6.1 Soundproofing

6.1.1 Prediction of parameters of the rooms

The acoustic parameters that relate to sound proofing, or acoustic isolation, of each space are principally the anticipated noise floors within each space and the operating level anticipated. Later sections (principally 7.1 and 7.2) will deal with the sound leakage from each room into its neighbouring spaces and from the general circulation space into each room. To this end, each room is listed here with a tabulated operational sound level and a background noise level that will be used as a basis for design. Whilst many rooms will perform satisfactorily at higher sound levels it would appear wasteful to expend resources keeping the acoustic level high enough to contain unreasonable working sound levels. The figures tabulated below are offered for comment as a basis for design and are based on measurements made in operational studios by White Mark. The later section on room performance either uses these levels or higher as set out in each individual instance.

Room designation	**Background**	**Operational level (L_{max})**						
		31.5	**63**	**125**	**250**	**1k**	**2k**	**4k**
Main Control Room 004A	NC25	93	104	102	101	96	94	76
Atmos Room 005	NC25	100	105	105	102	100	98	96
Booth 007A	NC20	61	58	64	67	75	65	63
Control Room 007	NC25	93	104	102	101	96	94	76
Foley CR 008	NC25	82	92	92	88	91	91	91
Foley Studio 008A	NC15*	82	92	92	88	91	91	91
Control Room 003	NC 25	93	104	102	101	96	94	76
Corridor noise	NC35	88	76	78	73	77	82	73
Central Machine Room 002	NC40	88	76	78	73	77	82	73

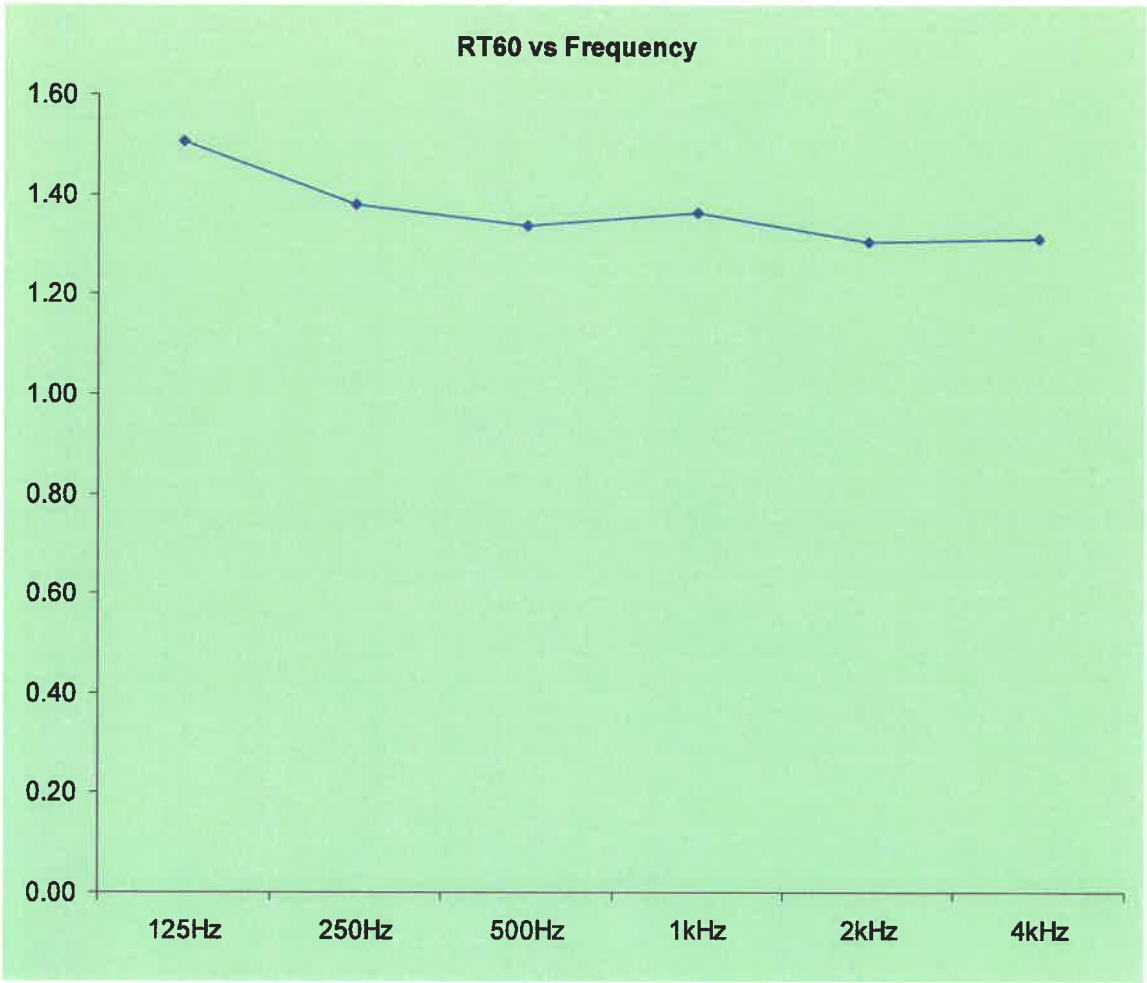
* **Note:** The noise floor in the Foley Studio area is nominally set to NC15 as a specification for mechanical systems design; a review of the ground slab vibration noise generation needs to be undertaken and the operating level of the a/c system specified appropriately. This is based on the installation of a floating floor element being inappropriate in the case of Foley spaces, because of their function.

The ingress of operational noise into a quiet working environment should be judged against the anticipated noise level in the receiving space. Generally a disturbing noise level will only be noticed if it is above the ambient noise floor of the room. It should be noted, however, that low frequency rhythmic noises, such as the beats of loud music bass lines, should be attenuated to a level at least 5dB below the noise floor and ideally 10dB to remain inconspicuous.

6.1.2 Soundproofing parameters of building partitions

The following pages offer illustrations of the proposed partition types to be used in the development. Each type is analysed for isolation performance and this data is tabulated.

Graphically expressed, this results in a response forecast to be thus:



Further development of the design is required once fire exits are agreed, make up of the floor and ceiling are confirmed and the nature of the wall surface construction is fully understood.

The creation of an excellent acoustic environment for the live room requires that measurements are taken at various stages of the construction of the space to allow review of the acoustic conditions as they are affected by the treatments during their installation. Care should be taken that this work is budgeted for during the construction phase, both in cost and in time during the construction programme, so that the best results for the space are achieved and the design is given a chance for verification whilst adjustments can efficiently be made.

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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Room 005 to Room 004 and to exterior space above

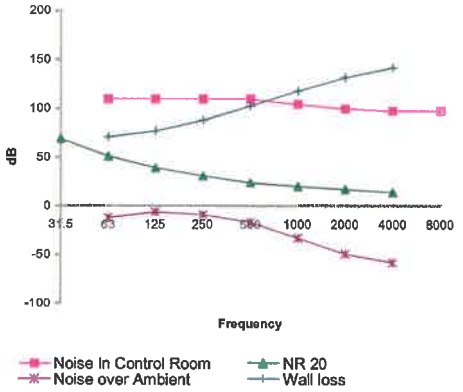
Existing wall: 250mm solid brick rendered (400kg/m2)

Studio wall: 140mm concrete block, 150mm air gap, 100mm mineral wool void damping.

Rw: 101

M-A-M resonance: 10Hz

	Frequency	Noise in Control Room	Wall loss	NR 20	Noise over Ambient
0	31.5			69	
1	63	110	71	51	-12
2	125	110	77	39	-6
3	250	110	88	31	-9
4	500	110	103	24	-17
5	1000	105	118	20	-33
6	2000	100	132	17	-49
7	4000	98	142	14	-58
8	8000	98			



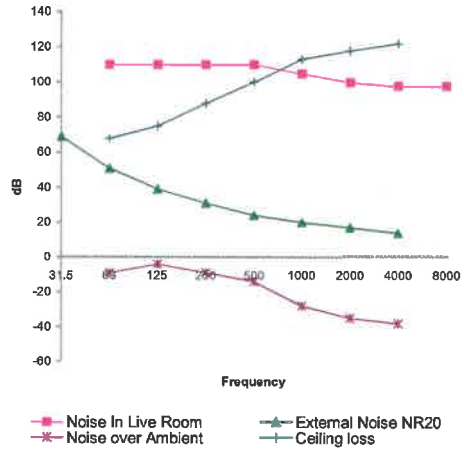
Existing roof: 300mm concrete cast floor with masonary above and support beams

Studio Isolation Cap: 15mm marine ply and three layers of 12.5mm plasterboard with studs on 600mm centres, 200mm Air Gap, 100mm mineral wool void damping.

Rw: 99

M-A-M resonance: 10Hz

Frequency	Noise in Live Room	Ceiling loss	External Noise NR20	Noise over Ambient
31.5			69	
63	110	68	51	-9
125	110	75	39	-4
250	110	88	31	-9
500	110	100	24	-14
1000	105	113	20	-28
2000	100	118	17	-35
4000	98	122	14	-38
8000	98			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Room 005 to Adjacent Booth 007A

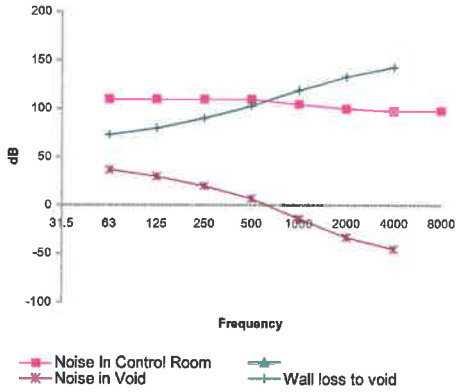
Existing wall: 250mm solid brick rendered (400kg/m2)

Control Room wall: 140mm concrete block, 150mm air gap, 100mm mineral wool void damping.

Rw: 102

M-A-M resonance: 9Hz

	Frequency	Noise in Control Room	Wall loss to void	Noise in Void
0	31.5			
1	63	110	73	37
2	125	110	80	30
3	250	110	90	20
4	500	110	103	7
5	1000	105	119	-14
6	2000	100	133	-33
7	4000	98	143	-45
8	8000	98		

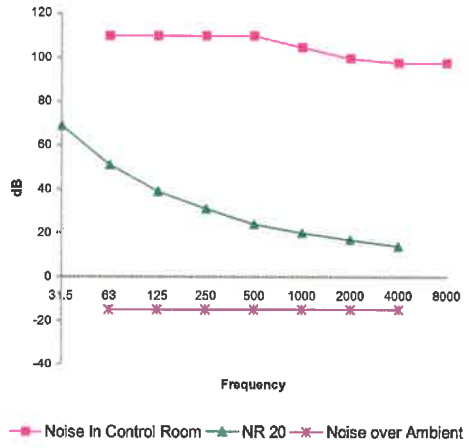


Additional Floated Booth Wall 140mm concrete block, 100mm air gap, 75mm mineral wool void damping.

Rw: 110

M-A-M resonance: 10Hz

Frequency	Noise in Control Room	Wall loss to Booth	NR 20	Noise over Ambient
31.5			69	
63	110	102	51	*-15*
125	110	115	39	*-15*
250	110	*>120*	31	*-15*
500	110	*>120*	24	*-15*
1000	105	*>120*	20	*-15*
2000	100	*>120*	17	*-15*
4000	98	*>120*	14	*-15*
8000	98			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Control Room 007 to Live Room 004 Note: Isolation limited by window design, reviewed elsewhere

Fixed wall: 250mm brick with 100mm Air gap

Control Room wall: 250mm brick with 100mm Air gap

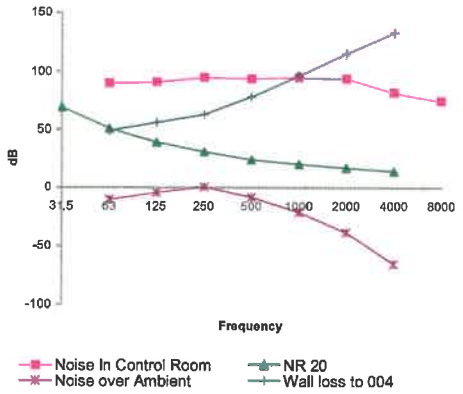
Rw: 76

M-A-M resonance: 17Hz

	Frequency	Noise in Control Room	Wall loss to 004	NR 20	Noise over Ambient
0	31.5			69	
1	63	90	49	51	-10
2	125	91	56	39	-4
3	250	95	63	31	1
4	500	94	78	24	-8
5	1000	95	96	20	-21
6	2000	94	115	17	-38
7	4000	82	133	14	-65
8	8000	75			

NB Reduced levels

NB Exceedance

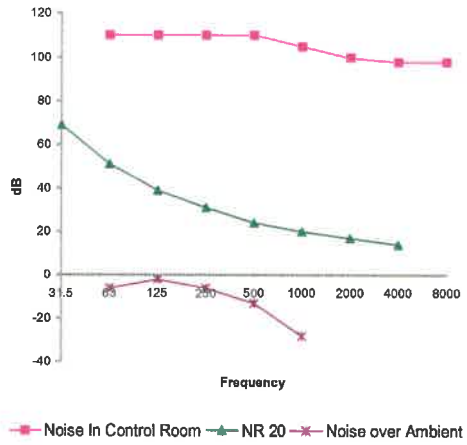


If cavity was infilled: 250mm brick with 100mm Air gap, 75mm mineral wool void damping.

Rw: 96

M-A-M resonance: 14Hz

Frequency	Noise in Control Room	Wall loss to 004	NR 20	Noise over Ambient
31.5			69	
63	110	65	51	-6
125	110	73	39	-2
250	110	*85*	31	-6
500	110	*99*	24	-13
1000	105	*113*	20	-28
2000	100	*>120*	17	
4000	98	*>120*	14	
8000	98			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Room 008 to Foley Control Room

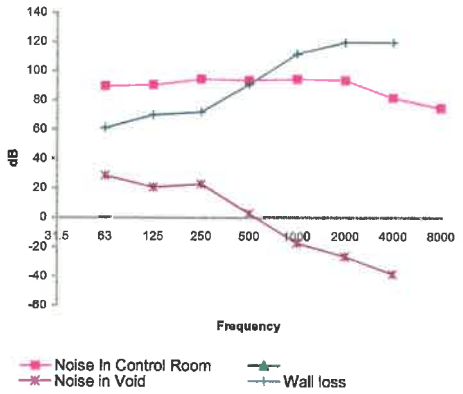
Fixed wall: 140mm Concrete block

Studio wall to void: 140mm concrete block, 50mm air gap, 50mm mineral wool void damping.

Rw: 88

M-A-M resonance: 20Hz

	Frequency	Noise in Control Room	Wall loss	Noise in Void
0	31.5			
1	63	90	61	29
2	125	91	70	21
3	250	95	72	23
4	500	94	91	3
5	1000	95	112	-17
6	2000	94	120	-26
7	4000	82	120	-38
8	8000	75		



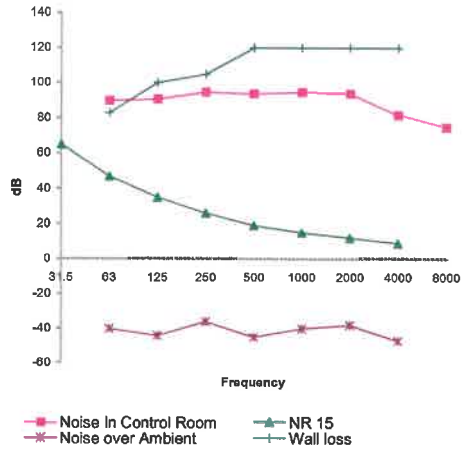
Secondary Wall to Control Room: 140mm concrete block, 90mm air gap, 50mm mineral wool void damping.

Studio to Control Room: 140mm concrete block, 50mm air gap, 50mm mineral wool void damping.

Rw: 105

M-A-M resonance: 20Hz

Frequency	Noise in Control Room	Wall loss	NR 15	Noise over Ambient
31.5			65	
63	90	83	47	-40
125	91	100	35	-44
250	95	105	26	-36
500	94	120	19	-45
1000	95	120	15	-40
2000	94	120	12	-38
4000	82	120	9	-47
8000	75			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Room 008 to Circulation spaces

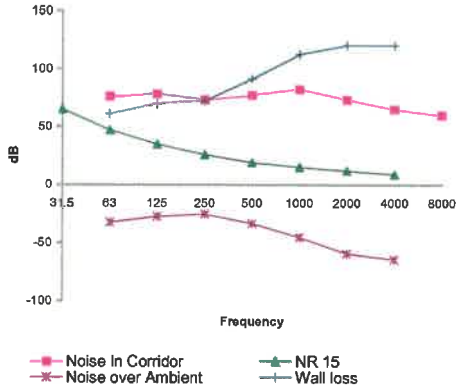
Studio wall: 140mm Concrete block

Corridor wall: 140mm concrete block, 50mm air gap, 50mm mineral wool void damping.

Rw: 88

M-A-M resonance: 20Hz

	Frequency	Noise in Corridor	Wall loss	NR 15	Noise over Ambient
0	31.5			65	
1	63	76	61	47	-32
2	125	78	70	35	-27
3	250	73	72	26	-25
4	500	77	91	19	-33
5	1000	82	112	15	-45
6	2000	73	120	12	-59
7	4000	65	120	9	-64
8	8000	60			



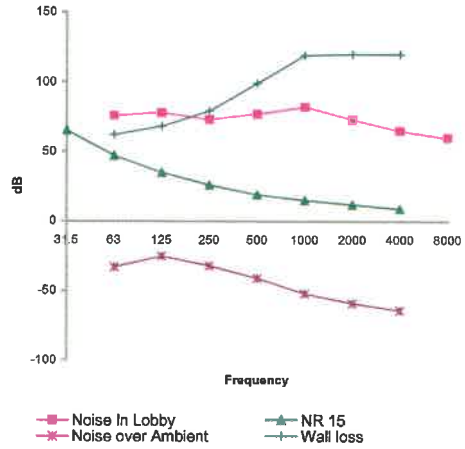
Secondary Wall to Control Room: 140mm concrete block, 90mm air gap, 50mm mineral wool void damping.

Lobby wall 250mm brick block, 50mm air gap, 50mm mineral wool void damping.

Rw: 91

M-A-M resonance: 18Hz

Frequency	Noise in Lobby	Wall loss	NR 15	Noise over Ambient
31.5			65	
63	76	62	47	-33
125	78	68	35	-25
250	73	79	26	-32
500	77	99	19	-41
1000	82	119	15	-52
2000	73	120	12	-59
4000	65	120	9	-64
8000	60			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Room 007 to Adjacent Booth, Room 007A Note: Boundary calculations only, wall/floor excitation ignored

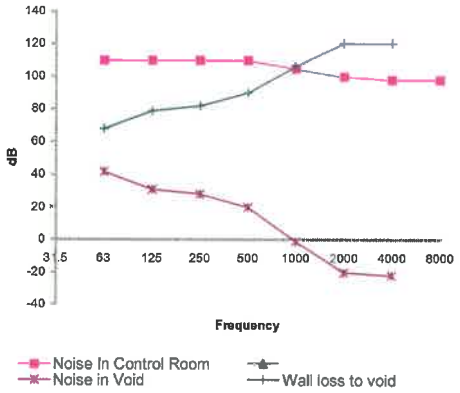
Fixed wall: 100mm concrete block rendered with 155mm Air gap to Control Room 75mm to Booth

Control Room wall: 140mm concrete block, 155mm air gap, 100mm mineral wool void damping.

Rw: 95

M-A-M resonance: 9Hz

	Frequency	Noise in Control Room	Wall loss to void	Noise in Void
0	31.5			
1	63	110	68	42
2	125	110	79	31
3	250	110	82	28
4	500	110	90	20
5	1000	105	106	-1
6	2000	100	120	-20
7	4000	98	120	-22
8	8000	98		

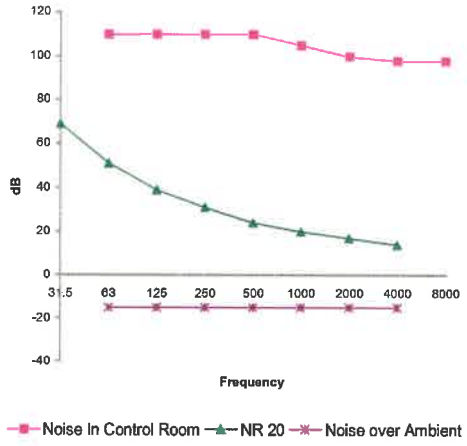


Additional Floated Booth Wall 140mm concrete block, 75mm air gap, 75mm mineral wool void damping.

Rw: 110

M-A-M resonance: 10Hz

Frequency	Noise in Control Room	Wall loss to Booth	NR 20	Noise over Ambient
31.5			69	
63	110	99	51	*-15*
125	110	117	39	*-15*
250	110	*>120*	31	*-15*
500	110	*>120*	24	*-15*
1000	105	*>120*	20	*-15*
2000	100	*>120*	17	*-15*
4000	98	*>120*	14	*-15*
8000	98			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Room 003 to Foley Room 008 Adjacent on Level -1

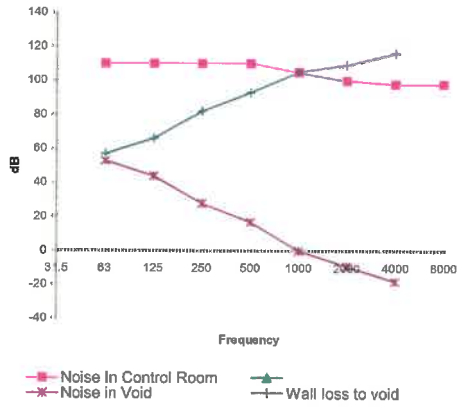
Fixed wall: 250mm brick with 100mm Air gap

Control Room wall to cavity: 15mm marine ply and three layers of 12.5mm plasterboard with studs on 600mm centres, 200mm Air Gap, 100mm mineral wool void damping.

Rw: 76

M-A-M resonance: 19Hz

	Frequency	Noise In Control Room	Wall loss to void	Noise In Void
0	31.5			
1	63	110	57	53
2	125	110	66	44
3	250	110	82	28
4	500	110	93	17
5	1000	105	105	0
6	2000	100	109	-9
7	4000	98	116	-18
8	8000	98		

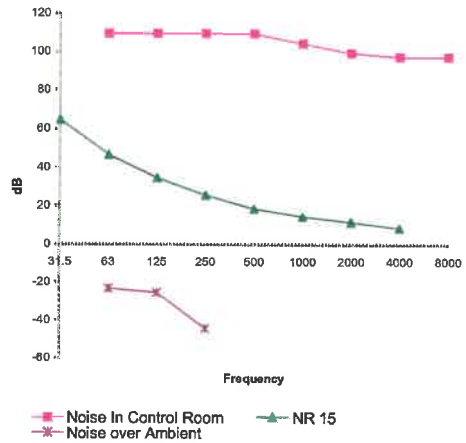


To Foley Suite upper zone: 140mm block with 100mm Air gap, 75mm mineral wool void damping.

Rw:

M-A-M resonance: 13Hz

Frequency	Noise In Control Room	Wall loss to 008	NR 15	Noise over Ambient
31.5			65	
63	110	86	47	-23
125	110	100	35	-25
250	110	*128*	26	-44
500	110	*>120*	19	
1000	105	*>120*	15	
2000	100	*>120*	12	
4000	98	*>120*	9	
8000	98			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

Control Room 003 to Foley Room 008

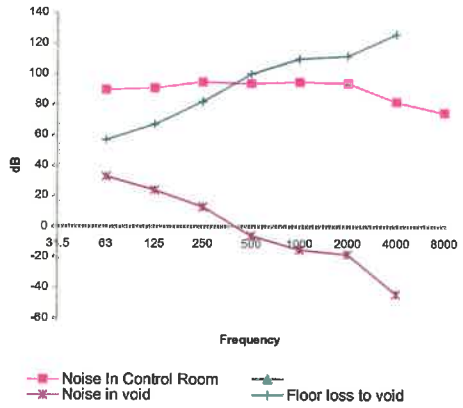
Existing Floor 200mm Concrete with 85mm Air gap

Control Room floor to cavity: 15mm marine ply and three layers of 12.5mm plasterboard with studs on 600mm centres, 200mm Air Gap, 100mm mineral wool void damping.

Rw: 92

M-A-M resonance: 24Hz

	Frequency	Noise in Control Room	Floor loss to void	Noise in void
0	31.5			
1	63	90	57	33
2	125	91	67	24
3	250	95	82	13
4	500	94	100	-6
5	1000	95	110	-15
6	2000	94	112	-18
7	4000	82	126	-44
8	8000	75		

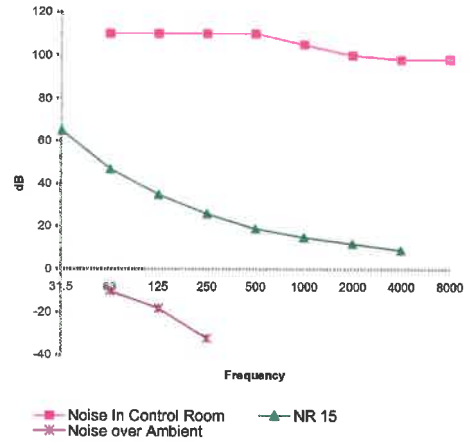


To Foley Suite celling cap: 15mm marine ply and three layers of 12.5mm plasterboard with studs on 600mm centres, 200mm Air Gap, 100mm mineral wool void damping.

Rw:

M-A-M resonance: 21Hz

Frequency	Noise in Control Room	Wall loss to 008	NR 15	Noise over Ambient
31.5			65	
63	110	73	47	-10
125	110	93	35	-18
250	110	*116*	26	-32
500	110	*>120*	19	
1000	105	*>120*	15	
2000	100	*>120*	12	
4000	98	*>120*	9	
8000	98			



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Isolation assessment chart (values calculation by Insul v 6.30 by Marshall Day Acoustics) **26/11/2013**

ControRoom 004A to Live Room 004 Note: Isolation limited by window design, reviewed elsewhere

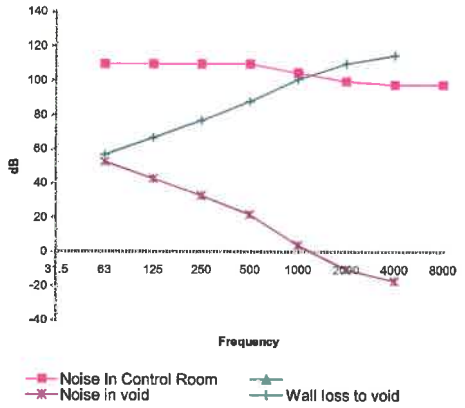
Fixed wall: 150mm Concrete block with 200mm air gap, 100mm mineral wool void damping

Control Room wall to cavity: 15mm marine ply and three layers of 12.5mm plasterboard with studs on 600mm centres, 200mm Air Gap, 100mm mineral wool void damping.

Rw: 89

M-A-M resonance: 20Hz

	Frequency	Noise In Control Room	Wall loss to void	Noise in void
0	31.5			
1	63	110	57	53
2	125	110	67	43
3	250	110	77	33
4	500	110	88	22
5	1000	105	101	4
6	2000	100	110	-10
7	4000	98	115	-17
8	8000	98		



Control Room to Live Room 004: 150mm Concrete block with 200mm air gap, 100mm mineral wool void damping

Rw:

M-A-M resonance: 14Hz

Frequency	Noise In Control Room	Wall loss to 004	NR 20	Noise over Ambient
31.5			69	
63	110	93	51	-34
125	110	109	39	-38
250	110	*113*	31	-34
500	110	*>120*	24	
1000	105	*>120*	20	
2000	100	*>120*	17	
4000	98	*>120*	14	
8000	98