Roof Plant

L4 INTERNATIONAL HOUSE
DESIGN & ACCESS STATEMENT

John Robertson Architects

JRA

Document Control

Job title:
International House

Job number:
1893

Report title:
Reception Look & Feel presentation
File location/ name:

\\AANEMESIS\1850x\1893_International House - St Katherines Dock\1893_Level 4 works\Admin\C-Statutory\C01-TownPlanning\201217_Roof plant_Design and access statement

Revision	Issue date	Prepared by	Checked by	Approved by:
01	18.12.2020	Becky Grigor	**Festus Moffat**	**Festus Moffat**

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JRA

Contents

1.0 Introduction

International House is located on the North bank of the Thames immediately East of the Tower of London, adjacent to the approach to Tower bridge. The building was constructed as part of the redevelopment of St Katherine Docks which began in 1977 and finished in 1983.

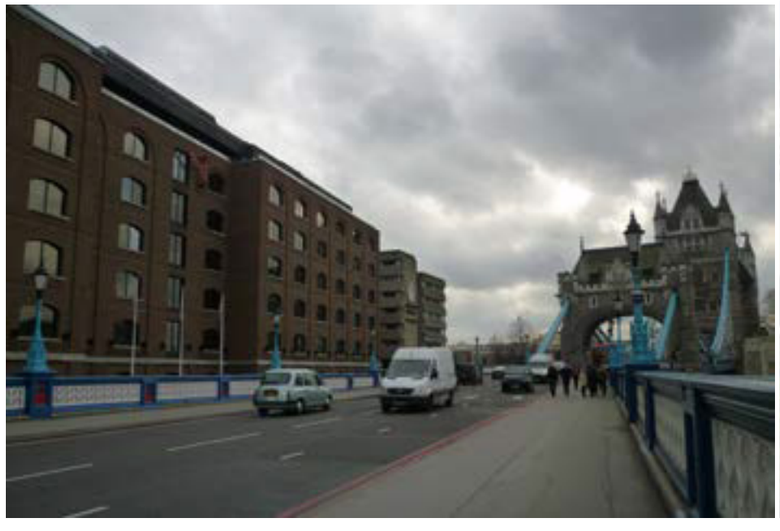
The St. Katharine Docks Estate, including International House, Commodity Quay, Ivory House and Devon House was acquired by Blackstone Properties in 2014.

To the East side of the building the frame at Quay level is clad in a cast iron Tuscan colonnade which appears to support a limestone entablature off which a brickwork facade rises for 5 storeys. Behind the colonnade the building is enclosed with full height PPC aluminium framed glazing.

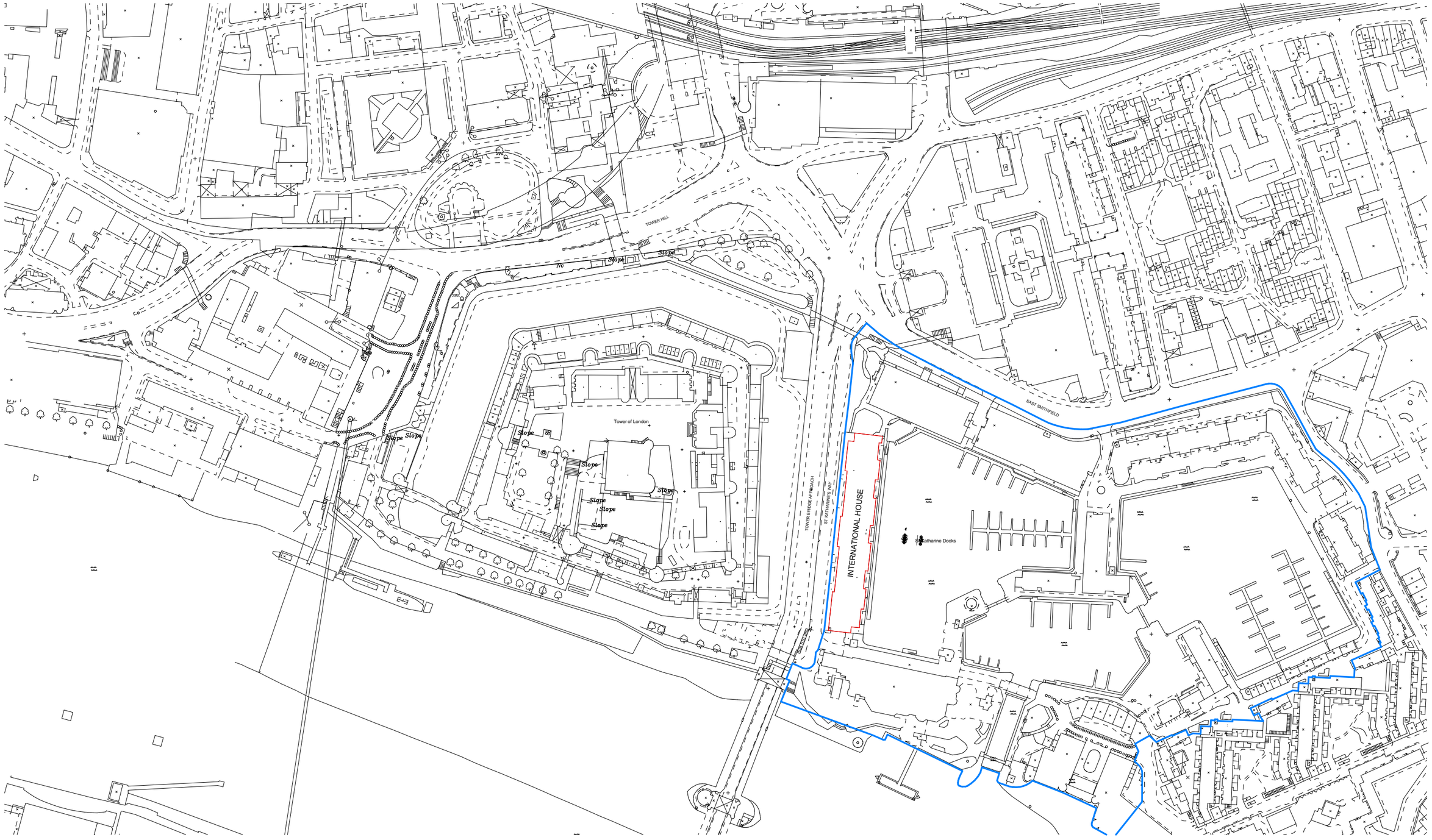
The West side of the building fronts onto St. Katherine's Way, a service road that runs parallel to Tower Bridge which leads down to the river front. The ground floor of the building is mostly obscured by the bridge approach when viewed from the Tower of London. Level 6 steps back from the building line providing a terrace in front of the office accommodation with full height PPC aluminium framed glazing to all four sides. The building is completed with a profiled steel roof, with artificial slate detailing and a combination of felt, liquid applied coatings and decking for pedestrian areas.

The internal common areas are predominantly accessed via a large reception area to the centre of the building. Four cores containing risers, lobbies, passenger lifts and stairwells are provided.

2.0 Context



3.0 Location Plan



1 Site Plan
SCALE 1:1250

0 12.5 25 50 m

4.0 Proposal

The proposal seeks to install 2 No. condenser units at roof level on International House in order to provide fit for purpose HVAC systems to serve incoming tenants with services in keeping with contemporary office standards to part of the level 4 which is being refurbished.

The building over the last few years has had a number of renovations as the building was in need some mondernisation in terms of the existing floors. Previous applications have been submitted and approved for the installation of new condensers for the previous renovations.

Application reference:
PA/16/01308
Granted 12/07/2016.

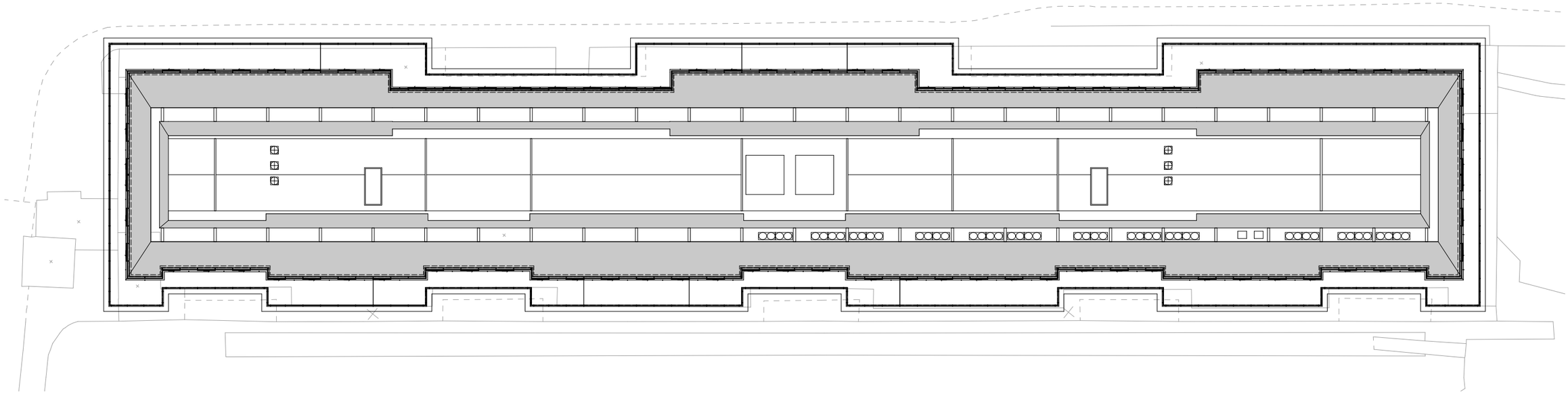
The logistics of replacing the systems are complicated because not all of the units can be removed. The roof plant is now a hybrid of new condensers from the above application but also some existing VAV air-conditioning needs to be maintained to serve long-term tenancies. Both of these will need to be maintained with the installation of the new condensers proposed in the application.

To keep in line with the previous application the units are being proposed to be positioned on the east facing terrace, into the dock to reduce any visibility from key views as demonstrated in the proposed drawings.

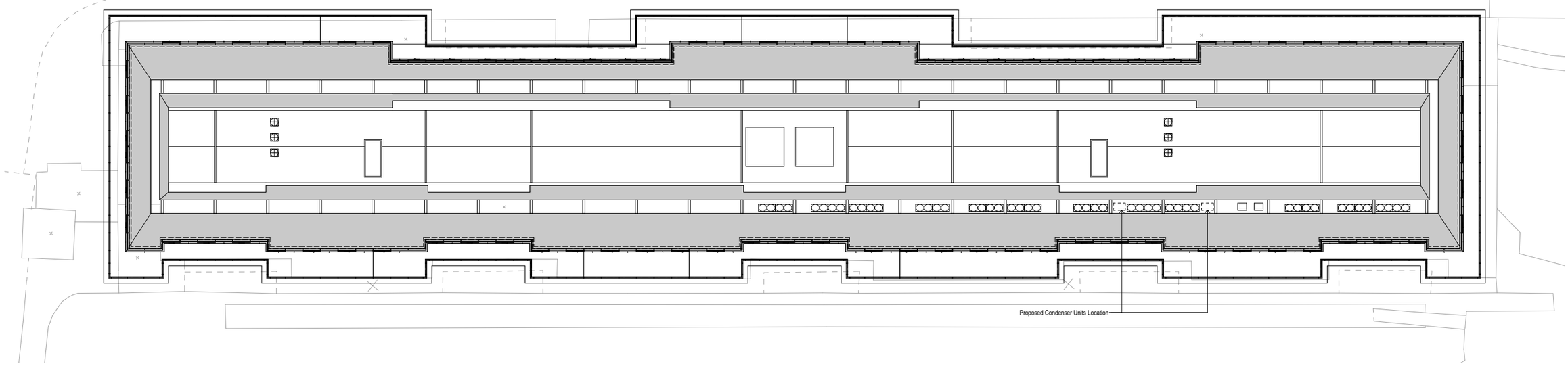
An acoustic study has been carried out to ensure that the acoustic requirements of the LBTH for the site are complied with (see appendix A of this statement). The enclosed report by Venta Acoustics sets out that the proposed condensing units should be capable of achieving the Council's requirements.

Full details of the proposed condenser units are enclosed in section 5 and 6 of this document, including details of the units dimensions, fitting, colour and mechanics

5.0 Proposed Drawings



1 Existing Roof Plan
SCALE 1:200



2 Proposed Roof Plan
SCALE 1:200

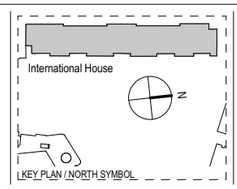
0 2 10 m

Source File: BIMcloud: STSBIM23 - BIMcloud Basic for ARCHICAD 23/1893_International House- Level 4/1893-JRA-00-ZZ-M3-A-0004_International House L4_4

Rev	Date	Dwn	Chk	Description
P01	18/12/2020	KG	BG	Planning

Rev	Date	Dwn	Chk	Description

Rev	Date	Dwn	Chk	Description



KEY PLAN / NORTH SYMBOL

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Project
International House - St Katherines Dock
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Client
Revantage

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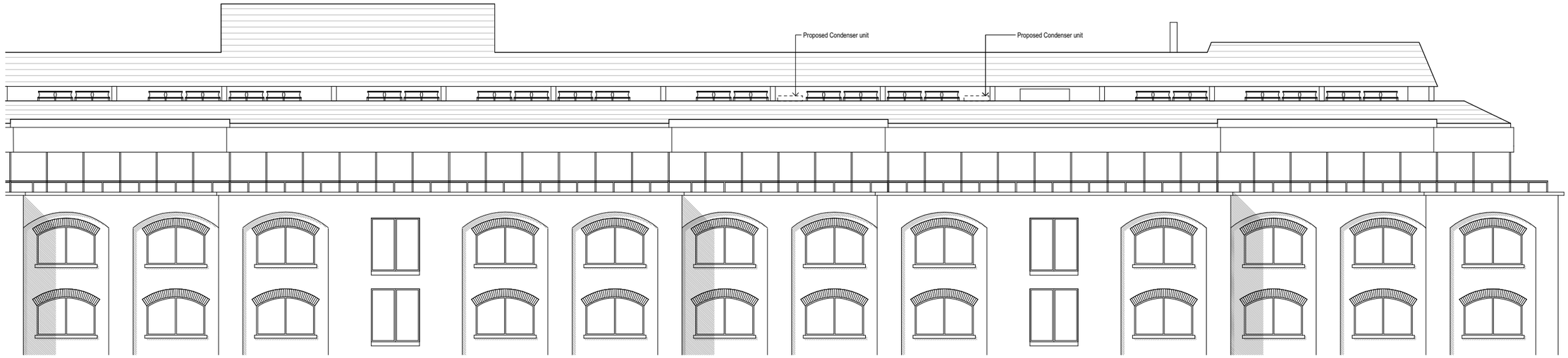
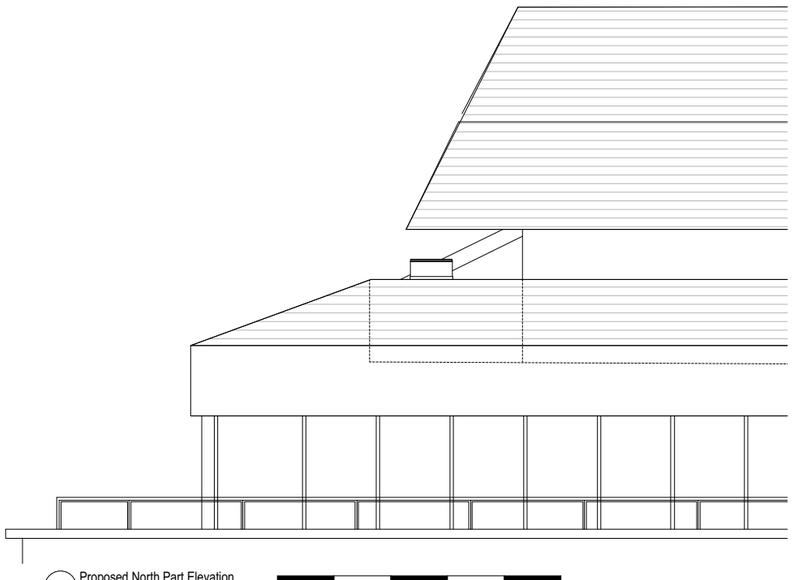
Drawing Title
Proposed Roof Plan

Scale	1:200 @ A1	Internal Project No. 1893
Dwg No.	**1893-JRA-00-ZZ-DR-A-0100**	
Suitability	FOR INFORMATION	S2
Revision	PRELIMINARY	**P01**



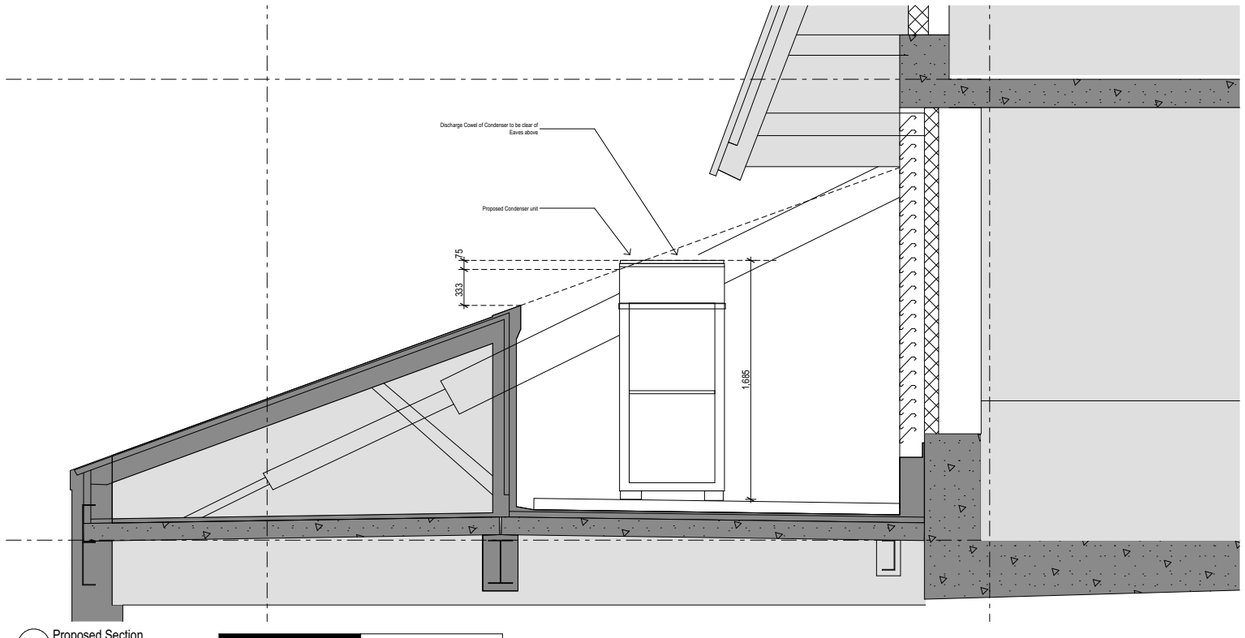
1 Proposed East Part Elevation
SCALE 1:100

0 1 10m



2 Proposed North Part Elevation
SCALE 1:50

0 1 5m



3 Proposed Section
SCALE 1:20

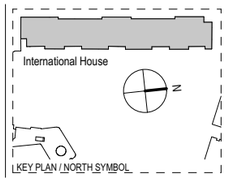
0 1 2m

Source File: BIMcloud: STSBIM23 - BIMcloud Basic for ARCHICAD 23/1893_International House- Level 4/1893-JRA-00-ZZ-M3-A-0004_International House L4_4

Rev	Date	Dwn	Chk	Description
P01	18/12/2020	KG	BG	Planning

Rev	Date	Dwn	Chk	Description

Rev	Date	Dwn	Chk	Description



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Drawing Title
Roof Section

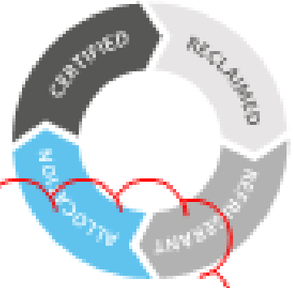
Scale	1:20, 1:50, 1:100 @ A1	Internal Project No. 1893
Dwg No.	**1893-JRA-00-ZZ-DR-A-0150**	
Suitability	FOR INFORMATION	S2
Revision	PRELIMINARY	**P01**

6.0 Condenser Specification

R-410A

REYQ-U (18 to 20 hp)

VRV IV+ Condensing Units – Heat Recovery



Outdoor Units			18 hp Single	18 hp Multi		20 hp Single	20 hp Multi	
			REYQ18U	REYQ8U	REYQ10U	REYQ20U	REYQ10U	REYQ10U
Capacity	Nominal Cooling	kW	50.40	50.40		55.90	55.90	
	Nominal Heating	kW	56.50	56.50		63.00	62.50	
Dimensions	Height x Width x Depth	mm	1685 x 1240 x 765	1685 x 930 x 765	1685 x 930 x 765	1685 x 1240 x 765	1685 x 930 x 765	1685 x 930 x 765
Weight		kg	317	230	230	317	230	230
Fan	Air Flow Rate	m³/sec	4.184	2.700	2.917	4.350	2.917	2.917
Electrical Details	Power Supply	Phase / Hz / V	3 / 50 / 380–415					
	Running Current	amps	24.6	8.9	11.8	31.1	11.8	11.8
	Starting Current	amps	4					
	Fuse Rating	amps	40	20	25	50	25	25
Refrigerant Circuit	Refrigerant Type		R410A					
	Refrigerant Charge	kg	11.8	9.7	9.8	11.8	9.8	9.8
	Additional Charge	kg	data book					
Sound Pressure		dBA	62.0	57.0	57.0	65.0	57.0	57.0
Sound Power		dBA	83.8	78.0	79.1	87.9	79.1	79.1
Piping Limits	Maximum Total Length	m	1000					
	Maximum Actual Length	m	165					
Piping Connections - Systems	Liquid	inch (mm)	5/8 (15.9)	5/8 (15.9)		5/8 (15.9)	5/8 (15.9)	
	Discharge	inch (mm)	7/8 (22.2)	7/8 (22.2)		1 1/8 (28.6)	1 1/8 (28.6)	
	Gas	inch (mm)	1 1/8 (28.6)	1 1/8 (28.6)		1 1/8 (28.6)	1 1/8 (28.6)	
Capacity Index Limit			225 – 585	225 – 585		250 – 650	250 – 650	
Maximum Number of Connected Indoor Units			64	64		64	64	

7.0 Appendix A
Acoustic Report

Report VA2952.201210.NIA2

International House, St Katherine's Way

Noise Impact Assessment

10 December 2020

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registered company no. 10139494

Contents

Attachments

1. Introduction

It is proposed to install new condenser units at roof level at International House, St Katherine's Way, as part of the refurbishment of a vacant area at 1st floor level within the building.

Venta Acoustics has been commissioned by John Robertson Architects to undertake an assessment of the potential noise impact of these proposals in in relation to the requirements of the planning consent.

2. Design Criterion and Assessment Methodology

2.1 Tower Hamlets Requirements

Tower Hamlets require that noise from external plant shall at no time exceed 10dB below the lowest background noise level (L_{A90}) when measured at the nearest sensitive receptor, with measurements taken in accordance with BS 4142.

2.2 BS4142:2014

British Standard BS4142:2014 *Methods for rating and assessing industrial and commercial sound* describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes sound from fixed installations comprising mechanical and/or electrical plant and equipment;

The assessment methodology considers the Specific Sound Level, as measured or calculated at a potential noise sensitive receptor, due to the source under investigation. A correction factor is added to this level to account for the acoustic character of the sound as follows:

Tonality – A correction of up to 6dB depending on the prominence of tones;

Impulsivity - A correction of up to 9dB depending on the prominence of impulsivity;

Other sound characteristics - A 3dB correction may be applied where a distinctive acoustic character is present that is neither tonal nor impulsive;

Intermittency - A 3dB correction may be applied where the specific sound has identifiable on/off conditions.

An estimate of the impact of the source is obtained by subtracting the typical background noise level from the corrected Specific Sound Level.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

- A difference of around +5 dB could be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context.

2.3 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to suitable internal noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 2.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room	40 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$

Table 2.1 - Excerpt from BS8233: 2014 **[dB ref. 20µPa]**

3. Site Description

As illustrated on attached site plan VA2952/SP1, the building is located overlooking St Katherine's Dock, with Tower Bridge Road to the west.

The most affected noise sensitive receiver is expected to be the Tower Hotel to the south.

Existing building services plant was noted on several of the neighbouring rooftops.

4. Environmental Noise Survey

A previous noise survey was undertaken by others at the Tower Hotel between Friday 1st and Monday 4th June 2018. The report is attached in Appendix B for reference.

4.1 Noise Survey Summary

The previous report has provided the following minimum background noise levels captured during the survey.

Monitoring Period	Minimum L_{A90}
07:00 – 23:00 hours	48 dB
23:00 – 07:00 hours	47 dB

Table 4.1 – Reported sound levels measured at Tower Hotel (by others)

4.2 Plant Noise Emission Limits

On the basis of the measured noise levels at Tower Hotel and the planning requirements of the Local Authority, and considering that it is not expected that tonal noise will be generated by the proposed plant units, the following plant specific sound levels should not be exceeded at the most affected noise sensitive receivers:

Monitoring Period	Design Criterion (L_{Aeq})
07:00 – 23:00 hours	38 dB
23:00 – 07:00 hours	37 dB

Table 4.2 – Specific sound pressure levels not to be exceeded at most affected noise sensitive receivers

5. Predicted Noise Impact

5.1 Proposed plant

The following plant is proposed for installation at roof level at the location indicated on site plan VA2952/SP1.

Plant Item	Quantity	Proposed Model
Condensers	2	Daikin REYQ20U

Table 5.1 – Indicative plant selections assumed for this assessment.

Consulting the manufacturer's datasheets, the following noise emissions levels are attributed to the proposed plant items:

Plant Item	Octave Band Centre Frequency (Hz) Sound Pressure, L_p@1m (dB)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Daikin REYQ20U	70	68	67	62	57	53	47	42	64

Table 5.2 – Advised plant noise data used for the assessment.

5.2 Recommended Mitigation Measures

It is not envisaged that any additional mitigation measured beyond the sites inherent geometry will be required for external noise emissions.

5.3 Predicted noise levels

The cumulative noise level at the most affected noise sensitive receiver, some 120 meters away, has been calculated on the basis of the above information, with reference to the guidelines set out in BS4142:2014.

Due to the low resulting noise at the receiver (21dB below the minimum background measured), no penalties have been applied under BS4142 as noise from the units would be effectively inaudible.

A summary of the calculations are shown in Appendix C.

Predicted Cumulative Noise Level	Design Criterion
L_{Aeq} 26 dB	L_{Aeq} 37 dB

Table 5.3 – Predicted cumulative noise level at most affected noise sensitive receiver and design criterion.

All plant and ductwork should be fitted with anti-vibration mounts in accordance with the manufacturer guidelines. This is expected to control structureborne noise to the building to acceptable levels.

All other air handling and extract plant will be fitted with acoustically specified splitter silencers in order that the cumulative noise level does not exceed the 24-hour design noise criterion.

5.4 Comparison to BS8233:2014 Criteria

BS8233 assumes a loss of approximately 15dB for a partially open window. The external noise level shown in Table 5.3 would result in internal noise levels that achieve the guidelines shown in Table 2.1.

6. Conclusion

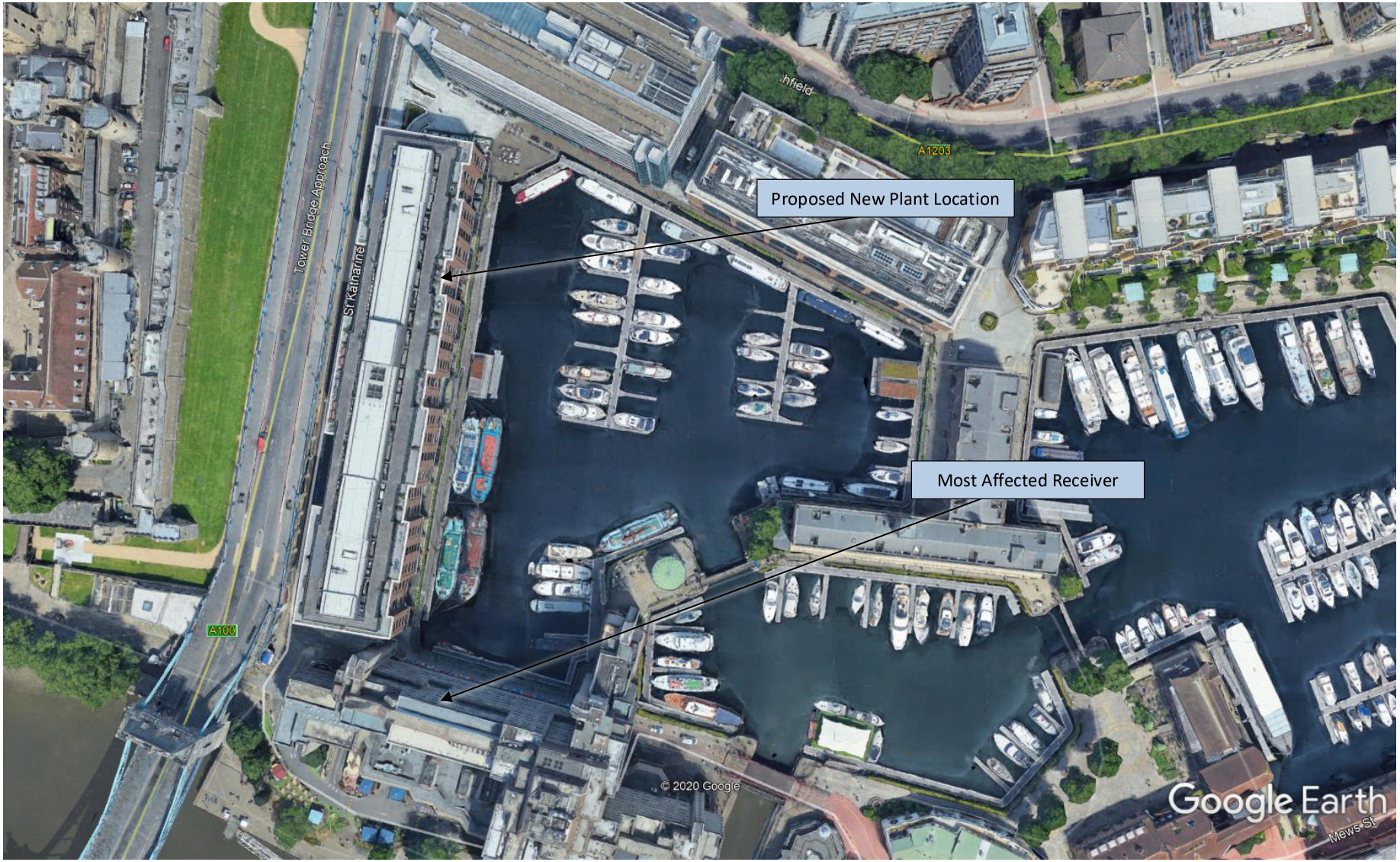
Venta Acoustics have undertaken a plant noise assessment for new plant at International House, St Katherine's Way in support of a planning application.

A baseline noise survey undertaken by others has been used to set noise emission limits at the most affected noise sensitive receiver such that the proposed installation meets the requirements of Tower hamlets.

The cumulative noise emission levels from the proposed plant have been assessed to be compliant with the plant noise emission limits.

The proposed scheme is not expected to have a significant adverse noise impact and the relevant planning requirements have been shown to be met.

Jamie Duncan MIOA


Proposed New Plant Location
Most Affected Receiver
A1203
A100
Tower Bridge Approach
St Katharine
© 2020 Google
Google Earth

APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.3 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as

APPENDIX A

loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

Appendix B

Previous Noise Survey

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E-mail: sales@noico.co.uk
Web site: www.noico.co.uk

REPORT No. 780561/1

International House
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ENVIRONMENTAL NOISE SURVEY REPORT & PLANT NOISE ASSESSMENT

PREPARED: 7th JUNE 2018

Presented by:

John Redknap MBA MIOA MCMI

CONTENTS

1.0 Introduction

1.1 Callisia Ltd has commissioned Noico Ltd to conduct an environmental noise survey at International House, 1 St Katherine's Way, London, E1W 1AY.

1.2 The purpose of the survey is to obtain statistical noise data and to determine the background noise levels at the site. Based on the noise survey data, noise criteria are to be established for limiting noise emission from the mechanical plant installations serving the premises. The noise criteria are to be set in accordance with the requirements of the local planning authority (The London Borough of Tower Hamlets).

1.3 Noico Ltd have also been instructed to carry out a plant noise assessment for the proposed new equipment being installed to ensure it meets the council requirement and offer recommendations should it not do so.

1.4 The roof space of the site on the Quay side of the building currently has a considerable amount of existing plant along the open mansard roof area. There are multiple top discharge condensers already installed further along this roof space plus other mechanical services plant serving the building. Consequently, the background noise level if measured on the roof space is likely to have been artificially raised if the survey equipment had been set up in this area.

1.5 To overcome measuring the artificially raised background a new location for the survey equipment needed to be established. The nearest affected façade was deemed to be that of The Tower Hotel, which overlooks the location of the proposed condensers, approximately 64m away from the nearest proposed unit. We therefore managed to gain access to a roof area of the hotel that was level with the plant – the area being adjacent to room number 972. From this location, it was considered we would be able to measure the background noise level impacting upon the hotel windows.

2.0 Instrumentation

2.1 A precision grade Norsonic 140 'Type 1' Integrating Sound Level Meter was used for the survey. This was equipped with an environmental microphone and extension cable. The instrument was powered by an external battery and stored in a weatherproof case.

2.2 The instrument was calibrated prior and subsequent to use with no calibration drift recorded.

3.0 Survey Details

3.1 Location: The environmental noise analyser microphone was located externally on a roof area adjacent to room number 972 of The Tower Hotel. This position was chosen as it was considered to be representative of the background noise environment that exists at the nearest noise affected window of the hotel. From the observations made on site there are no other residential dwellings within the immediate vicinity and the hotel rooms were thought to be air conditioned, although at least one of the windows per room appeared openable.

3.2 Period: Monitoring was carried out continuously from approximately 11.30 hrs on the 1st June 2018 through to 15:30 hrs on the 4th June 2018. The instrument was set up to monitor noise levels continuously and store data in fifteen minute intervals.

3.3 Weather: The prevailing weather condition throughout the majority of the survey period was satisfactory for noise monitoring, being dry, mild and with little to moderate breeze. Windspeed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

3.4 Site Noise Characteristics: The ambient noise level was characterised by mechanical plant serving adjacent buildings and no doubt the hotel itself, as well as road traffic noise from the surrounding roads crossing the adjacent Tower Bridge. It is thought that no unusual events occurred during the survey period and the data are considered to be a true representation of ambient noise levels.

4.0 Survey Results

4.1 The results of the environmental survey are presented in graphical and numerical format in the attached appendices, showing the recorded values of L_{Aeq} and L_{A90}.

4.2 See Appendix 1 for a glossary of terms.

4.3 With reference to the measured data, the minimum background noise level measured during the survey period was:

Daytime (07:00 to 23:00hrs)	- 48.4 L_{A90}
Night time (23:00 to 07:00hrs)	- 46.5 L_{A90}

5.0 Environmental Noise Level Criteria

5.1 Criteria for mechanical services noise emission are normally based upon the prevailing level of background noise in the period of concern and may be set against this to a level as normally defined by the local planning authority.

5.2 The London Borough of Tower Hamlets has advised that noise arising from fixed plant installations should not cause an increase in the existing minimum background noise level (as expressed as a L_{A90}) at the nearest noise affected property. In practical terms, this means that the noise arising from the plant should be at least 10 dB(A) below the minimum background noise level.

5.3 To conform to the above criteria, and in accordance with the minimum background noise levels measured during the survey (detailed summarised in 4.3 above), noise from the proposed plant installations should not exceed the following value.

Daytime plant operation (07:00 to 23:00hrs)	- 38.4 dB L_{A90}
Night time (23:00 to 07:00hrs)	- 36.5 dB L_{A90}

Note: These levels must be achieved cumulatively with all plant operating, and as measured at 1 metre from the window of the nearest affected property.

6.0 BS 4142

6.1 Using BS 4142 the likelihood of complaints from local residents due to plant noise emissions is assessed by the difference between noise from the new source(s) and the existing background level. The noise from the new source(s) is expressed in terms of a rating level, calculated from the specific noise source(s) plus any 'acoustic feature corrections' and is given as an $L_{Aeq,T}$ noise level.

6.2 The acoustic feature correction is applied where the source emits a noise of a tonal, impulsive or intermittent nature.

6.3 The existing background noise level is expressed in terms of an $L_{A90,\,T}$ noise level. The rating level can be subtracted from the background noise level to determine noise impact against the design criteria.

7.0 BS 4142 Assessment

7.1 We understand the following new equipment is to be installed on an existing mansard roof area on the Quay side of the building:

3no. Daikin REYQ16T condenser units & 2no. Daikin REYQ18T condenser units.

7.2 We have been advised that the new plant would run no longer than between the hours of 07:00 to 19:00 hours (ie. within the Daytime criteria). The design target will therefore be as outlined in section 4.3 – ie. 38.4 dB $L_{A90.}$

7.3 A review of the plant noise level indicates that there is no evidence of any tonal content and no acoustic feature correction is required.

7.4 We believe there are no residential dwellings in the immediate vicinity and have therefore included an acoustic assessment to the nearest noise sensitive windows in the adjacent Tower Hotel (see the attached Calculation Sheet 1 for further details).

7.5 The results of our acoustic assessment indicate that the noise level at 1 metre from the nearest affected hotel windows is 37dB(A) which is 1dB(A) below the council requirement of 38dB(A). Consequently, no mitigation measures will be necessary in order to comply with their requirements.

8.0 Conclusion

8.1 A background noise level survey has been carried out at International House, 1 St Katherine's Way, London, E1W 1AY.

8.2 Based upon the survey results and discussions with the local planning authority, criteria applicable to noise from the mechanical services plant have been established.

8.3 A plant noise assessment for the proposed new equipment being installed at the above referenced site has established that the required criterion will be achieved without the need for acoustic treatment.

Appendix 1 - Glossary of Terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (Lp).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A weighting	Arithmetic corrections applied to values of Lp according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of Lp actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of Lp actually measured.
$L_{n,T}$	Lp which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.

Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:1997.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:1997.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dB(A) penalty for any tonal, impulsive or irregular qualities, ref. BS4142:1997.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1 m from the façade of the nearest affected sensitive property.

Appendix 2 - Environmental Noise Monitoring Data

Date	LAeq	LA90
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(2018/06/01 11:45:05.00)	56.6	52.4
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(2018/06/01 12:30:05.00)	56.8	52.4
(2018/06/01 12:45:04.00)	55.7	52.8
(2018/06/01 13:00:05.00)	56.7	52.6
(2018/06/01 13:15:05.00)	57.6	52.9
(2018/06/01 13:30:04.00)	56.7	52.8
(2018/06/01 13:45:04.00)	53.9	52.3
(2018/06/01 14:00:04.00)	56.5	52.6
(2018/06/01 14:15:04.00)	55.9	52.4
(2018/06/01 14:30:05.00)	54.5	52.4
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(2018/06/01 15:30:05.00)	55.1	52.0
(2018/06/01 15:45:05.00)	52.9	51.3
(2018/06/01 16:00:04.00)	54.0	52.1
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(2018/06/01 17:45:05.00)	55.2	52.2
(2018/06/01 18:00:05.00)	53.8	52.4
(2018/06/01 18:15:05.00)	54.5	52.8
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(2018/06/03 05:30:05.00)	48.6	46.9
(2018/06/03 05:45:05.00)	49.4	47.6
(2018/06/03 06:00:05.00)	52.2	48.8
(2018/06/03 06:15:05.00)	52.8	48.2
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(2018/06/03 06:45:05.00)	54.7	48.2
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(2018/06/03 07:30:05.00)	53.1	48.8
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(2018/06/03 09:15:05.00)	52.2	50.4
(2018/06/03 09:30:05.00)	52.6	50.9
(2018/06/03 09:45:05.00)	54.5	50.3
(2018/06/03 10:00:05.00)	52.2	51.0
(2018/06/03 10:15:05.00)	53.4	51.2
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(2018/06/03 11:15:05.00)	54.5	51.3
(2018/06/03 11:30:05.00)	53.8	51.1
(2018/06/03 11:45:05.00)	52.7	51.2
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(2018/06/03 14:45:05.00)	59.3	51.4
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(2018/06/03 17:15:05.00)	57.8	52.0
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(2018/06/03 18:00:05.00)	58.7	52.1
(2018/06/03 18:15:05.00)	57.8	51.8
(2018/06/03 18:30:05.00)	57.6	51.8
(2018/06/03 18:45:05.00)	56.1	51.3
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Date	LAeq	LA90
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(2018/06/03 22:00:06.00)	54.3	49.7
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(2018/06/03 22:45:05.00)	50.9	49.7
(2018/06/03 23:00:05.00)	50.5	49.4
(2018/06/03 23:15:05.00)	50.6	49.4
(2018/06/03 23:30:05.00)	50.7	49.2
(2018/06/03 23:45:05.00)	51.3	48.9
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(2018/06/04 03:30:05.00)	49.0	47.5
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(2018/06/04 04:15:04.00)	49.8	48.2
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(2018/06/04 04:45:05.00)	49.6	48.3
(2018/06/04 05:00:05.00)	51.7	48.7
(2018/06/04 05:15:05.00)	50.3	48.9
(2018/06/04 05:30:05.00)	51.4	49.8
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(2018/06/04 06:00:05.00)	51.7	49.9
(2018/06/04 06:15:05.00)	51.6	50.3
(2018/06/04 06:30:05.00)	52.0	50.5

Date	LAeq	LA90
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(2018/06/04 08:45:05.00)	60.6	55.8
(2018/06/04 09:00:05.00)	60.3	55.8
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(2018/06/04 09:30:05.00)	59.3	52.9
(2018/06/04 09:45:05.00)	59.0	53.5
(2018/06/04 10:00:05.00)	58.2	53.3
(2018/06/04 10:15:05.00)	59.9	52.7
(2018/06/04 10:30:05.00)	58.6	53.4
(2018/06/04 10:45:05.00)	56.0	53.1
(2018/06/04 11:00:05.00)	58.0	52.7
(2018/06/04 11:15:05.00)	54.6	52.4
(2018/06/04 11:30:05.00)	58.4	52.8
(2018/06/04 11:45:05.00)	58.9	52.8
(2018/06/04 12:00:05.00)	57.8	52.8
(2018/06/04 12:15:05.00)	58.6	53.0
(2018/06/04 12:30:05.00)	58.9	53.1
(2018/06/04 12:45:05.00)	56.7	52.8
(2018/06/04 13:00:05.00)	57.8	53.2
(2018/06/04 13:15:05.00)	58.5	53.2
(2018/06/04 13:30:05.00)	56.7	53.2
(2018/06/04 13:45:05.00)	62.5	53.2
(2018/06/04 14:00:05.00)	56.7	52.7
(2018/06/04 14:15:05.00)	56.4	52.7
(2018/06/04 14:30:05.00)	57.0	52.7
(2018/06/04 14:45:05.00)	57.3	52.1
(2018/06/04 15:00:05.00)	59.2	52.7
(2018/06/04 15:15:05.00)	60.1	53.6
(2018/06/04 15:30:05.00)	54.3	52.7

Figure 1

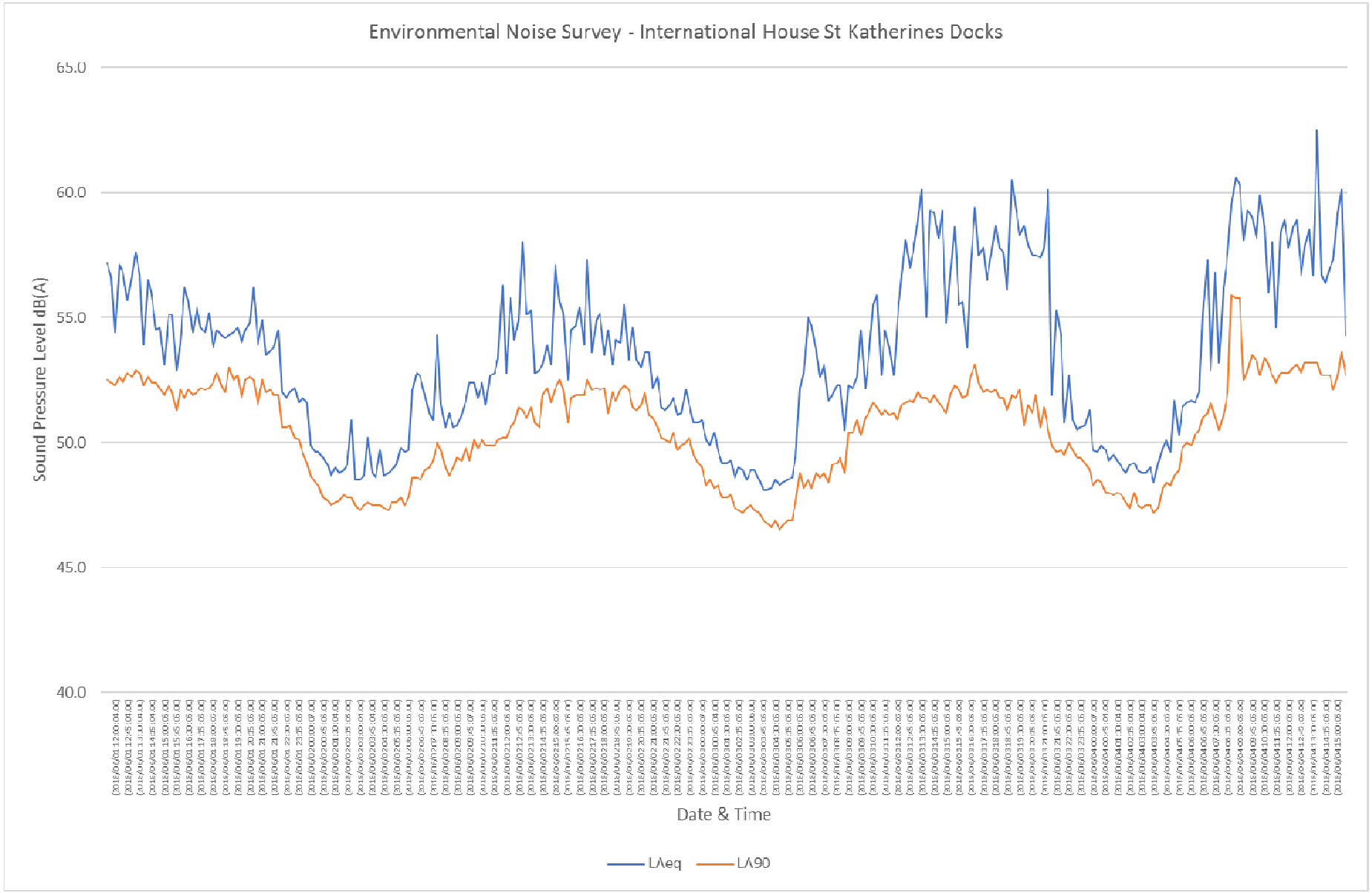
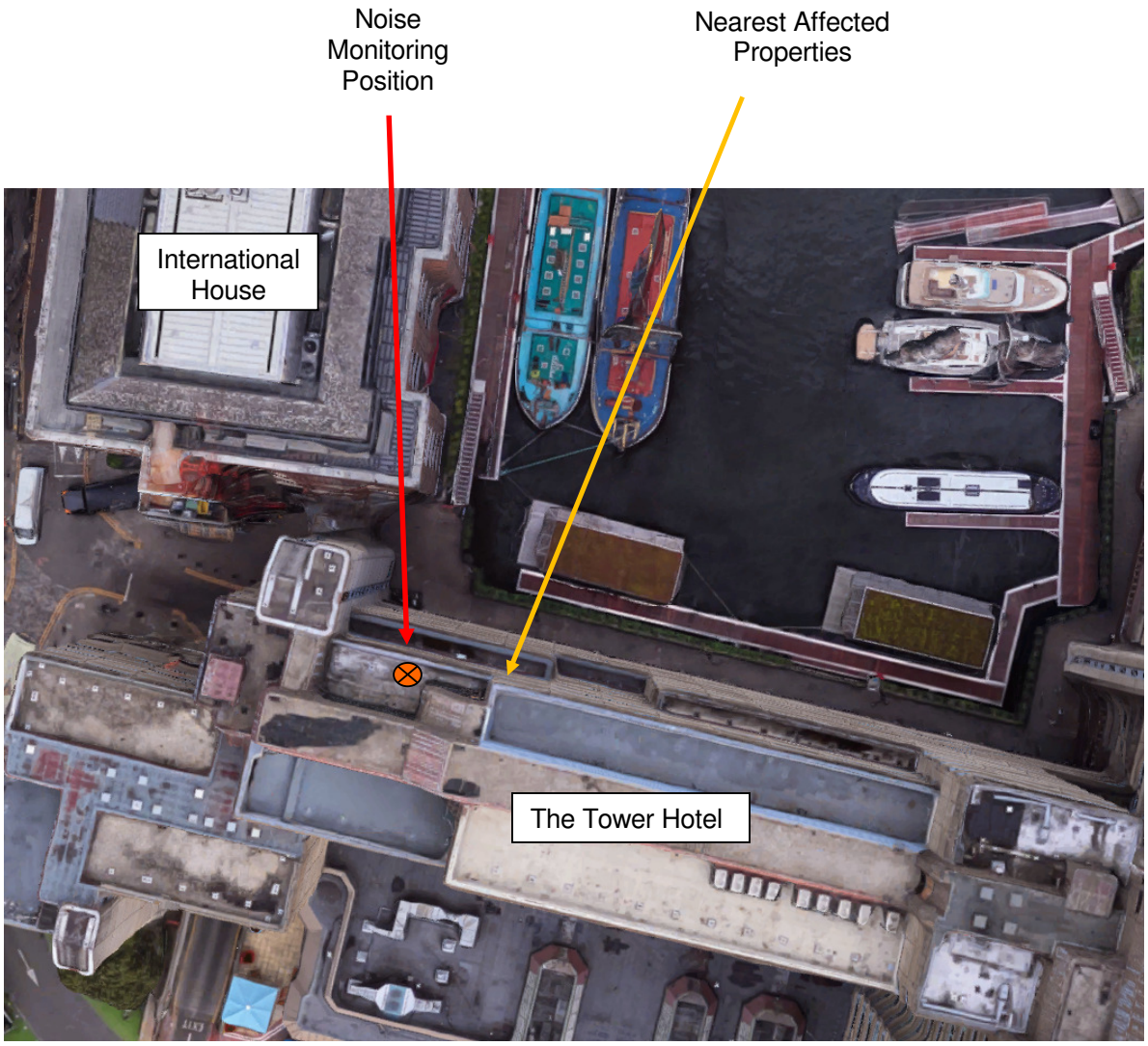

Environmental Noise Survey - International House St Katherines Docks
65.0
60.0
55.0
50.0
45.0
40.0
Sound Pressure Level dB(A)
Date & Time
LAeq
LA90

Figure 2



NOICO Noise Control Engineers	Project: St Katherine's Docks	Title: Noise Survey Position
	Dwg No. 780561 Rev A	Date: 7th June 2018
	Patrick House, Station Road Hook, Hampshire RG27 9HU	Tel: 01256 766207 Fax: 01256 768413

Figure 3

CALCULATION SHEET 1

CLIENT: **Callisia**		PROJECT: **International House 1 St Katherine's Way**								
		DATE: **7th June 2018**								
Roof level plant location		Octave Band Centre Frequency (Hz)								
Plant operation: 07:00 to 19:00hrs Only										
Description		**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**	**dB(A)**
ASSESSMENT LOCATION A1										
Daikin REYQ16T	Lp @ 1m	**70**	**68**	**67**	**62**	**57**	**53**	**48**	**42**	**64**
Daikin REYQ16T	Lp @ 1m	**70**	**68**	**67**	**62**	**57**	**53**	**48**	**42**	**64**
Daikin REYQ16T	Lp @ 1m	**70**	**68**	**67**	**62**	**57**	**53**	**48**	**42**	**64**
Daikin REYQ18T	Lp @ 1m	**66**	**65**	**67**	**64**	**59**	**55**	**50**	**44**	**65**
Daikin REYQ18T	Lp @ 1m	**66**	**65**	**67**	**64**	**59**	**55**	**50**	**44**	**65**
Other	Lp @ 1m									
Other	Lp @ 1m									
Other	Lp @ 1m									
Combined Total		**76**	**74**	**74**	**70**	**65**	**61**	**56**	**50**	**71**
Distance: 1m to 64m to nearest window		-37	-37	-37	-37	-37	-37	-37	-37	
Screenining via building	None	0	0	0	0	0	0	0	0	
Façade Correction		3	3	3	3	3	3	3	3	
Lp @1m from receivers façade		**42**	**40**	**40**	**36**	**31**	**27**	**22**	**16**	**37**

07:00 to 23:00Hours Design Target @ nearest noise sensitive window = 38

Excess = -1

Notes

Calculations are to the nearest noise sensitive windows in the hotel which are level with the plant

No allowance has been made in the above calculations for any noise/vibration transfer through the structure

Vibration isolation should be allowed for under the new plant

APPENDIX C

VA2952 - International House, St Katherine's Way

Noise Impact Assessment

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Daikin REYQ20U	Lp @ 1m	71	65	66	63	59	55	53	46	**65**
Number of Plant	2	3	3	3	3	3	3	3	3	
Distance Loss	To 120m	-42	-42	-42	-42	-42	-42	-42	-42	
Level at receiver		**32**	**26**	**27**	**24**	**20**	**16**	**14**	**7**	**26**

BS4142 Assessment

BS4142 Character Corrections		Rating Levels		Expected Impact
Tonality	0	Specific Sound Level	26	
Impulsivity	0	Corrected SSL	26	*Low impact*
Intermittency	0	Background (Night)	47	
Total	0	Difference	-21	

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