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Dear Gianluca

SUBSTATION, 140-146 CAMDEN STREET, NW1 NOISE & VIBRATION ASSESSMENT

We write to assist regarding the installation of the substation within the above development, as follows.

Noise Surveying & Criteria

Environmental noise surveying around the development site has already been undertaken and the results of the surveying are detailed in RBA Acoustics' Plant Noise Assessment Report 9587.RP01.PNA.3 dated 17 January 2020. Plant noise emission criteria were developed on the basis of the surveyed noise levels and criteria stipulated therein; namely a worst case value of 35dBA at 1m outside any existing residential window at night-time (based upon data from Position 3, which was in the exact same position as the proposed substation).

In addition, a worst-case assessment criterion has been developed based upon the guidance stated within BS 8233. The desirable internal noise level criterion within a bedroom during the night-time period is L_{Aeq} 30dB. As per guidance stated within the document, a partially open window results in approximately 15dBA attenuation from outside to inside. However, typically mechanical services noise should be designed to 5dBA below the target criterion, so as not to be noticeable. Thus, a criterion of 40dB L_{Aeq} ($30 + 15 - 5$) outside of the proposed development windows is also suggested and therefore targeted in the below calculations. This is considered to represent a fair and reasonable situation. The otherwise prevailing background noise level within the vicinity is 40dB L_{A90} (Position 3). Therefore, this target level would be equal to the background and, as per BS 4142, would indicate "the sound source having a low impact". In addition, the night-time L_{Aeq} is 53dB at Position 3 and therefore plant noise at 40dBA would not contribute to the noise environment.



Electricity Substation Transformer Assessment

It is very rare to undertake an acoustic assessment of a typical development substation. There are usually no concerns or issues. Notwithstanding this, we have experienced other substations and the transformer hum was only just audible at distances less than one metre from the unit. We have managed to obtain some acoustic test data (see attached Appendix A) for a 1000kVA transformer, which states a noise level (SPL) of 44dBA at 0.3m from the unit, and a power level of 56dBA. However, the substation proposed at Camden Street is a 800kVA unit, so is marginally quieter by 1dB, thus an adjustment has been made accordingly in the calculations.

Calculations have been undertaken of the noise breaking out of the substation room through the louvred door frontage up to the nearest proposed residential window directly above, albeit there is an overhang formed by the balconies – please see attached in Appendix B.

We are pleased to conclude the worst-case plant noise emission criterion of 35dBA outside the windows should easily be met.

In addition, the adjoining spaces (commercial back-of-house facilities to the side and below, and residential unit directly above) are separated by “massive” constructions, as is typically required by UKPN, et al. They comprise of 215mm brickwork walls and minimum 225mm concrete slab with floating screed to the flat above. Such low levels of noise from the substation transformer will not transfer through these forms of construction into the adjacent areas.

It has also been confirmed the substation transformer unit will be installed on anti-vibration mounts, such that no re-radiated noise will be created in any adjacent areas.

To this end, we therefore feel it is very unlikely any complaints regarding noise from the operation of the transformer substation will arise during the future occupation of the surrounding residential development.

We trust the above to be clear and of assistance. If you have any queries, however, please do not hesitate to contact the undersigned.

Yours sincerely,
For RBA Acoustics



Alex J Wyatt



Sound Level Measurement

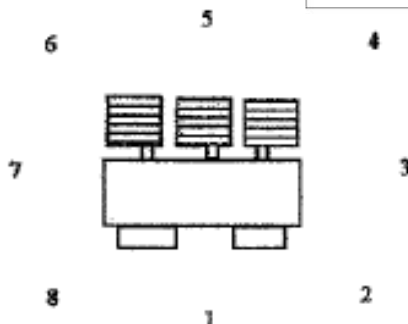
Transformer Rating 1000	Serial No 100205028
Transformer Type USS	Location IN THE TEST AREA
Drawing Number LK50299A0	
EDF Spec ES 4-6001	Date of Test 10/06/07
HV Voltage 11000	Tested in Accordance with BS EN 60076-10:2001 / IEC 60076-10:2001
LV Voltage 433	
Tap position 3	
Witness Paul Dyer From EDF Energy	Customer EDF Energy
Measurement in dB(A)	
	Without Breather Cap

Microphone Position	Ambient Before	Measured Level	Ambient After	Octave filter Frequency Hz	Measured value at point 1 (with Trf Energised)
1	37.6	47.0	38.6	31.5	52.6
2	38.1	41.9	39.1	62.5	56.1
3	38.8	44.8	38.9	125	51.4
4	38.5	43.6	38.5	250	54.6
5	38.7	45.6	39.0	500	41.6
6	38.4	43.8	38.8	1000	30.3
7	39.4	47.9	39.7	2000	29.1
8	37.4	44.6	37.4	4000	28.8
				8000	22.1
				16000	15.1
Average	38	45	39	A	45.6
Difference		7			
Correction		1			
Corrected	Lpa	44			
height	1.66 m	Contour Lm	6.86 m	$S=1.25hLm = 14.2 m^2$	
				$Lwa = Lpa+10\log S$	
				$= 44 + 12 = 56$	
Sound pressure	44 dB(A)	Sound power Level	56 dB(A)	Guaranteed value 56dB(A)	
Tested by	P.R.MOREU	Signature			

Table 5 – Maximum Sound Power Levels

Rating kVA	Sound Power dB(A)
315	51
500	54
800	55
1000	56

See Drawing LK50299A0 For Plan View



Appendix B – Calculations

$$L_{p,out} = L_{p,in} - R_{comp} - 6 + \text{Reflections} - 10 \cdot \log(r) - \text{Directivity} - \text{Screening}$$

Atmospheric Break-out of Front to Window Above									
Parameter	Octave Band Frequency Level (dB)								dBA
	63	125	250	500	1k	2k	4k	8k	
Plant Room Rev. Lp	62	58	63	50	39	37	37	30	55.3
Wall/Louved Door Composite SRI Performance	-1	-1	-1	-1	-1	-1	-1	-1	
In to Out Correction (Rev to Free Field)	-6	-6	-6	-6	-6	-6	-6	-6	
Reflections (Q=2)	3	3	3	3	3	3	3	3	
Distance Loss (10*log(3m))	-5	-5	-5	-5	-5	-5	-5	-5	
Directivity (90°)	-3	-4	-9	-13	-13	-13	-13	-13	
Screening (zero)	-9	-11	-13	-16	-19	-20	-20	-20	
Total Received Lp	42	34	31	12	-3	-5	-5	-12	24
Night-time Criterion (Position 1)									35
Sub-Station Data & Reverberant Calc									
1000kVA Schneider Transformer - Spectra @ Pos 1	56.1	51.4	54.6	41.6	30.3	29.1	28.8	22.1	47.1
Shifted to Lw average 55dBA (for 800kVA)	64.1	59.4	62.6	49.6	38.3	37.1	36.8	30.1	55.1
Krev (reverberant correction for plantroom)	-1.85	-1.85	0.33	0.33	0.33	0.33	0.33	0.33	
Thus, Plant Room Rev. Lp	62.2	57.5	62.9	49.9	38.6	37.4	37.1	30.4	55.3
Raw SRI Data									
Brick Wall	36	41	45	45	54	58	58	58	
Full-height Weather louved triple door opening	0	0	0	0	0	0	0	0	