RESULTS OF A 24-HOUR NOISE LEVEL SURVEY CARRIED OUT IN THE REAR GARDEN OF THE RESIDENTIAL HOUSE LOCATED AT 31 ELSWORTHY ROAD, LONDON NW3 AND A REPORT ON THE NOISE IMPACT OF THE PROPOSED NEW EXTERNAL PLANT

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Client	:	Carnell Warren Associates
Project	:	31 Elsworthy Road, London NW3
Emtec Ref.	:	QF10301/PF7635/RP2
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1.0. INTRODUCTION

This report details the results of a 24-hour noise survey carried out in the rear garden behind the residential property located at 31 Elsworthy Road, London NW3.

The objectives of the survey were as follows:

- To assess the proposal to install a new air cooled condenser and a Pool Air Handling Unit in the basement/ground floor of the property.

- To identify the nearest residential properties that might be affected by noise from the new plant.

- To establish the existing background noise level outside the nearest affected properties.

- To recommend noise limits and any necessary mitigating measures to ensure that the operation of the new plant does not disturb the occupants of the nearest affected properties and meets the planning directives of the local authority with regard to noise.

This report has been divided into the following sections for ease of analysis:

2.0. SITE DESCRIPTION

The house located at 31 Elsworthy Road is a three storey, detached building with brick facades under a pitched, slate roof. The building has a stone paved front garden area, which fronts onto Elsworthy Road and has a substantial rear garden with a stone patio onto a grass lawn.

The house is in the residential area of Chalk Farm just north of Regents Park.

The front and rear façades of the building can be seen in the attached Photos A and C.

There are similar residential properties on either side No 31 as can be seen in the attached Photos C, D and E. An aerial overview of the site can be seen on the attached Photo F.

3.0. TEST INSTRUMENTATION

All measurement equipment used during the survey complied with the requirements of BS4142:2014 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". Details of the equipment are as follows:

Integrating Sound Level Meter: Rion type NL-52 class 1 Sound Level Meter fitted with a Rion type UC-59 ½ inch condenser microphone. Serial No 01121378

Statistical Analysis Modules: Built in module capable of computing the percentile levels LA_1, LA_{10}, LA_{50}, LA_{90} and LA_{99} and also the LA_{eq} level.

Acoustic Calibrator: Bruel & Kjaer type 4231 electronic calibrator. Serial No 1934160

Calibration was performed before and after the survey and was +/- 0.1 dB from the reference source.

3.1. Existing Noise Climate

Road traffic travelling on surrounding roads could be heard at the start and end of the survey, so the noise levels measured will include contributions from road vehicles.

Commercial jet aircraft were observed at medium and high altitude during the manned periods at the start and the end of the survey, so it is possible that the noise levels measured could include contributions from medium altitude jet aircraft.

There are no overland railways nearby, so the noise levels measured will not include contributions from rail noise.

Construction works were not observed being carried out in the vicinity during the manned periods at the start and end of the survey so the sound levels recorded should be typical of normal daytime background noise levels.

4.0. TEST PROCEDURE

The survey was conducted during a continuous 24-hour period from 8:10 am on Thursday the 25th of July 2024 to 8:10 am on Friday the 26th of July 2024.

Data was continuously acquired throughout the measurement period with the individual averaging time for statistical noise data set to 15 minutes. The following 'A' weighted statistical measurements were recorded concurrently: -

LA_1 - The Sound Pressure Level exceeded for 1% of the measurement period.

LA_{10} - The Sound Pressure Level exceeded for 10% of the measurement period.

LA_{50} - The Sound Pressure Level exceeded for 50% of the measurement period.

LA_{90} - The Sound Pressure Level exceeded for 90% of the measurement period. LA_{90} is considered to represent the "background noise level" during the measurement period and is used for the assessment of noise to determine the likelihood of complaints (See BS 4142:2014).

LA_{99} - The Sound Pressure Level exceeded for 99% of the measurement period.

LA_{eq} - The continuous steady state Sound Pressure Level that has the same acoustic energy as the real fluctuating level.

4.1. Measurement Positions

The microphone was mounted on a tripod and was positioned on the back edge of the stone patio at the rear of the house. The microphone was approximately in the centre of the width of the garden. The location of the microphone can be seen on the attached Photos B, C, D and E.

The microphone was connected by a low impedance cable to the associated instrumentation which was contained within a weatherproof housing.

4.2 Weather Conditions

The weather conditions prevailing during the measurement period were in line with those recommended in BS 4142:2014: -

Weather daytime: -	Overcast	Weather night time: -	Overcast
Wind daytime: -	Calm	Wind night time: -	Calm

The microphone was protected during the survey by an acoustically transparent wind balloon.

5.0. RESULTS AND EVALUATION OF NOISE CRITERIA

The raw test data, gathered during the noise survey, is given in Appendix 'A 'of this report.

The 'A' Weighted L_{eq} levels measured over each 15 minute interval throughout the 24-hour period, denoted by LA_{eq}, (15 mins), are displayed as a bar graph on the attached Sketch No QF/10301/TT1 at the back of this report.

The 'A' Weighted percentile levels measured over each 15 minute interval throughout the 24-hour period, denoted by LA_{10} (15 mins), LA_{50} (15 mins) and LA_{90} (15 mins) are displayed as line graphs on the attached Sketch No QF/10301/TT2 at the back of this report.

5.1. Summary of Results

The table QF/10301/DD1 below summarises the noise levels taken over the 24-hour period in terms of the maximum and minimum Sound Pressure Levels recorded.

Table QF/10301/DD1 – Summary of Maximum and Minimum Noise Levels

	LA_{eq}	**LA_{1}**	**LA_{10}**	**LA_{50}**	**LA_{90}**	**LA_{99}**
Minimum	31dBA	33dBA	32dBA	31dBA	30dBA	30dBA
Maximum	65dBA	74dBA	69dBA	63dBA	54dBA	54dBA

The table QF/10301/DD2 below states the minimum LA_{90} noise levels recorded during the time periods of 7.00am to 23.00pm (Daytime / Evening) and 23.00pm to 7.00am (Night time)

Table QF/10301/DD2 – Minimum LA_{90} Noise Levels – Daytime/Evening and Night time

	Minimum LA_{90}
Daytime/Evening (7am to 11pm)	34dBA
Night Time (11pm to 7am)	30dBA

5.2. Summary of the Local Authority's planning requirements regarding noise for noise sensitive properties

The local planning authority is the London Borough of Camden.

The Camden Local Plan sets out the Council's planning policies and replaces the Core Strategy and Development Policy planning documents (adopted in 2010). It ensures that Camden continues to have robust, effective and up-to-date planning policies that respond to changing circumstances and the borough's unique characteristics and contribute to delivering the Camden Plan and other local priorities.

The Local Plan will cover the period from 2016-2031. Policy A4 of The Local Plan is entitled Noise and Vibration and states:

The Council will seek to ensure that noise and vibration is controlled and managed. Development should have regard to Camden's Noise and Vibration thresholds (Appendix 3). We will not grant planning permission for a) a development likely to generate unacceptable noise and vibration impacts or b) a development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses. We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.

The parts of Appendix 3 that we have identified as relevant to this application are as follows:

Appendix 3: Noise thresholds

The significance of noise impact varies dependent on the different noise sources, receptors and times of operation presented for consideration within a planning application. Therefore, Camden's thresholds for noise and vibration evaluate noise impact in terms of various 'effect levels' described in the National Planning Policy Framework and Planning Practice Guidance:

- *NOEL – No Observed Effect Level*
- *LOAEL – Lowest Observed Adverse Effect Level*
- *SOAEL – Significant Observed Adverse Effect Level*

Three basic design criteria have been set for proposed developments, these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application. The design criteria outlined below are defined in the corresponding noise tables. The values will vary depending on the context, type of noise and sensitivity of the receptor:

- *Green – where noise is considered to be at an acceptable level.*
- *Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.*
- *Red – where noise is observed to have a significant adverse effect.*

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	*Assessment Location*	*Design Period*	*LOAEL (Green)*	*LOAEL to SOAEL (Amber)*	*SOAL (Red)*
*Dwellings***	*Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)*	*Day*	*'Rating level' 10dB* below background*	*'Rating level' between 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings***	*Outside bedroom window (façade)*	*Night*	*'Rating level' 10dB* below background and no events exceeding 57dB L_{Amax}*	*'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}*	*'Rating level' greater than 5dB above background and/or events exceeding 88dB L_{Amax}*

**10dB should be increased to 15dB if the noise contains audible tonal elements (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require an NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted L_{eq} (5mins) noise levels in octave bands, 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

5.3. Determination of noise sensitive property design criteria

We believe that the sound produced by the new plant will not be intermittent or contain tones. To comply with a green rating from the table above the new plant should therefore have a Sound Pressure Level 10dB below the lowest LA_{90} background noise level at 1 metre from the nearest noise sensitive window.

The lowest recorded LA_{90} background noise levels measured during the 24 hour survey period are given in Table QF/10301/D2 above.

Applying the above criteria gives limiting rating levels as listed in table QF/10301/DD3 below:

Table QF/10301/DD3 – Proposed Design Rating Levels (LA_{eq})

Existing Noise sensitive receptor	*Design Period*	*Lowest measured background level*	***Proposed rating level***	*Proposed Local Authority criteria*
Dwellings	*Day*	34*dBA*	***24dBA***	*Green*
	Night	*30dBA*	***20dBA***	*Green*

5.4. Summary of external noise criteria

Based upon the lowest measured LA_{90} background noise levels during the survey and the Council's requirements outlined above we summarise the design rating levels to be adopted for this project in table QF/10301/DD4: -

Table QF/10301/DD4 – recommended design rating levels $L_{Ar,T}$

Type of premises	**$L_{Ar,T}$ (7am - 11pm)**	**$L_{Ar,T}$ (11pm - 7am)**
Noise sensitive	24dBA	20dBA

6.0. DISCUSSION OF RESULTS

It is proposed to install a Daikin REYQ20 air cooled condenser and a Menerga 35TX Air Handling Unit in the basement of the property as shown on the attached Carnell Warren drawings 2267/PL/201(P0) and 2267/PL/202(P0). The fresh air to the two units will be taken from a basement light well on the front left hand side of the property and the exhaust air from the units will be ducted to a ground floor level grilleage on the front right hand side of the property.

The condenser will be housed in a plantroom adjacent to the left hand light well and the Tables QF/10301/DD5 and -/DD6 below list the sound level of the condenser and the natural and required attenuation to reduce the noise output of the unit inlet and outlet to below the limiting LAeq noise level listed in Table QF/10301/DD4 above.

Table QF/10301/DD5 – Noise Level of the condenser and the natural and required attenuation of the inlet to the nearest adjacent neighbour's window in 29 Elsworthy Road

Noise Level/ Attenuation	Sound Pressure Level (dB ref 2 x 10^{-5} N/m^2) 63	125	250	500	1k	2k	4k	8k	dBA
Daikin REYQ20 – SPL at 1 m free field	70	65	66	63	59	54	53	46	
Plantroom reverberation	+5	+5	+5	+5	+5	+5	+5	+5	
Distance correction to nearest window (10m) at 10 log A_9/A_1	-15	-15	-15	-15	-15	-15	-15	-15	
Barrier effect of boundary wall (200mm)	-6	-8	-10	-12	-14	-16	-18	-20	
Emtec RAAC/25/1200LF inlet silencer & Emtec WCAC30 wall cladding in plantroom	-13	-19	-31	-40	-49	-47	-45	-36	
SPL at 1m from neighbour's window	41	28	15	1	-	-	-	-	17

Table QF/10301/DD6 – Noise Level of the condenser and the natural and required attenuation of the outlet to the nearest adjacent neighbour's window in 33 Elsworthy Road

Noise Level/ Attenuation	Sound Pressure Level (dB ref 2 x 10^{-5} N/m^2) 63	125	250	500	1k	2k	4k	8k	dBA
Daikin REYQ20 – SWL	96	87	86	88	81	76	74	70	
12 metres of ducting	-8	-8	-4	-4	-4	-4	-4	-4	
3 Bends	0	0	0	-3	-6	-9	-9	-9	
End Reflection	-8	-4	-1	0	0	0	0	0	
SWL to SPL	-8	-8	-8	-8	-8	-8	-8	-8	
Distance to nearest window (7m) at 20 log 7	-17	-17	-17	-17	-17	-17	-17	-17	
Emtec RAAC/43/3000LF outlet silencer	-11	-25	-38	-50	-50	-50	-45	-28	
SPL at 1m from neighbour's window	44	25	18	6	-	-	-	4	19

The calculations in Tables QF/10301/DD5 and -/DD6 above show that if the inlet to the condenser is attenuated by an Emtec RAAC/25/1200LF silencer, the plantroom is clad in Emtec WCAC30 acoustic wall panels and the discharge duct is fitted with an Emtec RAAC/43/3000 silencer then the limiting LAeq noise level of 20dBA will not be exceeded at 1 metre from the windows of the adjacent neighbouring houses.

The proposed attenuation will therefore allow the condensers to be operated, at full duty, on a 24 hour basis.

We would recommend that the condenser is placed onto anti-vibration mountings having a minimum static deflection of 6mm and that the condenser is connected to the discharge ducting by a suitable flexible connection. This will ensure that no structural borne noise is transferred into the fabric of the building.

The layout of the inlet to the plantroom around the condenser is shown on our attached sketch No QF/10301/GA2.

It is also proposed that an Pool ventilation Air Handling Unit will be installed in the basement of the house with fresh air being drawn in from the light well next to the condenser inlet and exhaust air rising up to connect onto the grilleage on the front right hand side of the building.

The following Table QF/10301/DD7 lists the Sound Power levels of the fresh air and exhaust air connections from the Air Handling Unit and the Table QF/10301/DD8 lists the dynamic insertion losses of the fresh air and exhaust air silencers that will be necessary in order to maintain no more than 17dBA at 1 metre from the windows at the front of the adjacent houses and thereby ensure that the limiting LAeq of 20dBA is not exceeded.

Table QF/10301/DD7 – Sound Power Levels of Pool Air Handling Unit

Location	Vol m^3/sec	Sound Power Level (dB ref 10^{-12} watts)							
		63	125	250	500	1k	2k	4k	8k
Fresh Air Inlet	0.65	81	79	74	71	64	60	55	51
Exhaust Air outlet	0.65	83	85	83	78	76	73	68	63

Note: the above data is based upon the use of a Menergra TX35 Air Handling Unit

Table QF/10301/DD8 – Dynamic Insertion Losses of silencers

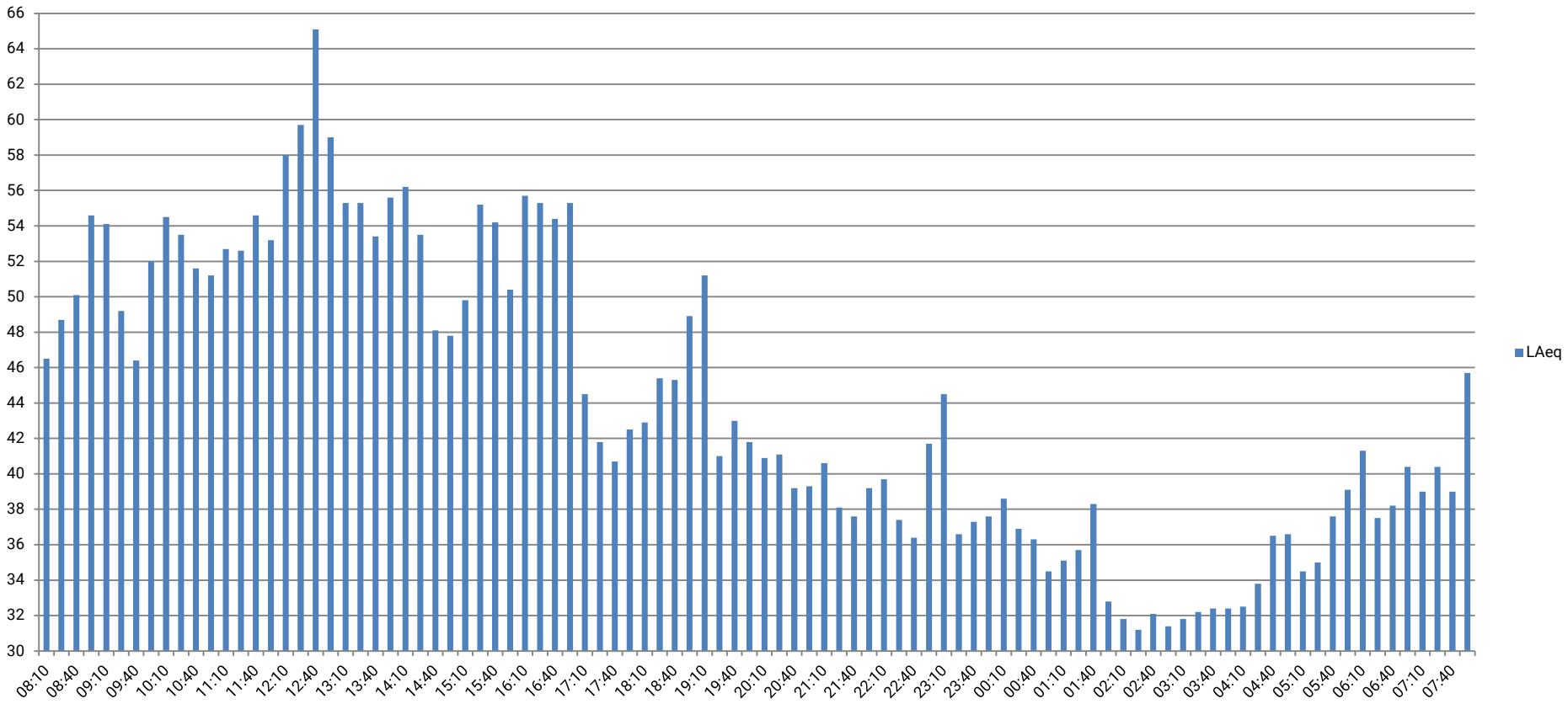
Location	Vol (m^3/sec)	Emtec Model	Dimensions W x H x L	Dynamic Insertion Losses (dB)							
				63	125	250	500	1k	2k	4k	8k
Fresh Air	0.65	RAAC/38/1800	600 x 325 x 1800	6	16	28	44	47	44	38	24
Exhaust Air	0.65	RAAC/38/2100	600 x 325 x 2100	7	19	33	47	50	49	41	28

If the fresh air inlet and exhaust air outlet silencers listed in table QF/10301/DD8 above are fitted to the fresh air inlet and exhaust air outlet ducts from the Pool Air Handling Unit and the acoustic treatment is installed to the condenser, as detailed on the attached sketch No QF/10301/GA2, then the noise output from the proposed ventilation and air conditioning plant will be in line the planning requirements of the local authority and should evoke no justifiable complaints under the guidelines of BS4142:2014.

Allowing for a minimum attenuation through an open window of 10dB, as laid down in BS8233:2014, we would arrive at a predicted noise level, within the rooms of the adjacent houses, of no more than 10dBA which is 20dB below the recommended level of 30dBA for uninterrupted sleep in BS8233:2014. This recommended noise level of 30dBA is based upon guidance provided by the World Health Organisation.

The proposed noise control measures will therefore satisfy the local authority's planning requirements and the requirements of both BS4142:2014 and BS8233:2014.

Emtec Products Ltd
22nd August 2024



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CLIENT: *Carnell Warren Associates*	*PF No: 7635*				*APPROVED BY:* *MGR*	*REVISION*							
PROJECT: *31 Elsworthy Road, London NW3*	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* *MGR*	*SKETCH No. QF/10301/TT1*							

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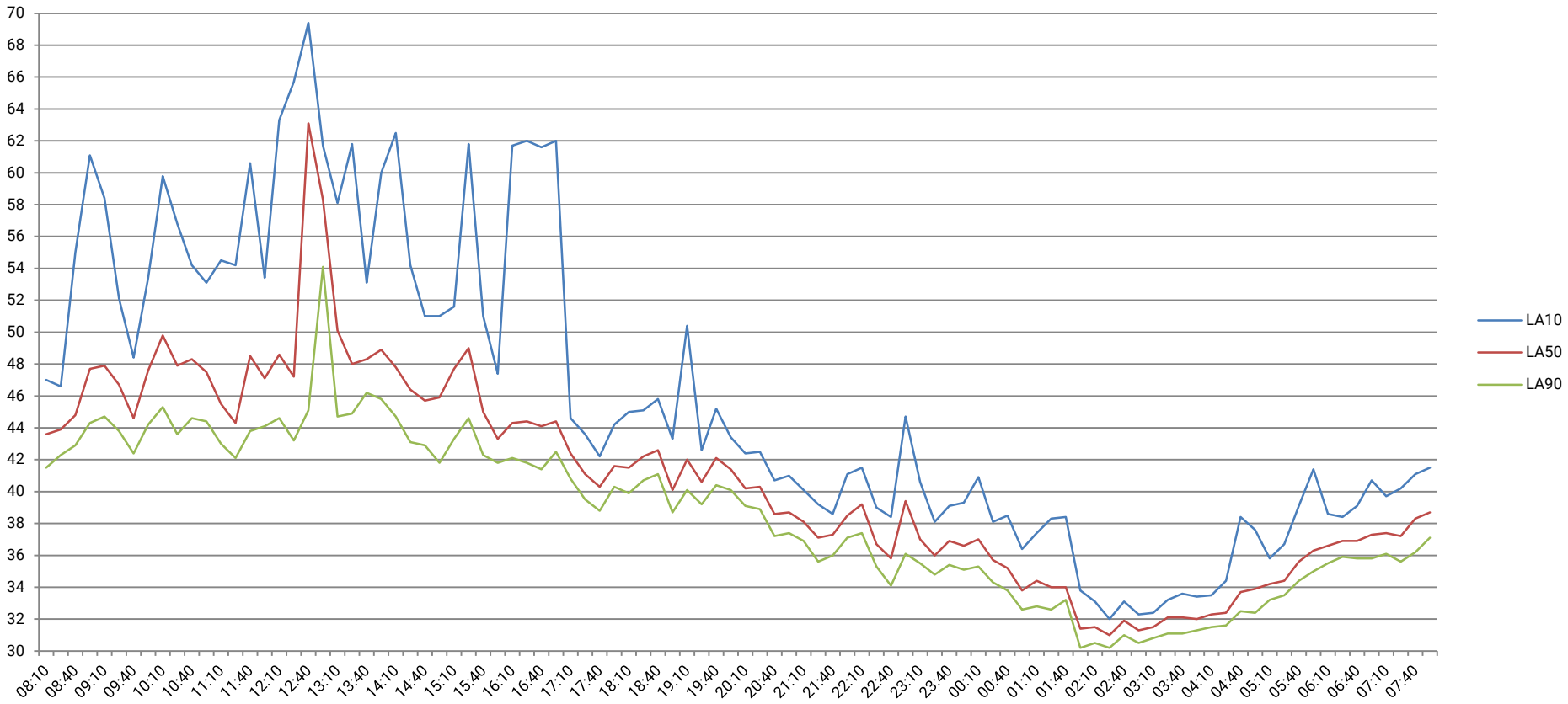

TITLE: *LA10; LA50 & LA90 Levels*	*ISSUE DATE:* *5th August 2024*				*DRAWN BY:* *MGR*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
CLIENT: *Carnell Warren Associates*	*PF No: 7635*				*APPROVED BY:* *MGR*	*REVISION*							
PROJECT: *31 Elsworthy Road, London NW3*	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* *MGR*	*SKETCH No. QF/10301/TT2*							

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APPENDIX ‘A’

Raw Data – Noise Survey

25th of July 2024 to 26th of July 2024

Project: 31 Elsworthy Road, London NW3
Client: Carnell Warren Associates
Date: 25th to 26th July 2024
Serial No: 01121378

Address	Start Time	LA_{eq}	LE	Lmax	Lmin	LA_{1}	LA_{10}	LA_{50}	LA_{90}	LA_{99}
1	08:10	47	76	70	39	57	47	44	42	40
2	08:25	49	78	79	40	57	47	44	42	41
3	08:40	50	80	65	40	60	55	45	43	41
4	08:55	55	84	65	41	64	61	48	44	43
5	09:10	54	84	74	43	63	58	48	45	43
6	09:25	49	79	70	41	57	52	47	44	42
7	09:40	46	76	69	40	53	48	45	42	41
8	09:55	52	82	66	42	63	53	48	44	43
9	10:10	55	84	67	42	64	60	50	45	43
10	10:25	54	83	68	40	64	57	48	44	42
11	10:40	52	81	68	42	62	54	48	45	43
12	10:55	51	81	69	41	63	53	48	44	43
13	11:10	53	82	69	41	64	55	46	43	42
14	11:25	53	82	66	40	64	54	44	42	41
15	11:40	55	84	67	41	64	61	49	44	42
16	11:55	53	83	66	41	65	53	47	44	43
17	12:10	58	88	70	42	68	63	49	45	43
18	12:25	60	89	76	41	70	66	47	43	42
19	12:40	65	95	78	41	74	69	63	45	42
20	12:55	59	89	67	53	65	62	58	54	54
21	13:10	55	85	71	40	67	58	50	45	42
22	13:25	55	85	68	41	65	62	48	45	43
23	13:40	53	83	67	43	65	53	48	46	45
24	13:55	56	85	70	42	66	60	49	46	44
25	14:10	56	86	70	42	66	63	48	45	43
26	14:25	54	83	73	41	65	54	46	43	42
27	14:40	48	78	64	40	56	51	46	43	42
28	14:55	48	77	65	39	55	51	46	42	40
29	15:10	50	79	66	40	62	52	48	43	41
30	15:25	55	85	69	41	65	62	49	45	42
31	15:40	54	84	70	40	68	51	45	42	41
32	15:55	50	80	65	40	63	47	43	42	41
33	16:10	56	85	72	40	68	62	44	42	41
34	16:25	55	85	66	40	64	62	44	42	41
35	16:40	54	84	68	39	64	62	44	41	40
36	16:55	55	85	66	41	64	62	44	43	42
37	17:10	45	74	70	39	48	45	42	41	40
38	17:25	42	71	54	38	47	44	41	40	39
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41	18:10	43	73	59	38	50	45	42	40	39
42	18:25	45	75	68	39	52	45	42	41	40
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47	19:40	43	73	53	39	49	45	42	40	40
48	19:55	42	71	49	39	46	43	41	40	39
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83	04:40	37	66	61	31	46	38	34	33	32
84	04:55	37	66	60	31	46	38	34	32	32
85	05:10	35	64	43	32	38	36	34	33	32
86	05:25	35	65	43	32	39	37	34	34	33
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88	05:55	39	69	53	34	49	41	36	35	34
89	06:10	41	71	73	34	44	39	37	36	34
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91	06:40	38	68	60	35	47	39	37	36	35
92	06:55	40	70	66	34	47	41	37	36	35
93	07:10	39	69	56	35	47	40	37	36	35
94	07:25	40	70	67	34	49	40	37	36	35
95	07:40	39	69	53	34	45	41	38	36	35
96	07:55	46	75	67	35	60	42	39	37	36

APPENDIX ‘B’

Photos and Drawing

Photo A: View of the front façade of the property at 31 Elsworthy Road, London NW3

Nearest windows of the neighbouring residential property to the West.

Location of the microphone

Photo B- View looking to the North West from the rear garden of the property.

Nearest windows of the neighbouring residential property to the East.

Microphone location in rear garden

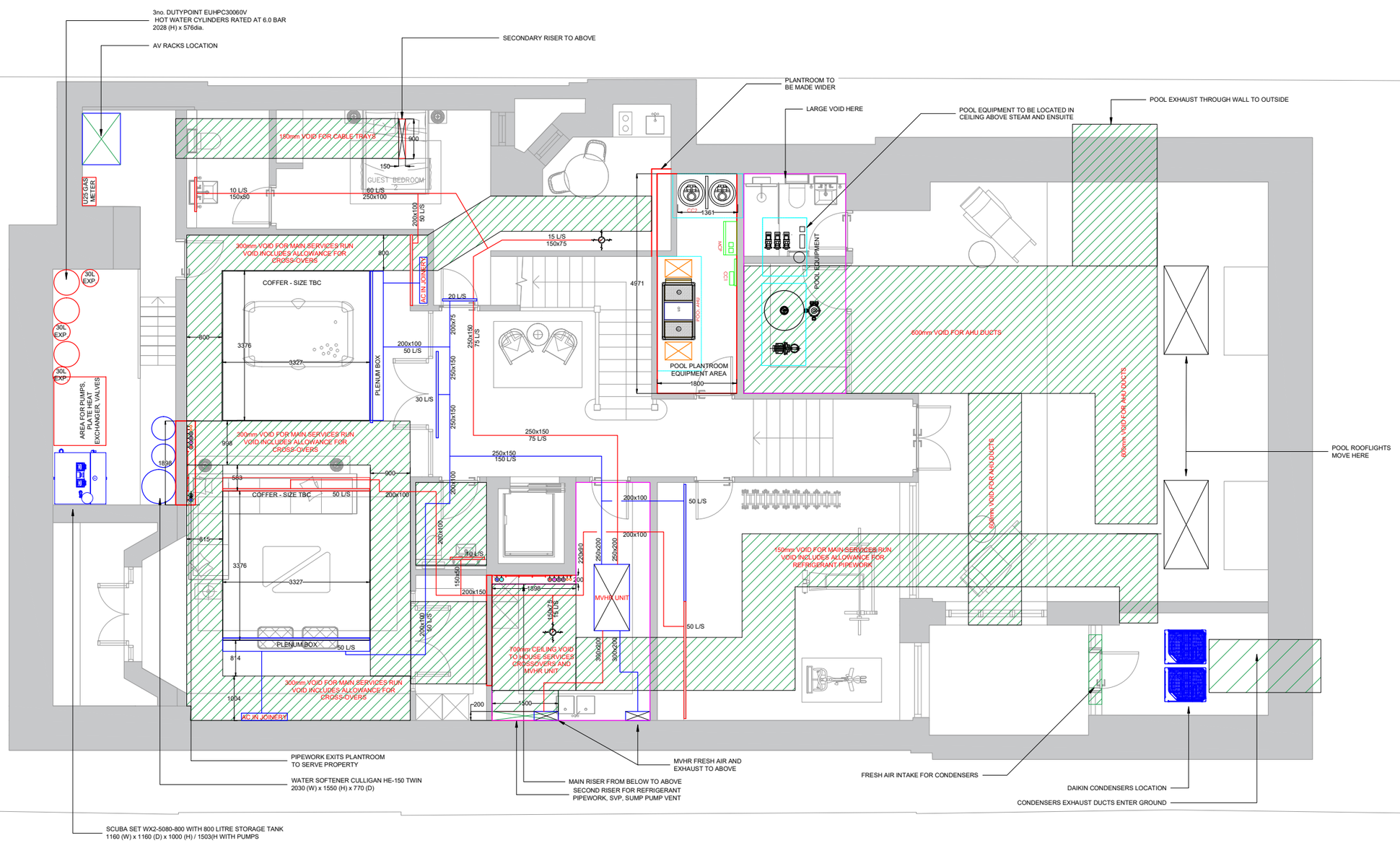
Photo C- View looking to the North East from the rear garden of the property.

Photo D: Aerial view of site and the surroundings at 31 Elsworthy Road, London NW3

General Notes:

1. This drawing is not an Architects drawing and must not be interpreted as such.
2. Do not scale off this drawing.
3. This drawing must not be used for construction or installation purposed unless stated.
4. All dimensions must be verified on site before completing shop drawings or setting out the work.
5. This drawing to be read in conjunction with the relevant technical specifications.
6. This drawing is to be read in conjunction with Architectural and Structural Engineers drawings.

HL	High Level	TA	To Above
LL	Low Level	TB	To Below
FA	From Above		
FB	From Below		



REV	MODIFICATIONS	DRAWN BY	DATE
P0	PRELIMINARY ISSUE	MP	2024-XX-XX

CARNELL WARREN ASSOCIATES
DUKE HOUSE | DUKE STREET | WOKING | GU215BA
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PROJECT NAME
31 ELSWORTHY ROAD

DRAWING TITLE
BASEMENT FLOOR PLANTROOMS & RISERS

CLIENT
PRIVATE CLIENT

SCALE | A1	PROJECT START DATE	PROJECT LEAD
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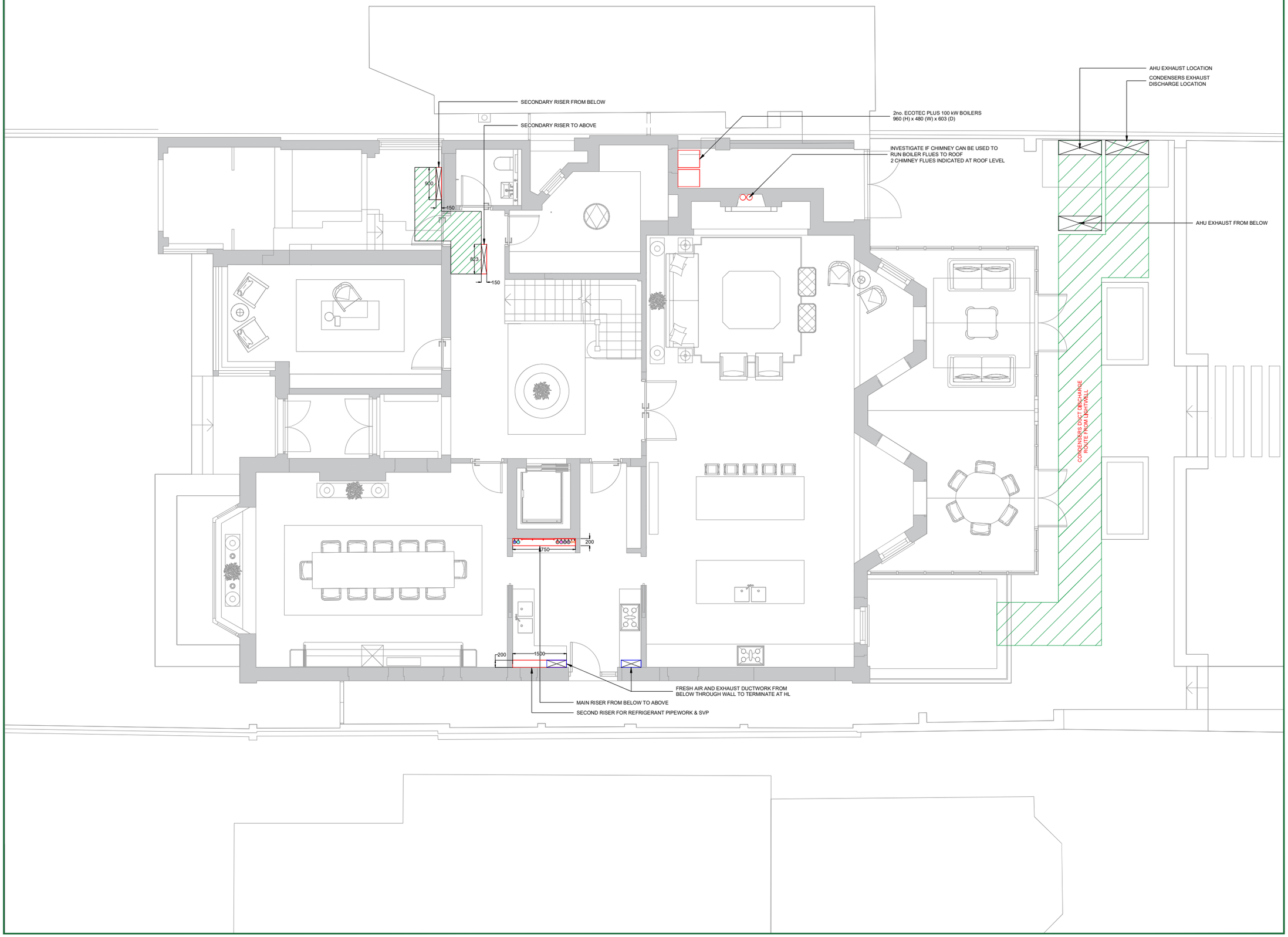
DRAWING NO.	REVISION
2267/PL/201	P0



General Notes:

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LL	Low Level	TB	To Below
FA	From Above		
FB	From Below		

P0	PRELIMINARY ISSUE	MP	2024-XX-XX
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PROJECT NAME
31 ELSWORTHY ROAD

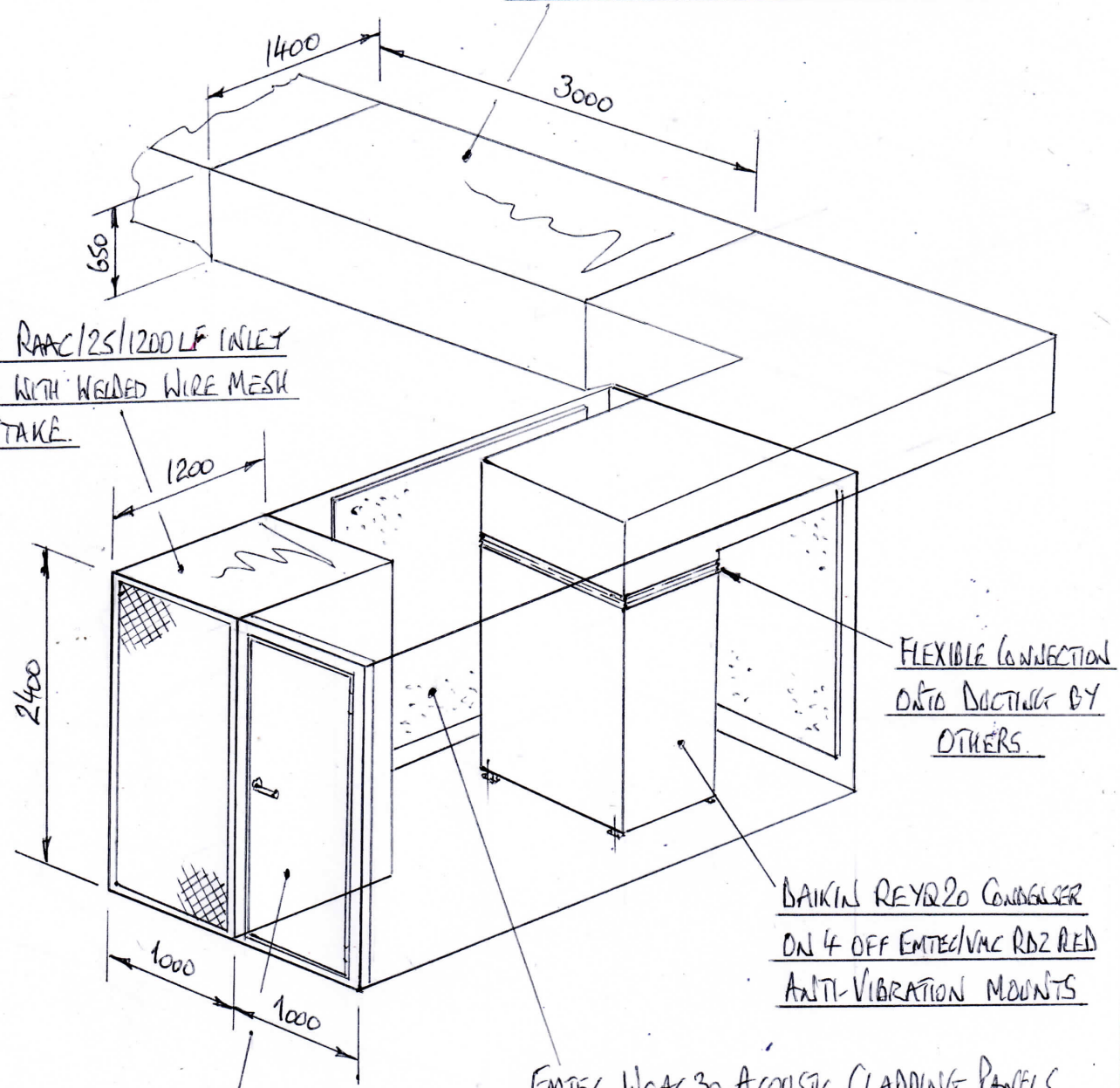
DRAWING TITLE
GROUND FLOOR
PLANTROOMS & RISERS

CLIENT
PRIVATE CLIENT

SCALE | A1	PROJECT START DATE	PROJECT LEAD
1:50	APR"24	WH

DRAWING NO.	REVISION
2267/PL/202	P0

All dimensions in mm unless stated



TITLE: LAYOUT OF CONDENSER PLANTROOM.	A B C D E F G H REVISION	DOCUMENT No. QF/10301/GA2	
CLIENT: CARNELL WARREN ASSOCIATES	Q A M I STATUS	EMTEC	
PROJECT: 31, ELSWORTHY ROAD, NW3.	APPROVED BY: 22/02/24	Emtec Products Ltd., Enterprise House, Blyth Road, Hayes, Middx, UB3 1DD. Tel: 0181-548 3031 Fax 0181-573 3505	
ISSUE DATE: 22/08/24 / PF No. / DRAWN BY: MGR	DESIGN AUTH: MGR		