

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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200 Grays Inn Road

Planning noise report

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

Sandy Brown Ltd

Registered in England & Wales

No. 13227735

post@sandybrown.com

www.sandybrown.com

Registered Office: 55 Charterhouse Street, London EC1M 6HA

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Summary

Sandy Brown has been commissioned by ERA UK Group Limited to provide acoustic advice in relation to the proposed external plant installation for Warner Bros at 200 Grays Inn Road.

It is proposed to install a new external condenser unit within an existing plant area to the south of the building.

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was undertaken between 20 January 2023 and 24 January 2023.

The facade corrected representative background sound levels measured during the survey were $L_{A90,15min}$ 53 dB during the daytime and $L_{A90,15min}$ 51 dB at night.

Based on the requirements of the Local Authority and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed $L_{Aeq,15min}$ 41 dB during the daytime, and $L_{Aeq,15min}$ 43 dB during the night.

These limits are cumulative, and apply with all plant operating under normal conditions.

An assessment of noise from the proposed condenser unit has been carried out. Providing the specified acoustic enclosure is incorporated within the design, the unit is expected to comply with above limits.

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1 Introduction

Sandy Brown has been commissioned by ERA UK Group Limited to provide acoustic advice in relation to the proposed external plant installation for Warner Bros at 200 Grays Inn Road.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

This report presents the survey method and results, and a discussion of acceptable limits for noise emissions from building services plant. An assessment has been carried out for the proposed plant unit to the nearest noise sensitive windows to the rear of the premises along Grays Inn Road.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown (outlined in yellow) in Figure 1.

The site is bound by Coley Street, Gough Street and Grays Inn Road to the north, east and west, respectively, with a mixed commercial and residential use site to the south.



Figure 1 Aerial view of site (courtesy of Google Earth Pro)

The site is located within the London Borough of Camden within a mixed commercial and residential area. The nearest residential properties to the site are located along Grays Inn Road indicated in red in Figure 1. The nearest office properties are located to the south along Elm Street, highlighted in blue.

3 Building services noise egress criteria

3.1 Standard guidance

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background sound level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

3.2 Local Authority criteria

In relation to noise egress from industrial and commercial noise sources, London Borough of Camden's local plan (June 2017) states:

"Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases, a 'Rating Level' of 10 dB below background (15 dB if tonal components are present) should be considered as design criterion."

Based on the extract from Camden Local Plan, all external plant must be such that the cumulative noise 1 m away from the windows of the nearest noise sensitive receptors is 10 dB below the representative measured background sound level $L_{A90,15\min}$ (15 dB if tonal components are present).

4 Noise survey method

Unattended noise monitoring was undertaken at the site over five days.

Details of the equipment used and the noise indices measured are provided in Appendix A.

The unattended measurements were taken over 15 minute periods between 12:48 on 20 January 2023 and 14:28 on 24 January 2023.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'A'. A photograph showing the measurement location is provided in Figure 2.

The microphone was positioned on a tripod at a height of 1.5 m above roof level, and at least 10 m from any other large reflecting surfaces. The measurements are considered to be free-field conditions.

This location was chosen to be located away from existing rooftop plant items and is considered to be reasonably representative of the background noise levels at the site and outside the nearest noise sensitive premises.



Figure 2 Photograph showing measurement location 'A'

4.1 Weather conditions

Weather conditions during the survey are described in Appendix A.

5 Noise survey results

5.1 Observations

The dominant noise sources observed at the site during the survey were from distant road traffic from surrounding buildings and distant building services plant items.

Less significant noise sources included construction activities at nearby buildings.

5.2 Noise measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

In line with BS 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements. Daytime and night-time statistical analysis of representative values for the site are given in Figure 3 and Figure 4 respectively.

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 50 dB during the daytime and $L_{A90,15min}$ 48 dB at night.

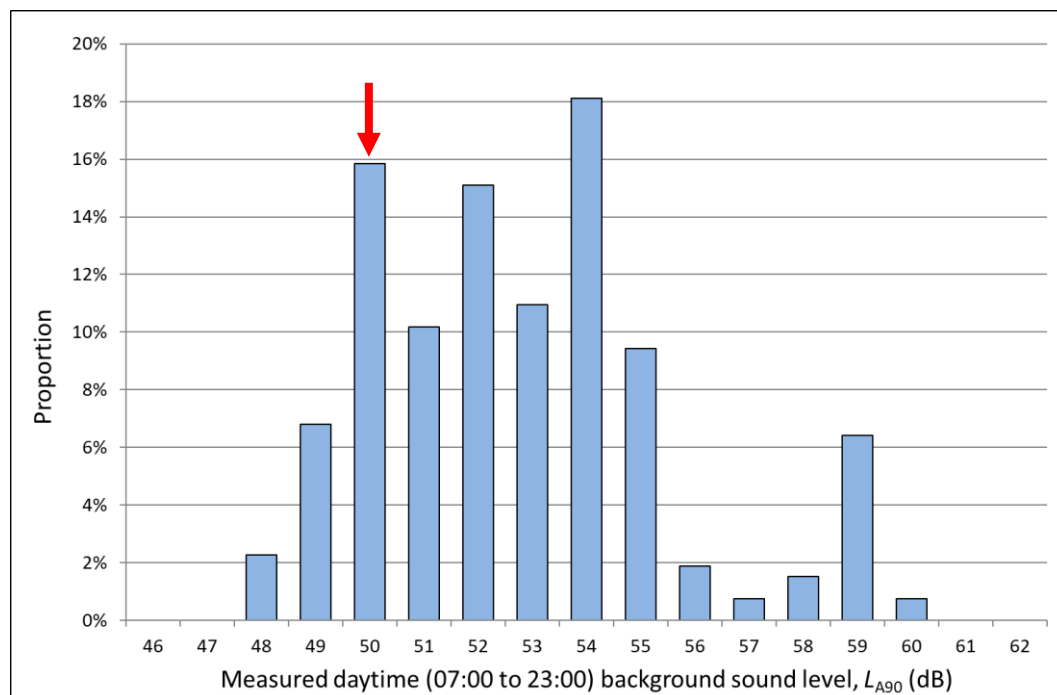


Figure 3 Statistical analysis of daytime background sound levels

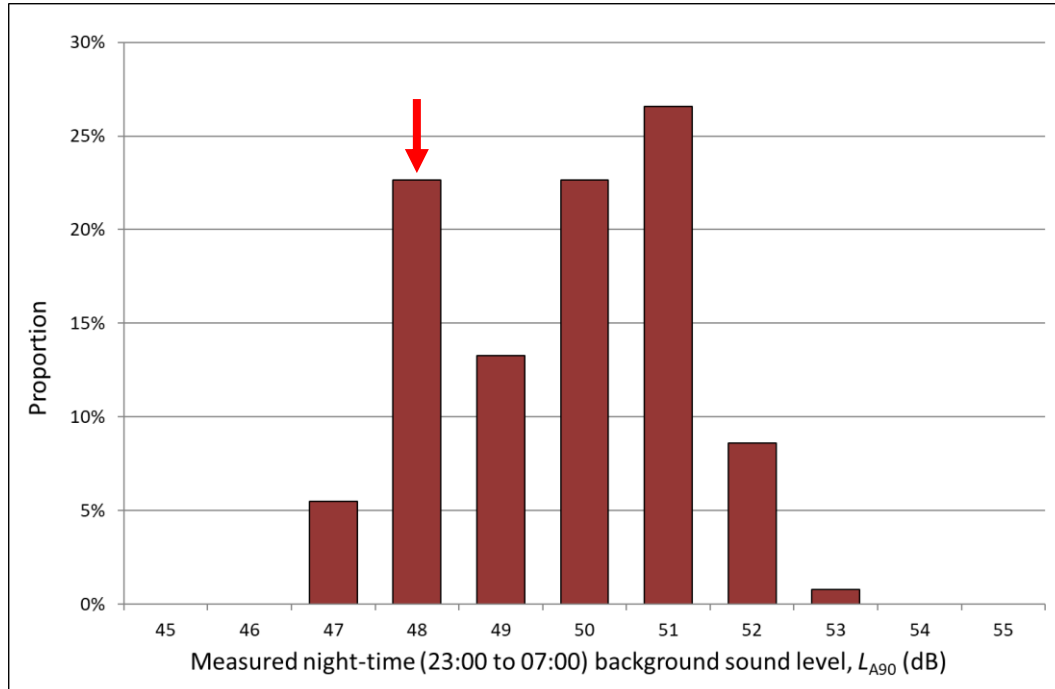


Figure 4 Statistical analysis of night-time background sound levels

5.3 Noise limits

Based on the above criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 1.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. These have been corrected relative to the measured free-field background sound levels by the addition of 3 dB (as per the guidance provided in BS 8233:2014 Section G.2.1). In this case these limits would apply at the windows of the residential properties along Grays Inn Road, overlooking the external plant area.

Table 1 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB) ^[1]
Daytime (07:00-23:00)	43
Night-time (23:00-07:00)	41

^[1] The limits set out in Table 1 do not include any allowance for attention catching features.

6 Plant noise assessment

6.1 Proposed installation

The location of the proposed plant area is shown in Figure 5 and Figure 6.

It is proposed to install one Daikin REYQ10U external condenser unit within the existing plant area to the south of the building.

The existing plant area is overlooked by residential windows within 190 Grays Inn Road, with the closest window being Level 1. This is located approximately 12 m away from the proposed location for the new external condenser unit.

The unit would primarily operate between the hours of 07:00-23:00, although could operate at a reduced load during the night. Based on this, the assessment has been undertaken in accordance with the night-time noise limit.

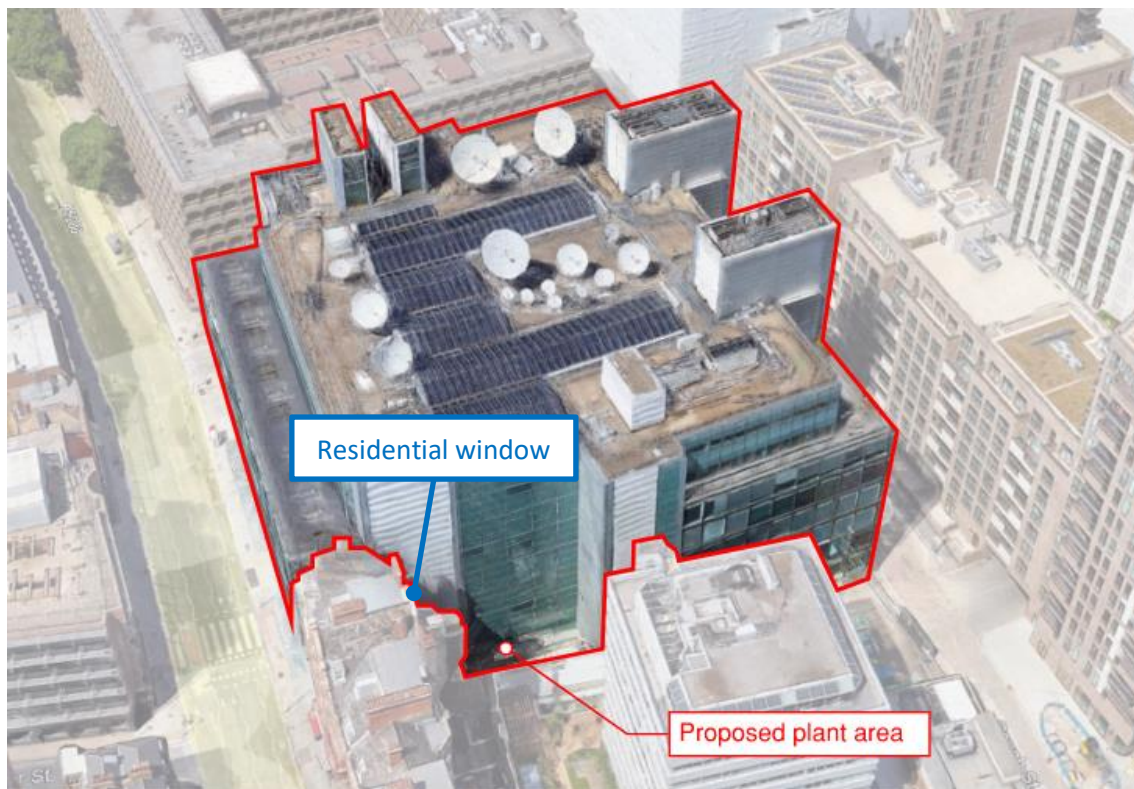


Figure 5 Proposed plant area to the side of the existing building in relation to residential window

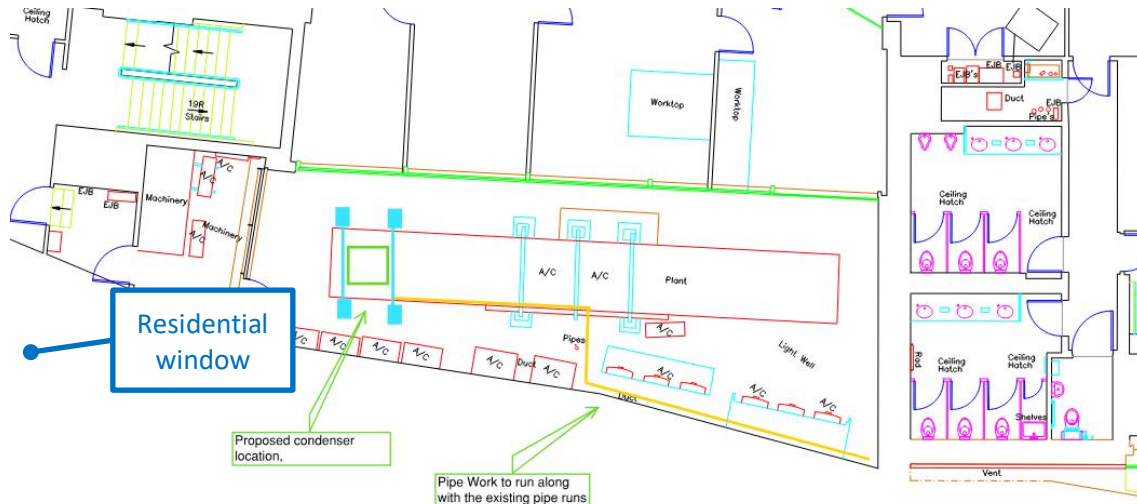


Figure 6 Proposed plant location within external plant area

6.2 Plant noise data

The manufacturers noise data for the proposed unit which was used within the assessment is presented in Table 2.

Table 2 Sound power levels for proposed unit

Item	Sound power level (dB) at octave-band centre frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000	dBA
Daikin REYQ-Y7Y1B	88	82	80	78	71	71	68	61	79

6.3 Mitigation measures

To control noise levels to the residential windows overlooking the plant area, it is proposed to install the unit within an acoustic enclosure. This will include acoustic attenuators in the intake and discharge sides of the unit. The insertion loss provided by these and used within the assessment are presented in Table 3.

Table 3 Insertion losses for attenuators on both sides of acoustic enclosure

Item	Insertion loss(dB) at octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Acoustic enclosure	8	12	18	24	32	25	20	13

6.4 Assessment

An assessment of noise egress from the proposed unit to the existing residential windows has been undertaken, considering corrections for distance attenuation, reflections from the building facades and attenuation from the proposed acoustic enclosure. The full calculation is shown in Appendix C.

The predicted level from the proposed plant at 1 m from the nearest residential window is L_{Aeq} 36 dB, which meets the day and night-time criteria.

7 Conclusion

The facade-corrected representative background sound levels from the noise survey were $L_{A90,15min}$ 53 dB during the day, and $L_{A90,15min}$ 51 dB during the night.

Based on the requirements of the Local Authority, the relevant plant noise limits at the worst affected existing noise sensitive premises are L_{Aeq} 43 dB during the day, and L_{Aeq} 41 dB during the night.

These limits are cumulative, and apply with plant operating under normal conditions.

An assessment of noise from the proposed condenser unit has been carried out. On the basis of the proposed acoustic enclosure, it is expected to comply with the above limits.

Appendix A

Survey details

Equipment

The unattended noise measurements were taken using a Rion NL-52 sound level meter. Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00264550	Rion	17 Aug 24	TCRT22/1514
Microphone	UC-59/09698	Rion	17 Aug 24	TCRT22/1514
Pre-amp	NH-25/64675	Rion	17 Aug 24	TCRT22/1514
Calibrator	NC-74/34367631	Rion	17 Aug 24	TCRT22/1509

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meter used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

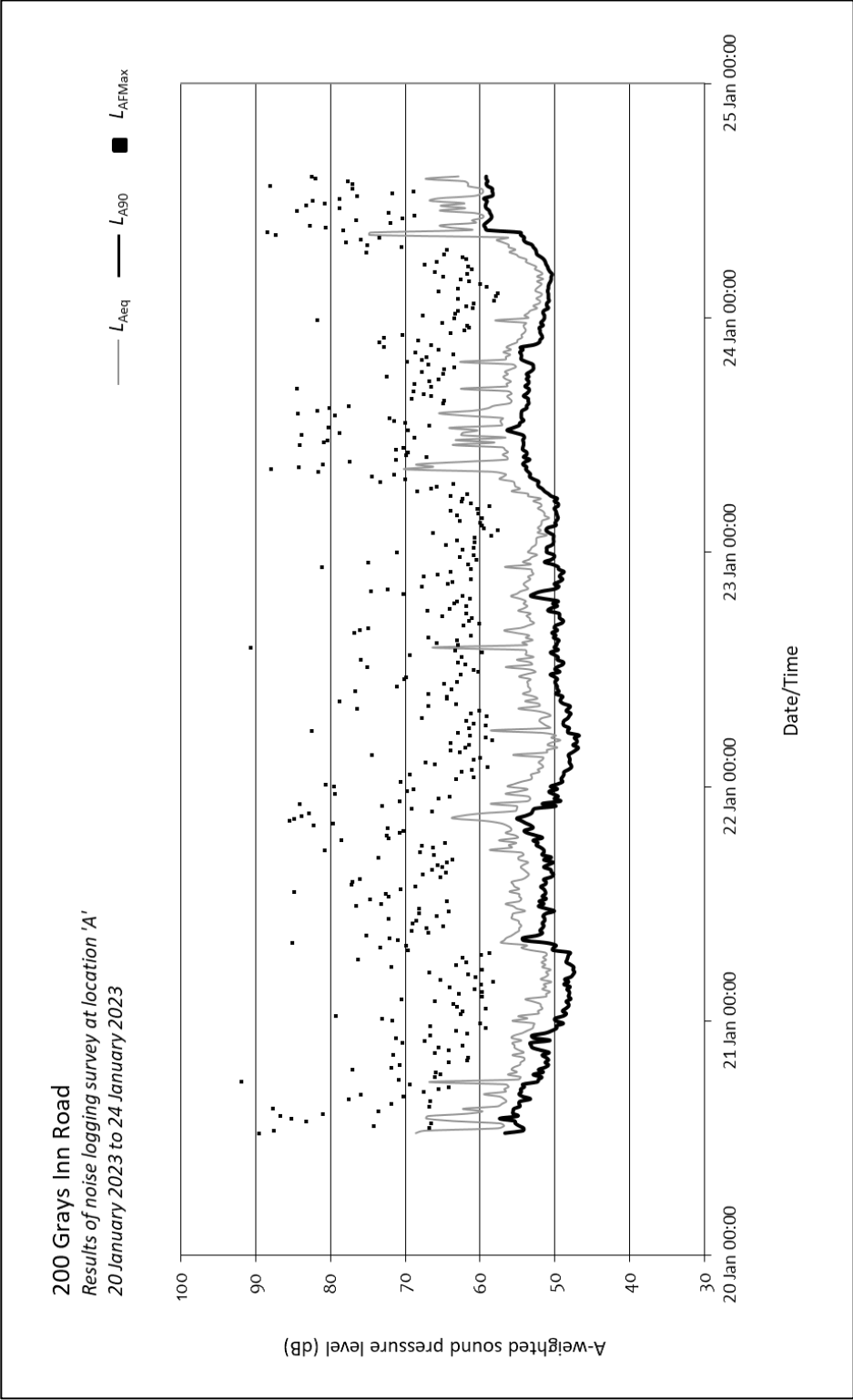
Weather conditions

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between -2°C at night and 9°C during the day, and the wind speed was less than 5 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location 'A'



Appendix C

Summary of plant noise calculations

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Project number 23031 **Project name** 200 Grays Inn Road, Warner Bros
Calculation revision A
Calculation by Ben Southgate **Date created** 14/03/2023
Checked by Daniel Stringer **Date checked** 14/03/2023
Calculation description Noise egress from external condenser unit to nearest noise sensitive window. External condenser unit located in plant area to Level 1 residential window.

Comments	Octave band centre frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Daikin REYQ10U unit									
Sound power level	88	82	80	78	71	71	68	61	79
Additional source directivity; Q = 4	6	6	6	6	6	6	6	6	
Total sound power level	94	88	86	84	77	77	74	67	85
Acoustic enclosure insertion loss									
Total sound power level after enclosure	86	76	68	60	45	52	54	54	66
Losses									
Distance attenuation - Point source, r=12m	32.6	32.6	32.6	32.6	32.6	32.6	32.6	32.6	
Total losses	33	33	33	33	33	33	33	33	
Sound pressure level after losses	53	43	35	27	13	19	21	21	33
Facade correction									
Total facade sound pressure level at receptor	56	46	38	30	16	22	24	24	36
Criteria									
Criteria - Night time									41
Difference									-5