

Care Home, Shays Drive, Clitheroe BB7 1LL

# Noise Assessment

for Eric Wright Construction Ltd., Sceptre House, Preston, PR5 6AW

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# **Executive Summary**

Environoise Consulting has been commissioned by Eric Wright Construction to provide a noise assessment to inform a planning application for a proposed 68-bedroom care home on land off Shays Drive, Clitheroe BB7 1LL.

The key review findings are as follows:

- A 24-hour noise survey was undertaken at two positions to determine baseline noise conditions.
- Plant noise limits to achieve a 'low impact, depending on the context' (as per BS 4142) have been given for any fixed external plant proposed to service the care home.
- An outline noise ingress assessment for the care home has determined that 25dB R<sub>w</sub> + C<sub>tr</sub> glazing is suitable for all spaces. A trickle ventilation unit sound insulation performance of ≥31dB D<sub>ne,w</sub> is recommended for the cinema. All other spaces may be ventilated through a partially open window or non-acoustic trickle ventilation units.
- External noise levels are suitably low to 'prevent the onset of moderate annoyance' as per BS 8233:2014 for all proposed outdoor amenity spaces.
- Potential noise from the operation of the existing sports pitch to the north-west has been assessed and it has been determined that internal noise level and external noise levels in outdoor amenity spaces will be met without the need for further noise mitigation measures.

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# 1 Noise Survey

## 1.1 Measurement Position

- 1.1.1 A-weighted ambient, maximum and background noise levels (L<sub>Aeq,T</sub>, L<sub>Amax,fast</sub>, L<sub>A90 (T)</sub>) and associated octave band noise levels were measured at three unattended positions between 11.25hrs, Monday 12<sup>th</sup> and 15.18hrs, Tuesday 13<sup>th</sup> December 2022 as follows:
  - **Position 1:** Representative of the care home façade most exposed to A59.
  - **Position 2:** Representative of the nearest residential receptors on Dyke Nook, Shays Drive and Pendlebrook.

Figure 1.1: Site and noise measurement positions.





## 1.2 External Noise Levels for Façade Strategy Review

#### **Ambient Noise Levels**

1.2.1 The logarithmically averaged daytime and night-time ambient noise levels measured at Position 1 are given in Table 1.1. The highest daytime hourly period has also been given for the assessment of non-residential care home spaces in accordance with HTM08-01.

Desition	Period		L <sub>eq,T</sub> (dB) at octave band centre frequency (Hz)						L <sub>Aeq,T</sub>
Position		63	125	250	500	1k	2k	4k	(dB)
	Daytime - 16-hour (07.00 - 23.00hrs)	65	55	43	43	46	37	30	49
1	Daytime – highest 1-hour (14.00 – 15.00, 12/12/2022)	65	58	47	45	49	40	33	52
	Night-time - 8-hour (23.00 - 07.00hrs)	62	49	32	37	39	28	15	41

Table 1.1: Logarithmically averaged octave-band ambient noise levels.

#### Maximum Noise Levels

1.2.2 In line with WHO Guidelines, we have considered the highest maximum noise level not exceeded more than 10-times during the night-time period at Position 1, see Table 1.2.

 Table 1.2: Night-time maximum noise levels.

Desition	Devied		L <sub>max</sub>	<sub>,fast</sub> (dB) at o	ctave band c	entre frequen	icy (Hz)		
FUSILION	Period	63	125	250	500	1k	2k	4k	LAmax,fast (UD)
1	Night-time (23.00 - 07.00hrs)	65	51	34	48	48	34	14	50

# 1.3 Background Noise Levels for Plant Noise Limits

- 1.3.1 To assess the impact of plant, BS 4142:2014+A1:2019 'Methods of rating and assessing industrial and comercial sound' (BS 4142)<sup>i</sup> requires the use of a 'representative' background noise level. The modal value has been determined to be representative level for both, the daytime, and night-time periods.
- 1.3.2 Plant noise limits have been given to control fixed external plant to be of 'low impact, depending on the context', as per BS 4142.



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Position	Measurement period	Measured background	Plant noise limits	
FOSILION		Range	Representative value	[L <sub>Ar,Tr</sub> (dB)]
2	Daytime (07.00 – 23.00 hrs)	32 – 50	40	40
2	Night-time (23.00 – 07.00hrs)	26 – 41	27	27



# 2 Noise Ingress

## 2.1 Criteria

## **Internal Noise Levels**

2.1.1 Department of Health 'Health Technical Memorandum 08-01: Acoustics' (HTM-08)<sup>ii</sup> only provides residential internal noise level targets for patient care (wards) and not long-term accommodation. Therefore, targets for care home bedrooms have been informed by guidance given in Table 4 of BS 8233 'Guidance on sound insulation and noise reduction for buildings'<sup>iii</sup> and World Health Organisation (WHO) Guidelines; 'Community and Noise,1999'<sup>iv</sup> for ambient and maximum noise levels respectively, see Table 2.1. The maximum noise level criterion should not be exceeded more than 10 times during the night-time period (23.00 – 07.00hrs).

Table 2.1: Recommended internal noise level targets	s for residential spaces.

	Leasting	Internal noise level target		
Αστινιτγ	Location	Daytime (07.00 - 23:00)	Night-time (23.00 - 07:00)	
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB L <sub>Aeq,8hour</sub> 45dB L <sub>Amax,fast</sub>	

## **Non-Residential**

2.1.2 External noise ingress criteria for the proposed Treatment Room and Kitchen care home spaces have been informed by HTM08-01 and are given in Table 2.2. Also given is an internal noise level target for the Cinema which has been informed by guidance given in Building Bulleting 93 'Acoustic design of schools - performance standards'<sup>v</sup>.

#### Table 2.2: External noise ingress level targets for non-residential spaces.

Room	External noise ingress target [LAeq, 1hour (dB)]
Cinema	35
Treatment Room	40
Kitchen	50



#### 2.1.3 Building services noise rating level targets (NR) have been informed by HTM08-01, see Table 2.3.

Location	Mechanical services noise level (NR level)
Bedrooms (daytime) Bedrooms (night-time)	30 25
Cinema	25
Treatment Room	35
Kitchen	40

## 2.2 Noise Ingress Assessment

- 2.2.1 External noise levels are sufficiently low that a detailed calculation accordance with BS EN 12354-3:2000<sup>vi</sup> is not required and target will be met considering a typical reduction of 15dB between external and internal noise levels with a partially opened window for all spaces other than the cinema. A noise ingress calculation is given for the cinema in Figure B1, Appendix B.
- 2.2.2 Noise from the proposed school to the west has not been assessed as the prediction of operational school noise levels would be inaccurate without detailed information which has not been provided. Therefore, the school designers should be responsible for considering the care home as a noise sensitive receptor.

## 2.3 Recommendations

#### **Glazing and Ventilation**

2.3.1 Suitable glazing sound insulation performances and natural ventilation methods are provided in Table 2.4. Noise from any mechanical ventilation should meet the NR levels given in Table 2.3.



Table 2.4. Will	ilmum sound insulation performances for ca			
	Glazing		Ver	tilation
Location	Laboratory sound insulation performance $[R_{w+}C_{tr} (dB)]$	Example glazing specification	Trickle vent sound insulation performance [D <sub>ne,w</sub> (dB)]	Example trickle vent specification
Cinema	>25	4mm pane / 16mm cavity / 4mm pane	31	Titon TV90 Hi-Lift
All other spaces	- ≥25		-	Partially open windows or non- acoustic trickle vent

Table 2.4. Minimum according ulation norfermances for easy home glating and notural contilation

2.3.2 The glazing performance should be constant across the overall assembly, so the framing should be of similar or greater performance than the glazing recommended. The performance of the glazing units also depends on the quality of framing and good contact with window seals.

#### **Building Envelope Constructions**

2.3.3 Outline external wall and roof constructions have been proposed as a blockwork/cavity/brick external wall and timber pitched roof. We have given example suitable constructions in Table 2.5 along with predicted<sup>1</sup> octave band sound reduction indices (R).

Table 2.5: Sound insulation	performances for build	ding envelope constructions.
-----------------------------	------------------------	------------------------------

Duilding closes	t Construction		R <sub>w</sub> + C <sub>tr</sub>							
Building elemen	Construction	63	125	250	500	1k	2k	4k	(dB)	
External wall	<ul> <li>102.5mm brick</li> <li>Wall ties forming a ≥50mm cavity</li> <li>100mm concrete blockwork (≥850kg/m<sup>3</sup>)</li> <li>12.5mm standard plasterboard (≥7.5kg/m<sup>2</sup>, e.g. Gyproc WallBoard) on dabs or a plastered finish</li> </ul>	31	41	41	45	55	65	76	47	
Roof	<ul> <li>Roof tiles</li> <li>Pitched timber roof system with 50mm mineral wool insulation</li> <li>12.5mm standard plasterboard (≥7.5kg/m<sup>2</sup>, e.g. Gyproc WallBoard)</li> </ul>	12	26	39	48	54	58	56	41	

<sup>&</sup>lt;sup>1</sup> Using Insul 9.0.20 modelling software. +/- 3dB margin of error. -3dB correction applied for lightweight constructions to account for prediction uncertainty.



## 2.4 External Noise in Outdoor Amenity Areas

- 2.4.1 BS 8233 states that for any dedicated outdoor amenity spaces it is desirable for the steady noise level in external amenity spaces (such as gardens or outdoor living areas) to be less than 50dB LAeq,16hour to 'prevent the onset of moderate annoyance' with 55dB LAeq,16hour regarded as an upper limit to 'prevent the onset of serious annoyance' for occupants.
- 2.4.2 The measured noise level of 49dB L<sub>Aeq,16hour</sub> is suitable to prevent the onset of 'moderate' or 'serious' annoyance as per BS 8233; therefore, no further noise mitigation measures are necessary.



# 3 Sports Pitch Noise Impact

## 3.1 Assessment

- 3.1.1 A SoundPLAN 8.2 noise model has been created to accurately predict noise propagation from the sports pitch 255 metres to the north-west of the proposed site boundary.
- 3.1.2 Sport England 'Design Guidance Note: Artificial Grass Pitch Acoustics Planning Implications'<sup>vii</sup> provides a typical free-field noise level of 58dB L<sub>Aeq,1hour</sub> at 10 metres from the halfway sideline'. The sound power level input into the noise model has been calibrated to achieve the Sport England level which results in a noise level of 35dB L<sub>Aeq,1hour</sub> at the nearest and most exposed care home façade.
- 3.1.3 The resultant noise level from use of the sports pitch is suitably low that internal noise level targets given Tables 2.1 and 2.2 and external noise in outdoor amenity areas given in Section 2.4 will be met.



# Appendix A: Noise Data



Figure A1: Noise data time history at Position 1.









# Appendix B: Noise Ingress Calculation

Figure B1: Cinema noise ingress calculation.

ENVIRONO	ISE			Le	q - (	Cine	ma				
Project Care Home, Clitheroe											
Client	Eric W	right	Cons	struc	tion						
Room	a										
Enter Facade Correction	0 dB	]									
Receiving Room	]										
Height of room	2.4 m	]									
Width of room	5.0 m	1									
Length of room	4.0 m	1									
Volume of room	48.0 m <sup>3</sup>	1									
Element	1										
Area 1 - Glazing	0.0 m <sup>2</sup>										
Area 2 - Glazing & TV	2.0 m <sup>2</sup>									-	
Area 3 - Non Glazed	9.0 m <sup>2</sup>										
Area 4 - Non Glazed	0.0 m <sup>2</sup>										
Angle of incidence	0 deg										
		1									
Frequency Hz		63	125	250	500	1000	2000	4000	8000		
Reverberation time	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
Absorption (sabine	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5			
Frequency Hz		63	125	250	500	1000	2000	4000	8000	dB(A)	
External dB	65	58	47	45	49	40	33	33	52		
External Freefield						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
External Freefield L	65	58	47	45	49	40	33	33	52		
Additional Correct	ion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
10log(cos(angle))		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		T									
SRI Ref	Area		-	-	-		_	-			
0 Clasics and Trickle Mart	0.0 m <sup>2</sup>	0	0	0	0	0	0	0	0	No data	
	2.0 m <sup>2</sup>	10	14	10	18	21	29	24 76	24 76	Extornal	
	9.0 m <sup>2</sup>	0	<u>41</u> 0	41 0	40 0	0	00	0	0		
Combined SRI		17	21	17	25	35	36	31	31	No data	
								·			
Oritorian (ND at 4141	58	47	39	33	29	26	24	22			
Criterion (INR at 1KH	~~~~~	****		~~~~~~							
Additional SRI Requir	red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	To Meet NR29	



# Appendix C: Risk Management Schedule

Table C1: Assessment of risks with control measures.

Severity Classifications (S)	Probability Classifications (P)	Degree of Risk (R)					
<ol> <li>Minor – Minor accident, resulting in no serious injuries or lost time; little or no damage to property or the environment.</li> </ol>	<ol> <li>Improbable – no known instances of such an event occurring.</li> </ol>	0 - 5 = Low Risk; ensure controls are adhered to and activity need not alter.					
2. Moderate – Potential injury necessitating less than 3 days off work; damage to property or the environment requiring remedial work.	2. Remote – past experience suggests that event rarely occur.	6 - 10 = Moderate Risk; tolerable, but efforts should be made to reduce the risk where cost effective and reasonably practicable.					
3. Serious – Accident reportable under RIDDOR 95; serious damage to property or the environment.	<ol> <li>Possible – experience shows that events occur on occasions.</li> </ol>	11 - 15 = Substantial Risk; all practicable measures must be taken to reduce the level of risk; tolerable only where further risk reduction is impracticable or disproportionate to the risk involved.					
<ol> <li>Major – Accident resulting in serious or permanent injury; major or permanent damage to property or the environment.</li> </ol>	4. Probable – experience shows that events occur frequently.	16 – 25 = Extreme Risk; Unacceptable except in extraordinary circumstances; all control measures must be taken regardless of cost.					
5. Catastrophic – Accident resulting in death or severe disablement; destruction of property; irreversible damage to the environment.	5. Likely – very likely to happen unless actively prevented.	>26. Works must be aborted and project need to be reviewed.					



Table C1 (continued): Assessment of risks with control measures.

Activity	Hazard	Consequence	De	Degree of Risk		- Risk Control Measures		esidu Risk	al	Risk Owner
, lotting	Hazara	Concequence	S	P R		S	Ρ	R		
Access to/ from site	Tripping or slipping hazards and falling objects.	Low risk	2	2	4	Take due care and attention to avoid tripping hazards. Do not work externally at height. Always sign in and out of site if required.	2	1	2	Contractor and consultant
Lifting or moving blockwork	injury through heavy load or improper lifting technique	Low risk	2	3	6	Blocks should be less than 20kg. Workers should wear gloves, steel toe cap boots and protective glasses. Workers must lift by bending their knees not their back. Make sure path is not obstructed by items being carried.	2	2	4	Contractor
Handling sheets of plasterboard	Injury through heavy load or improper lifting technique	Low risk	2	3	6	Plasterboard handled should be less than 20kg per sheet. Regardless of the mass several contractors may be needed to carry boards. Workers should wear gloves, steel toe cap boots and protective glasses. Workers must lift by bending their knees not their back. Make sure path is not obstructed by items being carried.	2	2	4	Contractor
Handling sheets of glass	Injury through heavy load/ improper lifting technique or laceration	Moderate	3	3	9	Detailed review of handling and positioning of glass to be done before installation by contractor. Glazing may need to be craned into position due to high mass. All glazed units must be clearly marked with tape/ marker to avoid people walking into the glass. Glazing must be handled with appropriate gloves only. Regardless of the weight, several contractors may be needed to carry units. Workers should wear gloves, steel toe cap boots and protective glasses. Workers must lift by bending their knees not their back. Make sure path is not obstructed by items being carried.	3	2	6	Contractor
Dust inhalation	Injury through being temporarily blinded of damage to lungs	Low risk	2	3	6	Only work in well ventilated space and wear appropriate PPE including dust mask. If cutting material make sure gloves are worn. Signage may be required to prevent other workers entering the space.	2	2	4	Contractor
Hearing damage	Injury to hearing or consequence of verbal communication not being heard	Moderate	3	3	9	Review of construction or demolition methods and all workers exposed to high levels of noise to be provided with suitable hearing protection. In the case of sound insulation testing, suitable signage should be used to warn contractors of high noise risk to certain rooms.	3	2	6	Contractor. Contractor and acoustic consultant for sound insulation tests.



# References

<sup>vi</sup> BS EN 12354-3:2000 'Building acoustics. Estimation of acoustic performance in buildings from the performance of elements. Airborne sound insulation against outdoor sound', 2000

<sup>&</sup>lt;sup>i</sup> BS 4142:2014+A1:2019 'Methods of rating and assessing industrial and comercial sound'

<sup>&</sup>lt;sup>ii</sup> Department of Health 'Health Technical Memorandum 08-01: Acoustics' (HTM-08).

iii BS 8233 'Guidance on sound insulation and noise reduction for buildings', 2014.

<sup>&</sup>lt;sup>iv</sup> World Health Organisation (WHO) Guidelines; 'Community and Noise, 1999'

<sup>&</sup>lt;sup>v</sup> Building Bulleting 93 'Acoustic design of schools - performance standards', 2015.

vii Sport England 'Design Guidance Note: Artificial Grass Pitch Acoustics – Planning Implications', 2015.