



Noise Impact Assessment
Former St Patrick's Centre
Trinity Street, Huddersfield

Valora Estates Ltd

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Opal Acoustics Ltd

Authored by: R. Whitaker BSc (Hons), MIOA

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1 Executive Summary

Opal Acoustics Ltd has undertaken a comprehensive noise impact assessment to support Valora Estates Ltd in the proposed redevelopment of the former St Patrick's Centre, Trinity Street, Huddersfield, into a food court, 52-bedroom hotel and rooftop restaurant. The assessment evaluates the existing acoustic environment, potential commercial noise emissions from the development, and the impact on nearby residential receptors.

The existing noise climate is dominated by road traffic on Trinity Street and Castlegate (A62), with no other significant sources noted during the survey period.

A detailed noise survey was undertaken between the 1st and 3rd of August 2026. Daytime noise levels were measured at up to 65 dB L_{Aeq} at P1 and 55 dB L_{Aeq} at P2, with night-time levels of 58 dB L_{Aeq} and 47 dB L_{Aeq} respectively.

Predictive modelling was undertaken to assess noise from the proposed food court, rooftop restaurant and any future amplified music events and were found to be below the existing background noise levels at the nearest noise sensitive receptors.

To protect nearby residential receptors, fixed plant noise limits have been set in accordance with BS 4142, requiring rating levels not to exceed existing background levels.

For the hotel element, a scheme of sound attenuation is recommended, including enhanced glazing and appropriate ventilation, ensuring suitable resting and sleeping conditions for future guests in accordance with BS 8233 and ProPG.

The assessment concludes that the proposed development can be delivered without giving rise to adverse noise impacts on surrounding residential uses and that, with the recommended mitigation in place, the hotel will achieve appropriate internal noise levels.

2 Introduction

2.1 Introduction

Opal Acoustics has been appointed by Valora Estates Ltd to undertake a noise impact assessment to support a proposed change of use at the former St Patrick's Centre, Trinity Street, Huddersfield, HD1 4DA to form a food court, hotel and restaurant (hereafter *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 hotel aspect of the development with reference to the pertinent requirements
- Establish the potential noise emissions associated with the commercial aspect of the development
- Assess the noise impact of the commercial aspect of the development on the nearest noise sensitive receptors (surrounding residential uses) in accordance with pertinent guidance
- Provide recommendations for a scheme of sound attenuation works, as necessary

This report details the methodology and results of the assessment and provides recommendations as appropriate. It has been prepared to accompany a planning application to be submitted to Kirklees Council.

The methodology adopted, survey results, and subsequent assessment are presented in the following sections.

This document has been prepared exclusively for Valora Estates Ltd for the purposes described above. No responsibility or duty of care is accepted to any third party. Any third party wishing to rely on the findings should first consult Valora Estates Ltd and Opal Acoustics regarding their applicability.

A glossary of acoustic terminology used throughout this report is provided in Appendix 1.

2.2 Site Description and Location

The site lies to the north of Trinity Street in Huddersfield town centre, as shown (highlighted in red) in Figure 2.1.

Figure 2.1: Site Location



The site is located in a mixed-use setting and is bound as follows:

- Trinity Street to the south
- Car parks and New North Parade to the north and east
- Neighbouring New North Road Baptist Church to the west

Proposals are for the conversion and vertical extension of the former St Patrick's Catholic Centre to form a food court at ground floor level, a 52-no. bedroom 3-storey hotel (first to third floor) and a roof top restaurant. The proposed site layout is provided in Appendix 3.

The noise climate at the site was found to be wholly dominated by road traffic on Trinity Street to the south and Castlegate (A62) to the west, with no other significant noise sources noted.

The nearest Noise Sensitive Receptors (NSRs) to the site are as follows:

- First floor accommodation above retail units on Trinity Steet (NSR1)
- Upper floor apartments on St Georges Street to the east (NSR2)

2.3 Proposed Food Court and Roof Top Restaurant

The proposed commercial element is expected to include fixed mechanical and electrical plant. As detailed information relating to the proposed external equipment was unavailable at the time of this assessment, the recommendations contained within this report should be used to guide the specification of any fixed external plant.

The final operational details of the proposed food court and rooftop restaurant have not been confirmed at this stage. However, it is understood that both facilities will operate predominantly during daytime and evening hours, typically between **11:00 and 22:00**, Monday to Sunday.

For the purposes of this assessment, it has been assumed that the food court and rooftop restaurant will not routinely host live entertainment or amplified music and that the internal acoustic environment will be limited to typical patron activity and low-level background music, resulting in representative internal ambient noise levels of approximately **70 dB L_{Aeq}**.

It is understood that the rooftop restaurant will have the capacity to accommodate private functions, which may on occasion include amplified music or a DJ. However, given the presence of hotel accommodation within the development, it is considered likely that such events will be infrequent and subject to operational controls. Accordingly, it has been assumed that any private functions involving amplified music will be restricted to the normal operating period, typically between **11:00 and 23:00**.

For the purposes of this assessment, it has also been assumed that no music, whether background or amplified, will be played externally on the rooftop terrace or balcony areas. Furthermore, during any private function involving amplified music, it is assumed that all external doors and windows serving the restaurant will remain closed, thereby preventing amplified music from propagating directly to the external environment.

2.4 Commercial Businesses in the Localised Area

With regard to potential commercial / entertainment noise sources the following businesses are noted and considered:

- The Old Hatte public house is located immediately adjacent to the site on Trinity Street, to the south. The premises operate between 11:00 and 23:00 Monday to Wednesday, 12:00 and 23:00 Thursday to Saturday, and 12:00 to 22:00 on Sundays. The venue primarily functions as a drink-led public house, with live sports shown during daytime trading hours and occasional karaoke and DJ events on Friday and Saturday evenings.

A karaoke event was taking place on the evening of Saturday 1st August during the noise survey. However, noise from the venue was not audible at the site, which was dominated by road traffic on Trinity Street and Castlegate (A62). No significant noise attributable to the public house was observed during the survey period, and it is therefore considered that the operation of the venue does not represent a constraint to the proposed development.

- The Crown public house is located to the south-east of the site on Westgate. The premises operate between 09:00 and 23:00 daily. The venue serves food between 10:00 and 18:00, with drinks available throughout its opening hours. In addition to regular trading, the public house screens live sporting events and hosts occasional karaoke and live music performances.

A live music performance was taking place on the evening of Sunday 2nd August during the noise survey. However, noise associated with the event was not audible at the site, as the prevailing acoustic environment was dominated by road traffic on Trinity Street and Castlegate (A62). No significant noise attributable to the public house was observed during the survey period, and it is therefore considered that the operation of the venue does not represent a constraint to the proposed development.

3 Noise Survey

3.1 Noise Monitoring

To establish the external noise climate affecting the proposed development, noise monitoring was undertaken on Saturday 1st August through to Monday 3rd August 2026.

For the purposes of the assessment, noise measurements were obtained at the monitoring locations described below. The approximate positions of the monitoring equipment are illustrated in Appendix 2 for reference:

- P1 was located on the southern façade overlooking Trinity Street at first floor level.
- P2 was located on the northern façade overlooking the car park and New North Parade at second floor level.

Noise measurements were undertaken using NTi XL3 and Svantek Svan 949 Type 1 integrating sound level meters at one meter from the existing building facades. Each instrument was fitted with a windshield-covered microphone and deployed at the monitoring locations described above. The performance of the measurement systems was verified immediately before and after the survey using a Brüel & Kjær Type 4231 acoustic calibrator. No calibration drift was identified during the monitoring period.

The survey recorded A-weighted broadband noise indices, including $L_{Aeq,T}$, and $L_{A90,T}$ together with linear octave band frequency data. Weather conditions throughout the monitoring period were suitable for noise monitoring, and were sunny and dry with wind speeds remaining below 5 m/s.

3.2 P1 and P2 Results

Tables 3.1 and 3.2 provide a summary of the measured noise levels at P1 and P2 for each monitoring position and period, with results rounded to the nearest decibel. As monitoring was undertaken at approximately 1 metre from the existing building façade, a façade correction of –3 dB has been applied to the measured levels to derive equivalent free-field noise levels.

Table 3.1: Summary of Positions 1 Noise Measurement Data

Position	Date	Time	L _{Aeq} (dB)	L _{A90} (dB)	L _{A10} (dB)	L _{AFMax} (dB)	Comment
P1	01/08/26	1005-2300	65	57	69	-	Dominated by road traffic on Trinity Street and Castlegate (A62) to the west
	01-02/08/26	2300-0700	58	41	63	78*	
	02/08/26	0700-2300	62	52	67	-	
	02-03/08/26	2300-0700	57	37	61	77*	
	03/08/26	0700-1208	64	56	69	-	
* 11 th highest maximum noise level event during measurement period							

Table 3.2: Summary of Position 2 Noise Measurement Data

Position	Date	Time	L _{Aeq} (dB)	L _{A90} (1 min) (dB)		L _{AFMax} (dB)	Comment
				Range	Typical		
P2	01/08/26	1031-2300	54	41-63	48	-	Dominated by road traffic on Castlegate (A62) to the west
	01-02/08/26	2300-0700	47	30-47	38	69*	
	02/08/26	0700-1342	55	37-56	46	-	
* 11 th highest maximum noise level event during the night-time							

3.3 P1 and P2 External Noise Analysis

Noise levels across the site were wholly dominated by road traffic on both Trinity Street to the south and Castlegate (A62) to the west, with no other significant noise sources noted.

Daytime and night time noise levels at P1 were measured at up to **65 dB L_{Aeq} (0700-2300)** and **58 dB L_{Aeq} (2300-0700)**, typical maximum noise levels measured at **78 dB L_{AFMax}** during the night time period.

Daytime and night time noise levels at P2 were measured at up to **55 dB L_{Aeq} (0700-2300)** and **47 dB L_{Aeq} (2300-0700)**, typical maximum noise levels measured at **69 dB L_{AFMax}** during the night time period. were

The typical (mean average) daytime and night time background noise levels at P1 were measured at **53 dB L_{A90} (15 min)** and **41 dB L_{A90} (15 min)**. For reference the typical evening background noise level was also measured at **53 dB L_{A90}** between 19:00 – 23:00 hrs. These levels are adopted for NSR1 and NSR2 which are exposed to Trinity Street.

The typical (mean average) daytime and night time background noise levels at P2 were measured at **46 dB L_{A90} (15 min)** and **38 dB L_{A90} (15 min)**. It is noted that there are no noise sensitive receptors located at the rear of development.

4 Noise Assessment Guidance

4.1 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'.

With regard to extant community noise sources and the potential to affect proposed new developments, Paragraph 200 states that:

'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.'

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

1 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2021)

4.2 Noise Policy Statement for England

The Noise Policy Statement for England² (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.’

² Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. March 2010.

4.3 Planning Practice Guidance on Noise

Planning Practice Guidance³ (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 although the PPG acknowledges that:

‘...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’.

Table 4.1 overleaf summarises the PPG noise exposure hierarchy.

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

Table 4.1: PPG Noise Exposure Hierarchy

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			
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. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

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.

4.4 ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)⁴ was published in 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

Stage 2: 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’⁵ (BS 8233), see Table 2.2.

Table 2.2: Indoor Ambient Noise Levels in Dwellings

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

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’.

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)

5 British Standards Institution (2014). *British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings*.

Based on the above assessment, the following internal noise criteria, assuming windows remain closed and an alternative means of ventilation is provided, are considered appropriate for the proposed residential development and are considered to provide suitable resting and sleeping conditions.

- $\leq 35 \text{ dB } L_{Aeq(0700-2300)}$ during the daytime
- $\leq 30 \text{ dB } L_{Aeq(2300-0700)}$ and $45 \text{ dB } L_{AFMax}$ not regularly exceeded during the night-time

4.5 BS 4142 ‘Methods for Rating and Assessing Industrial and Commercial Sound’

BS 4142:2014+A1-2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’ (BS 4142)⁶ describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to adverse impacts, and states:

‘The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of the impact.

For example:

A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context

A difference of around +5 dB 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 rating level is described as the specific sound level (the equivalent continuous A-weighted sound pressure level at the assessment position (NSR) produced by the specific sound source over the given reference time interval) plus any adjustment for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.

The background noise level is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting ‘F’ and quoted to the nearest whole number of decibels.

The reference time interval of the specific sound is 1 hour during the daytime and 15 minutes during the night-time.

⁶ British Standard 4142:2014+A1-2019 Methods for rating and assessing industrial and commercial sound, BSI (2014)

5 Commercial Noise Impact Assessment

The principal noise sources potentially associated with the proposed development are considered to be:

- Noise associated with fixed external plant
- Noise associated with the use of food court and roof top restaurant
- Music noise breakout from the restaurant

The following sections of the noise impact assessment discuss the potential noise impacts of the above activities on the amenity of the nearest residential dwellings.

5.1 Noise Associated with Fixed External Plant

It is anticipated that the development will incorporate fixed building services plant, including mechanical and electrical equipment.

Accordingly, it is considered appropriate to establish noise emission criteria for any external fixed plant associated with the development. These criteria should be based on the existing background sound levels measured at the nearest noise-sensitive receptors (NSRs) to ensure that the operation of the plant does not give rise to adverse noise impacts.

In accordance with the assessment methodology set out in **BS 4142:2014+A1:2019**, it is recommended that the rating level of noise from all fixed plant and equipment should not exceed the representative background sound level ($L_{A90,T}$ and summarised in section 3.3) when assessed in a free-field position at the nearest noise-sensitive receptors. The recommended design criteria are set out below:

Table 5.1: Maximum Permissible Noise Rating Levels

Period	Rating Noise Level at Receptor	
	NSR1	NSR2
Daytime (0700–2300)	53 dB $L_{A,r,Tr}$	53 dB $L_{A,r,Tr}$
Night-Time (2300–0700)	41 dB $L_{A,r,Tr}$	41 dB $L_{A,r,Tr}$

It is considered that these requirements can be adequately secured by an appropriately worded planning condition. Compliance with the recommended noise limits is expected to be achieved through the careful selection and positioning of plant and equipment, together with suitable building envelope design and the implementation of standard acoustic mitigation measures, where necessary.

5.2 Noise Associated with the Food Court and Restaurant

To assess the potential noise from the proposed ground floor food court and roof top restaurant impacting upon the NSRs, predictive noise modelling has been undertaken using iNoise environmental noise prediction software. The software is specifically designed for the assessment of environmental noise propagation and enables the calculation of sound levels across a defined assessment area.

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 iNoise default for brick-built structures.

The following assumptions were used in the model:

- Meteorological conditions: Temp. 20 °C, Relative Humidity 60%
- Foliage/woodland areas not considered to provide any reduction
- Reflections: set to two orders of reflection permitted in the model
- Ground absorption set to $G = 0.0$ (Hard)

In order to undertake the assessment, reference has been made to the Opal Acoustics database of noise sources. For the purposes of this assessment, an internal reverberant noise level of **70 dB L_{Aeq}** has been adopted. This is considered representative of a busy restaurant environment with typical patron activity and low-level conversational background music.

The most acoustically weak elements of the building façade are considered to be the sliding upper windows at ground floor level and the bi-folding doors serving the rooftop restaurant balconies. For the purposes of the noise modelling, these façade elements have been assumed to remain fully open, representing a robust worst-case assessment scenario.

A noise level contour map is contained in Appendix 4. The predicted resultant food court and restaurant and roof top restaurant noise levels at the nearest receptors are contained in Table 5.2 along with the worst-case evening (19:00 – 23:00) background noise levels for reference.

Table 5.2: Resultant Food Court and Restaurant Noise Levels

Receptor	Predicted Noise Level at NSR	Background Noise Level at NSR
NSR1	41 dB $L_{Aeq, T}$	53 dB L_{A90} (15 min)
NSR2	32 dB $L_{Aeq, T}$	53 dB L_{A90} (15 min)

As evidenced above, noise associated with the proposed food court and roof top restaurant is at least 12 dB below the typical background noise level at the nearest noise sensitive receptors.

5.3 Music Noise Breakout

It is understood that the roof top restaurant and event space may host occasional amplified music / DJ events. It is understood that such events would be restricted due to the underlying associated hotel use and therefore would typically finish no later than 23:00hrs.

In order to undertake the assessment, reference has been made to the Opal Acoustics database of noise sources, which includes entertainment noise within bars, night clubs and wedding venues. A typical level of 95 dB $L_{Aeq(A)}$ is considered typical of a busy bar with a DJ event. This level is adopted for assessment purposes.

In order to assess the propagation of noise from the venue to the nearest receptors, noise level predictions have been performed using iNoise acoustic modelling software (as described in section 5.2).

The noise model assumes that all windows and doors (except access) remain closed during an amplified music event. The most acoustically weak elements of the building façade are therefore considered to be the double-glazed windows / walls of the roof top restaurant and private function space. The noise model assumes standard double glazing (such as 6 mm glass / 12 mm cavity / 4 mm glass) with a sound reduction performance of 28 dB R_w+C_{tr} for all windows and doors.

A noise level contour map is contained in Appendix 5. The predicted resultant music noise levels at the nearest receptors are contained in Table 5.3 along with the worst-case evening (19:00 – 23:00) background noise levels for reference.

Table 5.3: Resultant Music Noise Levels

Receptor	Predicted Noise Level at NSR	Background Noise Level at NSR
NSR1	42 dB $L_{Aeq, T}$	53 dB L_{A90} (15 min)
NSR2	37 dB $L_{Aeq, T}$	53 dB L_{A90} (15 min)

As evidenced above, music noise levels are predicted to be at least 11 dB below the typical background noise level at the nearest noise sensitive receptors.

5.4 Commercial Noise Impact and Context

As evidenced in sections 5.2 and 5.3, noise associated with the proposed commercial elements including music noise have been predicted at up **42 dB L_{Aeq}** which is at least 11 dB below the typical evening background noise level at the nearest noise sensitive receptors.

In relation to context, it should be noted that a noise level of **≤ 42 dB L_{Aeq}** is relatively low in absolute terms. To put such levels into context:

- The World Health Organisation (WHO) Guidelines for Community noise considers that few people are moderately annoyed where daytime external noise levels do not exceed 50 dB L_{Aeq} (0700–2300)
- Assuming 15 dB attenuation for a partially open window, as referenced by the World Health Organization (WHO), results in an estimated internal noise level of approximately 27 dB L_{Aeq}. This is 8 dB below the internal daytime ambient noise criterion of 35 dB L_{Aeq} in accordance with ProPG *‘Planning and Noise: New Residential Development (ProPG)’* and BS 8233:2014 *‘Guidance on Sound Insulation and Noise Reduction for Buildings’*.

6 Hotel Scheme of Sound Attenuation

6.1 Design Noise Levels

Design noise levels for the front façade of the site are taken as follows:

- ≤ 65 dB L_{Aeq} (0700-2300) during the daytime
- ≤ 58 dB L_{Aeq} (2300-0700) during the night-time
- ≤ 78 dB L_{AFMax} during the night-time

Design noise levels for the rear façade of the site are taken as follows:

- ≤ 55 dB L_{Aeq} (0700-2300) during the daytime
- ≤ 47 dB L_{Aeq} (2300-0700) during the night-time
- ≤ 69 dB L_{AFMax} during the night-time

6.2 Scheme of Sound Attenuation

To determine the sound insulation performance required for the building envelope in habitable rooms across the development, the Building Research Establishment (BRE) façade insulation assessment spreadsheet was utilised. The spreadsheet follows the calculation procedure outlined in BS 8233 and enables the user to enter external noise levels, representative room dimensions, reverberation times, and the acoustic characteristics of the various building envelope components. Using these inputs, it predicts the resulting internal noise levels based on the relevant external noise indicators, namely L_{Aeq} and L_{AFMax} .

Ventilation

Due to the town centre location and commercial use of the hotel it is assumed that all bedrooms will be fitted with Mechanical Ventilation with Heat Recovery (MVHR), therefore trickle ventilators are not required.

Glazing

In order to satisfy the internal noise level criteria **detailed within section 4.4**, all hotel bedrooms on the southern, eastern and western façades should be provided with enhanced glazing rated at least **36 dB R_w+C_{tr}** (such as 8 mm glass / 16 argon / 4 mm glass 9.1 Optiphon).

All remaining hotel bedrooms on the rear façade should be provided with enhanced glazing rated at least **29 dB R_w+C_{tr}** (such as 8 mm glass / (6-20) / 4 mm glass).

For reference, a glazing mark-up is provided in Appendix 6.

The following points should be noted:

- *When specifying glazing to meet the acoustic requirements outlined above, it is essential that the stated $R_w + C_{tr}$ performance is achieved, rather than relying solely on the R_w rating. Published R_w values are typically higher than the corresponding $R_w + C_{tr}$ values, and selecting glazing based only on R_w may overestimate its acoustic performance, potentially resulting in elevated internal noise levels.*
- *The glazing specifications relate to the glazed unit itself. Responsibility rests with the window manufacturer and supplier to ensure that the frame design and installation do not adversely affect the overall acoustic performance of the window system.*
- *Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms.*
- *Bedrooms with a lightweight external wall construction should be double boarded and have 100 mm (minimum) insulation above.*
- *The glazing requirements are applicable to all windows including 'Velux', 'Balcony' and 'Patio' windows.*

Appendix 1 – Acoustic Terms

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:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = 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.

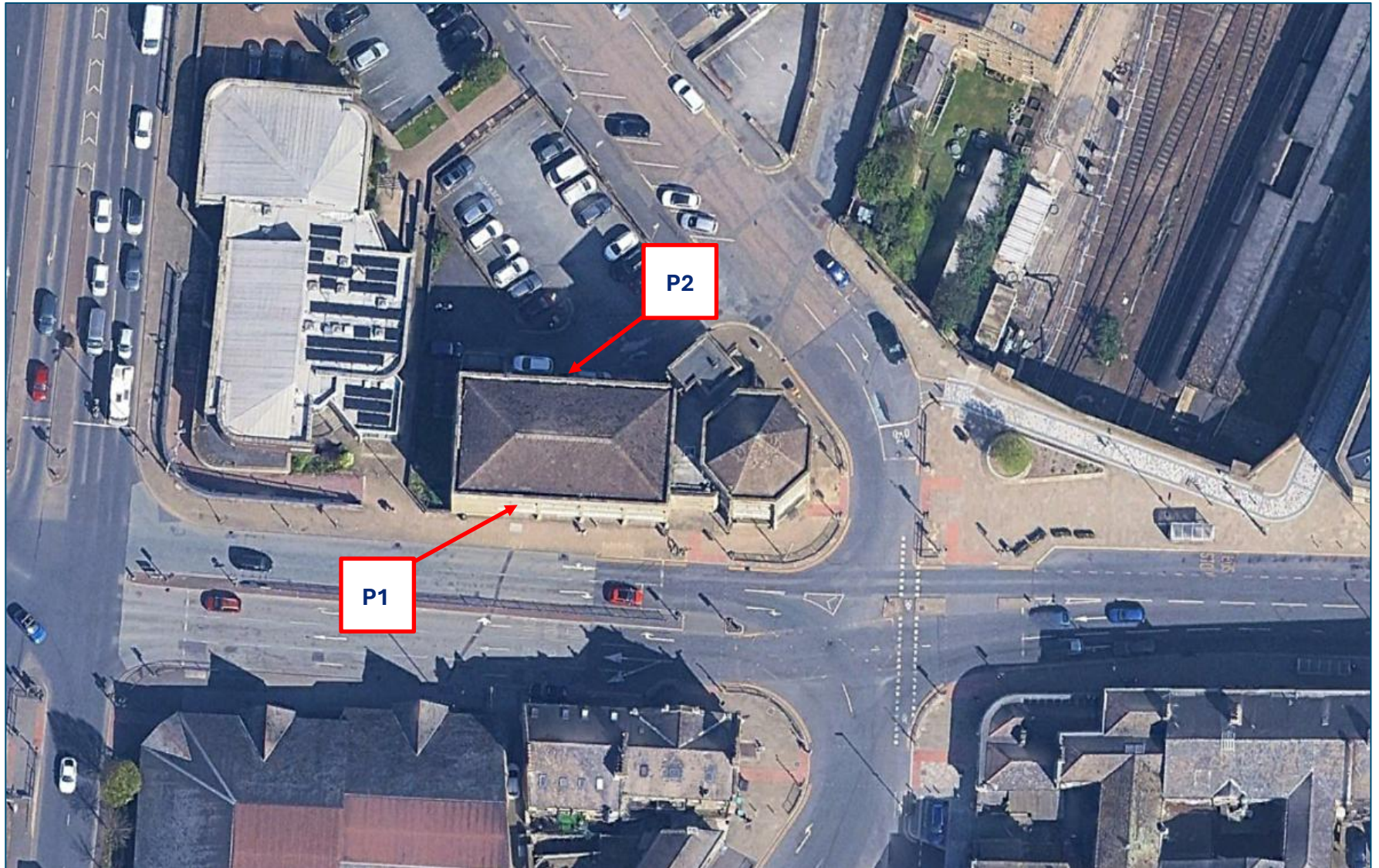
$L_{A90, T}$

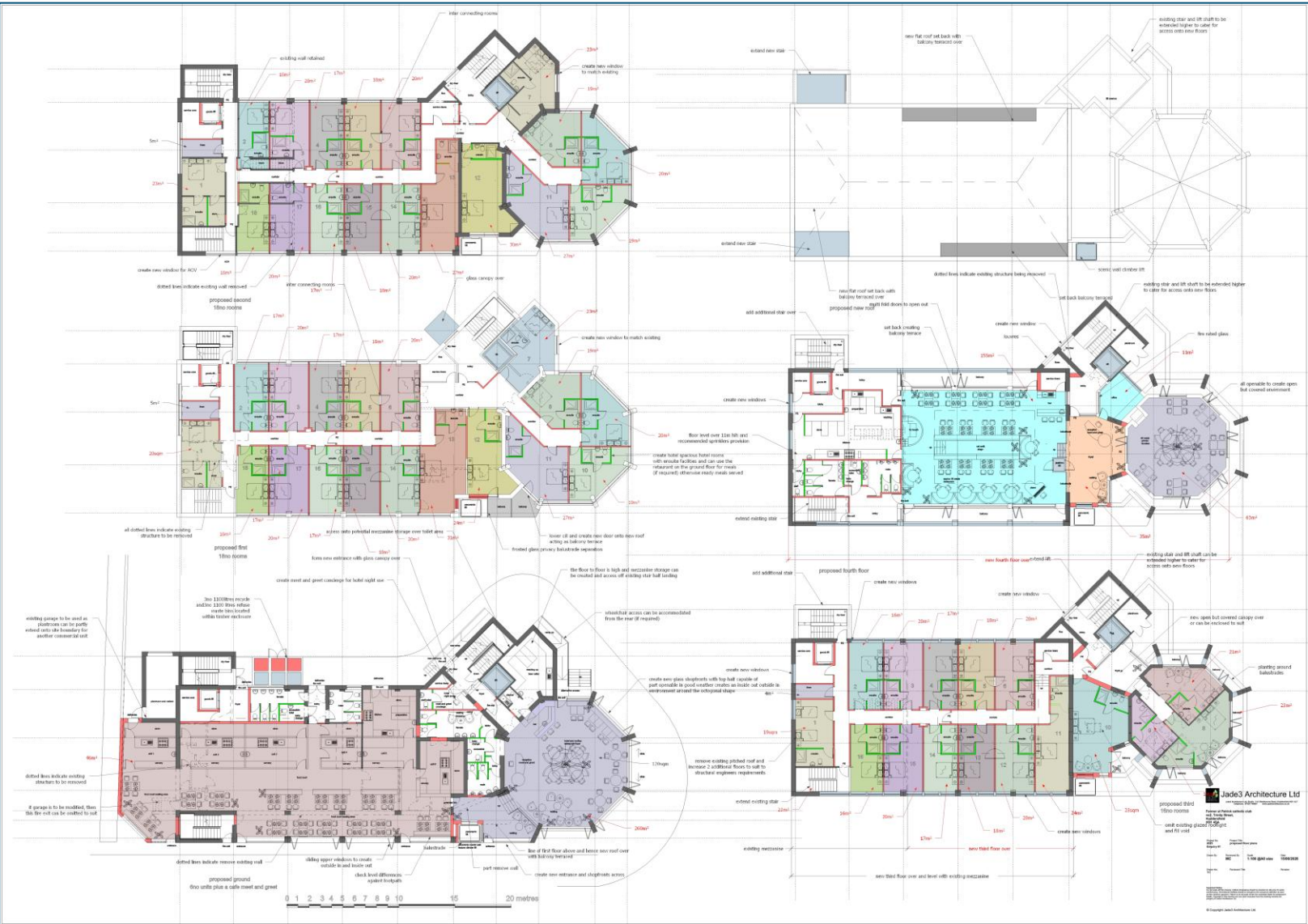
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

Weighted Sound Reduction Index (R_w)

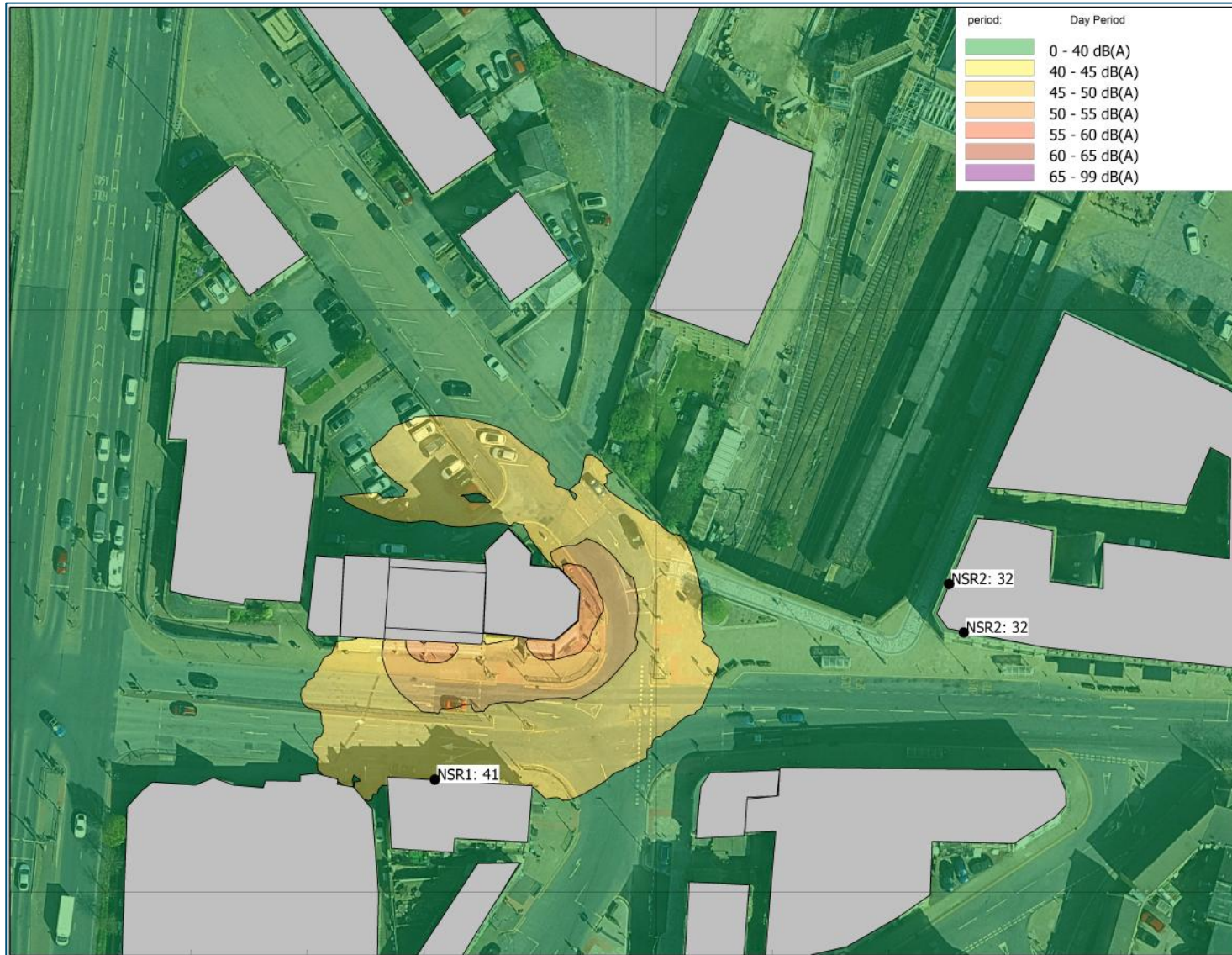
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 – Monitoring Locations





Appendix 4 – Food Court and Restaurant Noise Contour



Appendix 5 – Music Event Noise Contour

