Design Note

project BSF Camden

subject Fixed plant noise assessment

project no 025901

date 20 December 2012

Revision	Description	Issued by	Date	Approved (signature)
00	Fixed plant noise assessment, UCL	IT	20/12/12	IT
01	Revised calculations	IT	13/02/13	IT

1.1 Scope & approach

This Design Note has been prepared by Buro Happold following a request by BAM Construction. It provides an estimate of the environmental noise levels created by the operation of fixed building services plant associated with the new University College London Academy (UCLA) school at Swiss Cottage, and assessment against the requirements for noise control included with Condition 10 of the planning permission.

Estimates of environmental noise levels due to operation of fixed plant have been prepared with reference to the details of the installed equipment, based on the construction drawings and the technical data sheets for individual plant and equipment items.

The sound level from each item of equipment has been evaluated, with appropriate corrections for source directivity, screening, attenuation with distance and local reflection at the façade.

Sound levels are calculated for the nearest noise sensitive façade. In the case of UCL this is taken to be houses in Harley Road, as indicated on the Figure below.

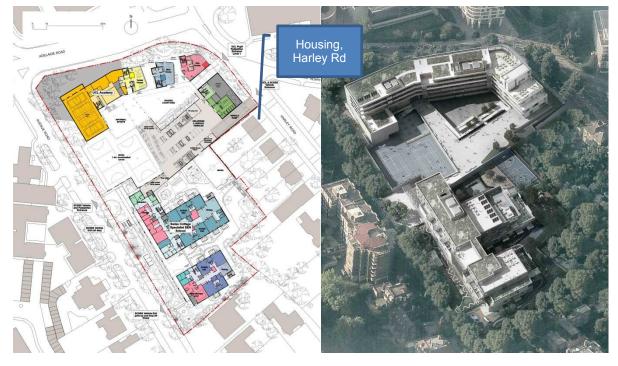


Figure 1Error! No text of specified style in document.—1 Site layout drawing (excerpt from AR-Arch 1000) and illustration of proposals in context

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1.1.1 External plant areas included within assessment

Enclosed plantroom at level 6, gridlines 20 to 21 (air handling equipment)

Roof level plant area, gridlines 20 to 21 (extract fans)

Roof level plant area, gridlines 11 to 14 (extract fans, air handling equipment)

Roof level plant area, gridlines 4 to 6 (extract fans, air handling equipment)

1.2 Calculations

Calculation sheets setting out the base data and assumptions made in calculation are appended to this Design Note for information.

1.3 Assessment

Receiver 1, (Rear of) houses in Harley Road.

From calculation, the daytime noise level from fixed plant is estimated to be 38 dBL_{Aeq} at 3.5 m from the façade of the nearest housing.

The pre development noise survey ¹ reported ambient noise levels at the nearest housing as follows (*data as report section 4.1 Table 4 and Figure C2*):

Daytime ambient noise levels at nearest residential, 3.5m from façade:

53 dB L_{Aeq}/ 43dB L_{A90}

Night time ambient noise levels at nearest residential, 3.5m from facade:

 $45 \text{ dB L}_{Aeq} / 35 \text{dBL}_{A90}$

The daytime design basis criterion for housing in Harley Road is taken to be 38dB L_{A90} ie 5 dB below the measured background of 43 dBL $_{A90}$.

On the basis of the information reviewed, the noise level from operation of fixed plant is estimated to meet the design basis daytime background noise level.

It is assumed that plant and equipment will not operate at night. At this stage no assessment has been made against the night time noise criteria.

Supporting information

- 1. Calculation summary sheet
- 2. Calculations
- 3. Design drawing s and equipment data

¹ Swiss Cottage School, Adelaide Road, London – Acoustic Strategy Report Rev 0 (prepared by Hoare Lee, issued 10 July 2008)

	Project	BSF Ca	mden			Sheet:		1	of		
		ULC Academy				Prepare	d IT		date:	20-Dec	
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Buro Happold	Element Description	Summa			Notes						
			ry sheet 125 30.5 34.0 34.1			From as built dwgs					
		00	405			entre frequ	0000				
		63	125	250	500	0 1000	2000	4000	8000		
Plantroom										L	
Lp at façade			30.5	31.5	24.5	17.5	13.5	11.5		30 dBA	
Roof plant L05, Grid line 21											
Lp at façade			34.0	30.3	23.4	16.5	11.7	11.6		26 dB/	
Roof plant L06, Grid line 21											
LP at façade			34.1	35.9	32.6	25.5	13.4	9.4		33 dB <i>A</i>	
Roof plant, Grid line 14											
LP at façade			34.4	35.8	31.9	24.9	14.0	10.4		32 dB <i>A</i>	
Roof plant, Grid line 05											
LP at façade			30.0	32.0	28.1	21.1	10.3	6.7		28 dBA	
Total at façade										38 dB	
										Pa	

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Buro Happold			Element Description	UCL Roo	f Plant L0	6 GL 21		Notes				
					I	I		<u> </u>	1			<u> </u>
				63	125	250	500	1000	2000	4000	8000	
L06 plantroom												
AHU R03A	extract fan	outlet	in duct Lw		83	86	86	82	77	73		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to atmosphere					82	86	86	82	77	73		
AHU R03B	supply fan	inlet	in duct Lw		86	90	90	86	82	77		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to atmosphere					76	79	77	72	66	61		
Total Lw					83	86.8	86.5	82.4	77.3	73.3		
nearest façade, m	35	14 Harley Rd	20log-11		-42	-42	-42	-42	-42	-42		
Directivity Q=	2	-	_		3	3	3	3	3	3		
screening	0.5m path ∆				-10	-12	-15	-18	-25	-25		
Lp (free field)					34	36	33	7 26	13	9		
Façade correction	Assume 3.5m fr	om façade			0	0	0	0	0	0		
LP at façade					34	36	33	26	13	9		33 dE

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Buro Happold			Element Description	UCL roof	plant GL0	5		Notes			
				63	125	250	500	1000	2000	4000	8000
					1,000					0015-55-50	
U TEF R01			in duct Lw		85	82	80	84	84	81	
Atten	900 circ				5	7	10	15	10	7	
Lw to env					80	75	70	69	74	74	
AHU R01A	extract fan	outlet	in duct Lw		82	86	85	81	77	72	
end reflection, m2	1				-1	0	0	0	0	0	
Lw to environment					81	86	85	81	77	72	
AHU R01A	supply fan	inlet	in duct Lw		84	88	88	84	80	75	
			heat wheel		-3	-3	-3	-3	-4	-4	
			filter		-3	-5	-7	-8	-8	-8	
			coils		-3	-3	-3	-3	-4	-4	
end refn, m2					-1	0	0	0	0	0	
Lw to environment					74	77	75	70	64	59	
AHU R01B	extract fan	outlet	in dust !···		82	86	85	81	77	72	
			in duct Lw								
end reflection, m2	1				-1	0	0	0 81	0	0 72	
Lw to room					81	86	85	01	77	12	
AHU R01B	supply fan	inlet	in duct Lw		84	88	88	84	80	75	
			heat wheel		-3	-3	-3	-3	-4	-4	
			filter		-3	-5	-7	-8	-8	-8	
			coils		-3	-3	-3	-3	-4	-4	
end refn, m2					-1	0	0	0	0	0	
Lw to enevironmen	t				74	77	75	70	64	59	
U AHU R05	supply fan	inlet	in duct Lw		82	87	87	83	79	74	
	ppij idii		heat wheel		-3	-3	-3	-3	-4	-4	
			filter		-3	-5 -5	-7	-8	-8	-8	
			coils		-3	-3	-3	-3	-4	-4	
end refn, m2			555		-1	0	0	0	0	0	
Lw to environment					72	76	74	69	63	58	
AHU R05	extract fan	outlet	in duct Lw		81	85	85	81	76	72	
end reflection, m2	1				-1	0	0	0	0	0	
Lw to environment					80	85	85	81	76	72	
Total Lw Ahus					86.2	91	90.2	86.1	81.7	77	
total Lw, Ahus +	เลกร				87.1	91.1	90.2	86.2	82.4	78.8	
nearest façade, m	90	14 Hadov Dd	20logr 11		-50	-50	-50	-50	-50	-50	
nearest raçade, m Directivity, Q=	2	14 Harley Rd	20logr -11		-50 3	-50	-50	-50	3	-50	
	2 0.5m path Δ										
screening	о.этп раш ∆				-10	-12	-15	-18	-25	-25	
Lp (free field)	Accumo 2 Fra fra	, foods			30	32	28	21	10	7	
	Assume 3.5m mon	ı iacade		1	0	0	0	0	0	0	1 1
Façade correction LP at façade	, 100 01110 010111 11011				30	32	28	21	10	7	28

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			Element	UCL roof	plant GL	14		220	U.			
Buro Happold			Description					Notes				
				63	125	250	500	1000	2000	4000	8000	
				63	125	250	500	1000	2000	4000	8000	
U TEF R02	as R01		in duct Lw		85	82	80	84	84	81		
Atten	900 circ				_ 5	7	10	15	10	7		
Lw to environment					80	75	70	69	74	74		
AHU R02A	extract fan	outlet	in duct Lw		83	86	85	81	77	72		
end reflection, m2	extract fan		III QUUL LW		-1	0	0	0	0	0		
Lw to environment					82	86	85	81	77	72		
AHU R02A	supply fan	inlet	in duct Lw		84	88	88	84	80	75		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					74	77	75	70	64	59		
AHU R02B	extract fan	outlet	in duct Lw		83	86	85	81	77	72		
end reflection, m2	1		III GGOT EW		-1	0	0	0	0	0		
Lw to environment					82	86	85	81	77	72		
AHU R02B	supply fan	inlet	in duct Lw		84	88	88	84	80	75		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
and rafe 0			coils		-3 -1	-3 0	-3	-3 0	-4 0	-4 0		
end refn, m2 Lw to environment					-1 74	77	0 75	70	64	59		
LW to environment					74	- //	75	70	04	39		
U AHU R04	supply fan	inlet	in duct Lw		82	87	87	83	79	74		
- •			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					72	76	74	69	63	58		
AUII DO4	autraat fan	outlet	in duct luc		00	96	96	90	77	70		
AHU R04 end reflection, m2	extract fan 1	outlet	in duct Lw		83 -1	86 0	86 0	82 0	77 0	73 0		
Lw to environment					82	86	86	82	77	73		
						34	- 35		- •			
Total Lw at 1m, Al-					87.3	91.3	90.5	86.4	82	77.3		
total Lp at 1m, Ahu					88	91.4	90.5	86.5	82.6	79		
					_				_	_		
nearest façade, m		14 Harley Rd	-20log r -11		-47	-47	-47	-47	-47	-47		
Directivity, Q=	2				3	3	3	3	3	3		
	0.5m path ∆				-10	-12	-15	-18	-25	-25		
Lp (free field)	Assume 3.5m from	foodo			34 0	36 0	32 0	25 0	14 0	10 0		
LP at façade	Assume 3.3m TON	ı iaçaue			34	36	32	25	14	10		32 c
Li aliayau c					J=4	30	32	23	14	10		J2 (

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Buro Happold			Element Description	UCL roof	plant GL 2	21		Notes				
				63	125	250	500	1000	2000	4000	8000	
U AHU 101	extract fan	outlet	in duct Lw		82	86	85	81	77	72		
end reflection, m2	CALIBOL IBIT	1	III GGGC LVV		-1	0	0	0	0	0		
Lw to room					81	86	85	81	77	72		
AHU R01B	supply fan	inlet	in duct Lw		81	85	86	82	78	73		
			heat wheel		-3	0	0	0	0	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
Attenuator	900mm 45%				-5	-11	-17	-20	-19	-12		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					66	66	59	51	47	45		
directivity correction	1m2				7	8	8	9	9	9		
nearest façade, m	30		-20logr		-30	-30	-30	-30	-30	-30		
hemi spreading					-8	-8	-8	-8	-8	-8		
screening	line of sight				-5	-5	-5	-5	-5	-5		
Total Lp, free field					30	31	24	17	13	11		
façade correction	Assume 3.5m from	om façade			0	0	0	0	0	0		
Lp at façade					30	31	24	17	13	11		

Atten 900 circ 5 7 10 15 10 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				Project	BSF Can	nden			Sheet:		1	of		
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Description									Revisions					
TEF 03 Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 72 77 66 61 67 67 VEF 501 Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 72 77 66 61 67 67 Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 79 77 76 71 68 67 UTEF R01 85 82 80 84 84 81 Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 8 85 82 80 84 84 81 Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 8 82.9 81.2 77.3 73.4 75.6 75.5 Total Lw 82.9 81.2 77.3 73.4 75.6 75.5 Total Ly 12 12 12 12 12 12 12 12 12 12 12 12 12	Buro Happold			TOTAL STATE OF THE PARTY OF THE	UCL roo	f plant L05	GL 21		Notes					
Atten 900 circ 5 7 10 15 10 7					63	125	250	500	1000	2000	4000	8000		
Atten 900 circ 5 7 10 15 10 7	TEC 02			in duct LM		77	04	76	76	77	74			
Lew to atmosphere 72 77 66 61 67 67 VEF 501		000 circ		III duct LVV										
FF 501		and clic												
Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 79 77 76 71 68 67 UTEF R01 85 82 80 84 84 81 Atten 900 circ 5 7 10 15 10 7 Lw to atmosphere 80 75 70 69 74 74 Interval Lw to atmosphere 82.9 81.2 77.3 73.4 75.6 75.5 Interval Lw 14 Harley Rd -20log r -11 42 42 42 42 42 42 42 42 42 42 42 42 42	Lw to atmosphere					12	11	90	ОІ	67	67			
Lew to atmosphere	V EF 501			in duct lw		84					74			
Directivity, Q = 2 2 3 3 3 3 3 3 3 3	Atten	900 circ				5		10		10				
Atten 900 circ 5 7 10 15 10 7	Lw to atmosphere					79	77	76	71	68	67			
Lw to atmosphere 80 75 70 69 74 74 Total Lw 82.9 81.2 77.3 73.4 75.6 75.5 Total Lw 75.6 75.5 Total Lw 75.6 75.5 Total Ly, free field 75.6 75.5 T	U TEF R01			in duct Lw		85	82	80	84	84	81			
Solution	Atten	900 circ				5	7	10	15	10	7			
nearest façade, m 35	Lw to atmosphere					80	75	70	69	74	74			
Directivity, Q= 2 3 17 12	Total Lw					82.9	81.2	77.3	73.4	75.6	75.5			
Directivity, Q= 2 3 17 12							_			_				
Screening 0.5m path Δ -10 -12 -15 -18 -25 -25 Total Lp, free field acçade correction 34 30 23 17 12 12 acçade correction Assume 3.5m from façade 0 0 0 0 0 0			14 Harley Rd	-20log r -11										
Total Lp, free field 34 30 23 17 12 12 raçade correction Assume 3.5m from façade 0 0 0 0 0	-													
açade correction Assume 3.5m from façade 0 0 0 0 0		0.5m path ∆												
_p at façade		Assume 3.5m from	n façade			_								
	Lp at façade					34	30	23	17	12	12		2	