Bellis Construction Ltd

Marine Ices, Haverstock Hill, Camden

Discharge of Condition 17a

May 2017

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Document Control

Project:	Marine Ices, Haverstock Hill, Camden
Client:	Bellis Construction Ltd
Job Number:	A0
File Origin:	O:\Acoustics Air Quality and Noise\Active Projects\A0

Document Checking:

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Issue	Date	Status
1	16th May 2016	First Issue
2		
3		
4		
5		

Contents Page

Appendix Contents

1. Introduction

This report presents the findings of a review of the building layout for the proposed redevelopment of the former Marine Ices building on Haverstock Hill.

Plans indicating the required sound insulation of walls and floors with adjacency to commercial properties have been reviewed and the sound insulation performance assessed and predicted in order to discharge Condition 17a of application reference 2015/0487/P.

Condition 17a states:

"Prior to commencement of the development, details shall be submitted to and approved in writing by the Council, of the sound insulation of the floor/ ceiling/ walls separating the commercial premises from the residential flats above and neighbouring property. Such details shall be based on the recommendations of the Noise Assessment dated January 2015 hereby approved and shall demonstrate that the sound insulation value DnT,w and L'nT,w is enhanced by at least 20dB above the Building Regulations value and, where necessary, additional mitigation measures are implemented to contain commercial noise within the commercial premises and to achieve the noise criteria of BS8233:2014 within the dwellings/ noise sensitive premises. Approved details shall be implemented prior to occupation of the development and thereafter be permanently retained."

For ease of reference the relevant tables of the January 2015 report in respect to the glazing requirements have been reproduced within this document. Full details of the assessment methodologies and findings can be reviewed in the original report.

2. Sound Insulation Requirements

2.1 Noise Intrusion Assessment for Ground Floor Commercial Unit

2.1.1 Noise Intrusion L_{Aeq} Daytime and Night-Time and L_{Amax} Glazing Requirements

Internal noise levels, at all the ground floor restaurant areas of the proposed development, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of a glazing with a sound reduction of 30 dB has been used unless stated otherwise. A room location plan for the ground floor is shown within SK01 of Appendix B.

Where the relevant internal ambient noise level criteria are not met with standard double glazing (sound reduction 30 dB) then glazing with greater sound reduction properties have been specified (bold text) accordingly in Table 2.1.

The glazing and ventilation strategy has been designed to achieve WHO/BS 8233 internal L_{Aeq} daytime noise level criteria of 50 dB with windows closed.

Table 2.1 Noise Intrusion Levels L_{Aeq} Ground Floor Commercial

Location	Daytime External L_{Aeq}	Required Glazing Specification (SRI) to Achieve 50 dB L_{Aeq} day	Alternative Ventilation Required?
Ground Floor 01	71.8	30.0	No
Ground Floor 02	72.1	30.0	No

2.2 Noise Intrusion Assessment for First Floor Residential

2.2.1 Noise Intrusion L_{Aeq} Daytime and Night-Time and L_{Amax} Glazing Requirements

Internal noise levels, at all the first floor residential bedrooms/living spaces of the proposed development, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of a glazing with a sound reduction of 30 dB has been used unless stated otherwise. A room location plan for the first floor is shown within SK01 of Appendix B.

Where the relevant internal ambient noise level criteria are not met with standard double glazing (sound reduction 30 dB) then glazing with greater sound reduction properties have been specified (bold text) accordingly in Table 2.2.

The glazing and ventilation strategy has been designed to achieve WHO/BS 8233 internal L_{Aeq} daytime noise level criteria of 35 dB and internal night-time L_{Aeq} noise level criteria (30 dB) with windows closed. The glazing specifications would also meet the L_{Amax} criteria of 45 dB with windows closed.

Table 2.2 Noise Intrusion Levels L_{Aeq} and L_{Amax} First Floor Residential

Locations	Daytime External L_{Aeq}	Night-Time External L_{Aeq}	External L_{Amax}	Required Glazing Specification (SRI) to Achieve 35 dB L_{Aeq} day, 30 dB L_{Aeq} night and L_{Amax} 45 dB	Alternative Ventilation Required?
First Floor 01	68.0	65.0	86.3	**33.0**	**Yes**
First Floor 02	71.3	68.4	90.9	**46.0**	**Yes**
First Floor 03	67.9	65.1	86.1	**33.0**	**Yes**
First Floor 04	63.3	62.5	80.3	30.0	**Yes**
First Floor 05	61.0	59.9	79.0	**34.0**	**Yes**
First Floor 06	60.0	58.9	78.3	**34.0**	**Yes**
First Floor 07	59.6	58.5	77.8	30.0	**Yes**
First Floor 08	54.1	44.0	66.4	30.0	**Yes**
First Floor 09	53.8	43.6	66.1	30.0	**Yes**
First Floor 10	54.8	47.1	67.1	30.0	**Yes**
First Floor 11	55.1	47.6	67.6	30.0	**Yes**
First Floor 12	55.1	48.0	68.1	30.0	**Yes**
First Floor 13	46.0	42.8	70.4	30.0	**Yes**
First Floor 14	45.0	42.0	69.2	30.0	**Yes**
First Floor 15	42.9	40.4	68.0	30.0	**Yes**
First Floor 16	44.9	41.3	71.3	30.0	**Yes**

Five bedrooms/living spaces on the first floor will feature improved glazing and 16 will feature an alternative means of ventilation in order to meet both ventilation and internal ambient noise criteria. Alternative ventilation can be provided in several ways from acoustic trickle vents (which need to have the same acoustic performance as the glazing), other passive ventilation systems or mechanical ventilations systems.

2.3 Noise Intrusion Assessment for 2nd Floor Residential

2.3.1 Noise Intrusion L_{Aeq} Daytime and Night-Time and L_{Amax} Glazing Requirements

Internal noise levels, at all the second floor residential bedrooms/living spaces of the proposed development, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of a glazing with a sound reduction of 30 dB has been used unless stated otherwise. A room location plan for the second floor is shown within SK01 of Appendix B.

Where the relevant internal ambient noise level criteria are not met with standard double glazing (sound reduction 30 dB) then glazing with greater sound reduction properties have been specified (bold text) accordingly in Table 2.3.

The glazing and ventilation strategy has been designed to achieve WHO/BS 8233 internal L_{Aeq} daytime noise level criteria of 35 dB and internal night-time L_{Aeq} noise level criteria (30 dB) with windows closed. The glazing specifications would also meet the L_{Amax} criteria of 45 dB with windows closed.

Table 2.3 Noise Intrusion Levels L_{Aeq} and L_{Amax} 2nd Floor Residential

Location	Daytime External L_{Aeq}	Night-Time External L_{Aeq}	External L_{Amax}	Required Glazing Specification (SRI) to Achieve 35 dB L_{Aeq} day, 30 dB L_{Aeq} night and L_{Amax} 45 dB	Alternative Ventilation Required?
Second Floor 01	68.6	65.6	86.8	**36.0**	**Yes**
Second Floor 02	70.6	67.7	90.6	**46.0**	**Yes**
Second Floor 03	68.4	65.5	86.5	**36.0**	**Yes**
Second Floor 04	62.7	61.6	80.2	**32.0**	**Yes**
Second Floor 05	60.9	59.6	78.9	**34.0**	**Yes**
Second Floor 06	60.2	58.9	78.2	**34.0**	**Yes**
Second Floor 07	59.7	58.4	77.7	30.0	**Yes**
Second Floor 08	54.1	44.4	67.0	30.0	**Yes**
Second Floor 09	53.8	44.0	66.6	30.0	**Yes**
Second Floor 10	54.7	47.2	67.6	30.0	**Yes**
Second Floor 11	55.0	47.7	68.0	30.0	**Yes**
Second Floor 12	55.1	48.2	69.1	30.0	**Yes**
Second Floor 13	49.9	47.0	73.4	30.0	**Yes**
Second Floor 14	47.5	44.4	71.5	30.0	**Yes**
Second Floor 15	44.1	41.4	68.8	30.0	**Yes**
Second Floor 16	49.3	45.5	73.5	30.0	**Yes**

Six bedrooms/living spaces on the second floor will feature improved glazing and 16 will feature an alternative means of ventilation in order to meet both ventilation and internal ambient noise criteria. Alternative ventilation can be provided in several ways from acoustic trickle vents (which need to have the same acoustic performance as the glazing), other passive ventilation systems or mechanical ventilations systems.

2.4 Noise Intrusion Assessment for 3rd Floor Residential

2.4.1 Noise Intrusion L_{Aeq} Daytime and Night-Time and L_{Amax} Glazing Requirements

Internal noise levels, at all the third floor residential bedrooms/living spaces of the proposed development, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of a glazing with a sound reduction of 30 dB has been used unless stated otherwise. A room location plan for the third floor is shown within SK02 of Appendix B.

Where the relevant internal ambient noise level criteria are not met with standard double glazing (sound reduction 30 dB) then glazing with greater sound reduction properties have been specified (bold text) accordingly in Table 2.4.

The glazing and ventilation strategy has been designed to achieve WHO/BS 8233 internal L_{Aeq} daytime noise level criteria of 35 dB and internal night-time L_{Aeq} noise level criteria (30 dB) with windows closed. The glazing specifications would also meet the L_{Amax} criteria of 45 dB with windows closed.

Table 2.4 Noise Intrusion Levels L_{Aeq} and L_{Amax} 3rd Floor Residential

Location	Daytime External L_{Aeq}	Night-Time External L_{Aeq}	External L_{Amax}	Required Glazing Specification (SRI) to Achieve 35 dB L_{Aeq} day, 30 dB L_{Aeq} night and L_{Amax} 45 dB	Alternative Ventilation Required?
Third Floor 01	68.0	65.1	86.4	**36.0**	**Yes**
Third Floor 02	70.1	67.2	90.2	**46.0**	**Yes**
Third Floor 03	67.8	65.0	86.1	**35.0**	**Yes**
Third Floor 04	57.8	55.7	76.2	**32.0**	**Yes**
Third Floor 05	57.3	55.3	75.6	**31.0**	**Yes**
Third Floor 06	56.7	54.7	74.8	30.0	**Yes**
Third Floor 07	56.5	54.4	74.2	30.0	**Yes**
Third Floor 08	54.2	45.2	68.2	30.0	**Yes**
Third Floor 09	53.9	44.8	67.9	30.0	**Yes**
Third Floor 10	54.7	47.5	68.7	30.0	**Yes**
Third Floor 11	55.0	48.0	69.1	30.0	**Yes**
Third Floor 12	55.2	48.7	71.0	30.0	**Yes**
Third Floor 13	53.2	50.6	75.8	30.0	**Yes**
Third Floor 14	49.9	46.7	73.8	30.0	**Yes**
Third Floor 15	47.2	44.0	72.1	30.0	**Yes**
Third Floor 16	54.9	51.3	78.6	30.0	**Yes**

Five bedrooms/living spaces on the third floor will feature improved glazing and 16 will feature an alternative means of ventilation in order to meet both ventilation and internal ambient noise criteria. Alternative ventilation can be provided in several ways from acoustic trickle vents (which need to have the same acoustic performance as the glazing), other passive ventilation systems or mechanical ventilations systems.

2.5 Noise Intrusion Assessment for 4th Floor Residential

2.5.1 Noise Intrusion L_{Aeq} Daytime and Night-Time and L_{Amax} Glazing Requirements

Internal noise levels, at all the fourth floor residential bedrooms/living spaces of the proposed development, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of a glazing with a sound reduction of 30 dB has been used unless stated otherwise. A room location plan for the fourth floor is shown within SK03 of Appendix B.

Where the relevant internal ambient noise level criteria are not met with standard double glazing (sound reduction 30 dB) then glazing with greater sound reduction properties have been specified (bold text) accordingly in Table 2.5.

The glazing and ventilation strategy has been designed to achieve WHO/BS 8233 internal L_{Aeq} daytime noise level criteria of 35 dB and internal night-time L_{Aeq} noise level criteria (30 dB) with windows closed. The glazing specifications would also meet the L_{Amax} criteria of 45 dB with windows closed.

Table 2.5 Noise Intrusion Levels L_{Aeq} and L_{Amax} 4th Floor Residential

Location	Daytime External L_{Aeq}	Night-Time External L_{Aeq}	External L_{Amax}	Required Glazing Specification (SRI) to Achieve 35 dB L_{Aeq} day, 30 dB L_{Aeq} night and L_{Amax} 45 dB	Alternative Ventilation Required?
Fourth Floor 01	69.2	66.2	86.6	**37.0**	**Yes**
Fourth Floor 02	68.6	65.7	86.2	**36.0**	**Yes**
Fourth Floor 03	52.3	47.3	70.3	30.0	**Yes**
Fourth Floor 04	52.6	48.0	69.8	30.0	**Yes**
Fourth Floor 05	53.0	48.7	70.1	30.0	**Yes**
Fourth Floor 06	53.2	48.9	71.0	30.0	**Yes**
Fourth Floor 07	56.3	53.8	77.7	30.0	**Yes**
Fourth Floor 08	53.1	50.1	75.8	**34.0**	**Yes**
Fourth Floor 09	58.7	55.3	78.9	**34.0**	**Yes**

Four bedrooms/living spaces on the fourth floor will include improved glazing and nine will feature an alternative means of ventilation in order to meet both ventilation and internal ambient noise criteria. Alternative ventilation can be provided in several ways from acoustic trickle vents (which need to have the same acoustic performance as the glazing), other passive ventilation systems or mechanical ventilations systems.

2.6 Sound Insulation Requirements

2.6.1 Floors

Condition 17a requires that the sound insulation details for the floor separating the residential apartments on the first floor from the commercial property on the ground floor in respect to airborne and impact noise be provided.

In accordance with Approved Document E (ADE), only floors that separate residential properties need to be insulated against impact noise. Therefore as the floor specified is between the commercial property and the residential apartments there is no need to state a sound impact level in terms of $L'_{nT,w}$. Despite this, an assessment of the $L'_{nT,w}$ has been completed and the proposed construction is predicted to achieve 49 dB $L_{nT,w}$. This is well above the criteria for residential partitions and is considered sufficient to attenuate impact noise from the accommodation on the first floor to the commercial property on the ground floor.

The floor is still subject to airborne noise criteria, which is predicted to meet the requirement of Condition 17a as it achieves a calculated D'_{nTw} of 65dB, 20 dB above the ADE criteria.

2.6.2 Partitions

Condition 17a requires that the sound insulation details for the walls separating the residential apartments from neighbouring properties in the adjacent buildings area is provided.

The sound insulation values of the walls (in $D_{nT,w}$) are required to be enhanced by at least 20dB over the values in the Building Regulations i.e. 65 dB $D_{nT,w}$. SK06 to SK07 in Appendix B show the requirements using the enhanced Building Regulations further adjusted to take into account the room volume of the adjacent room along with its proposed construction.

The wall types that form the partition with the adjacent building and their respective calculated R_w values are shown in Table 2.6 below.

Table 2.6 Proposed Wall Build-Ups Between Neighbouring Property and Proposed Development

Reference	Proposed wall type	R_w dB from proposed wall	D_{nTw} dB of proposed wall	D_{nTw} dB from existing party wall	Overall D_{nTw} dB existing +proposed
EWS 04	140mm Blockwork + Internal Insulation	55	55	>10	>65
EWS 05	100mm Blockwork Cavity Wall + Cavity Insulation	56	55	>10	>65

Table 2.6 demonstrates that the sound insulation performance of the proposed walls is 10 dB above the requirements of ADE. As Condition 17a requires the separating partition wall between the proposed flats and neighbouring property to exceed the ADE requirement of 45 dB $D_{nT,w}$ it is considered that the existing neighbouring property wall will provide well above the additional 10 dB required to achieve a 65 dB $D_{nT,w}$ rating.

SK05 in Appendix B shows the build-up of the partitions, SK06 and SK07 are Insul output drawings indicating the predicted Rw of the partitions reviewed in Table 2.6 above.

This shows that Condition 17a will be met and therefore can be discharged.

Appendices

Appendix A – Acoustic Terminology and Abbreviations

An explanation of the specific acoustic terminology referred to within this report is provided below.

dB — Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) — Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} — Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00 - 23:00}$.

L_{Amin} — The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} — The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n — Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w — The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Appendix B – Sketches

SK01 Ground, First and Second Floor Receptor and Facades Requiring Enhanced Glazing

SK02 Third Floor Receptor and Facades Requiring Enhanced Glazing

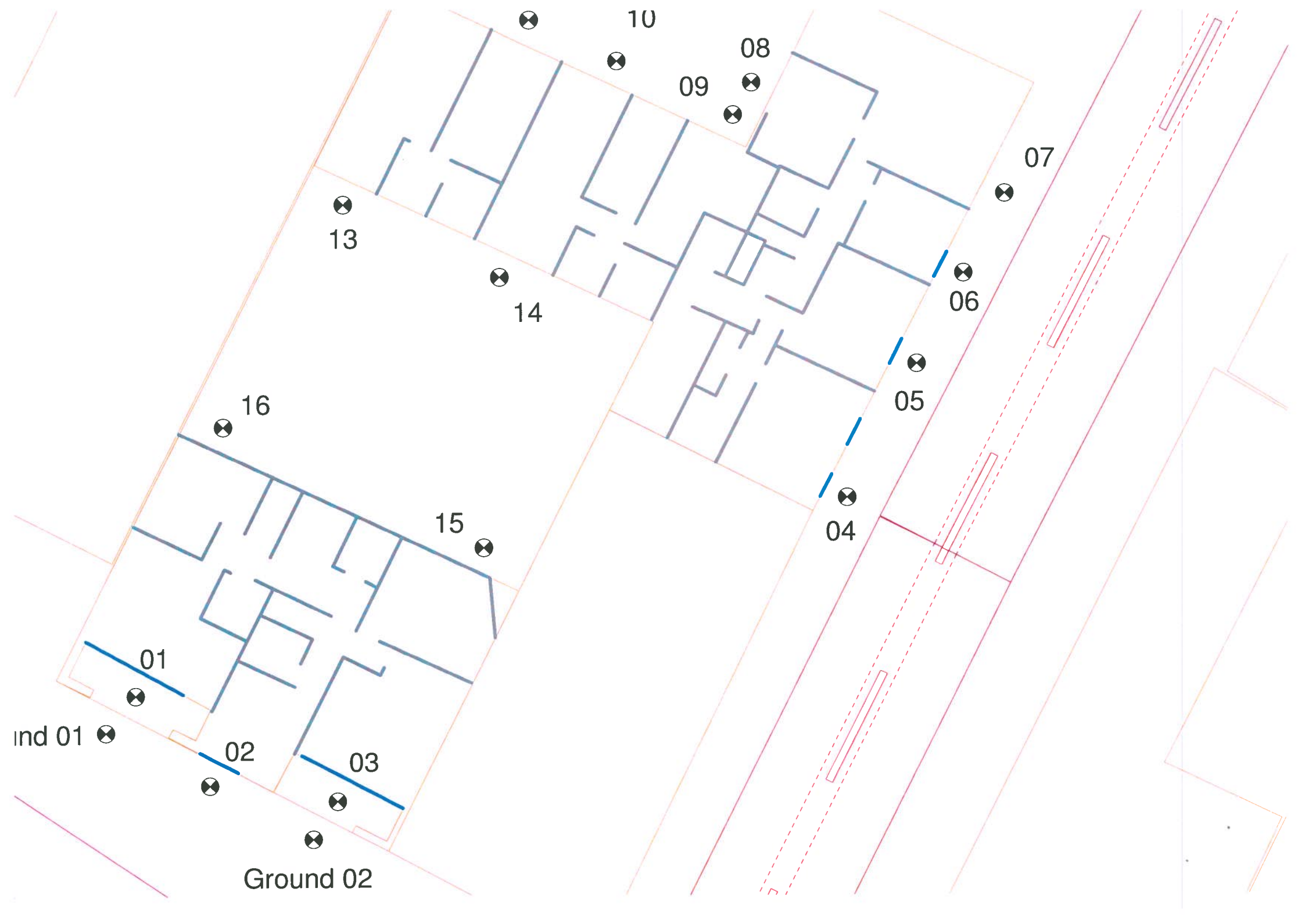
SK03 Fourth Floor Receptor and Facades Requiring Enhanced Glazing

SK04 Minimum Sound Insulation Requirements – Partitions (First Floor)

SK05 21st Architecture Drawing No 177_EWS_00 – External Wall Systems

SK06 Partition EWS-04

SK07 Partition EWS-05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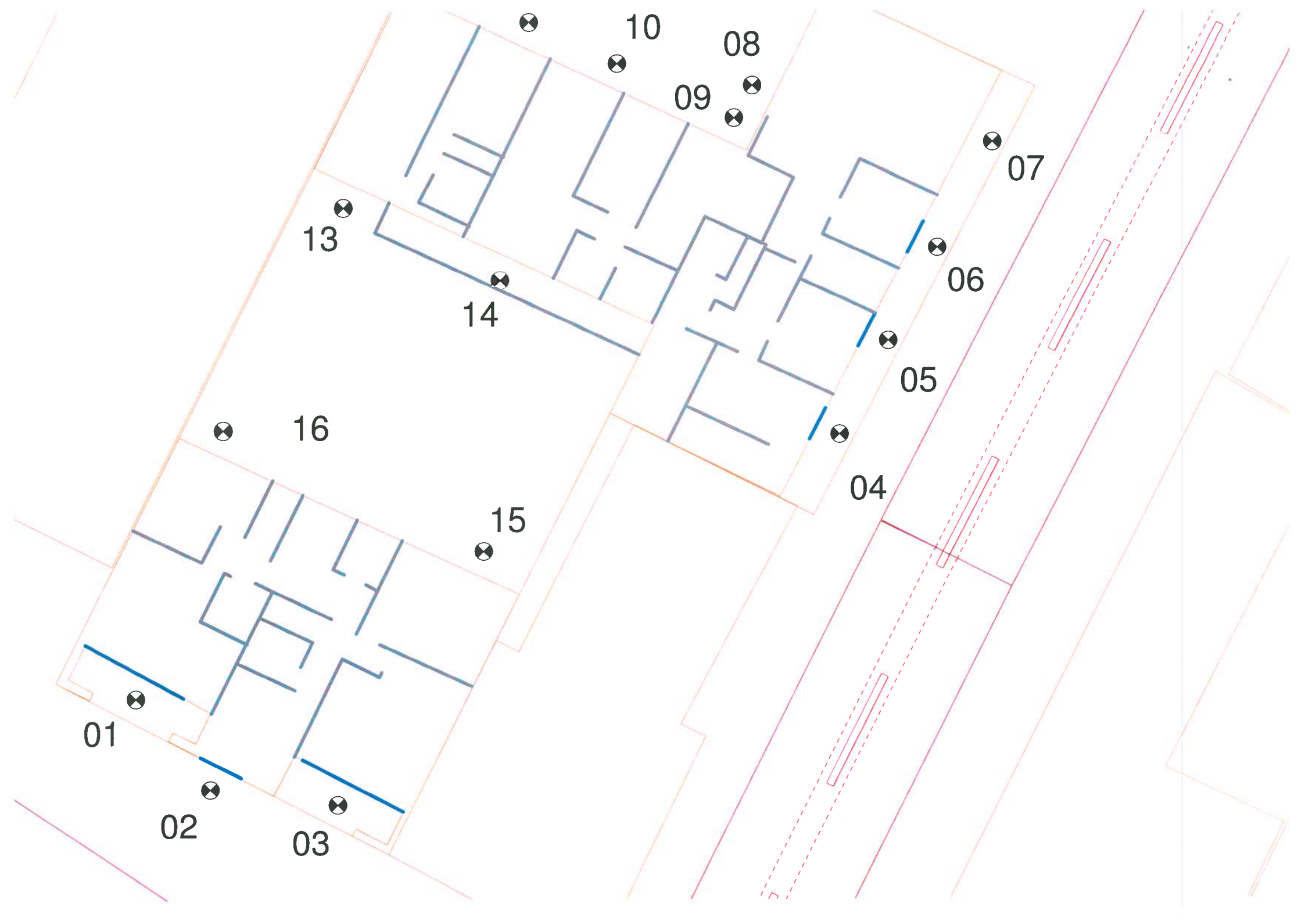
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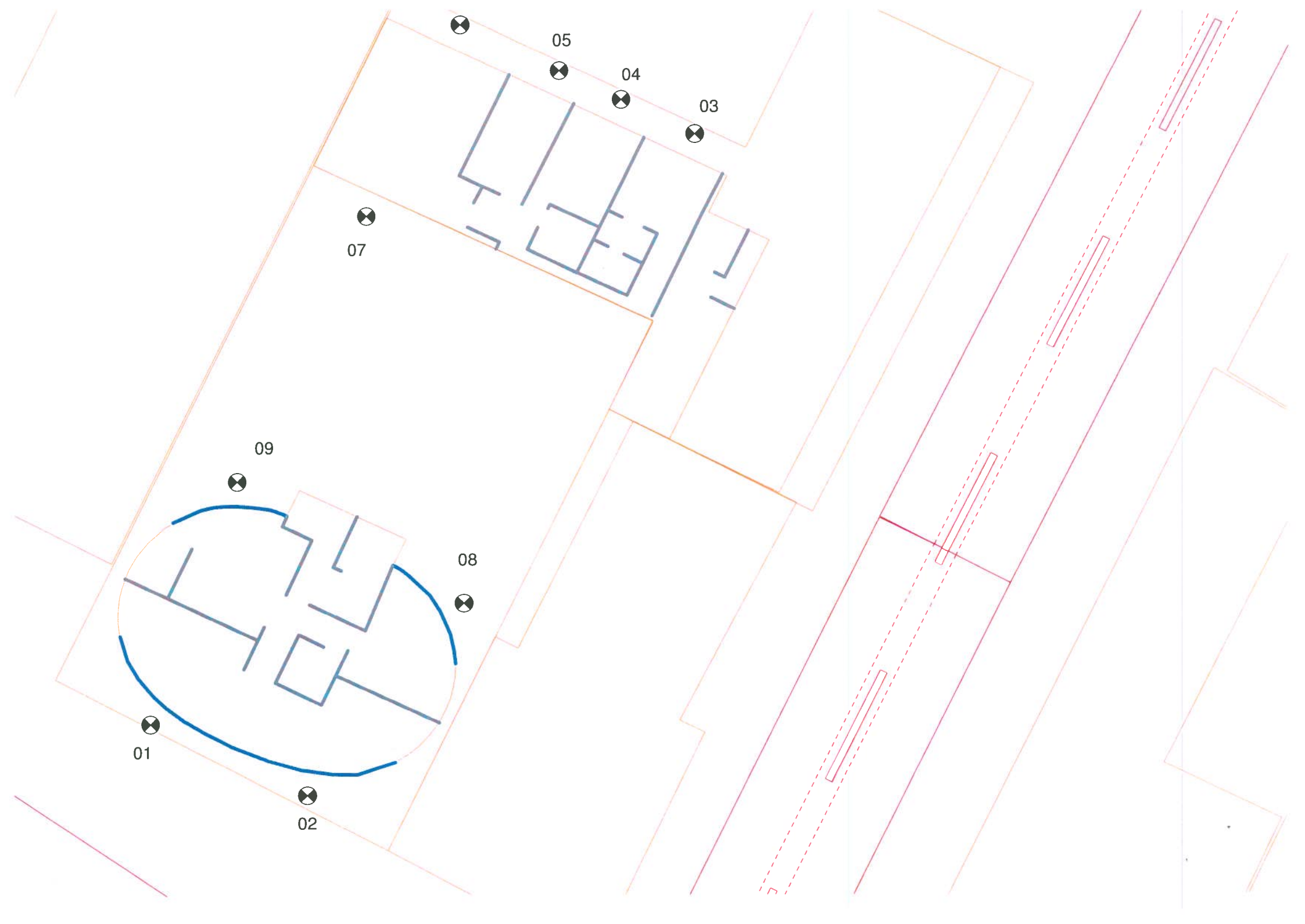
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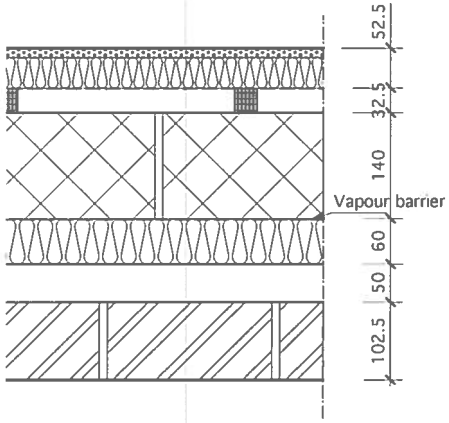
ckwork 140mm/110mm cavity

EWS-05 Blockwork- Doubleskin cavity wall+fulifill cavity insulation

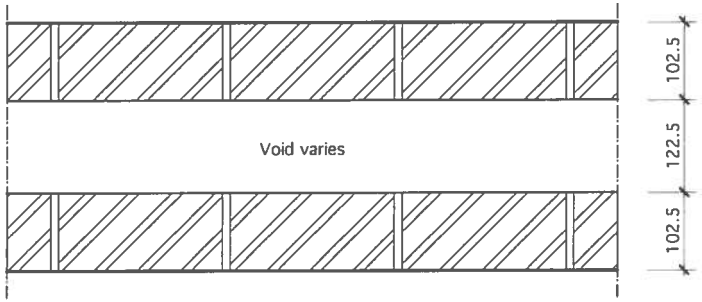
1:5 @ A1, 1:10 @ A3

EWS-09 Aluminium Rainscreen to lift shaft - 200mm cavity

1:5 @ A1, 1:10 @ A3

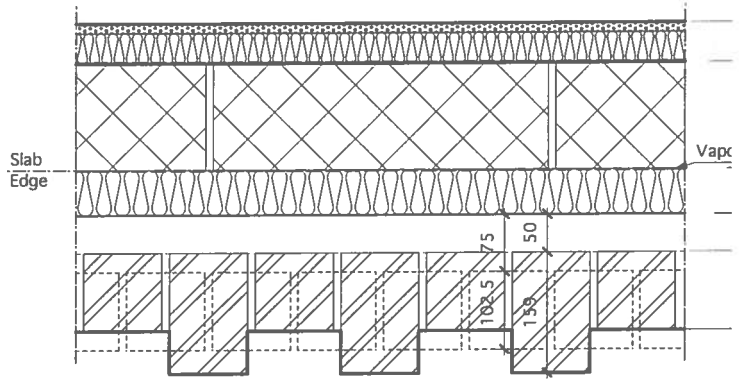


ockwork 140mm/110mm Cavity
200mm thick column



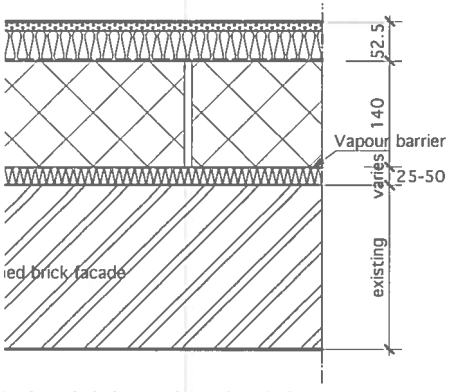
EWS-06 Brickwork- 1st-3rd Floor/Double skin Brick wall

1:5 @ A1, 1:10 @ A3

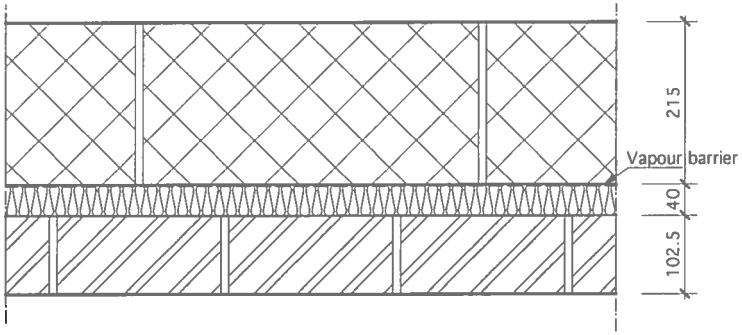


EWS-10 Brick Feature wall - 1st-3rd Floor/ blockwork 140mm + 110-135mm cavity

1:5 @ A1, 1:10 @ A3



lockwork 140mm + Inner insulation



EWS-07 Brickwork- 1st-4th Floor/Lift shaft wall

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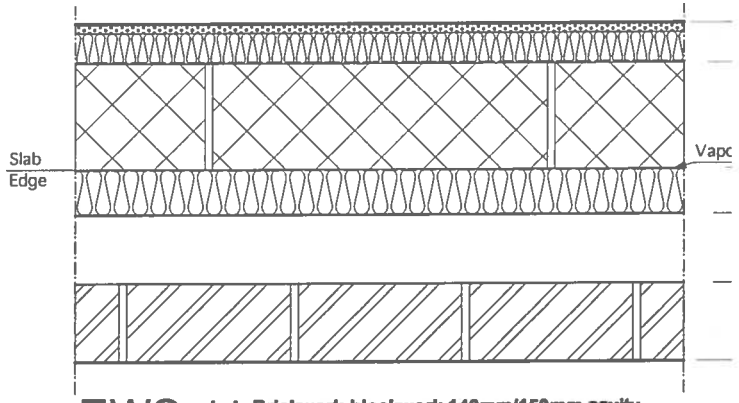

EWS-11 Brickwork-blockwork 140mm/150mm cavity

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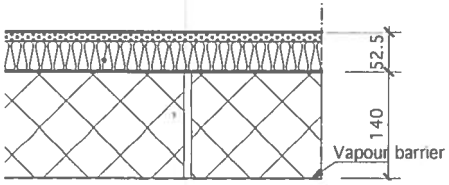

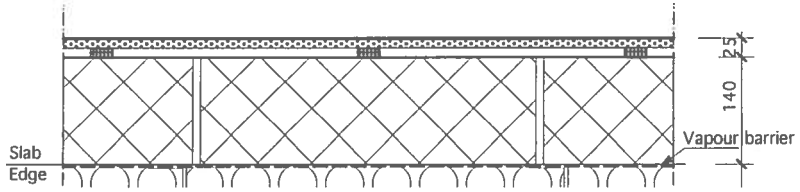

Sound Insulation Prediction (v7.0.6)

- Key No. 1508

Margin of error is generally within Rw +/- 3 dB

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Date: 16 May 16

Initials:AJN

EWS-04

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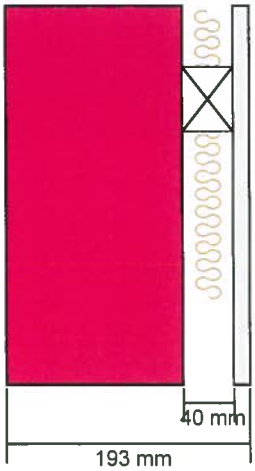


Rw	55 dB
C	-2 dB
C_{tr}	-7 dB

System description

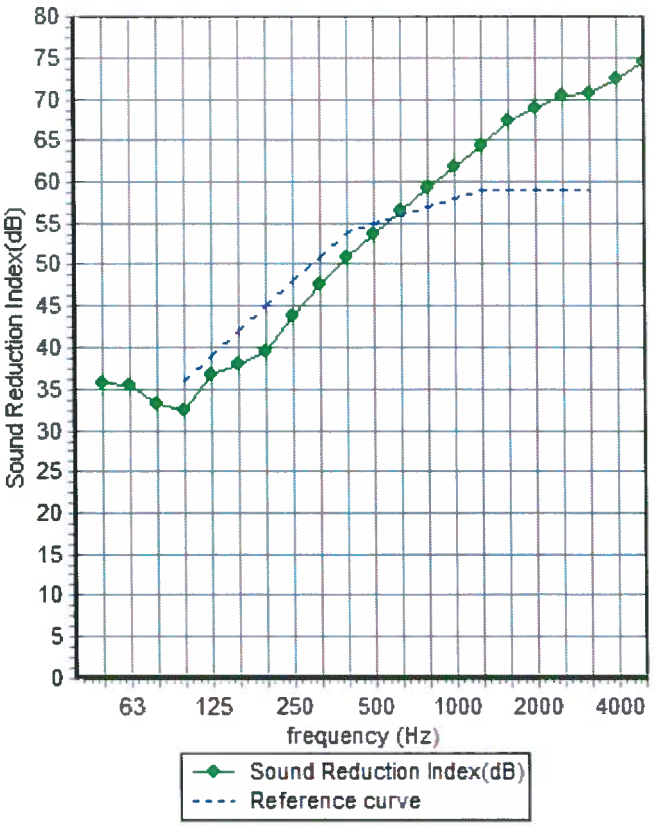
Panel 1 Outer layer: 1 x 140.0 mm Brick- (m=224.0 kg/m2, fc=196 Hz, Damping=0.00) Profile

Cavity: Timber stud @ 600 mm , Infill Sound absorber Thickness 26 mm
Panel 2 Inner layer: 1 x 12.5 mm Gyproc Wallboard 12.5mm- (m=8.0 kg/m2, fc=3263 Hz, Damping=0.01) Profile

Mass-air-mass resonant frequency =91 Hz

frequency (Hz)	TL(dB)	TL(dB)
50	36	
63	35	35
80	33	
100	32	
125	37	35
160	38	
200	39	
250	44	42
315	48	
400	51	
500	54	53
630	56	
800	59	
1000	62	61
1250	64	
1600	67	
2000	69	69
2500	70	
3150	71	
4000	72	72
5000	74	

Panel Size 2.7x4 m



Sound Insulation Prediction (v7.0.6)

- Key No. 1508

Margin of error is generally within Rw +/- 3 dB

Job Name:Marine Ices

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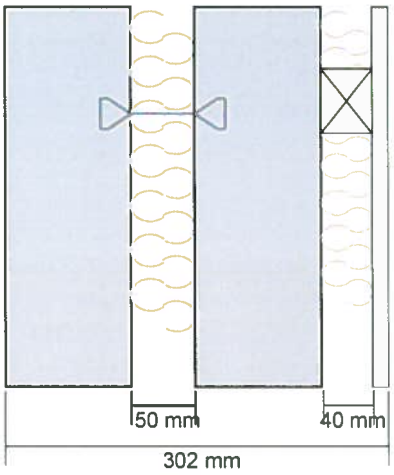
EWS-05

File Name: EWS-05.ixl



Rw	56 dB
C	-2 dB
C_{tr}	-5 dB

System description

Panel 1 Outer layer: 1 x 100.0 mm Aerated Concrete Block- (m=57.6 kg/m2, fc=312 Hz, Damping=0.01) Profile

Cavity: Butterfly Tie @ 600 mm , Infill Sound absorber Thickness 50 mm
Panel 2 Inner layer: 1 x 100.0 mm Aerated Concrete Block- (m=57.6 kg/m2, fc=312 Hz, Damping=0.01) Profile

Cavity: Timber stud @ 600 mm , Infill Sound absorber Thickness 40 mm
Panel 3 Inner layer: 1 x 12.5 mm Gyproc Wallboard 12.5mm- (m=8.0 kg/m2, fc=3263 Hz, Damping=0.01) Profile

Mass-air-mass resonant frequency =48 Hz , 113

Panel Size 2.7x4 m

frequency (Hz)	TL(dB)	TL(dB)
50	15	
63	27	20
80	33	
100	37	
125	43	40
160	43	
200	45	
250	46	45
315	45	
400	48	
500	51	50
630	53	
800	56	
1000	58	57
1250	60	
1600	63	
2000	64	64
2500	64	
3150	64	
4000	65	65
5000	67