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ACOUSTICS PLUS

Proposed Installation Of New Lift System

66-66A Goodge Street, London, W1T 4NG

Environmental Noise Assessment

March 2013

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Proposed Installation of New Lift System	
Project Address:	66-66A Goodge Street, London W1T 4NG
Project Reference:	102405

Issue/Revision Record			
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	Signature:	**Print:**	**Title:**	**Date:**
Author:		**Andy Dodd**	**Consultant**	**12/03/2013**
Reviewer:		**Phil Huffer**	**Principal Consultant**	**12/03/2013**

1. INTRODUCTION

1.1 Acoustics Plus Ltd (APL) is an independent firm of multi-disciplinary acoustic engineers. APL is engaged by both private and public sector clients. APL is a registered member of The Association of Noise Consultants and the author is a corporate member of The Institute of Acoustics.

1.2 APL has been instructed by the Applicant's agent, Metropolitan Development Consultancy (MDC), to consider and advise upon the noise implications of its proposal to install a new lift system at the rear of an existing commercial / residential development.

1.3 It is understood the Local Planning Authority (LPA)may require further information on noise levels from the proposed installation in order to consider the proposal further. This report provides the response to the LPA, on behalf of the Applicant.

2. BASELINE SITUATION

2.1 The Application Site (the "site") is located at 66-66A Goodge Street, London, W1T 4NG.

2.2 The site is an existing six storey building. The lower ground and ground floor levels are to be used for commercial use (Class A1 / A2) and the remaining storeys above are to be used exclusively for residential purposes.

2.3 We understand the proposal is to install a new lift system towards the rear boundary the site adjacent to an existing light well and the rear façade of 64 Goodge Street.

2.4 The position of the lift shaft is shown in Diagram 1 below:

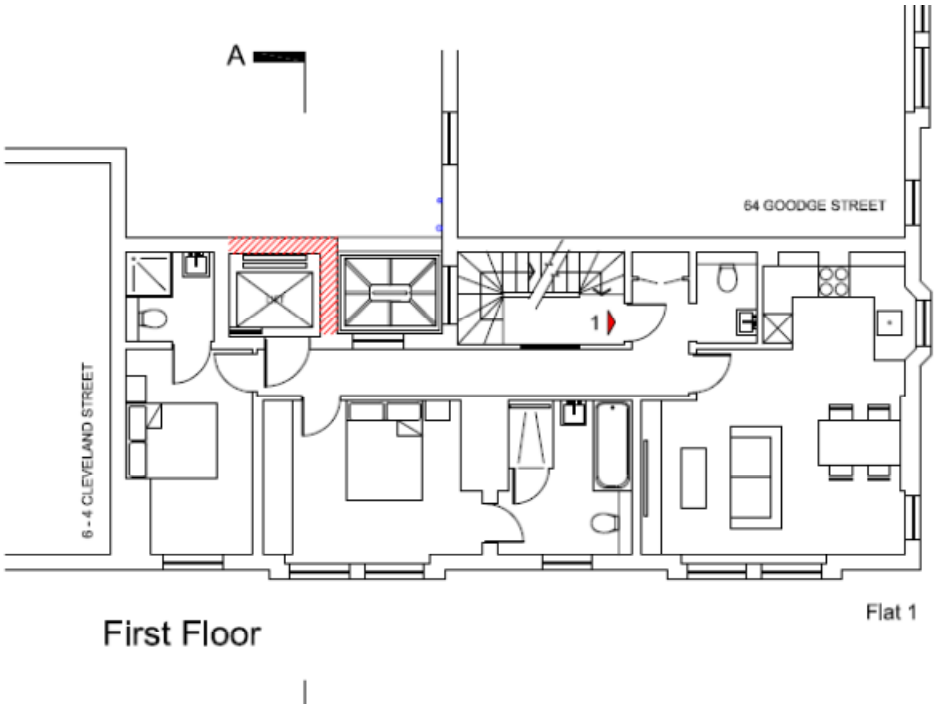

Diagram 1

2.5 The lift motor will not be mounted to the existing building structure but attached to the new structure forming the lift shaft; the motor will be acoustically isolated from the lift shaft structure by the use of anti-vibration mountings. APL was not responsible for the selection of these mounts but has been assured by the lift installer Swallow Lifts that the 'Sylomer' mountings and guiderail brackets proposed are extremely effective at controlling the transmission of vibration.

2.6 We understand the LPA's requirements are detailed within the council's Local Development Framework; Camden Development Policies 2010-2025 policy DP 28 'Noise and vibration' which states:

DP28 – Noise and vibration

The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) development likely to generate noise pollution; or

b) development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.

Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.

The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds.

The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact.

2.7 From previous discussions with Enforcement Officers at the London Borough of Camden, ensuring that the noise egress from lift operations do not result in levels within adjacent residential spaces greater than a level of LAeq 30dB, will ensure the amenity of residents are protected.

2.8 It is the intention of this report to identify the level of noise produced within the lift shaft and provide recommendations of sound insulation if required.

3. NOISE OUTLINE

3.1 In order to produce a recommendation of sound insulation, consideration must be given to the noise levels within the lift shaft.

3.2 The proposed lift is specified as a Felesa Supa Flight SF61; (6 person / 450Kg).

3.3 Measurements of airborne noise could not be obtained within the lift shaft as the system is yet to be installed. Measurement data was obtained from the manufacturer 'Felesa' (data sheet is contained within Appendix A) and this was compared to measurements of lift motor room noise obtained during a previous assessment to provide an indicative guide to the octave band noise produced by lift movements.

3.4 The measurements obtained within a lift motor room are presented in Table 1.

Duration (secs.)	L_{eq} Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
34	58	62	79	73	63	61	54	54	74

Table 1

3.5 The measurement data obtained within a lift motor room has been amended to match the measured noise contours to the worst case published noise egress levels of the proposed lift system of $L_{pa,Max}$ 64 dBA, this amended noise data is shown in Table 2 below:

$L_{pa,Max}$	L_{eq} Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
-	48	52	69	63	53	51	44	44	64

Table 2

4. NOISE ASSESSMENT

4.1 Further to the guidance contained within the LPA's Development Policy No.28 in regard of protecting the future amenity of occupants of 66-66A Goodge Street and the surrounding residential facades. The guidance is to ensure that the level within any room adjacent to the lift system does not exceed a level of LAeq 30dB over the duration of any lift activity.

4.2 There are two distinct noise impacts to consider;

(a) Internal residential dwellings within 66-66A Goodge Street,

(b) External residential dwellings surrounding the proposed site of the lift shaft.

Impact A

4.3 In order to calculate the expected level adjacent to the proposed lift system, consideration was given to Equation 1:

$$L_{p1} - L_{p2} = R - 10\text{Log}S + 10\text{Log}\,A$$

where :

L_{p1} is the average level in the source room

L_{p2} is average level in the receive room

S is area of partition (m^2)

A is the absorption in receiving room (m^2)

Equation 1

4.4 In order to consider the worst case scenario, the maximum value from the published data obtained from the manufacturer 'Felesa' from impulsive lift system movements has been used used in the calculation exercise (see Table 2 and the manufacturer's data sheet contained within Appendix A).

4.5 Given the considered noise level within the lift shaft, the Applicant's agent MDC has provided details for the likely external wall construction.

4.6 The construction is believed to be as follows:

(a) 255mm brickwork

4.7 The octave band sound transmission figures for the above construction is shown in Table 3. These values were extracted from published data.

Construction Type	Octave Band Centre Frequency (Hz)								R_w
	63	125	250	500	1k	2k	4k	8k	
255mm brickwork	34	41	45	48	56	65	69	72	-

Table 3

4.8 For the purposes of the calculation, it was assumed that, when occupied, the residential dwelling will have normal furnishings and hence it was assumed that each room would have a reverberation time of 0.5 seconds (as per BS 140-4:1998 – Measurement of sound insulation in buildings and of building elements).

4.9 The surface area of the affected party wall was measured from scaled drawings supplied by the applicant's agent MDC. The measured surface area is reported below:

(a) Party wall north-east of proposed lift shaft– 1.8m x 2.6m.

(b) Volume of adjacent space = 1.8 x 1.8 x 2.6 = 8.1 m^3

4.10 From the information provided above, the anticipated level within the adjacent residential space was calculated using equation 1. This calculated level is based on the assumed worst case impulsive lift movement data provided by the manufacturer Felesa and is reported in Table 4 below:

Inside adjacent residential space	L_p Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
	17	14	27	18	0	0	0	0	**20**

Table 4

Impact B

4.11 In considering the propagation of noise from the proposed lift shaft, consideration was given to the following equation.

$L_{p2} = L_{p1} – R – 6$

Where L_{p1} is the sound pressure level on the source side of the lift shaft
L_{p2} is the sound pressure level close to the lift shaft on the outside

R is the sound reduction index of the lift shaft wall construction

Equation 2

4.12 In order to consider the worst case scenario, the maximum value from the published data obtained from the manufacturer 'Felesa' from impulsive lift system movements has been used in the calculation exercise (see Table 2 and the manufacturer's data sheet contained within Appendix A)

4.13 Given the considered noise level within the lift shaft, the Applicant's agent MDC has provided details for the proposed lift shaft construction.

4.14 The proposed construction is as follows:

(a) 200mm dense concrete block work (density >1900 Kg/m^3)

4.15 The octave band sound transmission figures and overall R_w for the above construction are shown in Table 5. These values were extracted from published data.

Construction Type	Octave Band Centre Frequency (Hz)								R_w
	63	125	250	500	1k	2k	4k	8k	
200mm blockwork	38	42	46	50	57	60	65	65	55

Table 5

4.16 From the information provided above, the anticipated level just outside the lift shaft was calculated using equation 2. This level is based on the assumed worst case impulsive lift movement data provided by the manufacturer Felesa.

Outside of lift shaft wall	L_p Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
	4	4	17	7	0	0	0	0	**10**

Table 6

4.17 From the resultant level provided above, the calculated level of 10dBA outside of the lift shaft would be further mitigated by distance attenuation and a further reduction of 15dB due to the attenuation provided by an open window, as detailed in the excerpt from World Health Organisation document 'Guidelines for Community Noise' below:

"At night-time, outside sound levels about 1metre from facades of living spaces should not exceed 45 dB LAeq, so that people may sleep with bedroom windows open. This value was obtained by assuming that the noise reduction from outside to inside with the window open is 15 dB"

5. CONCLUSION

5.1 The foregoing assessment indicates that using the structure types itemised in paragraphs 4.6 and 4.14, a high level of sound insulation can be achieved, such that the requirements imposed by the LPA can be met.

5.2 Given the findings of the assessment exercise, we are of the opinion that further sound insulation measures will not be necessary.

5.3 Notwithstanding the above, given the high levels of sound insulation expected from the proposed 200m block work wall to form the new lift shaft, close attention should be paid during the construction phase. Poor workmanship of such a structure could have significant deleterious effects.

5.4 Particular importance is attached to the density of the separating structure proposed in paragraph 4.14 and unless checked a substitute block that has an inferior density to that specified should not be used.

Drawings

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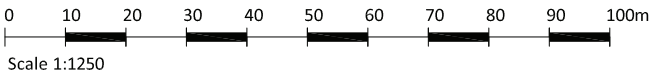
SITE LOCATION PLAN



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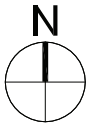
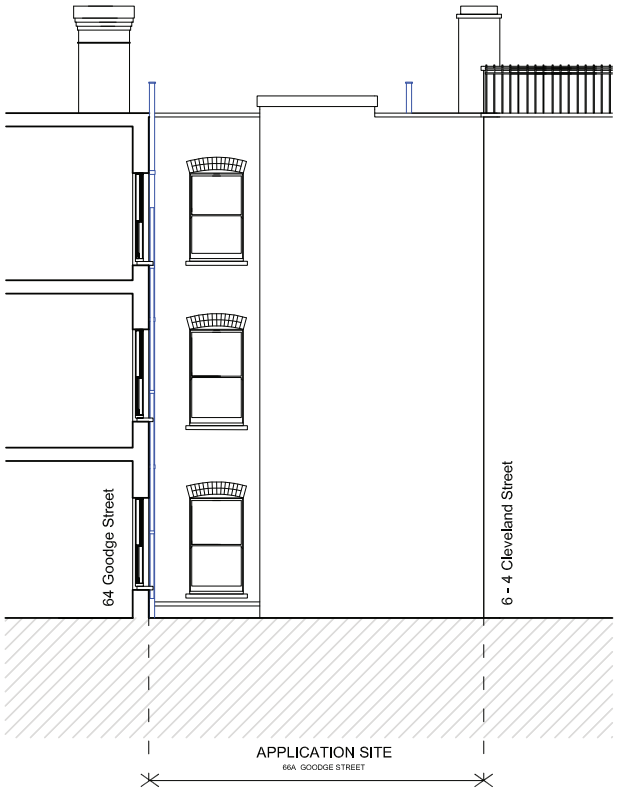


EXISTING

Rear Elevation

PROPOSED



Rear Elevation

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REV A Amendments
note

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client
PLANNING

drawing
EXISTING & PROPOSED
REAR ELEVATION

drawn	checked	date
KS	JE	25.02.2013

scale	@	paper size
1:100	@	A3

drawing no
7753 / 37 A

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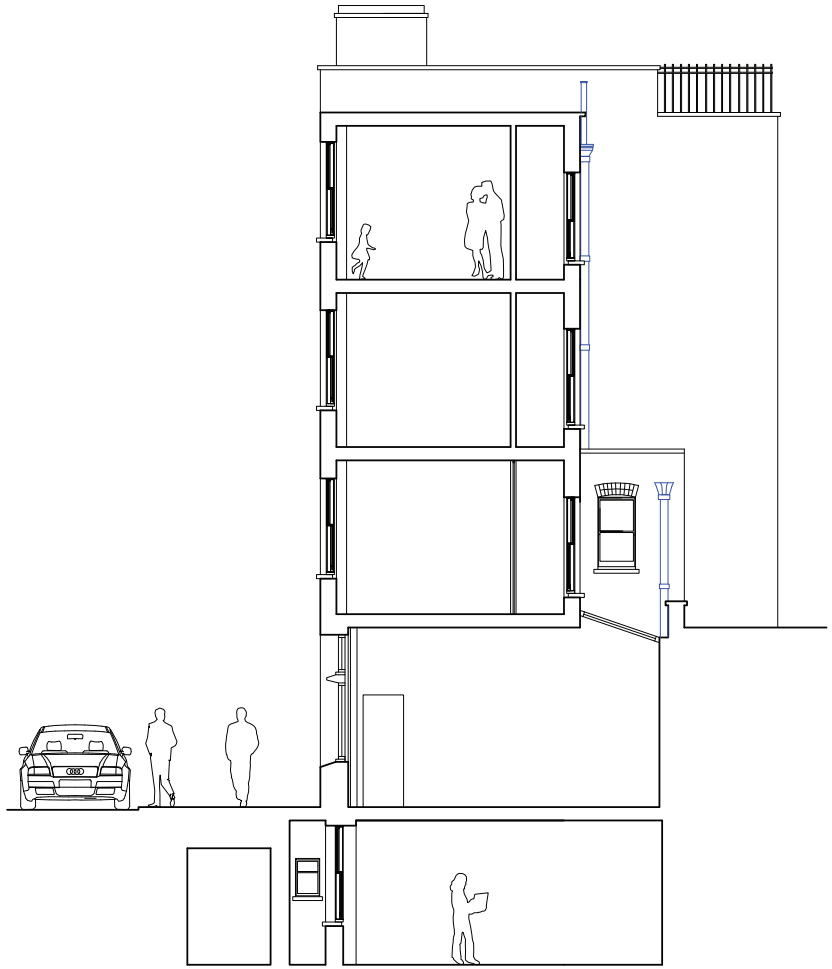
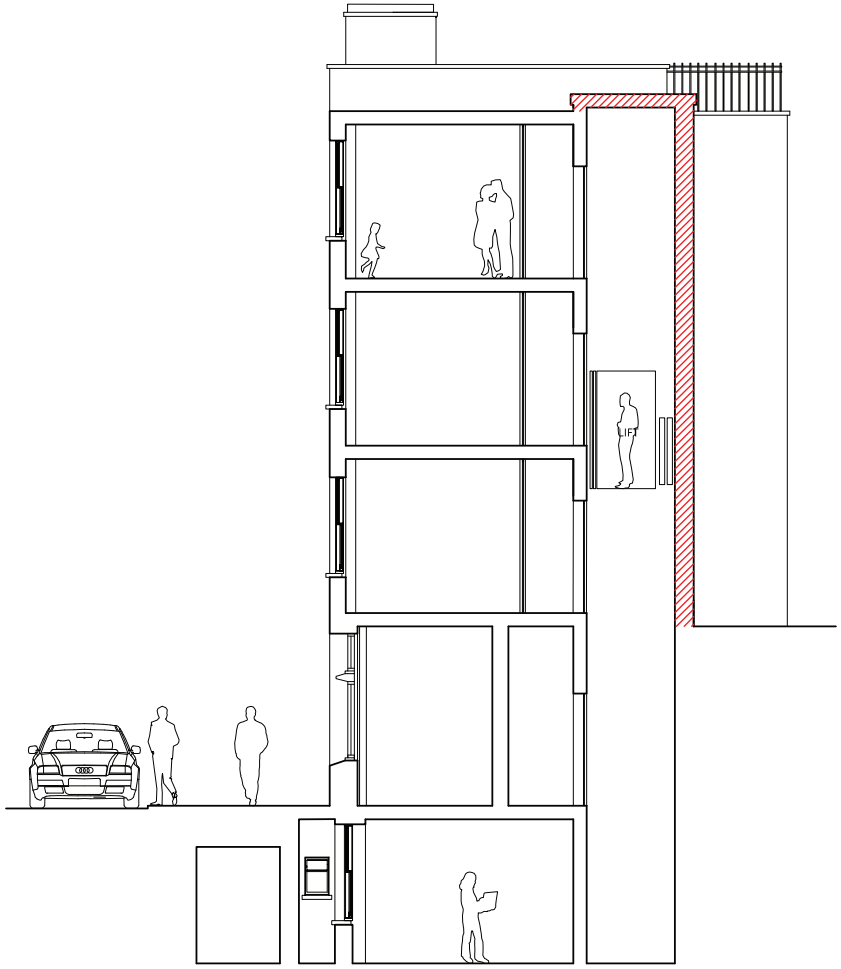


Section A-A

PROPOSED



Section A-A

NEW EXTERNAL CONSTRUCTION

0 1 2 3 4 5
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REV A Amendments
note

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drawing
EXISTING & PROPOSED
SECTION

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KS	JE	25.02.2013

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PLANNING

drawing no 7753 / 36 A

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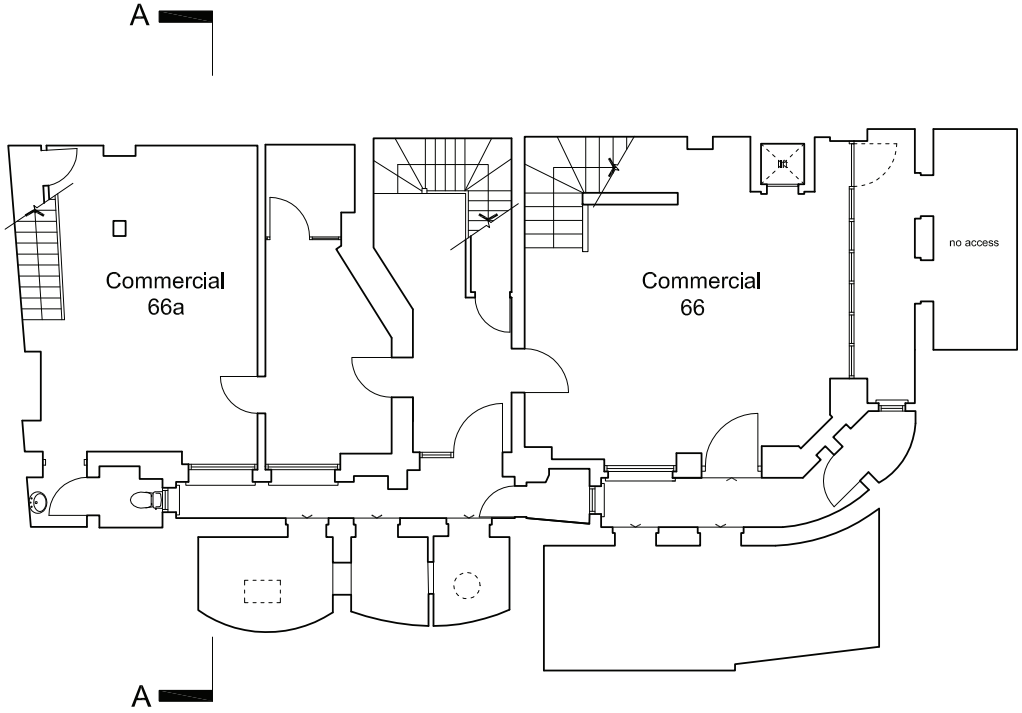
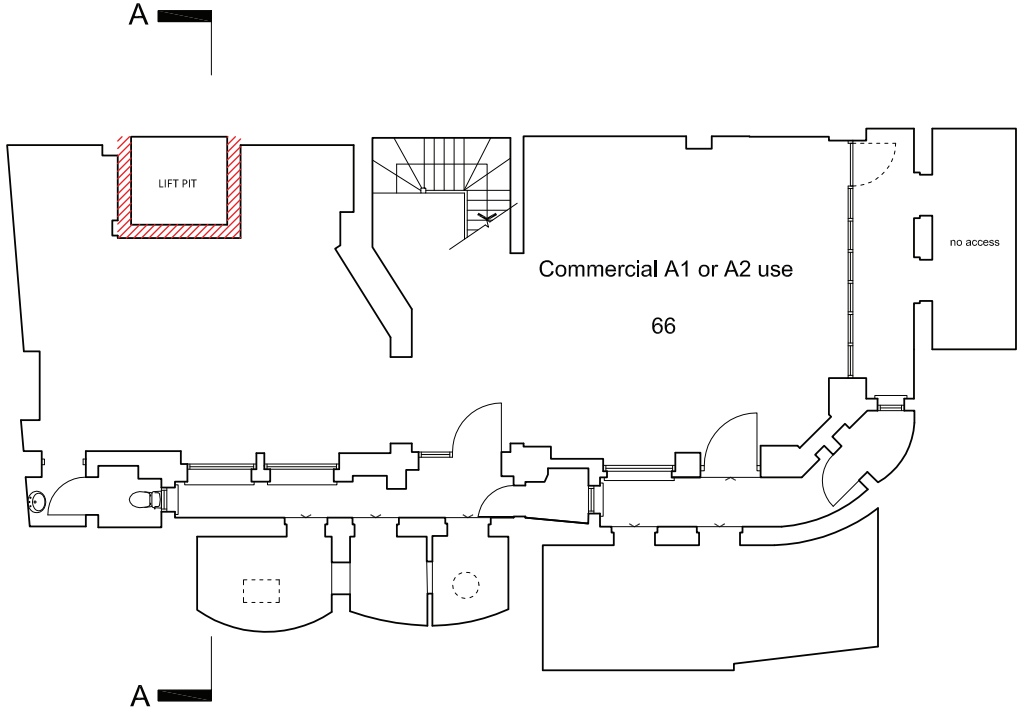


Lower Ground Floor

PROPOSED



Lower Ground Floor

NEW CONSTRUCTION

0 1 2 3 4 5
scale

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drawing
EXISTING & PROPOSED
LOWER GROUND FLOOR PLANS

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KS	JE	26.02.2013

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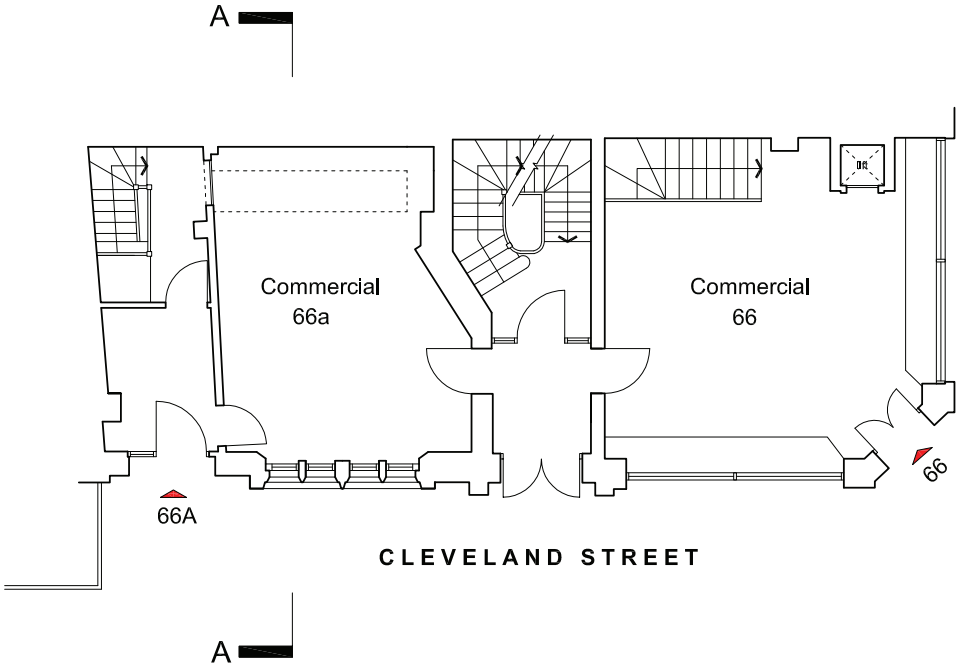
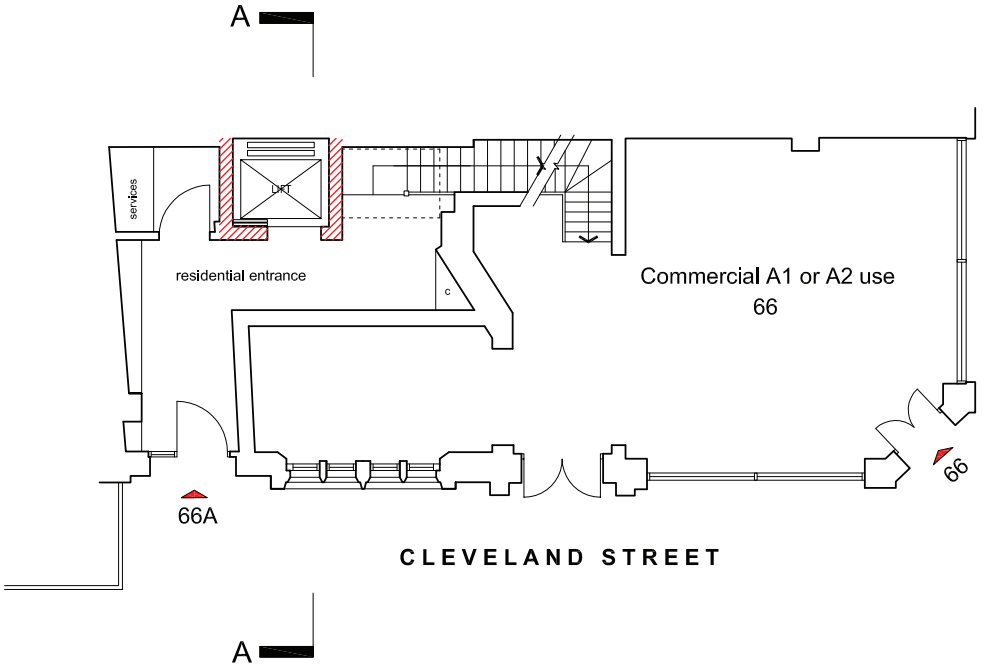
drawing no 7753 / 31 A

EXISTING



Ground Floor

PROPOSED



Ground Floor

NEW CONSTRUCTION

0 1 2 3 4 5
scale

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drawing
EXISTING & PROPOSED
GROUND FLOOR PLAN

drawn	checked	date
KS	JE	26.02.2013

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drawing no 7753 / 32 A

PLANNING

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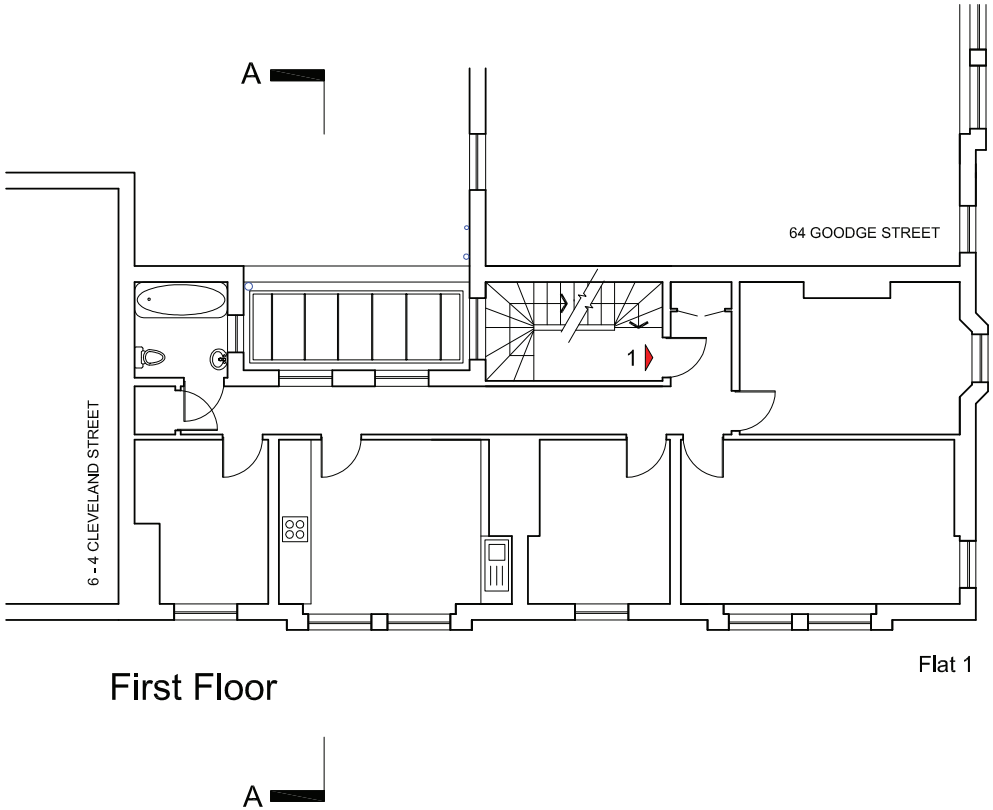

Flat 1

First Floor

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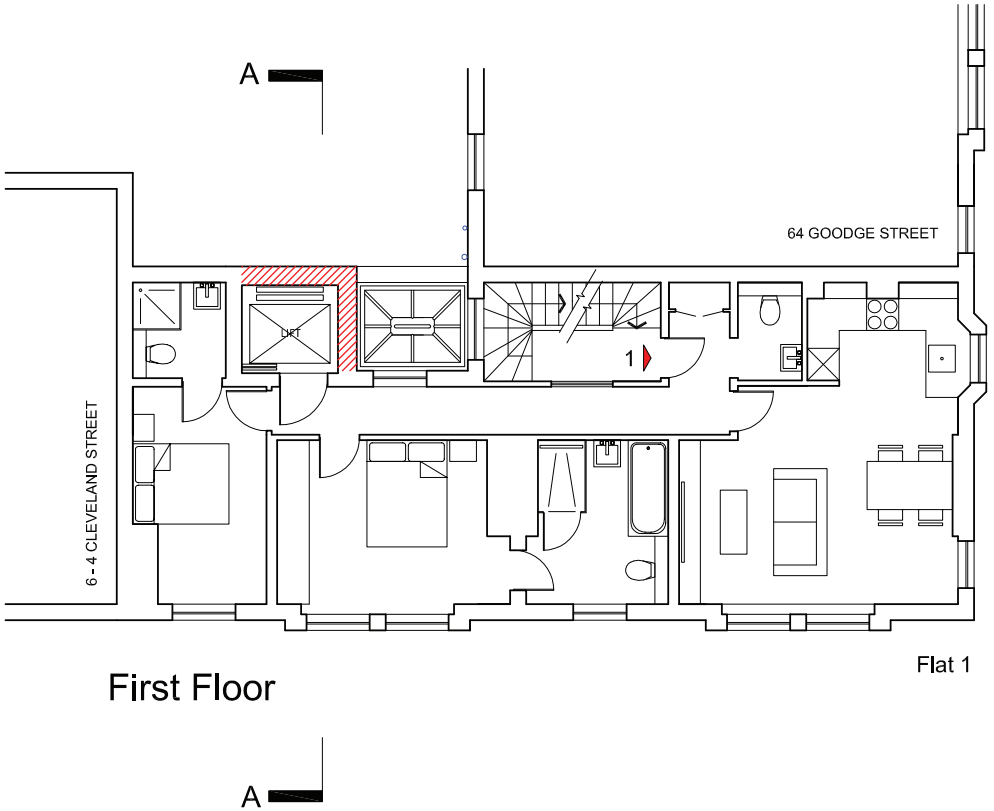

Flat 1

First Floor

NEW EXTERNAL CONSTRUCTION

0 1 2 3 4 5
scale

N

REV A Amendments
note

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drawing
EXISTING & PROPOSED
FLAT 1
FIRST FLOOR PLANS

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KS	JE	25.02.2013

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drawing no 7753 / 33 A

PLANNING

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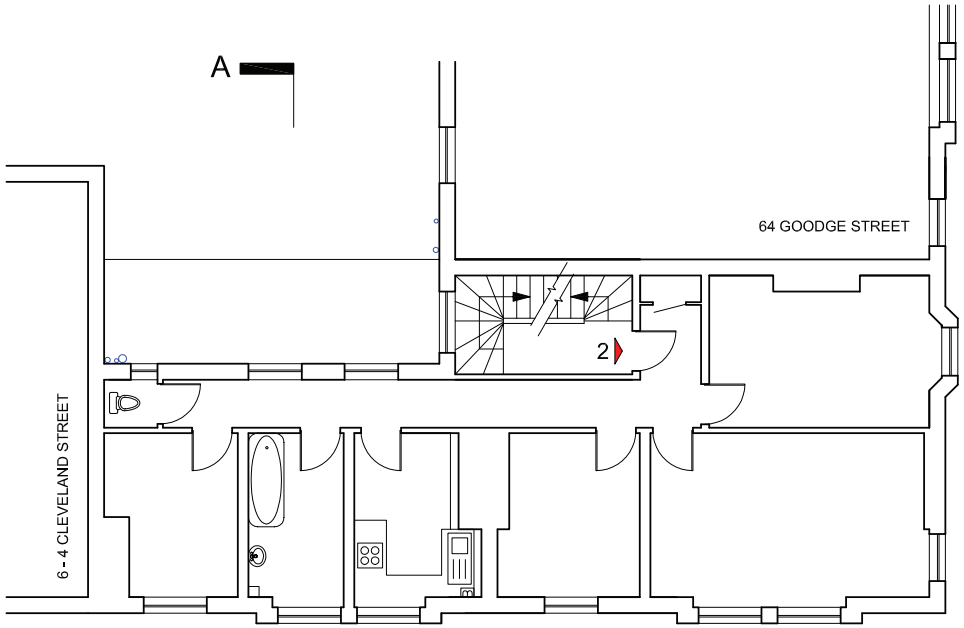
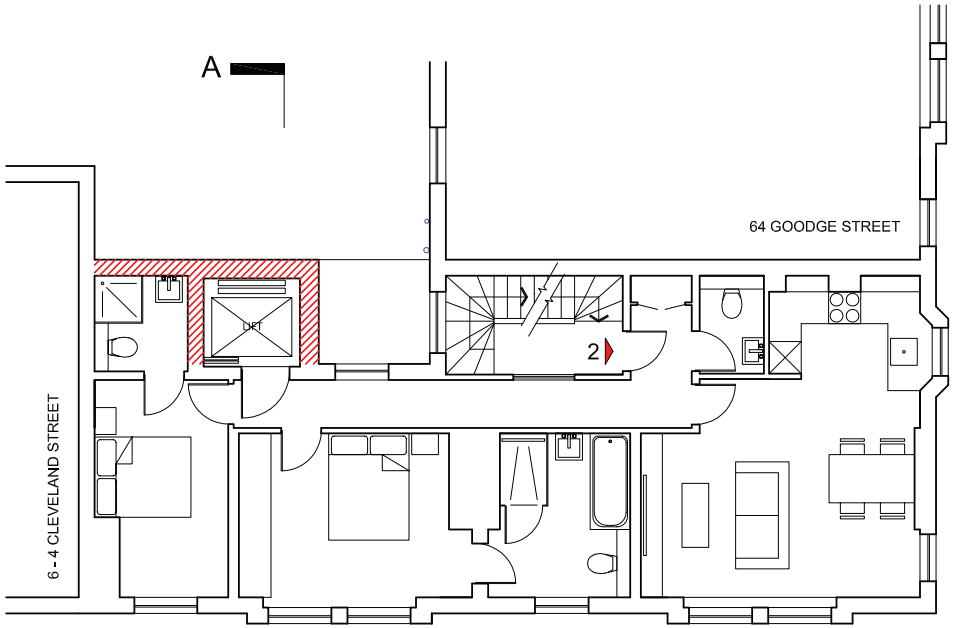


Second Floor

PROPOSED



Second Floor

NEW EXTERNAL CONSTRUCTION

0 1 2 3 4 5
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note

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drawing
EXISTING & PROPOSED
FLAT 2
SECOND FLOOR PLANS

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PLANNING

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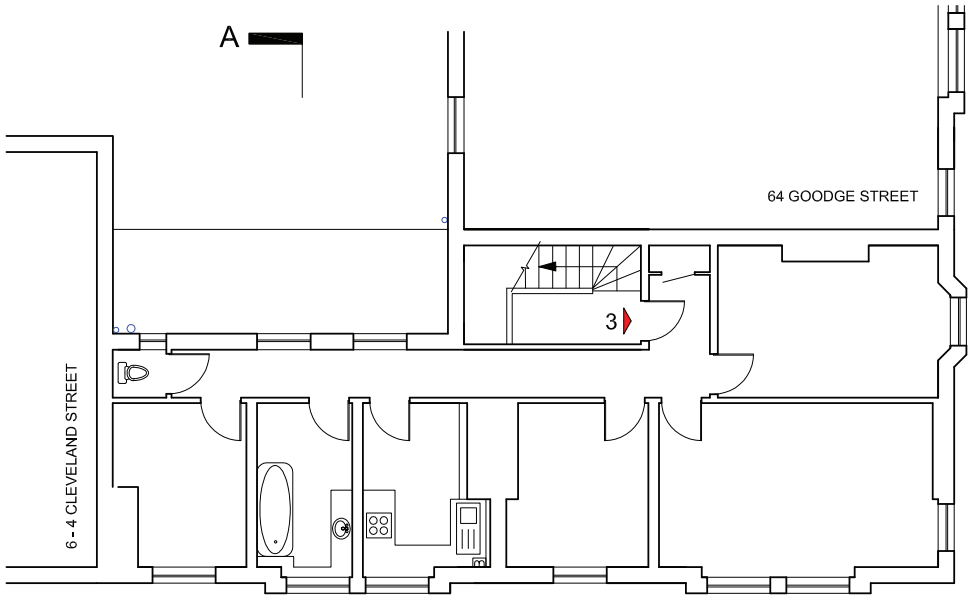
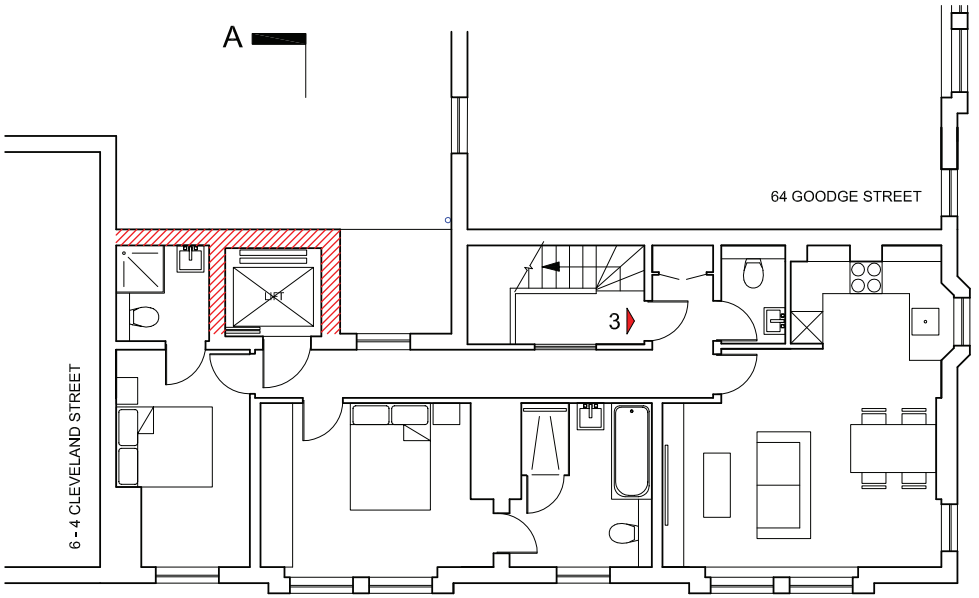


Third Floor

PROPOSED



Third Floor

NEW EXTERNAL CONSTRUCTION

0 1 2 3 4 5
scale

N

REV A Amendments
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client
PLANNING

drawing
EXISTING & PROPOSED
FLAT 3
THIRD FLOOR PLANS

drawn	checked	date
KS	JE	25.02.2013

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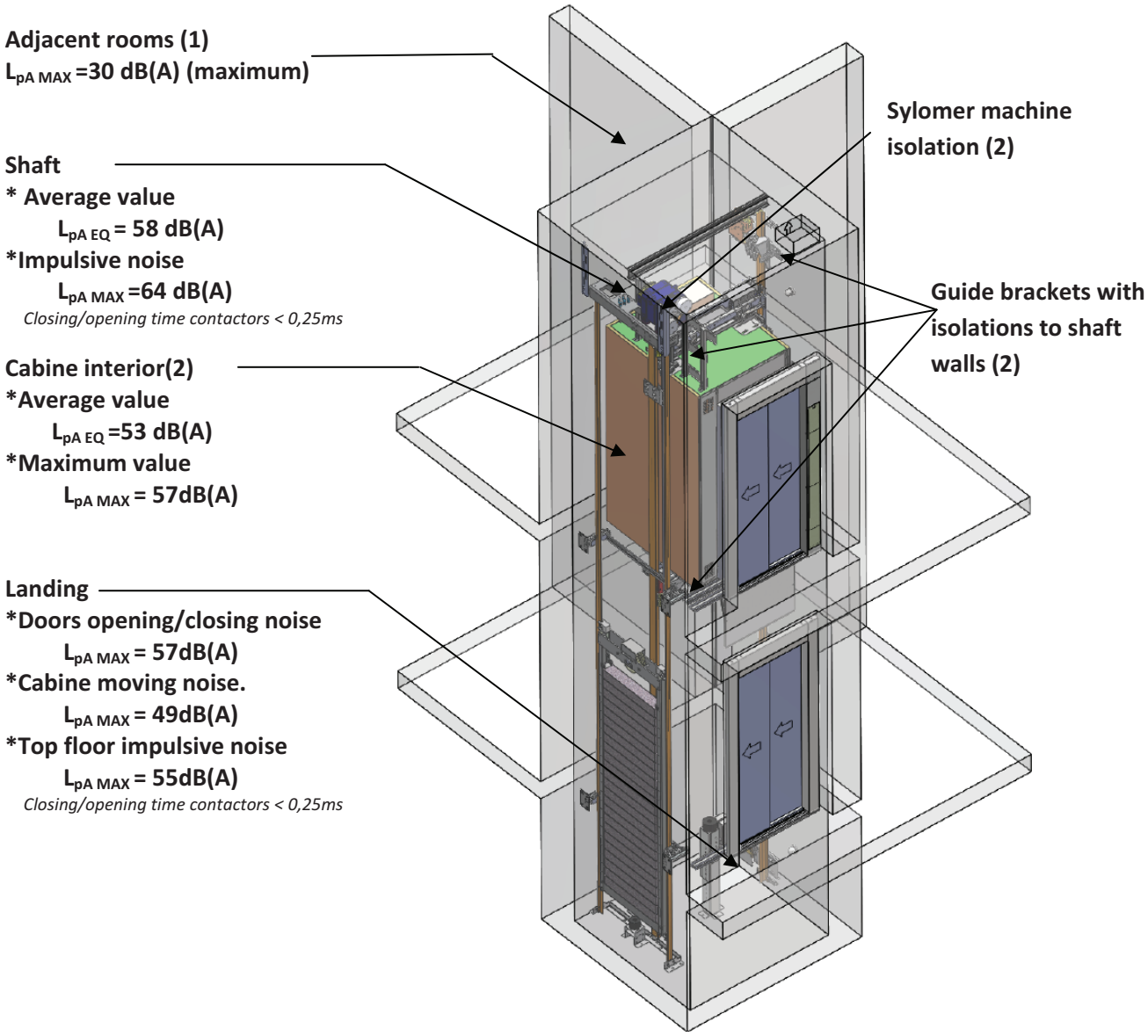
drawing no 7753 / 35 A

Appendix A

GRLP Vibrations and noises report

Vibrations and noises report lift type GRLp.

The image shows the configuration of an installation elevator type GRLp where there are detailed the values of the measurements obtained in our tests and the location of the different devices of isolation of I vibrate acoustic..



(1) (1) The Basic document HR " Protection opposite to the Noise " of the CTE (Technical Code of Building) establishes values limit of acoustic isolation to air noise between an enclosure of facilities and a protected and / or inhabitable enclosure. It is a responsibility of the Optional Direction of the building to guarantee that the walls and ceiling of the hollow offer a sufficient attenuation of the air and structural noise. The principal parameter is the specific mass (thickness) of the wall of the hollow. The point 3 " I Design and measured " with the mentioned Document HR it provides rules for the design of the walls of the hollow attending to the values of m (kg/m2) and of RA (dBA). In table IV.3 of the Document of Application of the CTE "HR1" also there offer constructive solutions that give presumption of conformity with CTE

(2) The paragraph 3.3.3.5" Elevators and Freight elevator " of the Basic Document HR, in his paragraph a) it specifies that they were anchoring the guides to forged of the building by means of the interposition of elastic elements, the anchorage being avoided to the vertical elements of separation and, in his paragraph b) that the machinery of the elevators will be desolarizada of the structural elements of the building by means of elements vibration dampers. The elevators type FELESA's GRLp give I complete adapted to these requirements, isolating suitably the fixings of the guides for interposition of elements vibrate acoustic (insulating) and, the machine by means of the placement of Sylomer's plates.