Design Note

project BSF Camden

subject Fixed plant noise assessment

project no 025901

date 21 December 2012

Revision	Description	Issued by	Date	Approved (signature)
00	Fixed plant noise assessment, SCSS	IT	21/12/12	IT
01	Calculation reviewed, additional receiver included	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 Swiss Cottage Specialist SEN School (SCSSS) 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 SCSSS two locations are considered, as indicated on the Figure below:

(1) houses in Avenue Road, (2) rear of houses in Harley Road

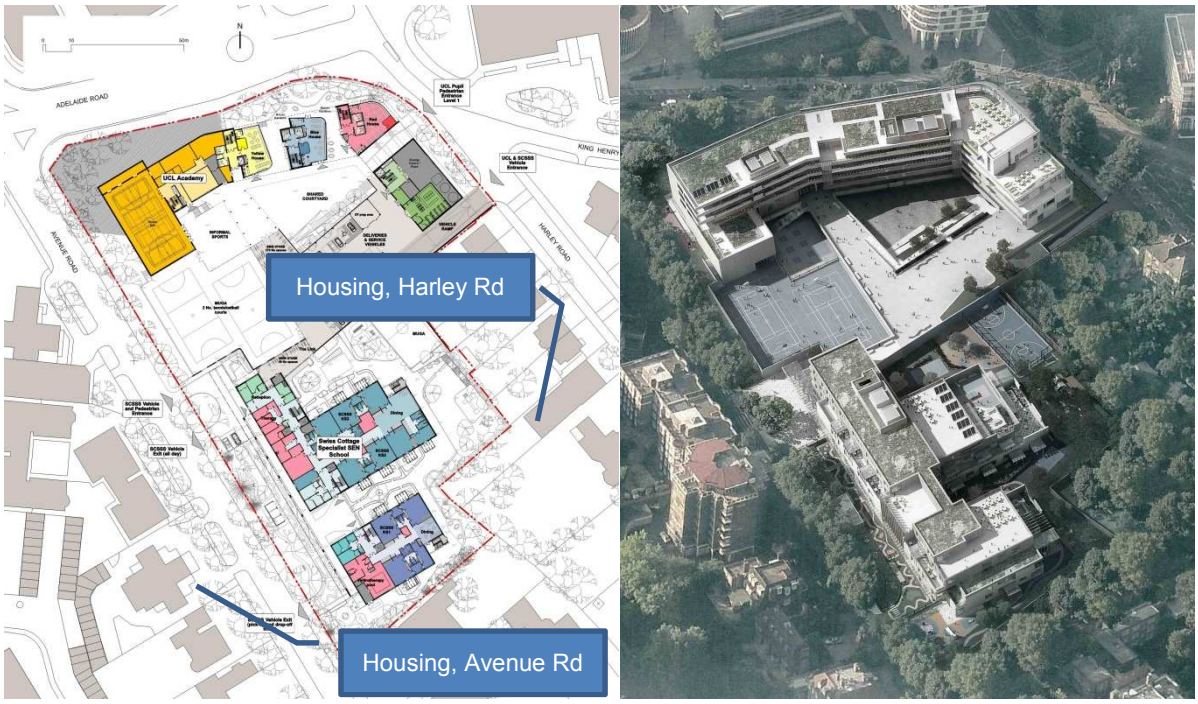

Figure 1 Site layout drawing (excerpt from AR-Arch 1000) and illustration of proposals in context

1.1.1 External plant areas included within assessment

External plant area at Level 04

Roof plant area at Level 05

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, Houses in Avenue Road.

From calculation, the daytime noise level from fixed plant is estimated to be 36 dBL_{Aeq} at 3.5m from the façade of the nearest housing.

The pre development noise survey [1] reported ambient noise levels at the nearest housing in Avenue Road as follows (*data as report Figure C3, position 1*):

Daytime ambient noise levels at houses in Avenue Road, 3.5m from facade	68 dB L_{Aeq}/ 54dB L_{A90}
Night time ambient noise levels at houses in Avenue Road, 3.5m from facade	not provided

The daytime design basis criterion for housing in Avenue Road is taken to be 49dB L_{A90} ie 5 dB below the measured background of 54 dBL_{A90}.

On the basis of the information reviewed, the noise level from operation of fixed plant is estimated to be 18 dB below the reported daytime background noise levels and the design condition is satisfied.

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

Receiver 2, Rear of houses in Harley Road.

From calculation, the daytime noise level from fixed plant is estimated to be 33 dBL_{Aeq} at 3.5m from the façade of the nearest housing.

The pre development noise survey 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 facade	53 dB L_{Aeq}/ 43dB L_{A90}
Night time ambient noise levels at nearest residential, 3.5m from facade	45 dB L_{Aeq} / 35dBL_{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 be 5 dB below the design basis daytime background noise level and the design condition is satisfied.

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 drawings and equipment data

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

Buro Happold

Project	BSF Camden	Sheet:	1 of	
	SCSSS	Prepared	IT	date: 20-Dec
Area of Project	External plant noise checks	Checked:		date:
		Revisions	Feb 2013:calc revised, façade to +3.5m	
Element Description	Summary sheet	Notes		
		From as built dwgs		

	Octave band centre frequency, Hz								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
Receiver 1: Houses opposite, Avenue Road									
SCSSS Plant L04									
LP at 3.5m from façade		34	37	34	27	16	11		34.0
SCSSS Roof Plant									
Lp at 3.5m from façade		45	46	43	36	26	22		32.1
Total at 3.5m from façade									36 dBA
Receiver 2: Rear of houses, Harley Road									
SCSSS plant L04									
LP at 3.5m from façade		32	34	31	20	16	11		30.6
SCSSS roof plant									
Lp at 3.5m from façade		33	33	29	23	12	8		29.8
Total at 3.5m from façade									33 dBA

Buro Happold

Project	BSF Camden	Sheet:	of
		Prepared	date:
Area of Project	External plant noise checks	Checked:	date:
		Revisions	
Element Description	SCSSS roof plant L04	Notes	

				63	125	250	500	1000	2000	4000	8000	
S AHU 4 01	extract fan	outlet	in duct Lw		81	84	84	80	75	71		
end reflection, m2	1				-1	0	0	0	0	0		
Lw to environment					80	84	84	80	75	71		
S AHU 4 01	supply fan	inlet	in duct Lw		84	87	87	83	79	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	76	74	69	63	59		
S AHU 4 02	extract fan	outlet	in duct Lw		83	87	88	84	80	75		
end reflection, m2	1				-1	0	0	0	0	0		
Lw to environment					82	87	88	84	80	75		
A AHU 4 02	supply fan	inlet	in duct Lw		82	86	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	75	74	69	63	58		
Total Lw AHUs					**84.8**	**89.2**	**89.7**	**85.6**	**81.3**	**76.6**		
nearest façade, m	60	Avenue Rd	-20logr-11		-47	-47	-47	-47	-47	-47		
source directivity	4				6	6	6	6	6	6		
screening	0.5m path Δ				-10	-12	-15	-18	-25	-25		
Lp (free field)					34	37	34	27	16	11		
Façade correction	*Assess at 3.5 from façade - no correction required*				0	0	0	0	0	0		
LP at 3.5m from façade					34	37	34	27	16	11		34 dBA
nearest façade, m	90	rear Harley Rd	-20logr-11		-47	-47	-47	-47	-47	-47		
source directivity	2				6	6	6	6	6	6		
screening	1.0m path Δ				-12	-15	-18	-25	-25	-25		
Lp (free field)					32	34	31	20	16	11		
Façade correction	*Assess at 3.5 from façade - no correction required*				0	0	0	0	0	0		
LP at 3.5m from façade					32	34	31	20	16	11		31 dBA

Assume 1/4 sphere radiation - adjacent stair enclosure

Assume hemi propagation this direction

Buro Happold				Project	BSF Camden		Sheet:	1 of					
							Prepared		date:				
				Area of Project	External plant noise checks		Checked:		date:				
							Revisions						
				Element Description	SCSSS roof plant		Notes						
							63	125	250	500	1000	2000	4000	8000	
S TEF 5 01	as R01			in duct Lw			85	77	77	64	63	61		
Atten	900 circ						5	7	10	15	10	7		
Lw to environment							80	70	67	49	53	54		
S TEF 5 02	as R01			in duct Lw			81	76	77	82	79	77		
Atten	900 circ						5	7	10	15	10	7		
Lw to environment							76	69	67	67	69	70		
S TEF 5 03	as R01			in duct Lw			88	81	72	67	67	63		
Atten	900 circ						5	7	10	15	10	7		
Lw to environment							83	74	62	52	57	56		
TotalLw, fans							**85.3**	**76.3**	**70.6**	**67.2**	**69.4**	**70.3**		
S AHU 5 01	extract fan		outlet	in duct Lw			78	83	83	79	75	71		
end reflection, m2		1					-1	0	0	0	0	0		
Lw to environment							77	83	83	79	75	71		
S AHU 5 01	supply fan		inlet	in duct Lw			84	88	89	86	82	78		
				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	76	72	66	62		
S AHU 5 02	extract fan		outlet	in duct Lw			84	87	87	83	79	74		
end reflection, m2		1					-1	0	0	0	0	0		
Lw to environment							83	87	87	83	79	74		
S AHU 5 02	supply fan		inlet	in duct Lw			85	90	90	87	83	79		
				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							75	79	77	73	67	63		
S AHU 5 03	extract fan		outlet	in duct Lw			79	84	84	81	77	72		
end reflection, m2		1					-1	0	0	0	0	0		
Lw to environment							78	84	84	81	77	72		
S AHU 5 03	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		
total Lw,AHUs 1&2							84.9	89.2	89	85	80.8	76.2		
Total Lw, AHU 03							79	84.6	84.4	81.3	77.2	72.2		
total Lw, Ahus + fans							**88.6**	**90.7**	**90.3**	**86.6**	**82.6**	**78.4**		
nearest façade, m	60	Assume hemi radiation- flat roof	Avenue Rd	-20log r -11			-47	-47	-47	-47	-47	-47		
Directivity, Q=	2						3	3	3	3	3	3		
screening	0.5m path Δ						-10	-12	-15	-18	-25	-25		
Lp (free field)							35	35	32	25	14	10		
Façade correction	*Assess at 3.5 from façade - no correction required*						0	0	0	0	0	0		
LP at 3.5m from façade		Assume hemi radiation- flat roof					35	35	32	25	14	10		32 dBA
nearest façade, m	78		Rear, Harley Rd	-20log r -11			-49	-49	-49	-49	-49	-49		
Directivity, Q=	2						3	3	3	3	3	3		
screening	0.5m path Δ						-10	-12	-15	-18	-25	-25		
Lp (free field)							33	33	29	23	12	8		
Façade correction	*Assess at 3.5 from façade - no correction required*						0	0	0	0	0	0		
Lp at 3.5m from façade							33	33	29	23	12	8		30 dBA