

The Gramophone Blyth Road

Hayes

Planning Condition 8 & 10 Acoustic Report

21 July 2020

For Really Local Group (Hayes) Limited 5 Cromwell Place London SW7 2JE



Contents

SUMN	1ARY	2
1.0	INTRODUCTION	3
2.0	DESCRIPTION OF SITE AND SURROUNDINGS	3
3.0	EXTERNAL NOISE LEVELS	5
4.0	CRITERIA FOR NOISE EMISSIONS	ō
4.1 Plar	nning Condition 10	5
4.2 Plar	nning Condition 8	7
5.0	ACTIVITY NOISE ASSESSMENT	3
5.1 Pro	posed Activities	3
5.2 Pro	posed Scheme of Sound Insulation	3
5.3 Pre	dicted Noise Break-Out Levels	3
6.0	BUILDLING SERVICES PLANT NOISE EMISSIONS)
6.1 Pro	posed Plant10	C
6.2 Nea	rest Noise Sensitive Properties	2
6.3 Plar	nt Noise Predictions	2
APPEN	IDIX A – ACOUSTIC TERMINOLOGY16	5
APPEN	IDIX B – ACTIVITY NOISE CALCULATIONS17	7
Machin	e Store1	7
Boiler H	louse	C
Terrace	d Houses to North-East	,



SUMMARY

The Gramophone is a new cultural hub, proposed on Blyth Road in Hayes. The project will include 4 screen cinema, with retail, bar, restaurant and exhibition spaces and ancillary spaces.

A planning condition for the proposals requires a sound insulation scheme to be submitted, to consider noise break-out from the development to nearby noise sensitive properties.

Limits have been proposed for noise due to internal activities and building services plant, based on the measured background/ambient noise levels at the site, planning condition requirements and London Borough of Hillingdon's standards.

Typical internal activity noise levels have been used to predict noise transmission via the building envelope to the nearest noise sensitive properties.

The predicted noise break-out levels do not exceed the proposed noise limits.

An assessment has been undertaken to predict noise emissions associated with the proposed building services plant at the nearest noise sensitive properties.

The predicted noise levels comply with the planning condition 8 requirements at the nearest noise sensitive properties during the proposed operating periods.

Project Number	14163	Issue Date	21 July 2020
Document Reference	R/PC8-10/1/200721	Version	04
Report Produced by	Nicholas Jones T: 07739 715411		11
	BEng(Hons) CEng MIOA	E: njones@auri	icl.com
auricl Limited www.auricl.com hello@auricl.com	107 Cheapside London EC2V 6DN	9 Greyfriars Ro Reading RG1 1NU	ad
		Registered Con	npany 09824075

Copyright © auricl Limited 2020. All rights reserved. This report is confidential to the party to whom it is addressed and their professional advisers for the specific purpose to which it refers. No responsibility is accepted to third parties, and neither the whole nor any part of this report nor reference thereto may be published or disclosed without the written consent of auricl Limited.



1.0 Introduction

The Gramophone is a new cultural hub, proposed on Blyth Road in Hayes. The project will include 4 screen cinema, with retail, bar, restaurant and exhibition spaces and ancillary spaces.

Planning conditions 8 and 10 for the proposals (permission reference 59872/APP/2016/3454) require a sound insulation scheme to be submitted, to consider noise emissions from the development to nearby noise sensitive properties.

The following report presents an assessment of noise transmission from the building to the nearest noise sensitive properties.

An explanation of the acoustic terminology used in this report is given in Appendix A.

2.0 Description of Site and Surroundings

The proposed development site is located on the south-western side of Blyth Road in Hayes, in a mixed residential and commercial area. Existing residential houses are located on the north-eastern side of Blyth Road, whilst blocks of new residential flats are located to the south-east and north-west of the site. Further residential properties are also proposed on the Machine Store site, to the south-west of the proposed building.

Figure 2.1 indicates the approximate existing site extent in **red** and the nearest noise sensitive properties indicated in **blue**.



Figure 2.1 Site Extent and Surroundings



Figure 2.2, 2.3 and 2.4 show the proposed ground, first and second floor layouts respectively (taken from Architecture Initiative drawings GRM-AI-XX-ZZ-DR-A-210 and GRM-AI-XX-ZZ-DR-A-211).











Figure 2.4 Proposed Second Floor Site Layout

Items of building services plant (air handling units, VRF units) are located on the roof over screen 1.

3.0 External Noise Levels

An unmanned environmental noise survey was undertaken in July 2016 by Messrs Hann Tucker and submitted with the planning application for the original wider development (including the Machine Store residential building to the south-west).

Measurement position 1 of the survey is considered most relevant to the location of the proposed Gramophone building, the approximate location of which is shown on Figure 3.1.



Figure 3.1 Site Plan Indicating Approximate Location of Measurement Position – July 2016



In addition, an unmanned environmental noise survey was undertaken by **auricl** at two positions around the proposed Gramophone development site between Tuesday 26 May 2020 and Wednesday 27 May 2020, at the locations shown in Figure 3.2.



Figure 3.2 Site Plan Indicating Approximate Location of Measurement Positions – May 2020

Based on the results of both surveys, typical $L_{A90 (15 \text{ min})}$ background noise levels and $L_{Aeq, T}$ ambient noise levels during the proposed daily operating periods (08:00 – 23:00 hours) are presented in Table 3.1 below.

T			Al	1 1-
i abie 3.	1 ivieasurea	васкдгоипа	noise	Leveis

Parameter	Measured Level (dB) during Daily Operating Period (08:00 – 23:00 hours)		
Typical LA90 (15 min) Background Noise Level	50		
Typical L _{Aeq, T} Ambient Noise Level	64		

The measured noise levels shown in Table 3.1 have been used to set noise limits for noise emissions, as discussed in the section that follows.

4.0 Criteria for Noise Emissions

4.1 Planning Condition 10

Planning Condition 10 specifies the following:

"Before the development reaches damp proof level, within the relevant building, a sound insulation scheme for the control of noise transmission to the adjoining dwellings shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall include such combination of sound insulation and other measures as may be approved by the LPA. Thereafter, the scheme shall be implemented and maintained in full compliance with the approved measures."



In determining specific criteria for activity noise emissions from the building, we have consulted Table 4 in Section 7.0 of the London Borough of Hillingdon's Supplementary Planning Document *"Development Control for Noise Generating and Noise Sensitive Development"* (April 2016), which is presented in Table 4.1 below.

Location	Time	Criteria
External	9am to 11pm	L _{Aeq, 5min} EN minus L _{Aeq, 5 min} or L _{A90, 5 min} WEN = 0 to +5 dBA L _{Ceq, 5min} EN minus L _{Ceq, 5 min} or L _{C90, 5 min} WEN = 0 to +5 dBC
External	11pm to 9am	L _{Aeq, 5min} EN minus L _{Aeq, 5 min} or L _{A90, 5 min} WEN = -5 to +3 dBA L _{Ceq, 5min} EN minus L _{Ceq, 5 min} or L _{C90, 5 min} WEN = -10 to +3 dBC
Internal	9am to 11pm	EN = Noise Rating NR 25-35 L _{eq, 5min} L _{Ceq, 5min} EN minus L _{Ceq, 5 min} or L _{C90, 5 min} WEN = -10 to +5 dBC
internal	11pm to 9am	EN = Noise Rating NR 15-25 L _{eq, 5min} L _{Ceq, 5min} EN minus L _{Ceq, 5 min} or L _{C90, 5 min} WEN = -10 to 0 dBC

Table 4.1 Hillingdon Noise Standards for Entertainment Noise

Based on the typical measured ambient noise levels and the above requirements, the worst-case limit for activity noise emissions associated with the development during proposed daily operating periods (08:00 - 23:00 hours) is 43 dB L_{Aeq (5 min}), when measured at the nearest noise sensitive properties.

The noise limit applies at a position 1m external to the specified noise sensitive properties and considers the total cumulative noise emissions at that position with all relevant activity noise sources contributing simultaneously.

4.2 Planning Condition 8

Planning Condition 8 specifies the following noise requirements for building services plant:

"The rating level of noise emitted from the plant and/or machinery hereby approved shall be at least 5dB below the existing background noise level. The noise levels shall be determined at the nearest residential property. The measurements and assessment shall be made in accordance with British Standard 4142."

Based on the measured background noise levels, the planning condition 8 requirements and BS 4142: 2014, the limit for plant noise emissions associated with the development during the proposed daily operating periods (08:00 - 23:00 hours) is 45 dB L_{Aeq (1 hour)}, when measured at the nearest noise sensitive properties.

The noise limit applies at a position 1m external to the specified noise sensitive properties and considers the total cumulative noise emissions at that position with all relevant plant operating simultaneously.

Where noise emitted from the proposed plant will contain unfavourable characteristics (e.g. tonality, impulsivity, intermittency, etc.), the noise limits shall be reduced in accordance with the guidance given in BS 4142: 2014.



5.0 Activity Noise Assessment

This section presents our assessment and calculations of transmission of noise to external areas due to internal activities, in relation to the planning condition 10 requirements and London Borough of Hillingdon's standards.

5.1 Proposed Activities

The building will typically operate during daytime periods only (08:00 - 23:00 hours), therefore only the daytime noise criteria in Table 4.2 have been considered.

Anticipated maximum noise levels in the cinema auditoria, bar/restaurant and recording studio are shown in Table 5.1.

Source	L _{eq} (dB) Sound Pressure Level at Octave Band Centre Frequency (Hz)							L _{Aeq}	
	63	125	250	500	1k	2k	4k	8k	(dB)
Cinema	89	87	87	87	87	87	82	77	92
Bar/ Restaurant	64	65	69	74	73	69	63	56	77
Recording Studio	89	87	87	87	87	87	82	77	92

Table 5.1 Internal Activity Noise Levels

5.2 Proposed Scheme of Sound Insulation

The external envelope of the building is proposed to achieve a high level of sound insulation by the addition of internal constructions, which are mainly intended to achieve appropriate sound insulation between internal areas, but which will also assist with reducing noise transmission to external areas.

5.3 Predicted Noise Break-Out Levels

Based on the typical internal noise levels and the predicted sound insulation performance of the building envelope, we have undertaken calculations to predict the level of noise break-out to the nearest noise sensitive properties, which are listed as follows and indicated in **blue** on Figure 2.1 above:

- Proposed Machine Store residential apartments to the south-east
- Existing Boiler House residential apartments to the north-west
- Existing terraced houses to the north-east

Our calculations have been undertaken in accordance with the methodology described in BS EN 12354-4: 2000 "Building acoustics – Estimation of acoustic performance of buildings from the performance of elements. Part 4: Transmission of indoor sound to the outside".

Our calculations for each noise sensitive property are shown in full in Appendix B and summarised in Tables 5.2, 5.3 and 5.4.



Source	Predicted Noise Level at Nearest Noise Sensitive Façade (L_{Aeq} dB)
Screen 1 – External Wall	38
Screen 1 – Roof	33
Bar – External Wall	23
Screen 2 – External Wall	36
Recording Studio – Roof	35
Screen 4 – Roof	34
Total	42
Noise Limit	43

Table 5.2 Summary of Noise Calculations – Machine Store

Table 5.3 Summary of Noise Calculations – Boiler House

Source	Predicted Noise Level at Nearest Noise Sensitive Façade (L _{Aeq} dB)
Screen 2 – External Wall	26
Recording Studio – External Wall	7
Screen 3 – External Wall	25
Screen 4 – Roof	25
Total	30
Noise Limit	43



Source	Predicted Noise Level at Nearest Noise Sensitive Façade (L_{Aeq} dB)
Screen 1 – External Wall	28
Bar – External Wall	14
Screen 3 – External Wall	25
Screen 4 – Roof	26
Total	32
Noise Limit	43

Table 5.4 Summary of Noise Calculations – Terraced Houses

It can be seen that the predicted noise levels do not exceed the proposed noise limit at each of the nearest noise sensitive properties.

6.0 Buildling Services Plant Noise Emissions

This section presents our assessment and calculations of noise emissions from the proposed roof plant, in relation to the planning condition 8 requirements.

6.1 Proposed Plant

Air handling units and VRF units are proposed on the south-eastern portion of the roof of the building, as indicated in **green** on Figure 6.1.

The Gramophone, Blyth Road, Hayes Planning Condition 8 & 10 Acoustic Report





Figure 6.1 Site Plan Indicating Approximate Roof Plant Area Location

The radiated sound power levels for the air handling units and VRF units, as advised by the manufacturers, are shown in Table 6.1.

Plant	Radiated Sound Power Level (L _{wA} dB)
Screen 1 AHU – Supply	48
Screen 1 AHU – Extract	48
Screen 2 AHU – Supply	47
Screen 2 AHU – Extract	46
Screen 3 AHU – Supply	47
Screen 3 AHU – Extract	46
Screen 4 AHU – Supply	47
Screen 4 AHU – Extract	46
General AHU – Supply	50
General AHU – Extract	50
VRF Unit 1	73
VRF Unit 2	73

Table 6.1 Plant Noise Levels



Plant	Radiated Sound Power Level (L _{wA} dB)
VRF Unit 3	71
VRF Unit 4	66
VRF Unit 5	63

In order to achieve the above, the VRF units will each be fitted with proprietary acoustic attenuation. In addition, the supply and extract grilles for each AHU will be fitted with in-duct attenuators.

6.2 Nearest Noise Sensitive Properties

We have considered the nearest noise sensitive property to be as follows:

- Proposed Machine Store residential apartments to the south-east
- Existing Boiler House residential apartments to the north-west
- Existing terraced houses to the north-east

6.3 Plant Noise Predictions

Our calculations to predict the total plant noise level at the nearest noise sensitive properties are presented in Tables 6.2, 6.3 and 6.4.



Plant	Sound Power Level (L _{wA} dB)	Distance Attenuation (dB)	Predicted Noise Level at Nearest Noise Sensitive Property (dB)
Screen 1 AHU – Supply	48	-35	13
Screen 1 AHU – Extract	48	-35	13
Screen 2 AHU – Supply	47	-30	17
Screen 2 AHU – Extract	46	-30	16
Screen 3 AHU – Supply	47	-32	17
Screen 3 AHU – Extract	46	-32	16
Screen 4 AHU – Supply	47	-33	17
Screen 4 AHU – Extract	46	-33	16
General AHU – Supply	50	-28	22
General AHU – Extract	50	-28	22
VRF Unit 1	73	-33	40
VRF Unit 2	73	-33	40
VRF Unit 3	71	-33	38
VRF Unit 4	66	-33	33
VRF Unit 5	63	-33	30
		Total	45
		Daytime Noise Limit	45

Table 6.2 Plant Noise Emission Calculations – Machine Store



Plant	Sound Power Level (L _{wA} dB)	Distance Attenuation (dB)	Predicted Noise Level at Nearest Noise Sensitive Property (dB)
Screen 1 AHU – Supply	48	-40	8
Screen 1 AHU – Extract	48	-40	8
Screen 2 AHU – Supply	47	-40	7
Screen 2 AHU – Extract	46	-40	6
Screen 3 AHU – Supply	47	-40	7
Screen 3 AHU – Extract	46	-40	6
Screen 4 AHU – Supply	47	-40	7
Screen 4 AHU – Extract	46	-40	6
General AHU – Supply	50	-40	10
General AHU – Extract	50	-40	10
VRF Unit 1	73	-39	34
VRF Unit 2	73	-39	34
VRF Unit 3	71	-39	32
VRF Unit 4	66	-39	27
VRF Unit 5	63	-39	24
		Total	39
		Daytime Noise Limit	45

Table 6.3 Plant Noise Emission Calculations – Boiler House



Plant	Sound Power Level (L _{wA} dB)	Distance Attenuation (dB)	Predicted Noise Level at Nearest Noise Sensitive Property (dB)
Screen 1 AHU – Supply	48	-32	16
Screen 1 AHU – Extract	48	-32	16
Screen 2 AHU – Supply	47	-37	10
Screen 2 AHU – Extract	46	-37	9
Screen 3 AHU – Supply	47	-35	12
Screen 3 AHU – Extract	46	-35	11
Screen 4 AHU – Supply	47	-34	13
Screen 4 AHU – Extract	46	-34	12
General AHU – Supply	50	-38	12
General AHU – Extract	50	-38	12
VRF Unit 1	73	-35	38
VRF Unit 2	73	-35	38
VRF Unit 3	71	-35	36
VRF Unit 4	66	-35	31
VRF Unit 5	63	-35	28
		Total	42
		Daytime Noise Limit	45

Table 6.4 Plant Noise Emission Calculations – Terraced Houses

It can be seen that the total predicted noise levels associated with the proposed roof plant do not exceed the noise limit at the nearest noise sensitive properties during the proposed operating hours.



Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20x10 ⁻⁶ Pascals).
Sound Pressure Level (L _p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L _A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L _{Aeq,T}	The A-weighted equivalent continuous noise level over the time period T (typically T= 1 hour for noise impact assessments during daytime periods and T = 15 minutes for night-time periods).
	This is the sound level that is equivalent to the average energy of noise recorded over a given period.
LA90 (15 min)	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15-minute period
R _w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz.
	The higher the value, the greater the sound insulation, and the more onerous the requirement.
D _{nT,w}	The weighted (w) standardised (nT) sound level difference (D), a single figure rating of the on-site airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz.
	The higher the value of $D_{nT,w}$, the greater the sound insulation, and the more onerous the requirement.



Appendix B – Activity Noise Calculations

Machine Store

Screen 1 – External Wall

Flement	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+18	+18	+18	+18	+18	+18	+18	+18		
Distance Attenuation	-19	-19	-19	-19	-19	-19	-19	-19		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	50	42	38	38	29	25	20	15	38	

Screen 1 – Roof

Element	Octave Band Centre Frequency (Hz)								
Liement	63	125	250	500	1k	2k	4k	8k	(dB)
Cinema Noise Level	89	87	87	87	87	87	82	77	92
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3	
Roof Sound Reduction	-35	-41	-45	-49-	-53	-55	-55	-55	
Area Correction	+24	+24	+24	+24	+24	+24	+24	+24	
Distance Attenuation	-29	-29	-29	-29	-29	-29	-29	-29	
Directivity Term, D _c	0	0	0	0	0	0	0	0	
Predicted Noise Level at Nearest Noise Sensitive Property	46	38	37	30	26	24	19	14	33



Bar/Restaurant -	- External	Wall
------------------	------------	------

Flement	Octave Band Centre Frequency (Hz)								
Liement	63	125	250	500	1k	2k	4k	8k	(dB)
Bar/Restaurant Noise Level	64	65	69	74	73	9	63	56	77
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3	
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58	
Area Correction	+18	+18	+18	+18	+18	+18	+18	+18	
Distance Attenuation	-19	-19	-19	-19	-19	-19	-19	-19	
Directivity Term, D _c	0	0	0	0	0	0	0	0	
Predicted Noise Level at Nearest Noise Sensitive Property	25	20	20	25	15	7	<0	<0	23

Screen 2 – External Wall

Flement	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+16	+16	+16	+16	+16	+16	+16	+16		
Distance Attenuation	-19	-19	-19	-19	-19	-19	-19	-19		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	48	40	36	36	27	23	18	13	36	



Recording Studio – Roof

Flement	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	(dB)
Studio Noise Level	89	87	87	87	87	87	82	77	92
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3	
Roof Sound Reduction	-35	-41	-45	-49-	-53	-55	-55	-55	
Area Correction	+15	+15	+15	+15	+15	+15	+15	+15	
Distance Attenuation	-29	-29	-29	-29	-29	-29	-29	-29	
Directivity Term, D _c	0	0	0	0	0	0	0	0	
Predicted Noise Level at Nearest Noise Sensitive Property	54	46	36	30	25	21	7	2	35

Screen 4 – Roof

Flement	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	(dB)
Cinema Noise Level	89	87	87	87	87	87	82	77	92
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3	
Roof Sound Reduction	-35	-41	-45	-49-	-53	-55	-55	-55	
Area Correction	+18	+18	+18	+18	+18	+18	+18	+18	
Distance Attenuation	-33	-33	-33	-33	-33	-33	-33	-33	
Directivity Term, D _c	0	0	0	0	0	0	0	0	
Predicted Noise Level at Nearest Noise Sensitive Property	53	45	35	29	24	20	6	1	34



Boiler House

Screen	2 -	External	Wall
JULUII	~	LALCINGI	vv an

Element	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	(dB)
Cinema Noise Level	89	87	87	87	87	87	82	77	92
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3	
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58	
Area Correction	+14	+14	+14	+14	+14	+14	+14	+14	
Distance Attenuation	-28	-28	-28	-28	-28	-28	-28	-28	
Directivity Term, D _c	0	0	0	0	0	0	0	0	
Predicted Noise Level at Nearest Noise Sensitive Property	37	29	25	25	16	12	7	2	25

Recording Studio – External Wall

Element	Octave Band Centre Frequency (Hz)									
Liement	63	125	250	500	1k	2k	4k	8k	(dB)	
Studio Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+11	+11	+11	+11	+11	+11	+11	+11		
Distance Attenuation	-28	-28	-28	-28	-28	-28	-28	-28		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	9	4	4	<0	<0	<0	<0	<0	7	



Screen 3 – External Wall

Flement	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+14	+14	+14	+14	+14	+14	+14	+14		
Distance Attenuation	-28	-28	-28	-28	-28	-28	-28	-28		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	37	29	25	25	16	12	7	2	25	

Screen 4 – External Wall

Element	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Roof Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+14	+14	+14	+14	+14	+14	+14	+14		
Distance Attenuation	-28	-28	-28	-28	-28	-28	-28	-28		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	37	26	25	25	6	12	7	2	25	



Terraced Houses to North-East

Screen 1 – External Wall

Element	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+19	+19	+19	+19	+19	+19	+19	+19		
Distance Attenuation	-29	-29	-29	-29	-29	-29	-29	-29		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	41	33	29	29	20	16	11	6	29	

Bar/Restaurant – External Wall

Element	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Bar/Restaurant Noise Level	64	65	69	74	73	9	63	56	77	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	-58	-58	-58		
Area Correction	+18	+18	+18	+18	+18	+18	+18	+18		
Distance Attenuation	-29	-29	-29	-29	-29	-29	-29	-29		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	16	11	11	16	6	<0	<0	<0	14	



Screen 3 – External Wall

Flement	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	58	-58	-58		
Area Correction	+16	+16	+16	+16	+16	+16	+16	+16		
Distance Attenuation	-29	-29	-29	-29	-29	-29	-29	-29		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	38	30	26	26	17	13	7	3	26	

Screen 4 – External Wall

Element	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1k	2k	4k	8k	(dB)	
Cinema Noise Level	89	87	87	87	87	87	82	77	92	
Diffusivity Term, C _d	-3	-3	-3	-3	-3	-3	-3	-3		
Wall Sound Reduction	-35	-41	-45	-45	-54	58	-58	-58		
Area Correction	+16	+16	+16	+16	+16	+16	+16	+16		
Distance Attenuation	-29	-29	-29	-29	-29	-29	-29	-29		
Directivity Term, D _c	0	0	0	0	0	0	0	0		
Predicted Noise Level at Nearest Noise Sensitive Property	38	30	26	26	17	13	8	3	26	