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04 October 2017

James Orchard
CBRE Global Investors
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One New Change
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Dear James

AS9286 SEVEN DIALS WAREHOUSE, COVENT GARDEN

Impact of terrace occupation

Clarke Saunders Associates has been commissioned to assess sound impact on nearby residents of the roof terrace space in Seven Dials Warehouse, 42-56 Earlham Street, London WC2H 9LJ, as part of the refurbishment scheme.

The current permission allows use of the 6th floor roof terrace until 19:00 hours and it is understood that the applicant wishes to apply for an extension of these hours until 21:00 hours.

1.1 Description of existing noise climate

The existing ambient noise climate is dominated by road and pedestrian traffic in the vicinity of the site together with a contribution from and existing plant noise. The noise climate on the surrounding streets is characterised by relatively consistent average and maximum levels. Noise survey data collected at roof level as part of the planning application (TH1-TH6 below) shows that there is a slight reduction in the overall average noise levels during the late evening period. Average noise levels remain in the high 50's to low 60's (L_{Aeq}, dB) throughout the period when the roof top terrace could be occupied. This is consistent with a Central London location.

1.2 Impact of terrace occupation

It is understood that concerns may be raised over the perceived likelihood of the extended hours of use of the roof top terrace to give rise to a detrimental noise impact on existing residential receptors.

Published data from *Pearson, Bennett, & Fidell (1977)* for an individual 'raised' voice has been referred to for the purposes of this assessment. Noise levels are shown in Table 1.1. Measurement data for a 'raised' voice has been used as a worst case.

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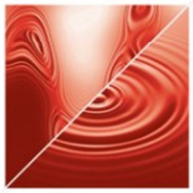


Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Individual Raised Voice 64dB(A) @ 1m	51	54	59	64	59	54	49	43

Table 1.1 Library Source noise data for individual "raised" voice (Pearson et al.) dB ref. 20µPa]

Measurement data which was used in a similar assessment of terrace noise levels for an office development at 12-14 New Fetter Lane (May 2014) and 160 Aldersgate Street (Jan 2016) has been used for the group calculations. Noise levels are shown in Table 1.2. No spectral information is provided in the third-party assessment for New Fetter Lane. An assumed character spectrum has been used for the purposes of this assessment. For information, there is not considered to be any significant difference between noise levels generated by a group of 25-30 people who are seated and 25-30 people who are standing.

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
25-30 people external seated area 61dB(A) @ 8m*	48	51	56	61	56	51	46	40

Table 1.2 Noise data for a group of 25-30 people.
***Assumed spectrum**

This data has been used in two separate scenarios in order to determine whether, for a pessimistic assessment methodology, noise impact on nearest residential receptors would be acceptable.

The nearest residential windows to the proposed terrace area have been established and these are denoted A, B, C and D, to reflect the most affected windows on 25 Shelton Street (A), 40 Earlham Street (B), properties of Nottingham Court (C) and properties of Odhams Walk (D). These are shown on the attached site plan, AS9286/SP1.

The maximum occupancy of the terrace is 136 people and is limited for health and safety.

Different scenarios have been assessed. Scenario 1 assumes a single raised voice at 1.7 m height to simulate an individual standing on the terrace. No screening is considered at this stage, and a pure distance loss calculation is applied. Losses are taken to the nearest standing location to each receiver window.

Scenario 2 assumes 5 groups of 25-30 people distributed across the terrace using raised voices. This is set out in AS9286/SP2. No significant difference in noise levels would be expected from 5 groups of 25-30 people where compared with more groups of fewer people.

The centre of the source is assumed to be in the middle of each of the groups of people and distance and screening losses from the plant enclosure and roof edge have been taken into account from this point. It should be noted that neither absorption nor screening by intervening terrace occupants has been included in the calculations to ensure a robust assessment. For each receptor window (A, B ,C ,D) the groups of people which contribute to the cumulative noise level at the receptor have been included in the calculations.

Receptor	Scenario 1 Single raised voice (L_{Aeq}, T dB)	Scenario 2 Groups of 25-30 voices ($L_{Aeq\ T}$, dB)
25 Shelton Street(A)	37	45
40 Earlham Street(B)	37	45
Nottingham Court(C)	29	39
Odhams Walk (D)	27	47

Table 1.3 Speech noise levels outside receptor window. **[db ref. 20µPa]**

Noise reduction from external to internal locations through an open window varies from 10 to 15dB(A) depending on the size and orientation of the open (or partially open) window. For example, a reduction of 10dB could be expected from a window which is wide open where the noise source is perpendicular to the façade.

In the context of the urban noise climate of the area, noise levels of up to 55dB(A) outside nearby windows are entirely consistent with the soundscape. Resultant internal levels of 40dB(A) and lower are unlikely to be intrusive and levels below 35dB(A) unnoticeable. By way of comparison, typical internal noise levels from a quiet television or background music would be around 45-55dB(A).

This assessment shows that extending the condition hours of use up until 21:00 hours will not have a detrimental impact on residential amenity.

Yours sincerely
for CLARKE SAUNDERS ASSOCIATES

Daniel Saunders
email: *dsaunders@clarkesaunders.com*

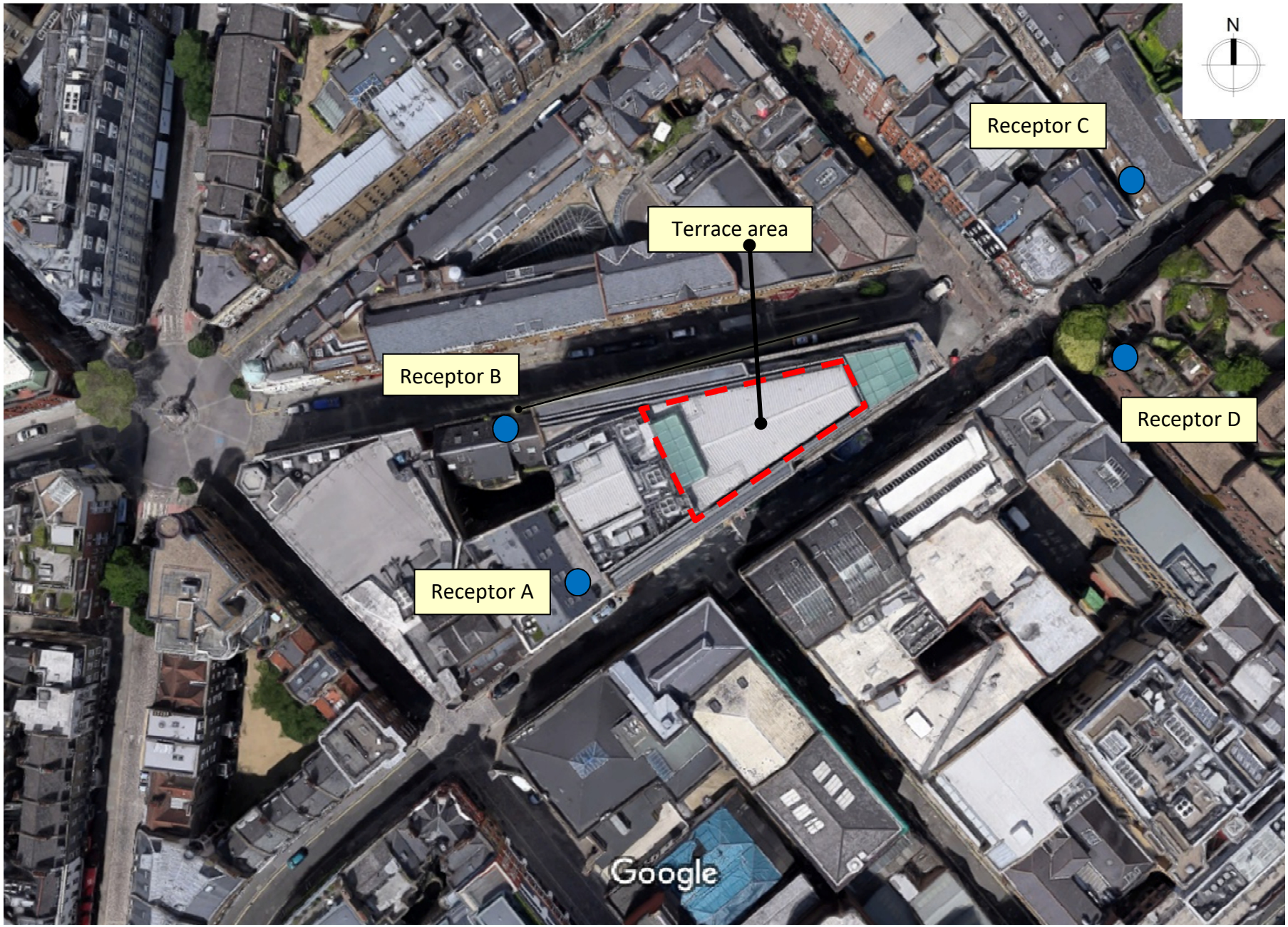


Figure AS9286/SP1

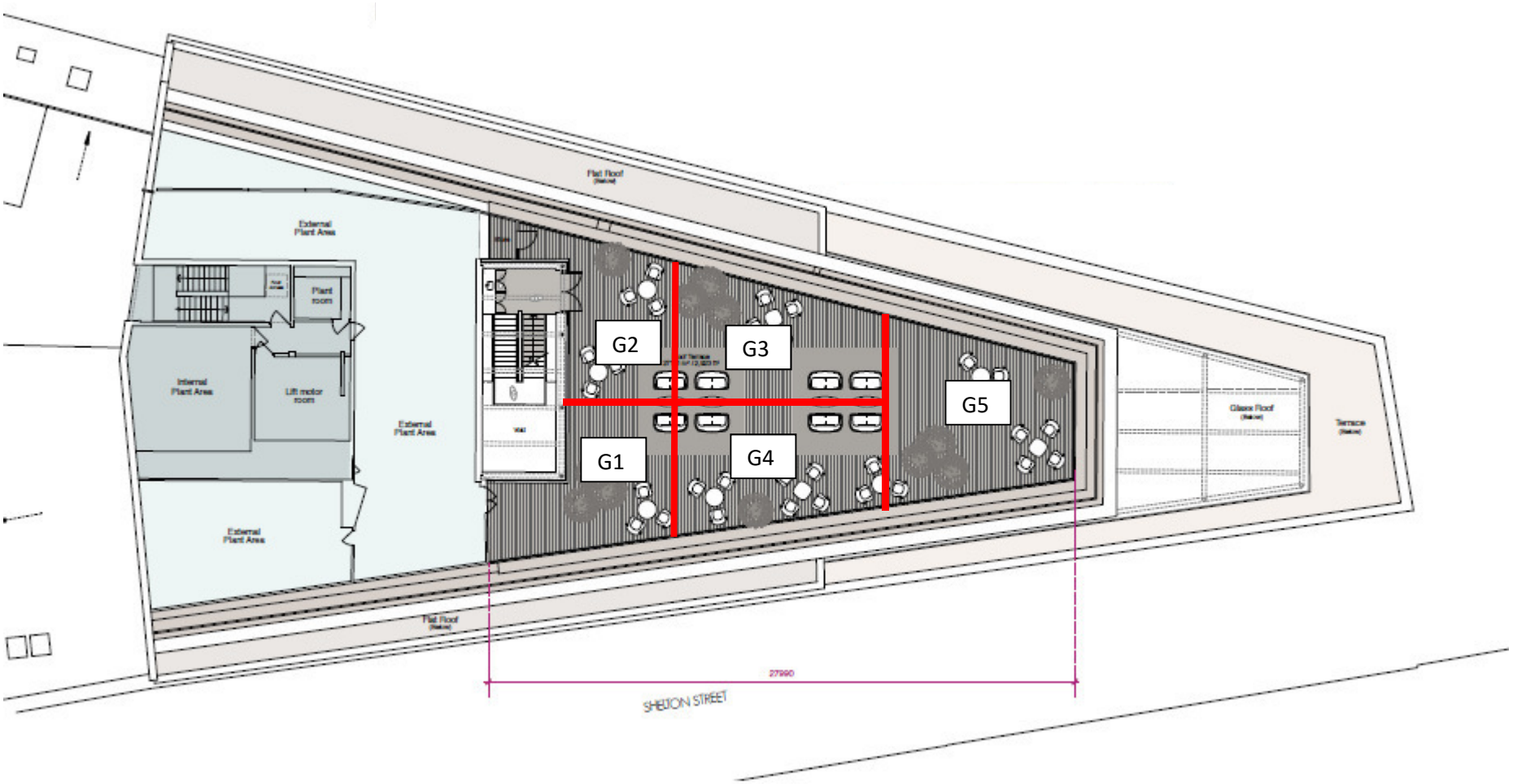
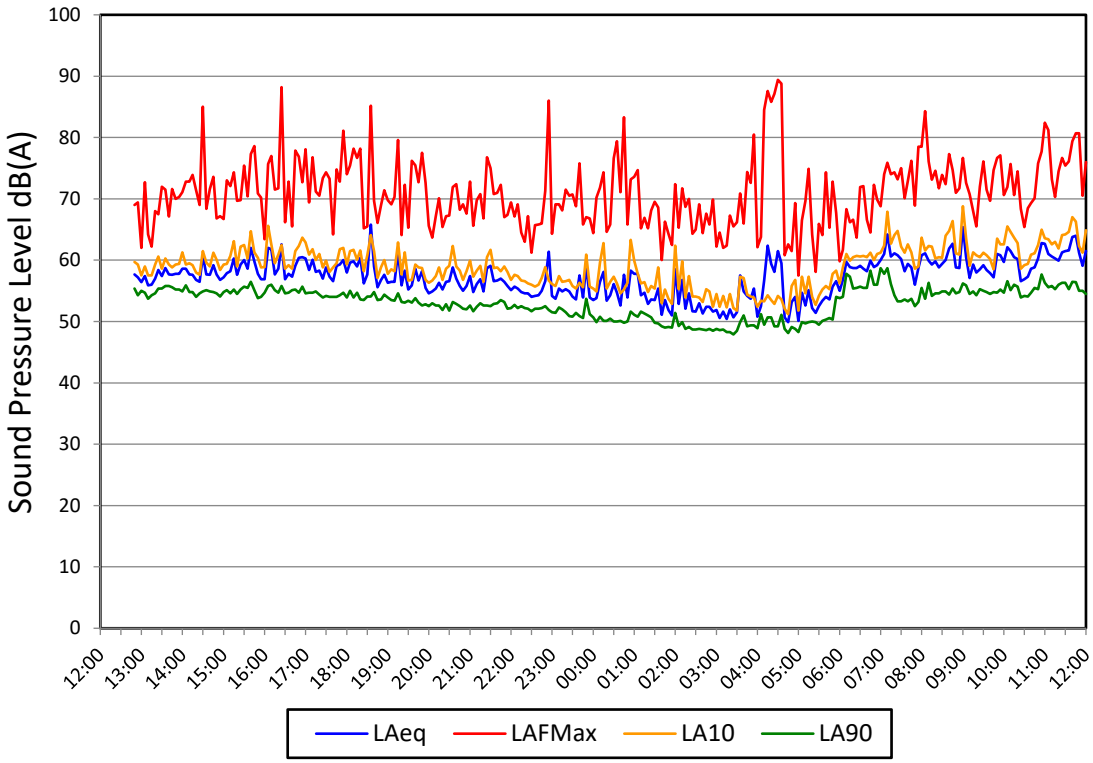


Figure AS9286/SP2

Seven Dials Warehouse, Covent Garden

Environmental Noise Time History

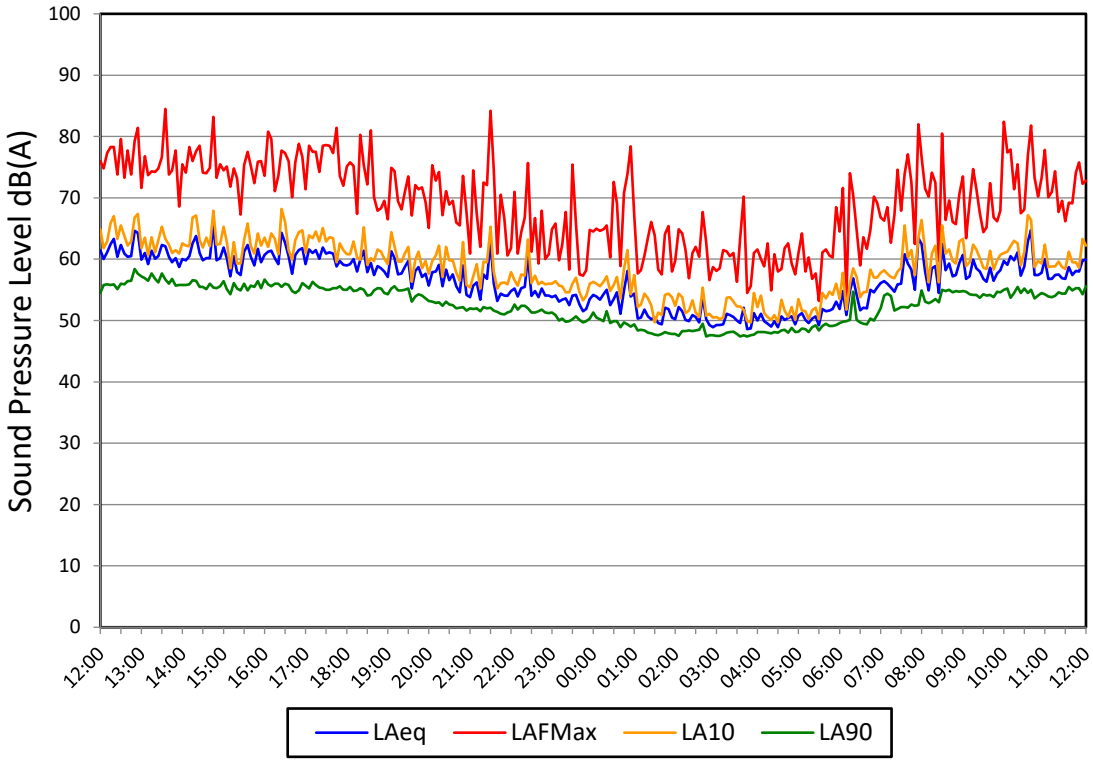


Tuesday 04 October to Wednesday 05 October 2016

Figure AS9286/TH1

Seven Dials Warehouse, Covent Garden

Environmental Noise Time History

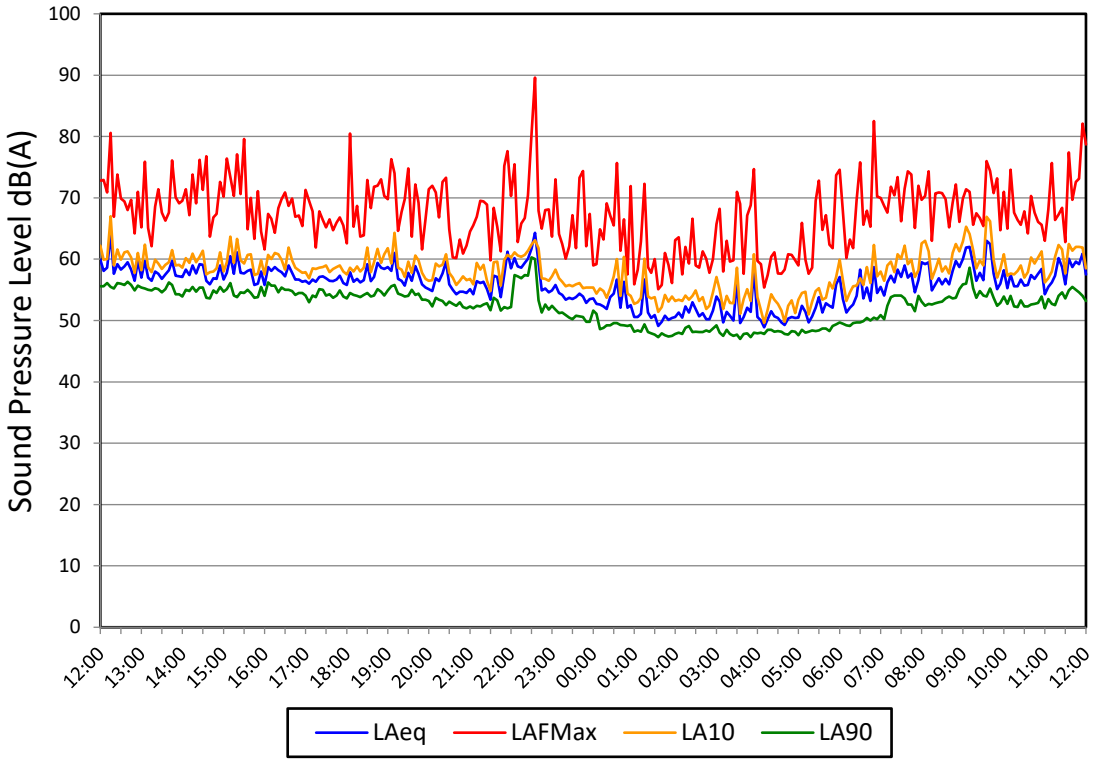


Wednesday 05 October to Thursday 06 October 2016

Figure AS9286/TH2

Seven Dials Warehouse, Covent Garden

Environmental Noise Time History

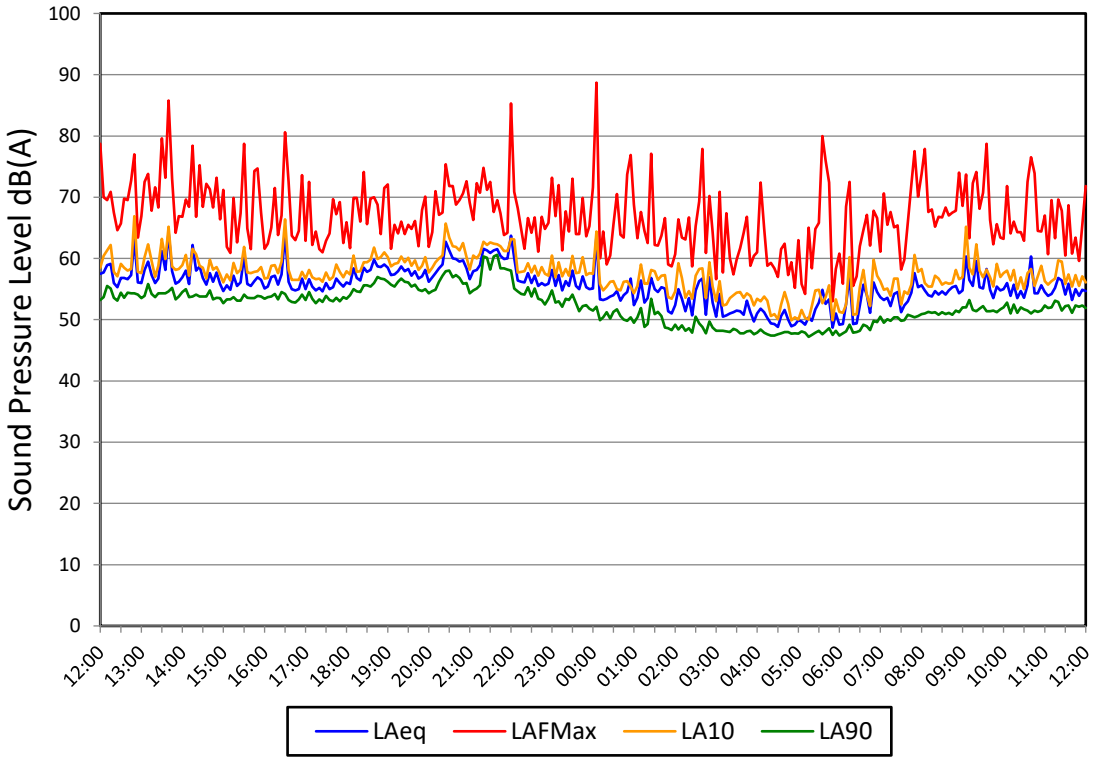


Thursday 06 October to Friday 07 October 2016

Figure AS9286/TH3

Seven Dials Warehouse, Covent Garden

Environmental Noise Time History

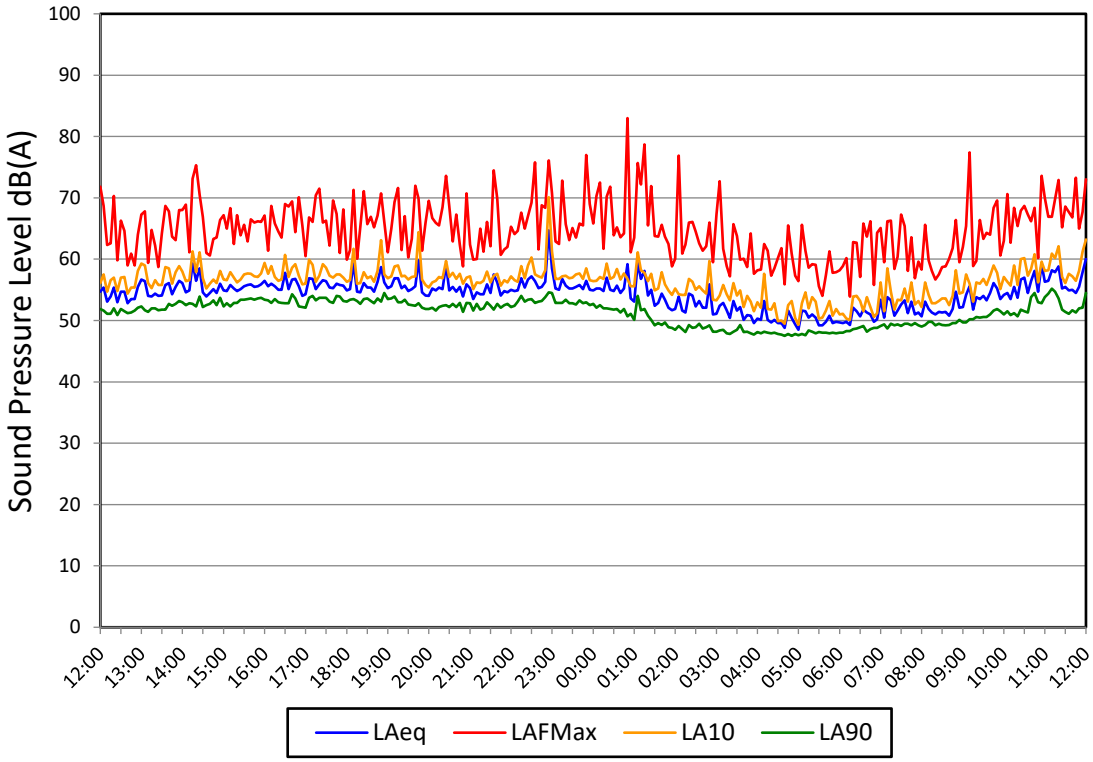


Friday 07 October to Saturday 08 October 2016

Figure AS9286/TH4

Seven Dials Warehouse, Covent Garden

Environmental Noise Time History

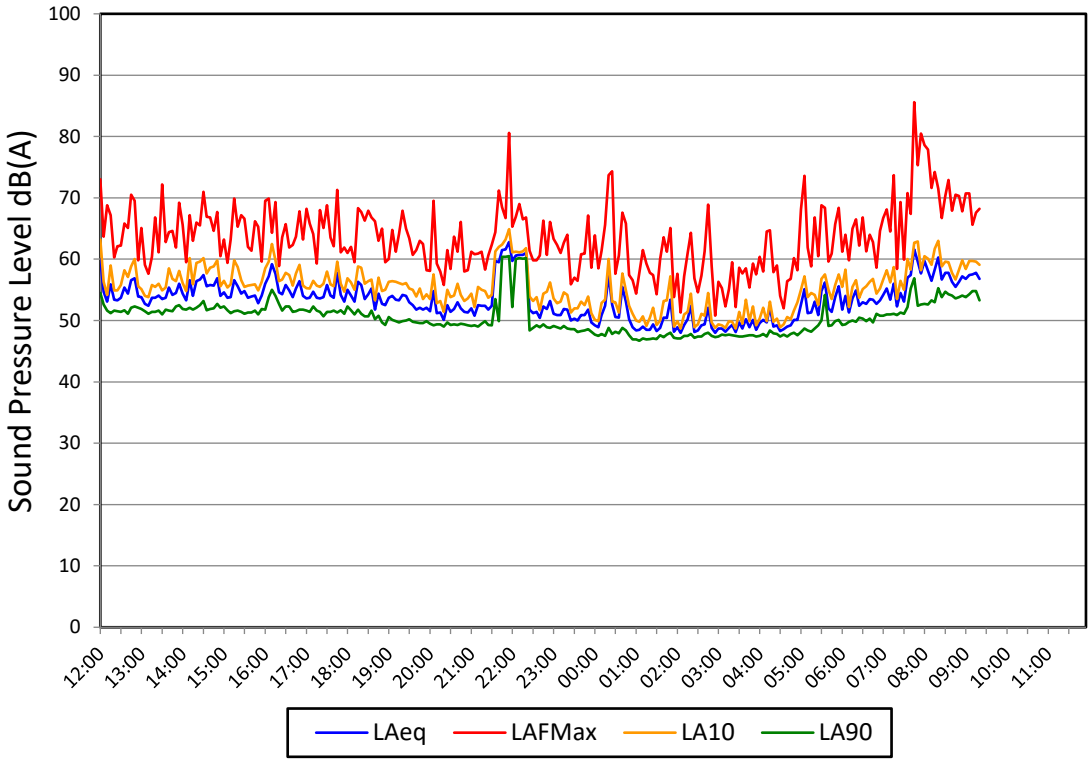


Saturday 08 October to Sunday 09 October 2016

Figure AS9286/TH5

Seven Dials Warehouse, Covent Garden

Environmental Noise Time History



Sunday 09 October to Monday 10 October 2016

Figure AS9286/TH6

TERRACE SPEECH EMISSIONS CALCULATIONS
Scenario 1

Roof terrace Voice 1 to Receiver A

			63	125	250	500	1000	2000	4000	8000	dB(A)
Single Raised Voice	Lp	1 m	51	54	59	64	59	54	49	43	64
Distance Loss		22 m	-27	-27	-27	-27	-27	-27	-27	-27	
Level At Receiver			*24*	*27*	*32*	*37*	*32*	*27*	*22*	*16*	37

Roof terrace Voice 1 to Receiver B

			63	125	250	500	1000	2000	4000	8000	dB(A)
Single Raised Voice	Lp	1 m	51	54	59	64	59	54	49	43	64
Distance Loss		22 m	-27	-27	-27	-27	-27	-27	-27	-27	
Roof terrace Group 3 to Receiver A			*24*	*27*	*32*	*37*	*32*	*27*	*22*	*16*	37

Roof terrace Voice 1 to Receiver C

			63	125	250	500	1000	2000	4000	8000	dB(A)
Single Raised Voice	Lp	1 m	51	54	59	64	59	54	49	43	64
Distance Loss		55 m	-35	-35	-35	-35	-35	-35	-35	-35	
Level At Receiver			*16*	*19*	*24*	*29*	*24*	*19*	*14*	*8*	29

Roof terrace Voice 1 to Receiver D

			63	125	250	500	1000	2000	4000	8000	dB(A)
Single Raised Voice	Lp	1 m	51	54	59	64	59	54	49	43	64
Distance Loss		41 m	-32	-32	-32	-32	-32	-32	-32	-32	
Level At Receiver			*19*	*22*	*27*	*32*	*27*	*22*	*17*	*11*	32

TERRACE SPEECH EMISSIONS CALCULATIONS
Scenario 2 - Receiver A/B

Roof terrace Group 1 to Receiver A

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		22 m	-9	-9	-9	-9	-9	-9	-9	-9	
Screening Loss			-6	-6	-8	-9	-11	-14	-17	-18	
Level At Receiver			*33*	*35*	*40*	*42*	*35*	*28*	*20*	*13*	41

Roof terrace Group 2 to Receiver A

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		31 m	-12	-12	-12	-12	-12	-12	-12	-12	
Screening Loss			-7	-8	-10	-12	-15	-17	-18	-18	
Level At Receiver			*29*	*31*	*34*	*36*	*29*	*21*	*16*	*10*	35

Roof terrace Group 3 to Receiver A

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		40 m	-14	-14	-14	-14	-14	-14	-14	-14	
Screening Loss			-5	-6	-7	-8	-10	-12	-15	-18	
Level At Receiver			*29*	*31*	*35*	*38*	*31*	*24*	*17*	*8*	37

Roof terrace Group 4 to Receiver A

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		39 m	-14	-14	-14	-14	-14	-14	-14	-14	
Screening Loss			-5	-6	-6	-8	-9	-11	-14	-17	
Level At Receiver			*29*	*31*	*36*	*39*	*32*	*25*	*18*	*9*	38

Roof terrace Group 5 to Receiver A

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		48 m	-16	-16	-16	-16	-16	-16	-16	-16	
Screening Loss			-5	-5	-6	-7	-8	-10	-13	-15	
Level At Receiver			*27*	*29*	*34*	*38*	*31*	*24*	*17*	*9*	37

Cumulative Level at Receiver A/B **45**

TERRACE SPEECH EMISSIONS CALCULATIONS
Scenario 2 - Receiver C

Roof terrace Group 1 to Receiver C

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		79 m	-20	-20	-20	-20	-20	-20	-20	-20	
Screening Loss			-6	-7	-9	-11	-14	-16	-18	-18	
Level At Receiver			*22*	*23*	*27*	*29*	*22*	*14*	*8*	*2*	28

Roof terrace Group 2 to Receiver C

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		79 m	-20	-20	-20	-20	-20	-20	-20	-20	
Screening Loss			-6	-7	-9	-11	-14	-16	-18	-18	
Level At Receiver			*22*	*23*	*27*	*29*	*22*	*14*	*8*	*2*	28

Roof terrace Group 3 to Receiver C

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		63 m	-18	-18	-18	-18	-18	-18	-18	-18	
Screening Loss			-6	-7	-8	-9	-12	-14	-17	-18	
Level At Receiver			*24*	*26*	*30*	*33*	*26*	*18*	*11*	*4*	32

Roof terrace Group 4 to Receiver C

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		63 m	-18	-18	-18	-18	-18	-18	-18	-18	
Screening Loss			-6	-7	-8	-9	-12	-14	-17	-18	
Level At Receiver			*24*	*26*	*30*	*33*	*26*	*18*	*11*	*4*	32

Roof terrace Group 5 to Receiver C

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		57 m	-17	-17	-17	-17	-17	-17	-17	-17	
Screening Loss			-5	-6	-6	-7	-9	-11	-13	-16	
Level At Receiver			*26*	*28*	*33*	*36*	*30*	*23*	*15*	*7*	35

Cumulative Level at Receiver C **39**

TERRACE SPEECH EMISSIONS CALCULATIONS

Scenario 2 - Receiver D

Roof terrace Group 1 to Receiver D

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		62 m	-18	-18	-18	-18	-18	-18	-18	-18	
Screening Loss			-5	-5	-5	-5	-5	-5	-5	-5	
Level At Receiver			*25*	*28*	*33*	*38*	*33*	*28*	*23*	*17*	38

Roof terrace Group 2 to Receiver D

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		62 m	-18	-18	-18	-18	-18	-18	-18	-18	
Screening Loss			-5	-5	-5	-5	-5	-5	-5	-5	
Level At Receiver			*25*	*28*	*33*	*38*	*33*	*28*	*23*	*17*	38

Roof terrace Group 3 to Receiver D

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		53 m	-16	-16	-16	-16	-16	-16	-16	-16	
Screening Loss			-5	-5	-5	-5	-5	-5	-5	-5	
Level At Receiver			*27*	*30*	*35*	*40*	*35*	*30*	*25*	*19*	40

Roof terrace Group 4 to Receiver D

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		53 m	-16	-16	-16	-16	-16	-16	-16	-16	
Screening Loss			-5	-5	-5	-5	-5	-5	-5	-5	
Level At Receiver			*27*	*30*	*35*	*40*	*35*	*30*	*25*	*19*	40

Roof terrace Group 5 to Receiver D

			63	125	250	500	1000	2000	4000	8000	dB(A)
Group Raised Voices	Lp	8 m	48	51	56	61	56	51	46	40	61
Distance Loss		43 m	-15	-15	-15	-15	-15	-15	-15	-15	
Screening Loss			-5	-5	-5	-5	-5	-5	-5	-5	
Level At Receiver			*28*	*31*	*36*	*41*	*36*	*31*	*26*	*20*	41

Cumulative Level at Receiver D **47**