate, providing there are no gaps in the construction.

If a solid timber fence is installed, then it should be ensured that it has a mass per unit area of ≥ 10 kg/m^2. The fence should have no gaps or holes and should be fully sealed at the ground (i.e. include a gravel board).

An indicative acoustic fence detail is illustrated below. The double-thickness solid timber construction is considered robust and appropriate.



Appendix 3 contains daytime garden noise level contour plots. The modelling indicates that, with the provision of acoustic screening as specified, daytime ambient noise levels in the majority of gardens (178 out of 196) are **≤ 50 dB $L_{Aeq\ (0700–2300)}$.**

Noise levels in the remaining 18 no. gardens are **50–55 dB $L_{Aeq\ (0700\text{-}2300)}$**. This is within the target range described in ProPG, which states that ***'noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.'***.

With respect to garden amenity, the Environmental Protection Team at NLC have previously stated that:

'Furthermore, section 7.7.3.2 of BS8233:2014 states that a compromise should be made between elevated noise levels in city centre and urban areas where there are other factors that should be considered such as the convenience of living in the location. However, Barton-Upon-Humber is a market town rather than a city, and this development is on the outskirts of the town which is not subject to noises typically found in a busy city.

This department would not expect outdoor living areas to exceed 50dB LAeq in this location to ensure adequate protection from noise.'

Section 7.7.3.2 of BS8233 also 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 $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.'*

Whilst Barton-Upon-Humber is a market town, the site itself is adjacent to a noisy road and a link road which is designed to re-route HGVs. It is therefore considered that the upper guideline value is acceptable for a limited number of gardens in proximity to these roads

Further, it is not feasible to reduce garden levels further without impractically high acoustic fencing or the loss of plots, and ProPG (part-authored by the CIEH) also reiterates that:

'...the advice in BS8233:2014 states that the resulting noise levels outside are never a reason for refusal as long as levels are designed to be as low as practicable.'

External noise levels above 50 dB yet below 55 dB, therefore still being within the target range described in ProPG, in a limited number of gardens across the site may therefore be reasonably expected in close proximity to a busy A-road, and these elevated levels should be considered within the wider context of the site as a convenient commuter location, in accordance with the guidance contained in ProPG/BS 8233.

Element 4 – Assessment of Other Relevant Issues

Paragraph 2.56 of ProPG provides a checklist of 5 aspects which should be considered with regard to other relevant issues. These aspects are listed below, along with preliminary considerations with respect to the site.

Table 4.2: ProPG Other Relevant Issues

Aspect	Preliminary Considerations
Compliance with relevant national and local policy	With regard to national policy, the assessment aligns with the aims of the NPPF, NPSE and PPG, as detailed in Section 2.00.
Magnitude and extent of compliance with ProPG	Given the external noise levels impacting the site, there are no anticipated issues with regards to meeting internal or external noise levels.
Likely occupants of the development	This is not considered relevant to this development.
Acoustic design v unintended adverse consequences	The likely noise control measures (acoustic glazing/ventilation and boundary screening) should not result in unintended adverse consequences are conflict with wider planning objectives.
Acoustic design v wider planning objectives	

5 Mitigation of Overheating

For reference, Paragraph 2.72 (h) of ProPG requires a detailed assessment of the overheating condition, including:

(i) the alternative design measures considered / applied to reduce noise impact on occupants, (ii) the expected internal noise levels when windows / ventilators are opened to provide relief from overheating, and (iii) an estimate of the amount of time that windows are likely to be open to provide relief from overheating

It should be noted that since publication of ProPG, Approved Document O (ADO) has come into force to address overheating in residential dwellings.

ADO supersedes the ProPG overheating assessment and simplifies the assessment of noise levels during the overheating condition by setting fixed noise thresholds and stating that bedroom windows must be assumed to be closed during night-time hours (2300–0700 hours) where these limits are exceeded.

This information is then provided to the overheating assessor for the site, in order to determine the extent of additional mitigation required to comply with ADO.

ADO states that for moderate risk locations (i.e. outside of London) the minimum free area of the open window should be at least 4% of the floor area of the room.

As the open area varies as a function of the floor area, for a typical floor-to-ceiling height of 2.4m, a free area of 4% of the floor area equates to an external to internal noise reduction of 10 dB.

With reference to the internal targets contained in ADO, it is assumed that open windows can form the overheating mitigation strategy with no additional ventilation or cooling, providing the external noise levels outside bedrooms at night do not exceed **50 dB $L_{Aeq\ (2300\text{-}0700)}$** and **65 dB L_{AFMax}**.

Based on the results of the noise modelling, road-fronting bedroom windows of plots in the vicinity of the A1077 and the link road are assumed to be closed during night-time hours (see Appendix 5 for façade locations where bedroom windows are assumed to be closed during night-time hours).

For remaining bedrooms, windows may be opened to the minimum open area of 5% of the floor area, meaning that the overheating mitigation strategy is not constrained by acoustics.

6 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential development at land to the south of Barrow Road, Barton-upon-Humber.

The noise environment at the site was observed to be dominated by road traffic on the A1077 Barrow Road, with no other significant noise sources noted. Noise from the proposed link road has also been taken into account.

A scheme of sound attenuation works (enhanced glazing/ventilation) and boundary treatments has been developed to protect the proposed residential development from the ambient noise climate.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 µPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night-time noise levels.

$L_{A10, T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 – Measurement Positions

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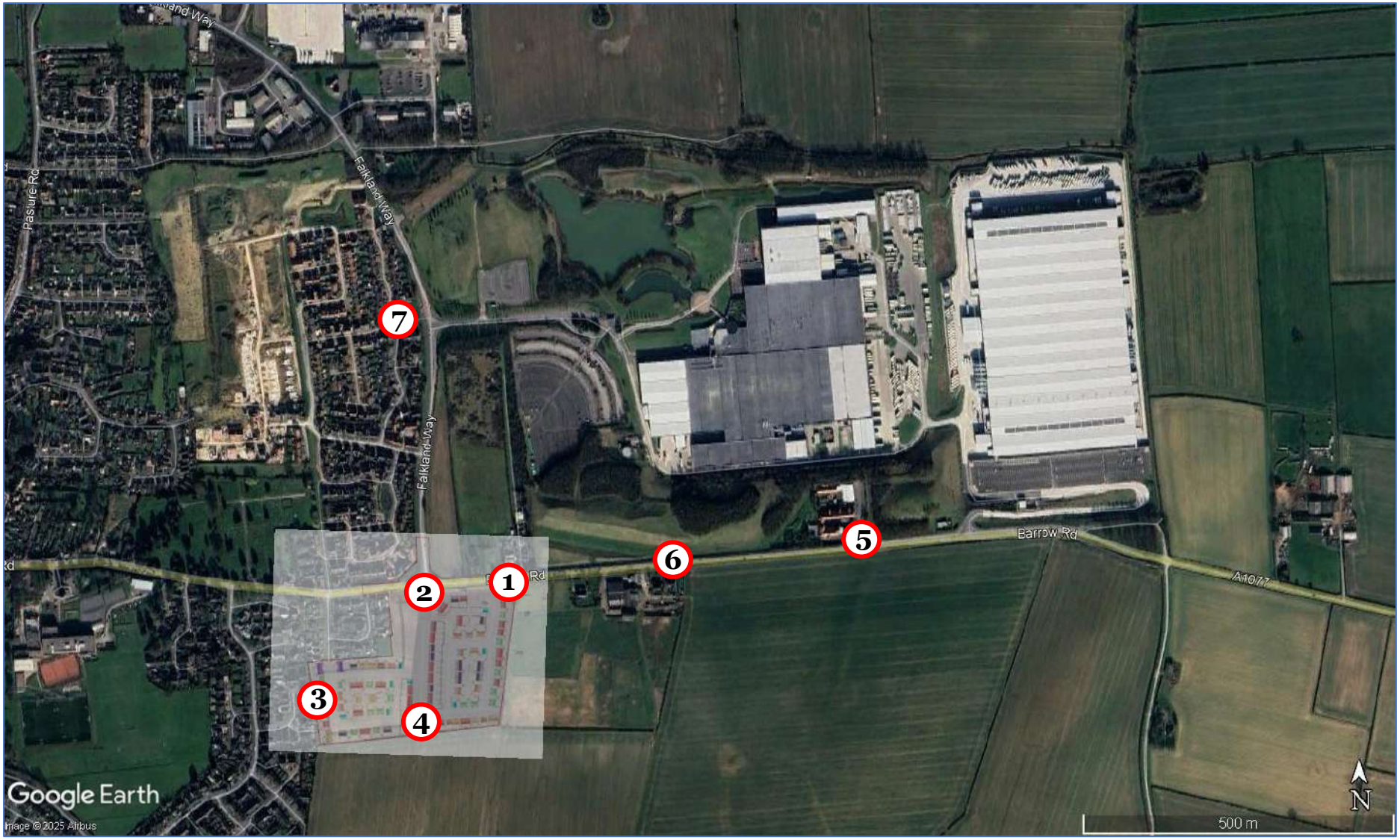
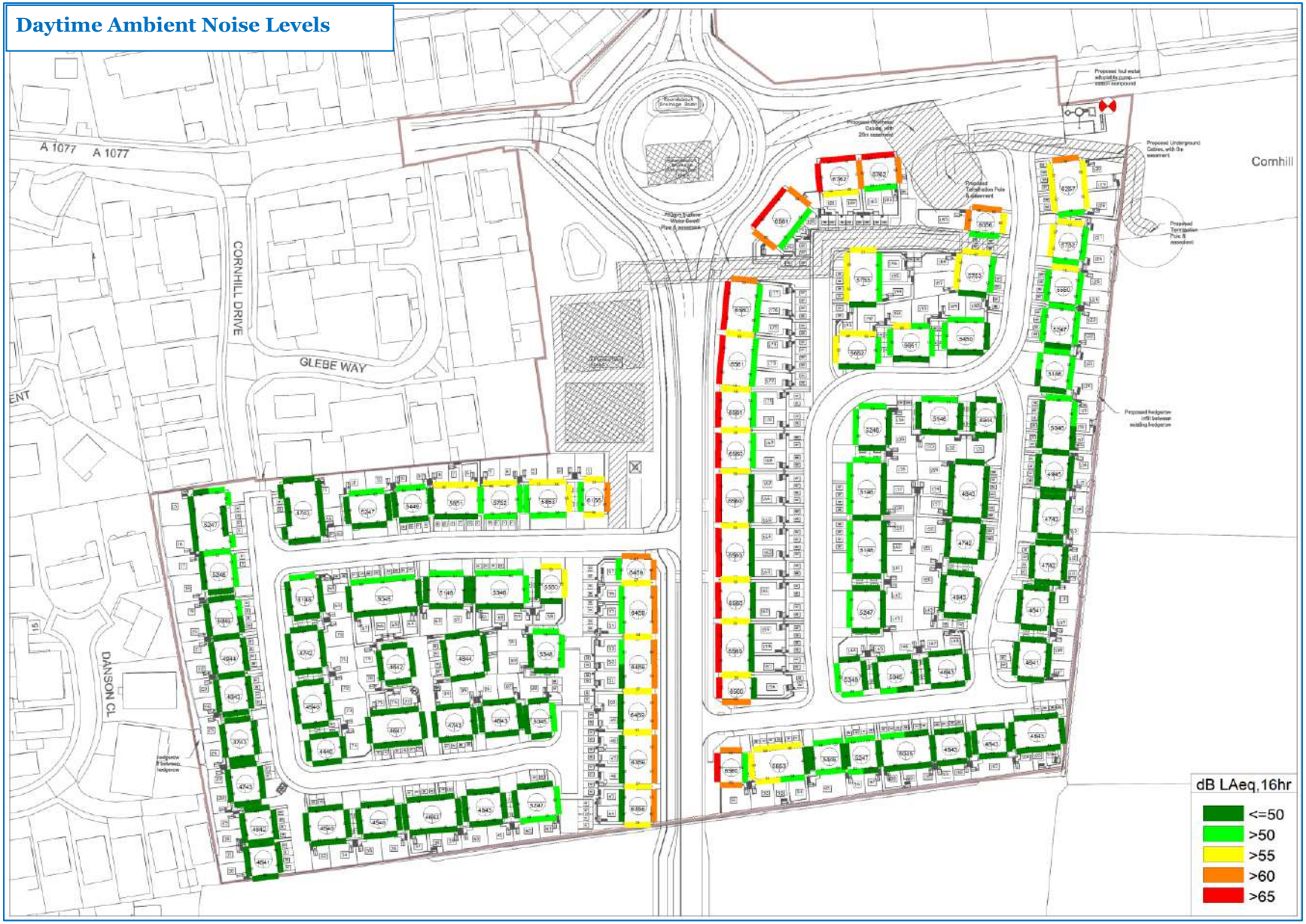


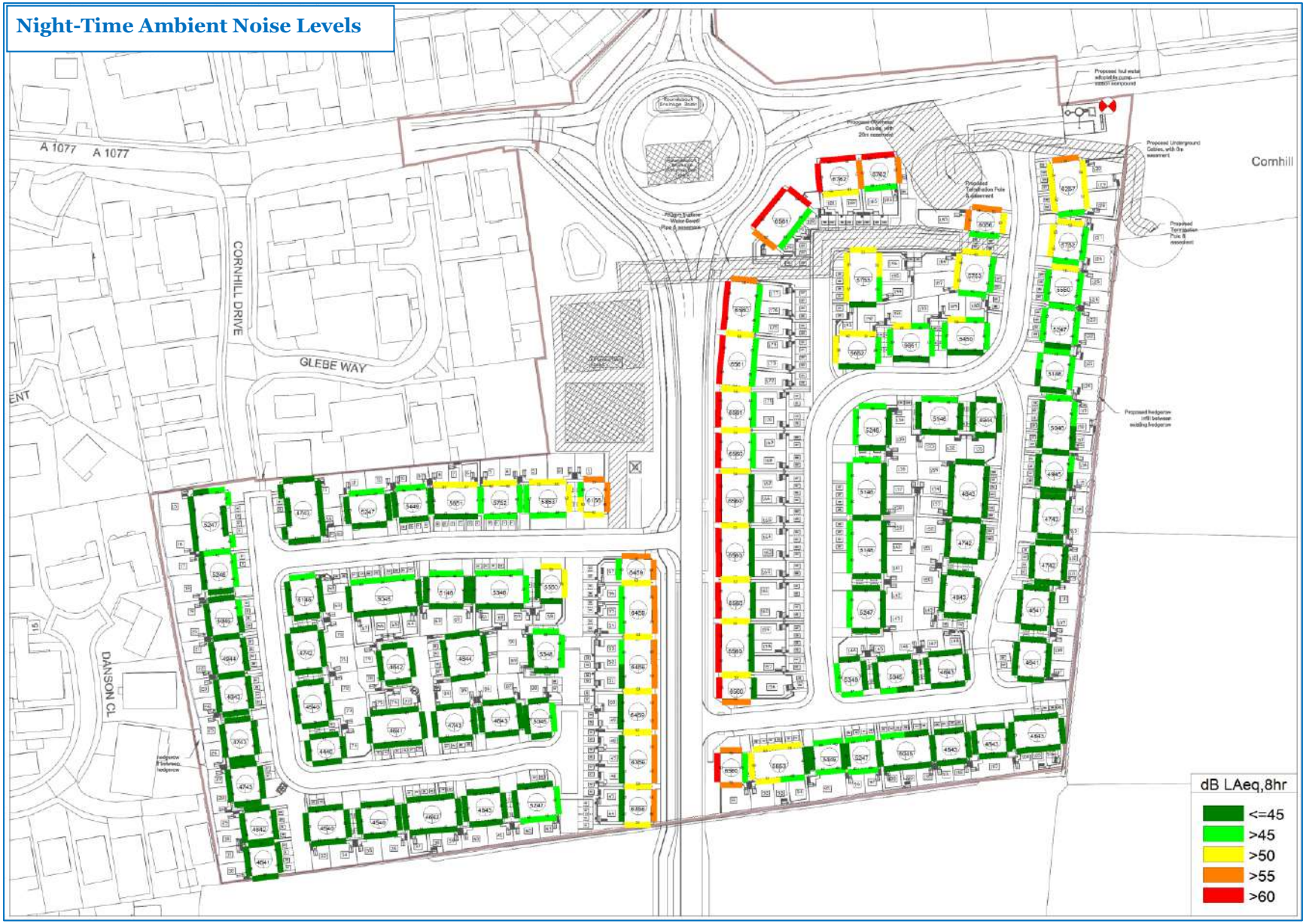
Appendix 3 – Noise Contour Plots

Daytime Ambient Noise Levels



Appendix 3 – Noise Contour Plots

Night-Time Ambient Noise Levels

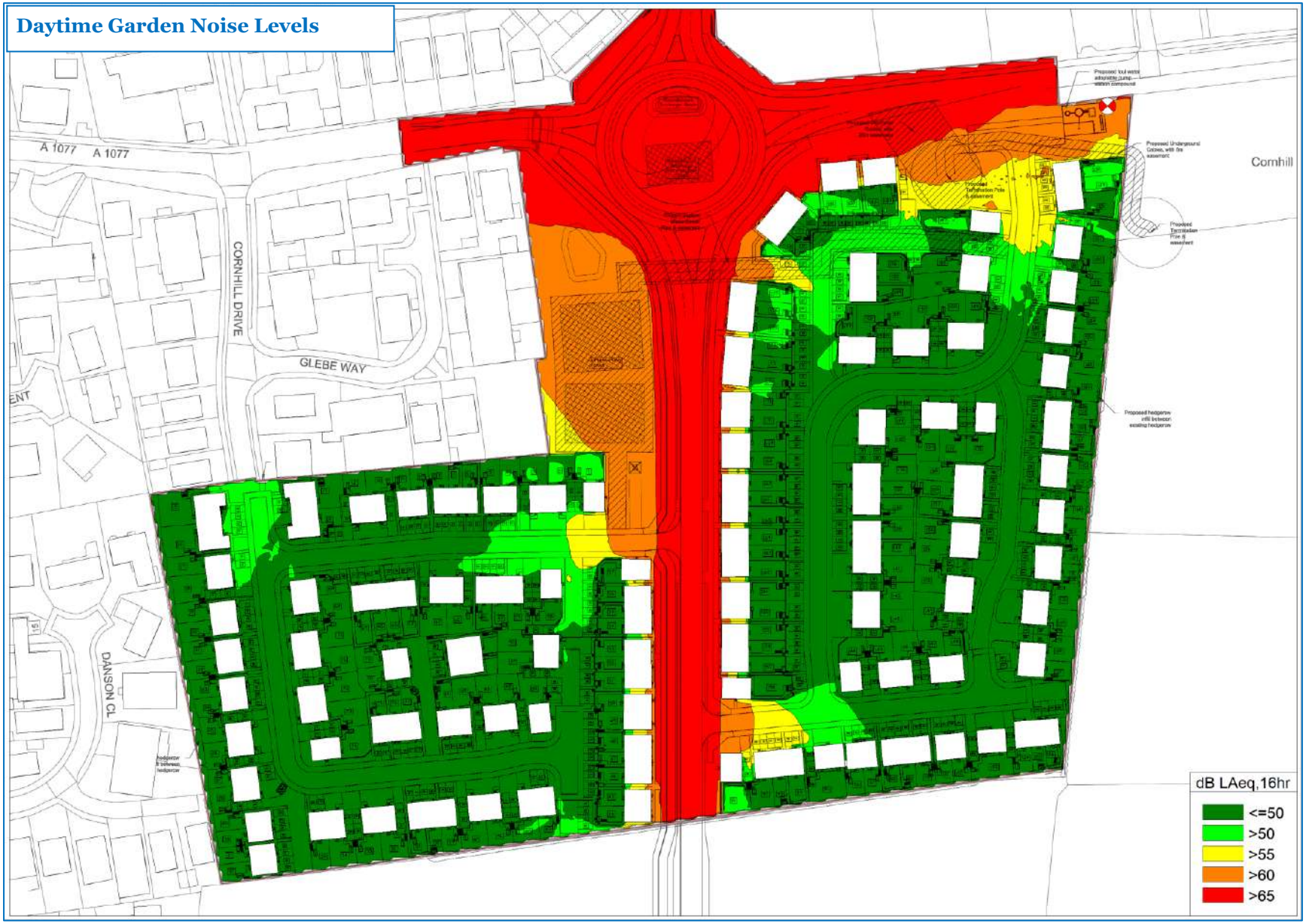


Appendix 3 – Noise Contour Plots

Night-Time Maximum Noise Levels

Appendix 3 – Noise Contour Plots

Daytime Garden Noise Levels



Appendix 4 – Scheme of Sound Attenuation

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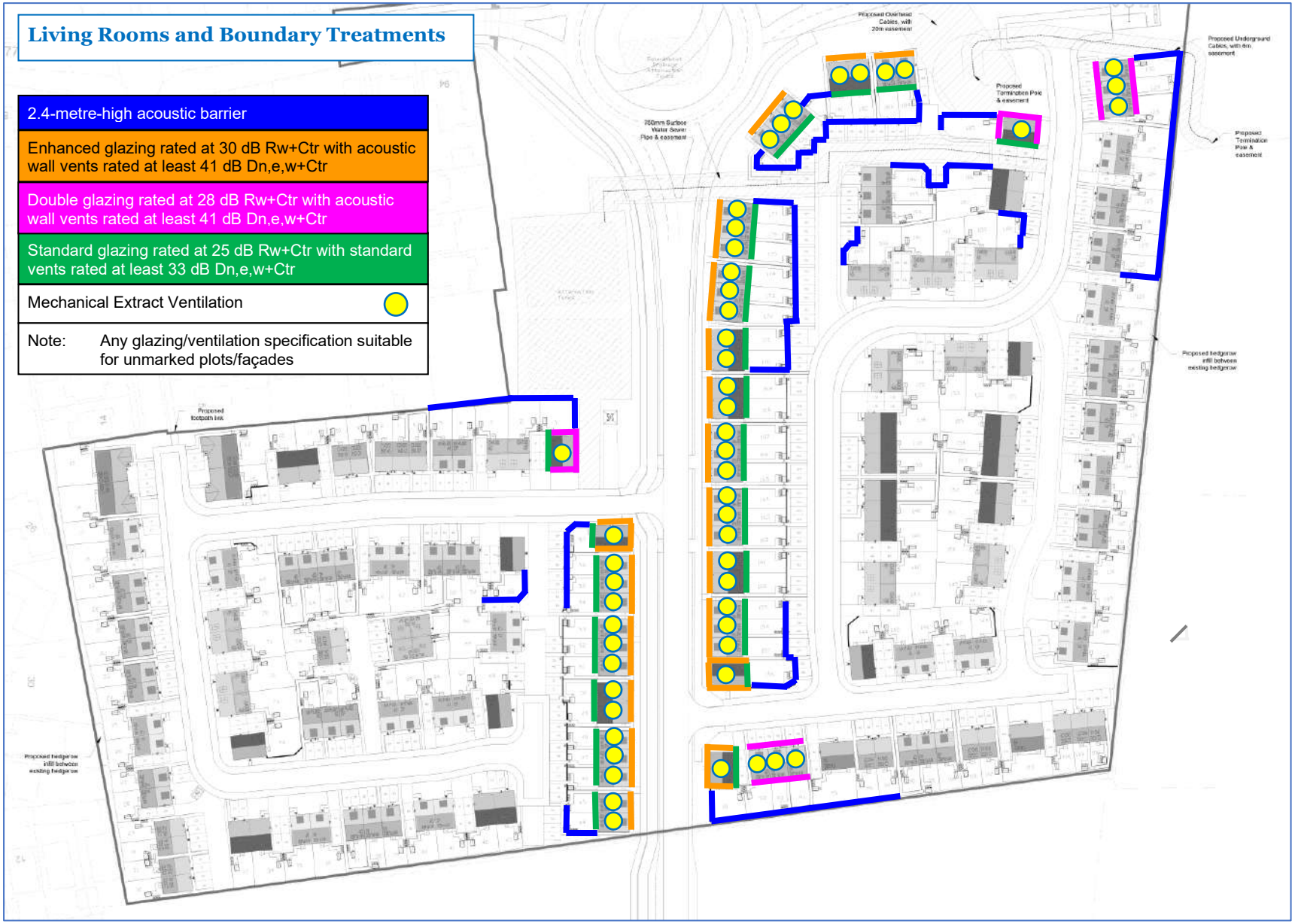

Appendix 5 – Approved Document O Assessment

Appendix 6 – Baseline Noise Measurement Data

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-19 07:00:00	70.0	84.6
2025-11-19 07:15:00	70.3	84.3
2025-11-19 07:30:00	70.6	81.3
2025-11-19 07:45:00	70.5	87.7
2025-11-19 08:00:00	71.0	87.6
2025-11-19 08:15:00	71.7	95.3
2025-11-19 08:30:00	70.4	83.9
2025-11-19 08:45:00	70.2	80.8
2025-11-19 09:00:00	69.7	82.8
2025-11-19 09:15:00	69.1	81.5
2025-11-19 09:30:00	69.3	83.1
2025-11-19 09:45:00	68.1	86.9
2025-11-19 10:00:00	68.9	82.4
2025-11-19 10:15:00	68.2	80.6
2025-11-19 10:30:00	68.9	82.0
2025-11-19 10:45:00	73.9	87.2
2025-11-19 11:00:00	72.2	85.0
2025-11-19 11:15:00	72.4	83.5
2025-11-19 11:30:00	72.4	84.9
2025-11-19 11:45:00	71.0	83.8
2025-11-19 12:00:00	71.4	83.3
2025-11-19 12:15:00	70.7	83.6
2025-11-19 12:30:00	70.0	83.2
2025-11-19 12:45:00	69.6	86.2
2025-11-19 13:00:00	71.7	88.5
2025-11-19 13:15:00	71.7	84.7
2025-11-19 13:30:00	72.9	88.7
2025-11-19 13:45:00	70.8	83.4
2025-11-19 14:00:00	70.9	84.4
2025-11-19 14:15:00	70.2	84.2
2025-11-19 14:30:00	71.3	84.1
2025-11-19 14:45:00	71.4	82.6
2025-11-19 15:00:00	71.4	83.9
2025-11-19 15:15:00	72.9	95.9
2025-11-19 15:30:00	71.6	83.3
2025-11-19 15:45:00	73.2	98.2
2025-11-19 16:00:00	72.0	83.8
2025-11-19 16:15:00	71.0	84.1
2025-11-19 16:30:00	70.9	83.0
2025-11-19 16:45:00	70.5	81.3
2025-11-19 17:00:00	71.1	83.4
2025-11-19 17:15:00	70.9	83.6
2025-11-19 17:30:00	71.0	83.1
2025-11-19 17:45:00	71.6	83.2
2025-11-19 18:00:00	70.3	81.8
2025-11-19 18:15:00	69.9	83.8
2025-11-19 18:30:00	69.6	84.1
2025-11-19 18:45:00	71.6	86.0
2025-11-19 19:00:00	70.6	82.2
2025-11-19 19:15:00	72.1	86.9
2025-11-19 19:30:00	70.8	86.7
2025-11-19 19:45:00	68.6	83.8
2025-11-19 20:00:00	69.1	85.3
2025-11-19 20:15:00	68.0	84.1
2025-11-19 20:30:00	68.2	85.2
2025-11-19 20:45:00	67.0	83.8

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-19 21:00:00	67.0	84.6
2025-11-19 21:15:00	66.6	81.1
2025-11-19 21:30:00	65.4	82.5
2025-11-19 21:45:00	63.5	84.8
2025-11-19 22:00:00	64.8	86.8
2025-11-19 22:15:00	63.6	82.3
2025-11-19 22:30:00	63.9	86.5
2025-11-19 22:45:00	61.5	81.3
2025-11-19 23:00:00	63.3	87.3
2025-11-19 23:15:00	58.9	79.9
2025-11-19 23:30:00	60.8	83.6
2025-11-19 23:45:00	57.7	80.0
2025-11-20 00:00:00	61.4	78.8
2025-11-20 00:15:00	57.5	78.7
2025-11-20 00:30:00	52.9	79.1
2025-11-20 00:45:00	55.3	78.3
2025-11-20 01:00:00	58.0	83.0
2025-11-20 01:15:00	53.8	77.4
2025-11-20 01:30:00	45.8	71.6
2025-11-20 01:45:00	53.8	77.6
2025-11-20 02:00:00	60.0	79.6
2025-11-20 02:15:00	56.2	81.7
2025-11-20 02:30:00	54.5	78.6
2025-11-20 02:45:00	49.4	75.0
2025-11-20 03:00:00	49.1	75.2
2025-11-20 03:15:00	56.9	85.4
2025-11-20 03:30:00	54.4	77.4
2025-11-20 03:45:00	59.9	82.2
2025-11-20 04:00:00	57.8	79.2
2025-11-20 04:15:00	58.7	79.4
2025-11-20 04:30:00	63.5	83.4
2025-11-20 04:45:00	64.4	81.0
2025-11-20 05:00:00	63.5	82.2
2025-11-20 05:15:00	67.1	82.2
2025-11-20 05:30:00	70.8	94.8
2025-11-20 05:45:00	69.7	83.3
2025-11-20 06:00:00	66.8	82.0
2025-11-20 06:15:00	70.7	89.1
2025-11-20 06:30:00	71.5	82.1
2025-11-20 06:45:00	69.7	86.2
2025-11-20 07:00:00	68.5	84.0
2025-11-20 07:15:00	69.7	82.3
2025-11-20 07:30:00	69.3	83.1
2025-11-20 07:45:00	69.4	81.8
2025-11-20 08:00:00	66.0	79.9
2025-11-20 08:15:00	64.8	82.5
2025-11-20 08:30:00	65.0	79.3
2025-11-20 08:45:00	67.3	88.4
2025-11-20 09:00:00	68.1	83.0
2025-11-20 09:15:00	68.1	83.7
2025-11-20 09:30:00	70.8	84.0
2025-11-20 09:45:00	70.7	81.9
2025-11-20 10:00:00	71.6	84.3
2025-11-20 10:15:00	71.2	84.9
2025-11-20 10:30:00	71.2	82.9
2025-11-20 10:45:00	71.9	84.7
2025-11-20 11:00:00	70.9	84.6
2025-11-20 11:15:00	70.7	84.0
2025-11-20 11:30:00	71.2	84.6

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-20 11:45:00	71.1	86.1
2025-11-20 12:00:00	72.1	85.4
2025-11-20 12:15:00	72.2	85.1
2025-11-20 12:30:00	72.6	85.0
2025-11-20 12:45:00	71.5	86.3
2025-11-20 13:00:00	72.1	87.0
2025-11-20 13:15:00	71.7	87.0
2025-11-20 13:30:00	71.3	83.9
2025-11-20 13:45:00	71.6	86.9
2025-11-20 14:00:00	71.0	83.4
2025-11-20 14:15:00	71.1	86.3
2025-11-20 14:30:00	72.1	88.7
2025-11-20 14:45:00	71.6	83.3
2025-11-20 15:00:00	72.2	85.1
2025-11-20 15:15:00	71.1	82.5
2025-11-20 15:30:00	71.8	82.4
2025-11-20 15:45:00	72.2	87.8
2025-11-20 16:00:00	72.0	83.8
2025-11-20 16:15:00	70.1	82.7
2025-11-20 16:30:00	71.4	88.5
2025-11-20 16:45:00	71.4	83.8
2025-11-20 17:00:00	71.2	85.7
2025-11-20 17:15:00	71.3	84.2
2025-11-20 17:30:00	71.6	85.4
2025-11-20 17:45:00	71.7	83.6
2025-11-20 18:00:00	70.5	82.0
2025-11-20 18:15:00	71.2	83.9
2025-11-20 18:30:00	70.1	83.4
2025-11-20 18:45:00	71.6	85.4
2025-11-20 19:00:00	71.9	84.6
2025-11-20 19:15:00	71.1	83.9
2025-11-20 19:30:00	72.1	84.4
2025-11-20 19:45:00	70.7	85.1
2025-11-20 20:00:00	70.7	84.8
2025-11-20 20:15:00	69.1	85.1
2025-11-20 20:30:00	68.1	83.6
2025-11-20 20:45:00	65.7	83.0
2025-11-20 21:00:00	67.7	83.8
2025-11-20 21:15:00	67.2	83.6
2025-11-20 21:30:00	64.9	82.6
2025-11-20 21:45:00	65.1	83.5
2025-11-20 22:00:00	65.0	82.0
2025-11-20 22:15:00	64.9	84.8
2025-11-20 22:30:00	65.6	83.9
2025-11-20 22:45:00	65.8	84.0
2025-11-20 23:00:00	65.5	82.5
2025-11-20 23:15:00	61.5	83.1
2025-11-20 23:30:00	56.9	79.3
2025-11-20 23:45:00	57.3	82.6
2025-11-21 00:00:00	61.5	79.8
2025-11-21 00:15:00	58.2	79.8
2025-11-21 00:30:00	59.1	84.4
2025-11-21 00:45:00	56.6	81.1
2025-11-21 01:00:00	54.3	78.3
2025-11-21 01:15:00	45.7	62.5
2025-11-21 01:30:00	59.4	82.6
2025-11-21 01:45:00	53.1	81.9
2025-11-21 02:00:00	58.9	78.2
2025-11-21 02:15:00	52.0	75.7

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-21 02:30:00	49.0	74.7
2025-11-21 02:45:00	52.2	79.4
2025-11-21 03:00:00	39.1	55.9
2025-11-21 03:15:00	53.1	81.2
2025-11-21 03:30:00	59.3	81.3
2025-11-21 03:45:00	60.9	82.5
2025-11-21 04:00:00	59.7	83.5
2025-11-21 04:15:00	62.0	85.0
2025-11-21 04:30:00	66.0	96.7
2025-11-21 04:45:00	64.5	85.3
2025-11-21 05:00:00	63.7	82.1
2025-11-21 05:15:00	66.8	81.0
2025-11-21 05:30:00	70.5	95.2
2025-11-21 05:45:00	69.8	87.7
2025-11-21 06:00:00	67.2	83.0
2025-11-21 06:15:00	69.4	83.2
2025-11-21 06:30:00	71.8	83.0
2025-11-21 06:45:00	71.0	87.5
2025-11-21 07:00:00	68.6	84.1
2025-11-21 07:15:00	69.8	89.3
2025-11-21 07:30:00	69.2	81.5
2025-11-21 07:45:00	69.0	83.4
2025-11-21 08:00:00	68.9	82.6
2025-11-21 08:15:00	69.2	83.6
2025-11-21 08:30:00	69.8	83.8
2025-11-21 08:45:00	69.9	85.5
2025-11-21 09:00:00	70.9	85.4
2025-11-21 09:15:00	70.4	83.5
2025-11-21 09:30:00	70.1	83.9
2025-11-21 09:45:00	70.5	85.9
2025-11-21 10:00:00	70.0	84.3
2025-11-21 10:15:00	69.2	84.8
2025-11-21 10:30:00	70.8	82.5
2025-11-21 10:45:00	70.8	84.9
2025-11-21 11:00:00	70.2	86.5
2025-11-21 11:15:00	70.3	83.4
2025-11-21 11:30:00	69.6	83.1
2025-11-21 11:45:00	70.6	87.9
2025-11-21 12:00:00	70.5	82.2
2025-11-21 12:15:00	70.0	81.0
2025-11-21 12:30:00	69.5	83.7
2025-11-21 12:45:00	70.4	83.8
2025-11-21 13:00:00	69.8	83.6
2025-11-21 13:15:00	70.0	85.8
2025-11-21 13:30:00	70.1	84.2
2025-11-21 13:45:00	69.2	81.0
2025-11-21 14:00:00	69.4	81.5
2025-11-21 14:15:00	69.9	82.3
2025-11-21 14:30:00	71.0	84.8
2025-11-21 14:45:00	70.7	83.8
2025-11-21 15:00:00	71.3	85.3
2025-11-21 15:15:00	71.7	82.7
2025-11-21 15:30:00	71.4	84.1
2025-11-21 15:45:00	71.8	82.2
2025-11-21 16:00:00	70.9	83.9
2025-11-21 16:15:00	70.4	82.9
2025-11-21 16:30:00	70.0	80.6
2025-11-21 16:45:00	70.7	80.1
2025-11-21 17:00:00	69.7	81.0

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-21 17:15:00	70.5	82.9
2025-11-21 17:30:00	70.3	84.6
2025-11-21 17:45:00	70.9	82.6
2025-11-21 18:00:00	70.1	82.2
2025-11-21 18:15:00	69.4	82.6
2025-11-21 18:30:00	69.2	84.7
2025-11-21 18:45:00	68.7	83.6
2025-11-21 19:00:00	68.4	83.7
2025-11-21 19:15:00	68.5	82.9
2025-11-21 19:30:00	67.8	84.4
2025-11-21 19:45:00	66.4	82.1
2025-11-21 20:00:00	66.0	82.4
2025-11-21 20:15:00	65.1	83.3
2025-11-21 20:30:00	66.7	83.1
2025-11-21 20:45:00	65.2	83.0
2025-11-21 21:00:00	66.0	82.1
2025-11-21 21:15:00	64.4	84.3
2025-11-21 21:30:00	64.6	81.8
2025-11-21 21:45:00	64.8	82.0
2025-11-21 22:00:00	65.7	81.9
2025-11-21 22:15:00	65.3	83.4
2025-11-21 22:30:00	63.6	81.3
2025-11-21 22:45:00	63.1	82.8
2025-11-21 23:00:00	66.1	87.5
2025-11-21 23:15:00	61.9	81.6
2025-11-21 23:30:00	62.8	81.8
2025-11-21 23:45:00	59.4	79.6
2025-11-22 00:00:00	63.5	80.0
2025-11-22 00:15:00	62.5	83.5
2025-11-22 00:30:00	61.1	80.5
2025-11-22 00:45:00	58.6	82.4
2025-11-22 01:00:00	57.3	79.6
2025-11-22 01:15:00	51.5	70.2
2025-11-22 01:30:00	54.3	76.5
2025-11-22 01:45:00	56.6	80.0
2025-11-22 02:00:00	59.6	78.5
2025-11-22 02:15:00	51.0	71.9
2025-11-22 02:30:00	53.8	78.1
2025-11-22 02:45:00	43.9	54.7
2025-11-22 03:00:00	49.0	74.3
2025-11-22 03:15:00	56.6	77.7
2025-11-22 03:30:00	54.2	75.2
2025-11-22 03:45:00	56.5	81.6
2025-11-22 04:00:00	59.6	82.9
2025-11-22 04:15:00	56.9	80.8
2025-11-22 04:30:00	58.7	81.6
2025-11-22 04:45:00	56.8	79.4
2025-11-22 05:00:00	58.1	77.0
2025-11-22 05:15:00	66.5	83.0
2025-11-22 05:30:00	71.3	83.6
2025-11-22 05:45:00	71.0	95.8
2025-11-22 06:00:00	65.4	83.9
2025-11-22 06:15:00	63.9	83.0
2025-11-22 06:30:00	64.7	87.6
2025-11-22 06:45:00	65.1	82.5
2025-11-22 07:00:00	63.7	82.1
2025-11-22 07:15:00	65.7	82.0
2025-11-22 07:30:00	66.5	82.4
2025-11-22 07:45:00	69.1	86.5

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-22 08:00:00	67.1	82.2
2025-11-22 08:15:00	68.1	83.7
2025-11-22 08:30:00	69.0	85.5
2025-11-22 08:45:00	69.4	82.6
2025-11-22 09:00:00	70.0	83.9
2025-11-22 09:15:00	70.2	84.5
2025-11-22 09:30:00	70.1	82.9
2025-11-22 09:45:00	70.2	85.5
2025-11-22 10:00:00	70.6	81.9
2025-11-22 10:15:00	70.5	83.7
2025-11-22 10:30:00	69.3	81.0
2025-11-22 10:45:00	70.6	82.7
2025-11-22 11:00:00	71.0	83.0
2025-11-22 11:15:00	70.3	82.2
2025-11-22 11:30:00	70.1	84.3
2025-11-22 11:45:00	69.9	80.1
2025-11-22 12:00:00	70.8	83.4
2025-11-22 12:15:00	69.8	82.9
2025-11-22 12:30:00	69.5	81.8
2025-11-22 12:45:00	69.0	83.4
2025-11-22 13:00:00	69.6	83.5
2025-11-22 13:15:00	70.1	83.8
2025-11-22 13:30:00	71.0	84.0
2025-11-22 13:45:00	71.2	82.3
2025-11-22 14:00:00	71.1	85.0
2025-11-22 14:15:00	70.3	85.7
2025-11-22 14:30:00	70.3	81.6
2025-11-22 14:45:00	70.5	93.3
2025-11-22 15:00:00	70.5	82.9
2025-11-22 15:15:00	69.8	82.9
2025-11-22 15:30:00	69.9	85.3
2025-11-22 15:45:00	69.4	82.9
2025-11-22 16:00:00	68.7	81.1
2025-11-22 16:15:00	69.0	83.1
2025-11-22 16:30:00	69.6	85.8
2025-11-22 16:45:00	69.7	86.7
2025-11-22 17:00:00	69.1	84.5
2025-11-22 17:15:00	69.5	81.9
2025-11-22 17:30:00	69.4	81.6
2025-11-22 17:45:00	69.6	82.1
2025-11-22 18:00:00	69.0	82.6
2025-11-22 18:15:00	68.3	82.6
2025-11-22 18:30:00	68.3	80.7
2025-11-22 18:45:00	68.0	82.1
2025-11-22 19:00:00	67.5	80.7
2025-11-22 19:15:00	66.3	80.4
2025-11-22 19:30:00	67.9	80.9
2025-11-22 19:45:00	65.7	81.6
2025-11-22 20:00:00	65.6	81.3
2025-11-22 20:15:00	64.0	84.5
2025-11-22 20:30:00	65.7	82.2
2025-11-22 20:45:00	64.2	81.4
2025-11-22 21:00:00	64.6	82.9
2025-11-22 21:15:00	65.8	82.1
2025-11-22 21:30:00	65.5	82.2
2025-11-22 21:45:00	66.0	82.9
2025-11-22 22:00:00	62.8	83.0
2025-11-22 22:15:00	66.0	83.2
2025-11-22 22:30:00	63.8	83.2

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-22 22:45:00	64.0	84.7
2025-11-22 23:00:00	61.3	81.6
2025-11-22 23:15:00	64.0	80.8
2025-11-22 23:30:00	62.1	82.1
2025-11-22 23:45:00	61.6	82.9
2025-11-23 00:00:00	58.2	84.0
2025-11-23 00:15:00	58.8	81.8
2025-11-23 00:30:00	57.1	79.7
2025-11-23 00:45:00	59.9	83.4
2025-11-23 01:00:00	57.7	79.5
2025-11-23 01:15:00	57.8	78.5
2025-11-23 01:30:00	57.9	81.6
2025-11-23 01:45:00	46.4	71.8
2025-11-23 02:00:00	48.4	75.5
2025-11-23 02:15:00	50.6	76.1
2025-11-23 02:30:00	58.8	86.1
2025-11-23 02:45:00	50.8	78.5
2025-11-23 03:00:00	58.5	80.4
2025-11-23 03:15:00	51.7	77.2
2025-11-23 03:30:00	53.6	81.1
2025-11-23 03:45:00	47.8	75.6
2025-11-23 04:00:00	40.2	61.4
2025-11-23 04:15:00	49.4	76.1
2025-11-23 04:30:00	56.3	82.0
2025-11-23 04:45:00	53.3	78.5
2025-11-23 05:00:00	55.9	77.5
2025-11-23 05:15:00	53.9	79.1
2025-11-23 05:30:00	60.6	80.9
2025-11-23 05:45:00	58.8	80.2
2025-11-23 06:00:00	59.4	79.1
2025-11-23 06:15:00	60.4	82.1
2025-11-23 06:30:00	63.9	84.7
2025-11-23 06:45:00	61.5	81.6
2025-11-23 07:00:00	61.9	81.6
2025-11-23 07:15:00	61.4	81.7
2025-11-23 07:30:00	62.6	82.1
2025-11-23 07:45:00	65.0	81.5
2025-11-23 08:00:00	61.9	81.6
2025-11-23 08:15:00	65.7	81.4
2025-11-23 08:30:00	66.7	83.2
2025-11-23 08:45:00	68.6	82.7
2025-11-23 09:00:00	68.7	86.0
2025-11-23 09:15:00	68.4	82.2
2025-11-23 09:30:00	68.7	82.7
2025-11-23 09:45:00	70.0	91.0
2025-11-23 10:00:00	69.5	85.4
2025-11-23 10:15:00	70.5	83.1
2025-11-23 10:30:00	70.8	83.3
2025-11-23 10:45:00	70.6	81.6
2025-11-23 11:00:00	70.8	84.8
2025-11-23 11:15:00	71.1	89.2
2025-11-23 11:30:00	69.7	83.7
2025-11-23 11:45:00	69.4	81.5
2025-11-23 12:00:00	71.4	95.7
2025-11-23 12:15:00	70.2	81.7
2025-11-23 12:30:00	70.4	82.3
2025-11-23 12:45:00	69.2	81.9
2025-11-23 13:00:00	70.2	83.1
2025-11-23 13:15:00	72.0	85.4

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-23 13:30:00	73.2	83.5
2025-11-23 13:45:00	71.6	82.3
2025-11-23 14:00:00	71.7	85.0
2025-11-23 14:15:00	71.7	83.7
2025-11-23 14:30:00	71.0	83.5
2025-11-23 14:45:00	72.7	85.7
2025-11-23 15:00:00	71.8	84.1
2025-11-23 15:15:00	72.2	82.3
2025-11-23 15:30:00	70.9	85.2
2025-11-23 15:45:00	70.6	81.9
2025-11-23 16:00:00	69.8	81.9
2025-11-23 16:15:00	69.8	84.9
2025-11-23 16:30:00	69.1	82.3
2025-11-23 16:45:00	68.5	82.5
2025-11-23 17:00:00	67.4	83.7
2025-11-23 17:15:00	68.7	89.4
2025-11-23 17:30:00	70.3	89.2
2025-11-23 17:45:00	69.7	83.3
2025-11-23 18:00:00	69.0	82.7
2025-11-23 18:15:00	69.7	85.6
2025-11-23 18:30:00	72.0	91.5
2025-11-23 18:45:00	69.6	83.6
2025-11-23 19:00:00	69.3	82.0
2025-11-23 19:15:00	69.3	84.2
2025-11-23 19:30:00	68.0	83.2
2025-11-23 19:45:00	67.4	82.3
2025-11-23 20:00:00	67.5	84.4
2025-11-23 20:15:00	65.7	83.5
2025-11-23 20:30:00	64.5	82.5
2025-11-23 20:45:00	64.7	81.8
2025-11-23 21:00:00	64.9	82.2
2025-11-23 21:15:00	64.2	84.7
2025-11-23 21:30:00	63.4	80.8
2025-11-23 21:45:00	61.0	81.2
2025-11-23 22:00:00	65.3	84.3
2025-11-23 22:15:00	61.6	77.6
2025-11-23 22:30:00	61.3	82.0
2025-11-23 22:45:00	60.4	82.2
2025-11-23 23:00:00	62.4	83.5
2025-11-23 23:15:00	60.6	82.0
2025-11-23 23:30:00	59.0	81.0
2025-11-23 23:45:00	59.6	82.2
2025-11-24 00:00:00	53.0	76.5
2025-11-24 00:15:00	56.6	79.0
2025-11-24 00:30:00	54.6	81.4
2025-11-24 00:45:00	49.3	73.5
2025-11-24 01:00:00	54.1	80.2
2025-11-24 01:15:00	59.3	82.5
2025-11-24 01:30:00	47.8	57.4
2025-11-24 01:45:00	53.6	77.2
2025-11-24 02:00:00	51.2	71.1
2025-11-24 02:15:00	56.3	81.9
2025-11-24 02:30:00	56.4	79.0
2025-11-24 02:45:00	43.1	52.7
2025-11-24 03:00:00	46.5	71.7
2025-11-24 03:15:00	55.4	78.3
2025-11-24 03:30:00	60.2	83.3
2025-11-24 03:45:00	61.1	82.5
2025-11-24 04:00:00	56.4	78.1

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-24 04:15:00	62.4	83.4
2025-11-24 04:30:00	64.0	84.2
2025-11-24 04:45:00	64.8	83.1
2025-11-24 05:00:00	65.9	89.3
2025-11-24 05:15:00	68.4	82.5
2025-11-24 05:30:00	70.0	84.0
2025-11-24 05:45:00	71.7	101.0
2025-11-24 06:00:00	67.5	81.0
2025-11-24 06:15:00	71.6	86.1
2025-11-24 06:30:00	72.1	82.2
2025-11-24 06:45:00	71.0	86.1
2025-11-24 07:00:00	68.1	82.7
2025-11-24 07:15:00	70.5	89.5
2025-11-24 07:30:00	70.4	83.9
2025-11-24 07:45:00	70.7	84.0
2025-11-24 08:00:00	70.8	92.6
2025-11-24 08:15:00	71.1	83.2
2025-11-24 08:30:00	69.7	88.3
2025-11-24 08:45:00	70.2	84.8
2025-11-24 09:00:00	69.9	85.6
2025-11-24 09:15:00	68.6	82.2
2025-11-24 09:30:00	70.7	87.1
2025-11-24 09:45:00	70.4	82.6
2025-11-24 10:00:00	70.8	101.1
2025-11-24 10:15:00	67.8	81.6
2025-11-24 10:30:00	69.5	83.7
2025-11-24 10:45:00	68.3	83.2
2025-11-24 11:00:00	68.9	81.6
2025-11-24 11:15:00	68.0	83.3
2025-11-24 11:30:00	68.2	81.9
2025-11-24 11:45:00	67.9	82.6
2025-11-24 12:00:00	69.0	88.6
2025-11-24 12:15:00	70.2	83.6
2025-11-24 12:30:00	71.5	86.1
2025-11-24 12:45:00	72.4	83.7
2025-11-24 13:00:00	72.1	85.4
2025-11-24 13:15:00	72.0	84.2
2025-11-24 13:30:00	71.6	87.6
2025-11-24 13:45:00	70.9	85.7
2025-11-24 14:00:00	71.2	84.7
2025-11-24 14:15:00	70.8	86.0
2025-11-24 14:30:00	71.7	82.5
2025-11-24 14:45:00	72.4	91.3
2025-11-24 15:00:00	72.3	84.1
2025-11-24 15:15:00	72.5	84.8
2025-11-24 15:30:00	72.8	85.2
2025-11-24 15:45:00	72.1	83.5
2025-11-24 16:00:00	71.8	81.6
2025-11-24 16:15:00	71.3	81.5
2025-11-24 16:30:00	71.4	81.2
2025-11-24 16:45:00	70.9	82.9
2025-11-24 17:00:00	71.8	83.8
2025-11-24 17:15:00	71.1	81.6
2025-11-24 17:30:00	70.8	82.3
2025-11-24 17:45:00	71.2	83.1
2025-11-24 18:00:00	70.7	85.0
2025-11-24 18:15:00	69.2	83.7
2025-11-24 18:30:00	69.8	90.1
2025-11-24 18:45:00	67.8	83.0

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-24 19:00:00	69.6	86.6
2025-11-24 19:15:00	72.3	101.2
2025-11-24 19:30:00	69.0	85.2
2025-11-24 19:45:00	67.4	83.2
2025-11-24 20:00:00	66.7	80.8
2025-11-24 20:15:00	65.9	79.5
2025-11-24 20:30:00	66.7	85.1
2025-11-24 20:45:00	67.0	82.7
2025-11-24 21:00:00	67.4	85.8
2025-11-24 21:15:00	65.5	81.2
2025-11-24 21:30:00	63.1	83.7
2025-11-24 21:45:00	61.0	82.4
2025-11-24 22:00:00	63.4	79.3
2025-11-24 22:15:00	62.5	86.2
2025-11-24 22:30:00	63.4	86.3
2025-11-24 22:45:00	62.1	84.9
2025-11-24 23:00:00	61.0	85.9
2025-11-24 23:15:00	58.6	83.8
2025-11-24 23:30:00	57.4	81.3
2025-11-24 23:45:00	58.5	83.1
2025-11-25 00:00:00	61.6	81.1
2025-11-25 00:15:00	59.3	80.0
2025-11-25 00:30:00	57.3	80.1
2025-11-25 00:45:00	50.0	73.9
2025-11-25 01:00:00	53.7	78.0
2025-11-25 01:15:00	42.7	57.1
2025-11-25 01:30:00	37.0	52.1
2025-11-25 01:45:00	54.6	81.5
2025-11-25 02:00:00	54.1	84.2
2025-11-25 02:15:00	38.7	49.2
2025-11-25 02:30:00	41.0	66.0
2025-11-25 02:45:00	50.2	77.5
2025-11-25 03:00:00	53.9	78.8
2025-11-25 03:15:00	57.9	82.6
2025-11-25 03:30:00	58.7	82.3
2025-11-25 03:45:00	60.3	80.9
2025-11-25 04:00:00	57.7	79.5
2025-11-25 04:15:00	62.1	83.1
2025-11-25 04:30:00	62.6	83.2
2025-11-25 04:45:00	65.4	86.8
2025-11-25 05:00:00	64.0	82.2
2025-11-25 05:15:00	70.8	99.3
2025-11-25 05:30:00	69.8	82.8
2025-11-25 05:45:00	69.6	86.3
2025-11-25 06:00:00	70.0	92.4
2025-11-25 06:15:00	70.7	82.4
2025-11-25 06:30:00	71.5	83.7
2025-11-25 06:45:00	72.1	96.9
2025-11-25 07:00:00	69.8	84.5
2025-11-25 07:15:00	69.9	82.2
2025-11-25 07:30:00	71.2	85.5
2025-11-25 07:45:00	70.6	84.4
2025-11-25 08:00:00	70.7	86.2
2025-11-25 08:15:00	71.4	87.8
2025-11-25 08:30:00	69.8	82.0
2025-11-25 08:45:00	70.5	81.9
2025-11-25 09:00:00	71.6	89.5
2025-11-25 09:15:00	70.2	83.1
2025-11-25 09:30:00	71.2	84.0

Time	L_{Aeq} (dB)	L_{AFmax} (dB)
2025-11-25 09:45:00	70.3	82.7
2025-11-25 10:00:00	70.4	83.7
2025-11-25 10:15:00	70.5	84.3
2025-11-25 10:30:00	70.2	82.0
2025-11-25 10:45:00	70.6	84.3
2025-11-25 11:00:00	69.6	86.5
2025-11-25 11:15:00	70.3	85.3
2025-11-25 11:30:00	70.2	88.2
2025-11-25 11:45:00	70.3	82.0
2025-11-25 12:00:00	70.6	84.8
2025-11-25 12:15:00	69.5	83.8
2025-11-25 12:30:00	68.7	82.7
2025-11-25 12:45:00	70.2	85.2
2025-11-25 13:00:00	69.4	87.8
2025-11-25 13:15:00	69.2	83.9
2025-11-25 13:30:00	69.0	84.3
2025-11-25 13:45:00	69.0	84.9
2025-11-25 14:00:00	69.5	83.0
2025-11-25 14:15:00	68.8	83.9
2025-11-25 14:30:00	69.9	84.2
2025-11-25 14:45:00	69.8	84.0
2025-11-25 15:00:00	70.5	85.0
2025-11-25 15:15:00	70.8	82.5

Appendix 7 – Equipment Calibration Details

Survey	Item	Serial Number	Certificate	Date of expiration of calibration
November 2025	NTi XL3 SLM	A3A-01534-F0	UK-25-051	25/04/2027
	NTi XL3 SLM	A3A-01329-F0	UK-24-095	11/10/2026
	Bruel & Kjaer 2250 SLM	3007903	2024-0731	24/07/2026
	Bruel & Kjaer 4231 Calibrator	2292068	2025-0847	03/09/2026

NTi AUDIO

ENS 182

Manufacturer Calibration Certificate

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3. All tests are traceable in accordance with ISO/IEC 17025.

No pattern approval is available for this sound level meter configuration.

Sound Level Meter

Manufacturer	NTi Audio		
Type	XL3	S/N	A3A-01534-F0
Firmware	V1.46		
Microphone Model	M2230		
Preamplifier	MA220	S/N	15078
Microphone Capsule	MC230A	S/N	A30704
Performance class	Class 1		
Customer Inventory Nr.			

Customer

Environmental Noise Solutions Ltd
Doncaster Business Innovation Centre
Ten Pound Walk
Doncaster
DN4 5HX

Date 25 April 2025

Certificate UK-25-051

Results **PASSED**
(for detailed report see next pages)

Operator David Young

NTi Audio UK Ltd • Office 33C Julians Road • Stevenage
Hertfordshire, SG1 3ES, UK • uk@nti-audio.com

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ENS 161

NTi AUDIO

Manufacturer Calibration Certificate

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3. All tests are traceable in accordance with ISO/IEC 17025.

No pattern approval is available for this sound level meter configuration.

Sound Level Meter

Manufacturer	NTi Audio		
Type	XL3	S/N	A3A-01329-F0
Firmware	V1.38		
Microphone Model	M2230		
Preamplifier	MA220	S/N	14696
Microphone Capsule	MC230A	S/N	A29614
Performance class	Class 1		
Customer Inventory Nr.			

Customer

Environmental Noise Solutions Ltd
Doncaster Business Innovation Centre
Ten Pound Walk
Doncaster
DN4 5HX

Date 11 October 2024

Certificate UK-24-095

Results **PASSED**
(for detailed report see next pages)

Operator David Young

NTi Audio UK Ltd • Office 33C Julians Road • Stevenage
Hertfordshire, SG1 3ES, UK • uk@nti-audio.com

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CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	24 July 2024	CERTIFICATE NUMBER	2024-0731
DATE OF CALIBRATION	24 July 2024		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 1	

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment	**B&K 2250, s/n: 3007903**
Description	Sound Level Analyser, Hottinger Bruel & Kjaer UK Ltd
Customer	Environmental Noise Solutions Limited Suite 24, Doncaster Business Innovation Centre, Ten Pound Walk, Doncaster, DN4 5HX

Standards
BS EN 61672-3

Conditions

Atmospheric Pressure	101.4 kPa
Temperature	26.0 °C
Relative Humidity	48.2 %

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
Druck DPI 141	479	HP 34401	3146A16728
Vaisala HMP23	S2430007		

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	03 September 2025	CERTIFICATE NUMBER	2025-0847
DATE OF CALIBRATION	03 September 2025		
CALIBRATION INTERVAL	12 months	PAGE 1 OF 2	

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER: Jamie Bishop

APPROVING SIGNATORY: Greg Rice

Equipment: **B&K 4231, s/n: 2292068**

Description: Calibrator - Acoustic - Class 1, Hottinger Bruel & Kjaer UK Ltd

Customer: Environmental Noise Solutions Limited
Suite 24, Doncaster Business Innovation Centre, Ten Pound Walk, Doncaster, DN4 5HX

Standards
BS EN 60942

Conditions

Atmospheric Pressure	98.7 kPa
Temperature	23.6 °C
Relative Humidity	52.9 %

Calibration Data

Output Level	93.8 dB
Frequency	1000.0 Hz

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
B&K 4134 L	1675305	Druck DPI 141	479
HP 34401	3146A16728	Nor 1253	20848
Stanford DS36	33213	Vaisala HMP23	S2430007

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.