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Environmental Associates

Noise Assessment

58 – 68 Ocean Road, South Shields

September 2024

Regal Property Maisy's Ltd

Noise Assessment

58 – 68 Ocean Road, South Shields

Client: Regal Property Maisy's Ltd

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1 INTRODUCTION

1.1 Background

1.1.1 NJD Environmental Associates Ltd was instructed by Regal Property Maisy's Ltd to undertake a noise assessment to seek prior approval for the change of use from an existing nightclub to student accommodation at 58 – 68 Ocean Road in South Shields. The site location is provided below in Drawing 1.

Drawing 1: Site Location

1.1.2 A noise report has been prepared, with measurements taken of noise levels impacting the site, calculations performed using noise modelling software, and the results interpreted in accordance with the relevant standards.

2 ASSESSMENT METHODOLOGY

2.1 BS8233:2014 and WHO 1999 Guidance Levels

2.1.1 BS8233:2014 *'Guidance on sound insulation and noise reduction for buildings'* provides guidance for the control of noise in and around buildings. It applies to the design of new buildings, or refurbished buildings undergoing a change of use.

2.1.2 BS8233 refers to the World Health Organisation research and recommendations when defining acceptable and upper guidance noise levels within gardens during the day, and within habitable rooms in dwellings during the day and night-time periods as follows:

Table 1: Summary of BS8233 guidance noise levels

Activity	Location	0700 to 2300h	2300 to 0700h
Resting	Living room	35dB LAeq,16h	-
Relaxing	Gardens	55dB LAeq,16h	-
Dining	Dining room	40dB LAeq,16h	-
Sleeping (Daytime resting)	Bedroom	35dB LAeq,16h	30dB LAeq,8h 45dB LAmax

2.1.3 The above levels have been adopted for the purpose of this assessment.

2.2 BS4142:2014+A1:2019 Industrial and Commercial Sound Guidance

2.2.1 Where industrial or commercial noise is present or proposed and likely to impact a residential receptor, the guidance contained within BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'* should be followed. The guidance enables the effects of such noise on people nearby to be assessed and the associated risks to be minimised.

2.2.2 The guidance provides a methodology for determining an initial estimate of significance through subtracting the measured background noise level from the rating level (the specific sound level of the source corrected for any distinctive acoustic characteristics).

2.2.3 Typically, the greater the difference, the greater the magnitude of the impact.

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the

less likely it is that the specific sound source will have an adverse impact or 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.

2.2.4 The context, as defined within BS4142, relates to the following factors:

- The absolute level of sound.
- Character and level of the residual sound compared to the character and level of the specific sound.
- Acoustic design measures.

3 NOISE SURVEY

3.1 Introduction

3.1.1 Between the 06th and 10th September 2024, noise measurements were taken at the proposed development site, in order to quantify noise from surrounding sources.

3.1.2 Measurements were taken using Acoem Fusion sound level meters. The Class 1 instruments logged 1/3 octave levels throughout the measurements, in addition to audio recordings to aid subsequent analysis. The instruments were calibrated before and after the measurements to a reference level of 94dB, with no notable drift observed.

3.1.3 The sound level meters (SN: 14925 and 14359) and field calibrator (SN: 34675377) both hold valid calibration certificates traceable to national standards, compliant with the requirements of BS7445. All calibration certificates can be made available upon request.

3.2 Monitoring Locations

3.2.1 Measurements were taken at the locations shown in Drawing 2 below.

Drawing 2: Noise monitoring locations

3.2.2 The monitoring locations were as follows:

- **ML1:** Microphone protruding approximately 1m through the wall of the northern elevation, on the first floor, overlooking Ocean Road.

  The measurement took place during the following dates and times:
  - 1220h on the 06th September, to 1305h on the 10th September 2024.

- **ML2:** Microphone protruding approximately 1m from an open second floor window on the southern elevation, the closest secure location overlooking the A183 to the east.

  The measurement took place during the following dates and times:
  - 1240h on the 06th September, to 1300h on the 10th September 2024.

3.2.3 During the deployment and collection of noise monitoring equipment, road traffic noise from Ocean Road and the A183 were found to be dominant across the site.

3.2.4 Following both a detailed site walkover and analysis of the noise monitoring data, no existing building services plant was found to be audible during daytime or night-time at the elevations of the proposed development.

3.2.5 It is noted that all the existing building services plant associated with the current night-club premises is to be removed under the scheme. Therefore, no assessment of these sources is considered necessary.

3.2.6 Weather conditions throughout the survey were favourable; with minimal rainfall noted and windspeeds generally between 1 to 3ms^{-1} from variable directions.

3.2.7 Any extended periods of rainfall or higher windspeeds have been excluded from the dataset.

Uncertainties

3.2.8 Noise measurements have been undertaken with high precision Class 1 instruments calibrated before and after the survey by an appropriately qualified and experienced technician.

3.2.9 The baseline data has been recorded over a number of days including both a weekend and weekday period.

3.2.10 The noise models presented in this assessment calculate noise propagation to the methodologies contained within ISO 9613-2 Acoustic – Attenuation of sound during propagation outdoors. This gives a higher level of accuracy for the level of attenuation provided by intervening topography and barriers than the method provided by BS5228.

3.2.11 Whilst an element of uncertainty will inherently exist in any noise assessment due to the large number of potential variables, all reasonable steps have been taken to reduce this.

3.2.12 As such, the level of uncertainty should not be significant and the results and conclusions should be considered robust.

3.3 Existing Noise Levels

3.3.1 The noise levels from the identified monitoring locations are summarised in Tables 3 and 4 below.

Table 3: Summary of measured noise levels (dBA) – ML1			
Date	**LAeq**	**LA90**	**LAmax**
Daytime (0700 – 2300)			
Friday 06/09/2024	64	54	99
Saturday 07/09/2024	63	52	96
Sunday 08/09/2024	67	52	102
Monday 09/09/2024	63	51	91
Tuesday 10/09/2024	67	56	88
Night-time (2300 – 0700)			
Friday 06/09/2024	58	44	80
Saturday 07/09/2024	60	43	86
Sunday 08/09/2024	56	40	74
Monday 09/09/2024	54	42	79

Table 4: Summary of measured noise levels (dBA) – ML2			
Date	**LAeq**	**LA90**	**LAmax**
Daytime (0700 – 2300)			
Friday 06/09/2024	64	53	93
Saturday 07/09/2024	64	52	97
Sunday 08/09/2024	65	49	101
Monday 09/09/2024	65	47	93
Tuesday 10/09/2024	63	52	73
Night-time (2300 – 0700)			
Friday 06/09/2024	58	43	82
Saturday 07/09/2024	58	43	77
Sunday 08/09/2024	49	35	73
Monday 09/09/2024	60	44	85

3.4 LAmax Analysis

3.4.1 WHO Guidelines for Community Noise (1999) suggests guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general populations. The WHO (1999) recommends a guidance level of 45dB LAmax(f) within bedroom areas during the night-time, with the recommendation that;

'For intermittent noise, it is emphasized that it is necessary to take into account both the maximum sound pressure level and the number of noise events.'

3.4.2 World Health Organisation (WHO 2009), states in Section 3.4:

3.4.3 *'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAmax more than 10 – 15 times per night.'*

3.4.4 The ProPG Noise further expands this point with reference to BS8233 Table 4, Note 4, stating:

'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 LAmax,F more than 10 times a night.'

3.4.5 In light of the above, analysis has been conducted based on the LAmax events observed during the night-time period at ML1 and ML2. The analysis found that the 10th highest measured LAmax during the night-time period at ML1 and ML2 was 76dB and 75dB respectively. These levels have therefore been adopted for use in the noise modelling exercise, as detailed in the following Section.

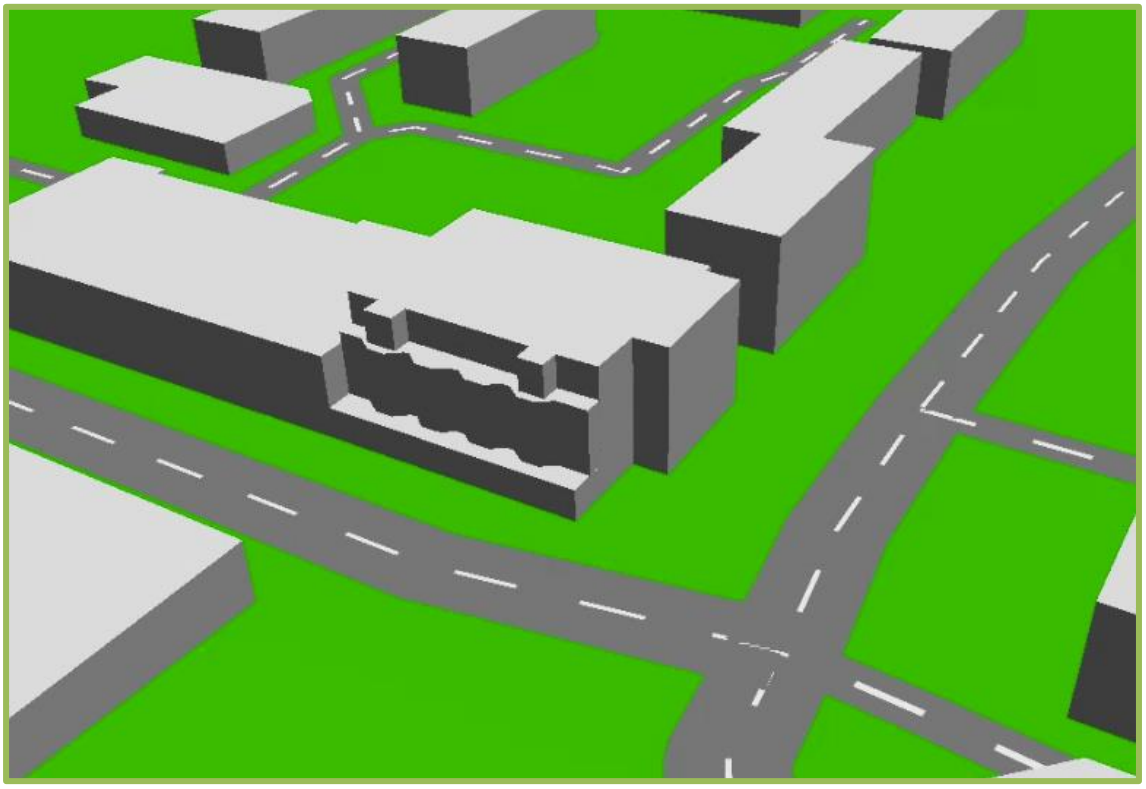
4 CADNAA NOISE MODELS

4.1 Input Data

4.1.1 Topographic data of the site and surrounding land has been incorporated into the noise models, with buildings and roads positioned to reflect the proposed future conditions.

4.1.2 For the purpose of these calculations, the ground absorption has been set to G=0.25 (which represents predominantly acoustically hard surfaces around the site with some soft ground features), with buildings and roads also set to G=0, with two orders of reflection considered.

4.1.3 A 3D representation of the model is shown in Drawing 3 below.



Drawing 3: CadnaA noise model

Existing Road Traffic

4.1.4 The models have been programmed to assess scenarios based on the daytime (0700 to 2300h) and night-time (2300 to 0700h) periods. The building evaluation function has been utilised to calculate noise levels at every floor on each elevation, based on the heights of windows from architect plans.

4.1.5 Point (LAmax(F)) and line (LAeq,T) sources have been set using the data presented in Section 3.

4.2 Noise Model Results

Road Traffic Noise

4.2.1 The results from each scenario assessed at all facades of the development at first floor level are shown in Figures 1 to 3.

4.2.2 Table 5 summarises the highest levels expected across the development during the respective day and night-time periods.

4.2.3 Following a review of the architect's plans, there are no windows to sensitive rooms (i.e., living rooms or bedrooms) on the northern elevation of the ground floor (due to this being developed as retail). Furthermore, there are no windows

to sensitive rooms on western or eastern elevations on any floor of the development. These facades are therefore not required to be assessed.

Table 5: Summary of highest modelled noise levels across the development			
PSR Location (Elevation)	**LAeq,16h**	**LAeq,8h**	**LAmax**
Ground Floor			
Southern	61	56	73
First Floor			
Northern	67	61	74
Southern	62	57	74
Second Floor			
Northern	67	61	74
Southern	62	57	73
Third Floor			
Northern	66	60	72
Southern	62	57	73

4.2.4 The modelled levels have been used with reference to the required standards to determine appropriate mitigation, as discussed in the following Sections.

4.3 Noise Model Factors, Limitations and Uncertainties

4.3.1 The noise models presented in this assessment calculate noise propagation to the methodologies contained within ISO 9613-2 Acoustic – Attenuation of sound during propagation outdoors. This gives a higher level of accuracy for the level of attenuation provided by intervening topography and barriers than the method provided by BS5228.

4.3.2 All noise level predictions are based on simplified models of sound generation and propagation; however, some local conditions such as gusts of wind or bursts of turbulence in the air are too complex to be factored into the algorithms.

4.3.3 The noise models may therefore be subject to some minor uncertainties; however, it is noted that all predictions assume theoretical down-wind

propagation from all sources to all receptors, and as such the models are more likely to over-predict noise levels compared to real-life conditions.

4.3.4 The primary factor that governs the validity of the models is the quality of the input data. As such, all practicable means have been explored to ensure that the data used in the models is as accurate as possible.

5 BS8233 ASSESSMENT OF NOISE LEVELS IN LIVING ROOMS AND BEDROOMS

5.1 Living Rooms and Bedrooms During the Daytime

5.1.1 During the daytime period, BS8233 recommends a guidance level of 35dB LAeq,16h inside living room and bedroom areas.

5.1.2 WHO (1999) indicates that with a window partially open for ventilation, approximately 15dB of attenuation from external noise sources should be achieved.

5.1.3 On this basis, living rooms and bedrooms of the development will not achieve internal guidance levels without the provision of some form of acoustic ventilation and enhanced glazing.

5.2 Bedrooms During the Night-time

5.2.1 During the night-time period, BS8233 recommends a guidance level of 30dB LAeq,8h and 45dB LAmax inside bedroom areas.

5.2.2 As per the daytime requirements, bedrooms of the development will not achieve the guidance levels with windows open.

5.2.3 Appropriate mitigation measures are discussed in Section 7.

6 MITIGATION MEASURES TO ACHIEVE INTERNAL GUIDANCE LEVELS

6.1.1 The receiving rooms subject to the highest potential impact are generally those with the greatest ratio of window area to room volume, in closest proximity to the dominant noise sources surrounding the development.

6.1.2 Table 5 above outlines the locations most exposed to noise ingress during both the daytime and night-time periods of each elevation.

6.1.3 The differences in predicted noises for each floor varies little between ground to second floor and therefore the highest noise level has been used to derive the mitigation across the whole elevation.

6.1.4 Based on the results following modelling, the levels of attenuation required to achieve the internal guidance levels for noise sensitive rooms of the development are summarised in Table 6 below.

Table 6: Highest attenuation requirements			
	LAeq,16h	**LAeq,8h**	**LAmax**
Northern Elevation (Floors 1, 2 and 3)			
Level at façade of receptor (dBA)	67	61	74
Guidance level (dBA)	35	30	45
Level of attenuation required (dBA)	32	31	29
Southern Elevation (Floors Ground, 1, 2 and 3)			
Level at façade of receptor (dBA)	62	57	74
Guidance level (dBA)	35	30	45
Level of attenuation required (dBA)	27	27	29

6.1.5 Tables 7 and 8 below summarises the calculations based on equations provided by BS8233 and BS EN12354-3 for performing detailed noise break-in for composite facades and individual façade elements such as ventilators. The equations are shown below.

$$L_2 = L_{1,in} - R + 10 \times Log\,(S/V) + 10 \times Log(T) + 11$$

$$L_2 = L_{1,in} - D_{n,e} - 10 \times Log\,(V) + 10 \times Log(T) + 21$$

6.1.6 The calculation uses dimensions of glazing and façade elements from the apartments experiencing the highest noise impact in combination with the highest glazing to internal room volume ratio.

6.1.7 As part of the assessment, reference has been made to appropriate literature to provide an estimate of the typical noise attenuation that could be expected from existing and retained building elements.

6.1.8 With reference to Table E.2 of BS8233:1999, it could reasonably be expected that the walls of the dwellings will achieve sound insulation in the range of 45 to 50dB DnT,w.

6.1.9 Adopting the lower figure for the purpose of a robust assessment at this stage of the development, a glazing and ventilation scheme can be recommended

across each elevation to help achieve internal guidance levels. The calculations are presented in Tables 7 and 8 below.

Table 7: Summary of calculated levels (Northern Elevation)						
	Total Area / No. Vents	**125Hz**	**250Hz**	**500 Hz**	**1kHz**	**2kHz**
Glazing; Rw + Ctr 33 dB (e.g 10/12/6mm or equivalent)	4.0m²	25	29	34	39	37
Acoustic Ventilation; Dnew + Ctr 37 dB (e.g GlazPart Linkvent MK11 2500EA or equivalent	2no.	39	50	51	44	35
Composite Façade Attenuation	35 dB					
Summary of Calculated Noise Levels						
	Daytime (dB LAeq)		**Night-time (dB LAeq)**		**Night-time (dB LAmax)**	
External Noise Level	67		61		74	
Internal Noise Level	32		26		39	

Table 8: Summary of calculated levels (Southern Elevation)						
	Total Area / No. Vents	**125Hz**	**250Hz**	**500 Hz**	**1kHz**	**2kHz**
Glazing; Rw + Ctr 29 dB (e.g 6/12/4mm or equivalent)	2.1m²	23	21	24	39	36
Acoustic Ventilation; Dnew + Ctr 37 dB (e.g GlazPart Linkvent MK11 2500EA or equivalent	2no.	39	50	51	44	35
Composite Façade Attenuation	31 dB					
Summary of Calculated Noise Levels						
	Daytime (dB LAeq)		**Night-time (dB LAeq)**		**Night-time (dB LAmax)**	
External Noise Level	62		57		74	
Internal Noise Level	31		26		43	

6.1.10 The results from the tables above demonstrates that the recommended glazing and ventilation scheme can achieve the internal guidance levels based on the requirements for the worst-case living rooms and bedrooms.

6.1.11 The final glazing and ventilation scheme for each floor are presented illustratively in Figures 4 – 6.

6.2 Pedestrian Footfall

6.2.1 The proposed development is located to the east of a pedestrianised high street in South Shields town centre. There are ground floor retail shops located along Ocean Road and this area is also located on the direct walking route to the coast. Therefore, there is a presence of pedestrian footfall at street level, particularly on the northern elevation of the building.

6.2.2 During the site visits it was noted that a larger volume of footfall is experienced during the daytime hours, however this is largely masked by the presence of road traffic noise from the roads directly adjacent, which dominates the baseline environment.

6.2.3 The use of the premises along Ocean Road are associated with retail stores and takeaway restaurants as opposed to bars and pubs. The closest pub is located on the pedestrianised high street to the west. Examination of the sound files did not identify any noise from loud patrons, however, given the location, it is inevitable that occasionally, a source (such as someone shouting) could be present.

6.2.4 The mitigation scheme presented above has been based on dominant road traffic noise (which masked noise associated with pedestrians) and is therefore considered to be sufficient in reducing noise levels internally from any noise associated with passing footfall.

7 ACOUSTIC DESIGN STATEMENT

7.1 Introduction

7.1.1 In accordance with the ProPG: Planning and Noise, an acoustic design statement has been prepared to supplement the noise assessment report.

7.1.2 The statement has been informed by the results presented in the previous sections of this report, and also based on the discussions, processes and limitations considered during the design of the development prior to submission of this prior approval.

7.2 Internal Guidance Levels

7.2.1 The ProPG recommends where it is not considered practical to achieve the internal noise level guidelines with windows open, justification should be provided to the LPA setting out the reasons for this.

7.2.2 To ensure that land is utilised in an efficient and economical way, increasing the stand-off from the surrounding transport links is not considered viable option.

7.2.3 There is no scope to introduce acoustic fencing towards the perimeter of the site.

7.2.4 The only other viable means for reducing internal noise levels to an acceptable standard would therefore be through either the reorientation of internal layouts (i.e., moving noise sensitive rooms away from the main noise sources) or through the use of an alternative means of ventilation.

7.2.5 Due to the proportion of student apartments affected and limited space available, the reorientation of bedrooms is not considered a realistic, economical or proportionate solution.

7.2.6 It is therefore recommended that the most practical solution to achieve guidance levels is through the reliance on some form of acoustic ventilation in noise sensitive rooms.

7.2.7 Where limiting factors exist that make achieving internal guidance levels with windows open impractical, acoustic ventilation is considered a suitable solution that meets the good acoustic design test, as per Paragraph 2.33 to 2.34 of the ProPG, which states:

"It should be noted that the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, typically reducing the insulation to no more than 10 to 15 dB(A).

Most residents value the ability to open windows at will, for a variety of reasons, and LPAs should therefore normally request that designers principally aim, through the use of good acoustic design, to achieve the internal noise level guidelines in noise-sensitive rooms with windows open. Where internal noise levels are assessed with windows closed the justification for this should be included in the ADS.

Where the LPA accepts that there is a justification that the internal target noise

levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment.

In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide "whole dwelling ventilation" in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal LAeq target noise levels should not generally be exceeded."

7.2.8 It is felt that in this circumstance, with due consideration to the factors set out above, achieving the guidance levels through use of an alternative means of ventilation is a suitable solution that meets the good acoustic design test.

8 ACOUSTIC DESIGN SUMMARY

8.1.1 Table 9 summarises the recommendations for glazing and ventilation across the different areas of the site.

Table 9: Glazing and ventilation requirements summary			
Principle Elevation	**Rooms**	**Glazing**	**Ventilation**
Northern	Bedrooms and Living rooms	Rw + Ctr 33 dB e.g., 10/12/6mm (or equivalent)	Dnew + Ctr 37 dB e.g., GlazPart Linkvent MK11 2500 EA (or equivalent)
Southern		Rw + Ctr 29 dB e.g., 6/12/4mm (or equivalent)	Dnew + Ctr 37 dB e.g., GlazPart Linkvent MK11 2500 EA (or equivalent)
***Notes**: These recommendations apply to noise sensitive rooms (living rooms and bedrooms) with the applicable elevations shown on Figures 4 – 6. All unmarked facades have no specific requirement.* *It should be noted that the above mitigation strategy assumes a background ventilation system with continuous extract fans in wet rooms. If a background ventilation system with intermittent extract fans were to be installed this may increase the equivalent area of background ventilation will be required to be increased in accordance with Approved Document Part F. This may result in an increase number / specification of vents required which in turn may result in a reduced specification requirement for the glazing for which it is sited. To the contrary, if a mechanical ventilation with heat recovery (MVHR) system were to be installed this would negate the requirement for background ventilators completely, which may reduce the required specification of the glazing.* *The final glazing and ventilation design should be reviewed by an acoustician.*			

9 OVERHEATING

9.1.1 Building Regulations Approved Document Part O was published on 15th June 2022. Section 3 states the following in relation to noise:

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

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

a. *40 dB LAeq,T, averaged over 8 hours (between 11pm and 7am).*

b. *55 dB LAFmax, more than 10 times a night (between 11pm and 7am).*

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

9.1.2 Whilst the document relates to Building Regulations, it has been considered within this assessment at the planning stage as the most appropriate guidance to follow to identify which elevations are likely to exceed the criteria outlined above. This is based on the measured and resulting modelled noise levels identified within this report.

9.1.3 With reference to Residential Design Guide on Acoustic Ventilation and Overheating ("the AVO Guide"), 13dB of attenuation from an open window should be assumed when evaluating the plots potentially exposed to levels in excess of the ADO criteria. This would therefore equate to the following external noise limits at the elevations in question:

- 40dB LAeq,T + 13dB attenuation = 53dB LAeq,T externally
- 55dB LAmax + 13dB attenuation = 68dB LAmax externally

9.1.4 Resultant noise levels are shown within the sections above. Based on these modelled noise levels, northern and southern elevations are unlikely to be able to rely on openable windows for ventilation purposes and therefore a ventilation strategy has been designed accordingly above.

9.1.5 It should be noted that windows will be openable (i.e., not sealed) and residents have the choice to open windows if required, whilst accepting that the guideline internal noise levels are exceeded.

9.1.6 However, as the identified areas are unable to rely on openable windows to provide ventilation, an overheating assessment may be required to comply with Building Regulations, i.e., post planning.

10 CONCLUSION

10.1 Introduction

10.1.1 NJD Environmental Associates has undertaken a noise assessment seeking prior approval for the change of use from an existing nightclub to student accommodation at 58 – 68 Ocean Road in South Shields.

10.2 BS8233 and WHO Assessment

10.2.1 The BS8233:2014 assessment found that noise sensitive rooms in the majority of areas will require an enhanced double-glazing scheme coupled with an alternative means of acoustic ventilation to achieve the internal guidance noise levels.

10.2.2 Noise break-in calculations have demonstrated appropriate schemes of glazing and ventilation that can be adopted, with the details summarised in Table 9 and Figures 4 - 6.

10.2.3 Night-time noise levels identified that receptors are likely to exceed the noise criteria outlined within Approved Document Part O and therefore are unable to rely on openable windows to mitigate overheating. An overheating assessment may therefore be required.

10.2.4 It is concluded that subject to the recommended mitigation measures being implemented, noise should not be a prohibitive factor in the determination of this prior approval.

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