# **TECHNICAL NOTE**

**Project Camden Schools-SCCS Site** 

Subject Planning Conditions – Acoustics - Permanent Plant

Author David ONeill Ref SCCS DN07

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The SCCS scheme is a secondary school in South Camden. It has planning permission from London Borough of Camden (LBC) subject to various planning conditions. In respect of plant noise, conditions 9 and 10 relate to the permanent scheme and condition 2 relates to the temporary accommodation.

This technical note refers to the noise from permanent plant which comprises primarily Air Handling Units and various extract fans distributed across the various buildings of the scheme.

# **Planning Condition**

The following conditions have been imposed by LBC for the permanent plant:

#### Permanent Scheme

9. At 1 metre outside the windows of any neighbouring habitable room the level of noise from all plant and machinery shall be at all times at least 5 decibels below the existing background noise levels, expressed in dB(A) at such locations. Where the noise from the plant and machinery is tonal in character the differences in these levels shall be at least 10 dB(A)

10. Technical specification details of the mechanical plant to be installed within the plant areas shown on the submitted floor plans approved, together with an accompanying acoustic report, shall be submitted to and approved by the local planning authority prior to installation of this plant. The plant shall not be operated other than in complete accordance with such measures as may be approved

## **Plant Noise Limits**

The plant noise limits are derived in relation to the background noise levels in the absence of the plant. A baseline noise survey was carried out by Hoare Lea as part of the original planning application for the scheme. Their survey was reported in their report "South Camden Community School – Acoustic Strategy Report" dated 10/07/08 (their reference MR-1002999). This report was prepared for London Borough of Camden prior to the appointment of the current

design and development team. Background noise levels around the school were measured at several positions. This included an unattended long term monitor as well as some short term attended monitoring.

The report documents the noise measurements and states plant noise limits applicable to the scheme, which are 5 dB below the measured background noise. This corresponds with the requirements of planning conditions 9 and 10 above. Their report gives the following noise limits in Table 7 of the report, these are implemented as the plant noise limits for this scheme:

Period	Prevailing background noise	Plant Noise Rating Limit (L <sub>Aeq</sub> )
	levels (L <sub>A90</sub> )	
Day (0700 – 1900)	42 dB	37 dB
Night (2300 – 0700)	37 dB	32 dB

# **Proposed Plant Scheme**

Details of the operational plant scheme have been provided by Buro Happold services and BAM Construction. The plant details in terms of plant specification, noise levels and distance to receptors are shown in the calculation sheets. Noise data has been provided in terms of sound power level in octave bands from manufacturers.

The location of the plant is shown on the Buro Happold services drawings. As these are distributed around the site and there are several different residential receptors to be considered. The receptor locations (numbered 1 to 4) and indicative locations of the plant are shown in marked up drawings in Figure 1, showing the main area and in Figure 2 showing the youth / sports building. These are indicative only and the actual locations are on differing roof levels; the services drawings should be referenced for full details.

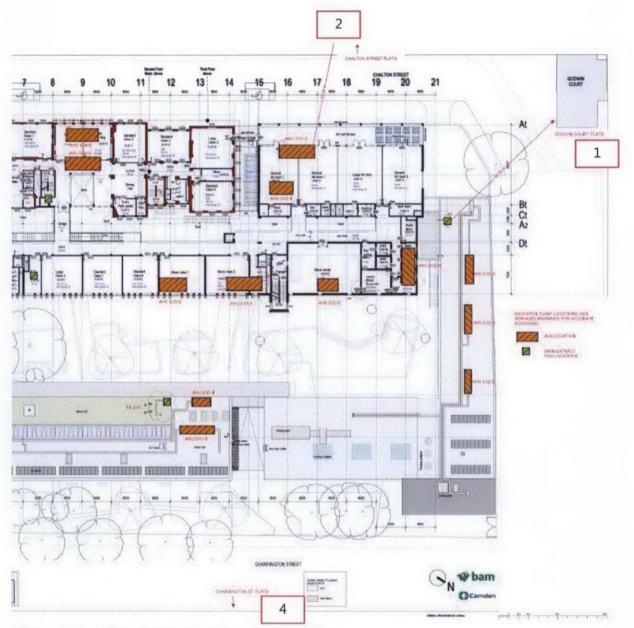


Figure 1: Location of Main Plant Areas and Housing

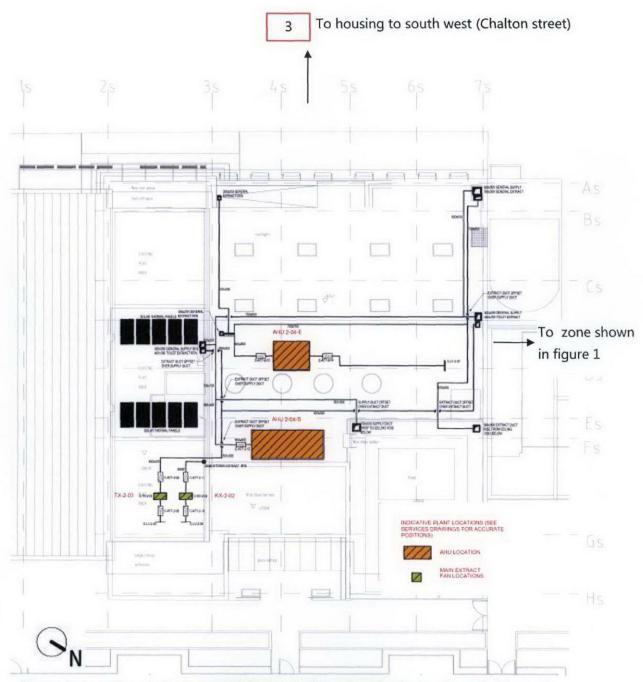


Figure 2: Location of plant on youth/sports building (south of zone shown in Figure 1)

#### **Plant Noise Calculations**

Plant noise calculations have been prepared for the four receptor positions. The calculation includes the effect of the noise mitigation treatment which is being implemented to meet the limits. The supplier has proposed attenuators, and in most cases these are adequate to meet the limits. There are only a few items of plant where additional treatment is required. These have been identified to the team and discussed and agreed with the services designers. The requirements have been implemented in the design. Therefore, this report documents the current design proposal.

There is one case, the main kitchen extract fan, where it is possible that an alternative plant item may be sourced. The scheme below is based on the current selection and meets the noise limits with a casing enclosure and increased attenuation. However, if an alternative fan were selected it would be selected to be quieter and also designed, along with any attenuation measures, to meet the aggregate noise limit at the housing.

Table 1 shows the aggregate plant noise levels predicted at four different residential locations. The calculation assumes all plant is running simultaneously and is therefore a worst case condition. The critical location is to the north-west (Godwin Court) and the full calculation is appended for this position. A similar calculation has been prepared for all receptor positions.

Receptor	Plant noise level with all plant running	Plant noise limit	Compliant?	
1 North West – Chalton St (Godwin Court)	37 dB	37 dB	Yes	
2 South West – Chalton St (flats at north end 119-146)	36 dB	37 dB	Yes	
3 South West – Chalton St (flats opposite youth/sports)	34 dB	37 dB	Yes	
4 North East – Charrington St (houses opposite plant zone)	29 dB	37 dB	Yes	

## Summary

The plant noise levels calculated at all residences around the site meet the daytime limit of 37 dB(A). The plant will not be used during the night and therefore the daytime and early evening limit is appropriate. The proposed plant and mitigation scheme therefore meets the local authority standard criteria for plant noise.

# Calculation: Noise Level of all plant to Godwin Court to North West

		Octave Band Centre Frequency, Hz													
	South	Camde	en Com	munity	Schoo	1		63	125	250	500	1000	2000	4000	dB(A)
	From:	All Roo	ftop pla	nt											day
	To:	Housin	g To No	rth - Cha	iton Str	eet (Go	dwin Co	ourt - tov	ver)						total
	Total -	sum of	all plant	operating	g										37.4
							day	excess	;	eve	excess	•			
	1						dB	dB		dB	dB				
	Cande	n Plan	ning No	ise Lim	it		37	0		37	0				
	4			distance	_										
	Summ	пагу		horiz	verti	slant	shield		SPL	(dB) at	octave	bands (	Hz)		dB(A)
				m	m	m	dB	63	125	250	_	1000	2000	4000	
1	Ahu 2-	03 - sup	oply	37	6	37.48	0	20.0	32.0	14.0	4.0	-8.5	-10.5	-16.5	16.5
2	Ahu 2-	02 - su	oply	40	6	40.45	0	13.9	15.9	13.9	3.9	8.9	10.9	4.9	15.2
3	Ahu 3-	3-01 - supply		50	6	50.36	0	20.0	30.0	8.0	2.0	1.0	1.0	1.0	14.9
4	Ahu 3-	01 - ext	ract	60	6	60.30	5	19.9	37.9	35.9	30.9	18.4	13.4	8.4	31.4
5	Ahu 3-	02 - su	oply	45	6	45.40	0	23.9	36.9	23.9	13.9	12.9	11.9	6.9	23.2
6	Ahu 3-	02 - ext	ract	55	6	55.33	0	24.1	34.1	23.1	23.1	17.1	18.1	16.1	25.8
7	Ahu 3-	03 - sup	oply	75	6	75.24	5	12.0	24.0	0.0	-5.0	-17.5	-13.5	-15.5	8.2
8	Ahu 3-	3-03 - extract		87	6	87.21	5	6.7	21.7	9.7	9.7	-7.8	-4.8	-4.8	10.2
9	kitchen	extract	(KX 2-0	30	6	30.59	0	40.8	48.8	28.8	19.8	20.3	20.3	18.3	33.7
10	Kitcher	Extrac	t breako	30	6	30.59	0	29.3	44.3	28.3	20.3	15.3	13.3	7.3	29.4
11	AHU 2	-03-S				37.48		18.5	26.5	14.5	3.5	4.5	2.5	-2.5	13.4
12	AHU 2	-02-S				40.45		14.9	11.9	13.9	0.9	4.9	4.9	-2.1	10.9
13	AHU 3	-02-S				45.40		25.9	33.9	24.9	11.9	9.9	6.9	0.9	21.1
14	AHU 3	-01-E				60.30		18.4	26.4	17.4	4.4	2.4	-0.6	-6.6	13.6

	Calcul	ation fo	or indiv	ridual plan	nt items			Octave	Band	Centre F	requenc	y, Hz			
1	Ahu 2-	03 - su	vlac				63	125	250	500	1000	2000	4000		
	inlet		,				63.0	72.0		45.0	45.0	43.0	37.0	57.1	
							00.0	12.0	04.0	40.0	40.0	10.0	0.10	Jr.1	-
	end ret	lection	800mm	, 800mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		-
	oria roi	icction,	COOMMIN	, coomin		Lw	59.0	71.0	54.0	45.0	45.0	43.0	37.0		-
	Atmos	here			distance		42.5	42.5	42.5	42.5	42.5	42.5	42.5		
	-timos	or ioi c	direc	tivity · 20s	,90°, 800mm,	A CONTRACTOR OF THE PARTY OF TH	3.5	3.5	2.5	1.5	-11.0	-11.0	-11.0		-
			unec	arvity . 50	,50 , 60011111,		20.0	32.0	14.0	4.0	-8.5	-10.5	-16.5	10.5	dD/
-	shield	ina	0			Lp	0.0	0.0	0.0	0.0	0.0	AND WATER OF		16.5	UDU
_	200000000000000000000000000000000000000	housi					(0.70)	78.50	-75-2000	1000	10000000	0.0	0.0	40.5	-IFD
	art at	Housi	ıy				20.0	32.0	14.0	4.0	-8.5	-10.5	-16.5	16.5	abi
2	Ahu 2-	02 - sup	nnlv				63	125	250	500	1000	2000	4000		
	outlet		10.1				56.0	54.0	51.0	40.0	44.0	46.0	40.0	50.8	
	2411140							01.0	00	10.0	11.0	10.0	10.0	00.0	
	end ref	lection	800mm	, 800mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
	3112101	- action i	Joonnill	Joonan		Lw	52.0	53.0	51.0	40.0	44.0	46.0	40.0		
	Atmosp	here			distance		43.1	43.1	43.1	43.1	43.1	43.1	43.1		
	· miosp		direc	tivity · 30°	,30", 800mm,	CONTRACTOR OF SECURITY	5.0	6.0	6.0	7.0	8.0	8.0	8.0		
			un ec	y . 30	,000,1111,	Lp	13.9	15.9	13.9	3.9	8.9	10.9	4.9	15.0	dD
	shield	ina	0			rh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	udi
-		housii	_				13.9	15.9	13.9	3.9	8.9	10.9	4.9	45.0	, ID
	SFL at	Housii	ıy				13.5	15.8	13.9	3.8	6.9	10.9	4.9	15.2	abi
	Ahu 3-01 - supply					63	125	250	500	1000	2000	4000			
	supply	airside	(inlet)				64.0	70.0	47.0	40.0	38.0	38.0	38.0	54.6	
	and vat	laction	900mm	900mm			40	40	00	00	0.0	00	0.0		
	enu rei	iection,	occinin,	, 800mm		1	4.0	1.0	0.0	0.0	0.0	0.0	0.0		
-	****	dana			-0-4	LW	60.0	69.0	47.0	40.0	38.0	38.0	38.0		-
	Amosk	Atmosphere dista directivity: 30°,30°, 800			distance	CONTRACTOR NO.	45.0	45.0	45.0	45.0	45.0	45.0	45.0		
-			urec	tivity . 30	,30°, 600mm,	-	5.0	6.0	6.0	7.0	8.0	8.0	8.0		
						Lp	20.0	30.0	8.0	2.0	1.0	1.0	1.0	14.8	dB(
-	shield		0				0.0	0.0	0.0	0.0	0.0	0.0	0.0		-
-	SPL at	housin	ng				20.0	30.0	8.0	2.0	1.0	1.0	1.0	14.9	dB(
4	Ahu 3-l	01 - ext	ract				63	125	250	500	1000	2000	4000		
-	F. W. Con. 1		(outlet)				72.0	87.0	90.0	88.0	81.0	76.0	71.0	88.1	
$\rightarrow$		nal atter					0.0	0.0	5.0	7.0	0.0	0.0	0.0	30.1	
-		Month of Control		800mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
	-1.01		- commit	Journal		Lw	68.0	86.0	85.0	81.0	81.0	76.0	71.0		
	Atmosp	here			distance		46.6	46.6	46.6	46.6	46.6	46.6	46.6		
			directi	vity : 30° 1	50°, 800mm,		3.5	3.5	2.5	1.5	-11.0	-11.0	-11.0		
				, , , ,	-2 ( -2011111)	Lp	24.9	42.9	40.9	35.9	23.4	18.4	13.4	36.4	dB
	shieldi	ina	5				5.0	5.0	5.0	5.0	5.0	5.0	5.0	30.4	CID
-4		housir	-				19.9	37.9	35.9	30.9	18.4	13.4	8.4	31.4	dBr
										,			-11	31.1	
		Ahu 3-02 - supply					63	125	250	500	1000	2000	4000		
-	supply	airside (	(inlet)				67.0	76.0	62.0	51.0	49.0	48.0	43.0	61.6	
	end ref	lection.	800mm.	800mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
1						Lw	63.0	75.0	62.0	51.0	49.0	48.0	43.0		
	Atmosp	here			distance		44.1	44.1	44.1	44.1	44.1	44.1	44.1		
ľ			direct	tivity: 30°	30°, 800mm,	200000000000000000000000000000000000000	5.0	6.0	6.0	7.0	8.0	8.0	8.0		
				.,,	1 - 1 - 3 - 0 - 1 - 1	Lp	23.9	36.9	23.9	13.9	12.9	11.9	6.9	23.2	dBo
İ						-P	20.0	00.0	20.0	10.0	12.0	11.0	0.0	20.2	and
	shieldi	ina	0				0.0	0.0	0.0	0.0	0.0	0.0	0.0		

								Octave	Band C	entre F	requenc	cy, Hz			
							63	125	250	500	1000	2000	4000		
6	Ahu 3-0	2 - extr	ract				63	125	250	500	1000	2000	4000		
	Extract	air side	(outlet)				70.0	81.0	71.0	66.0	58.0	59.0	57.0	69.6	
							1.0	6.0	8.0	4.0	3.0	3.0	3.0		
	mitred bend, 1000mm end reflection, 800mm, 800mm					4.0	1.0	0.0	0.0	0.0	0.0	0.0			
						Lw	65.0	74.0	63.0	62.0	55.0	56.0	54.0		
	Atmospi	here			distance	55.3m	45.9	45.9	45.9	45.9	45.9	45.9	45.9		
			direct	tivity: 3	0",30", 800mm,		5.0	6.0	6.0	7.0	8.0	8.0	8.0		
						Lp	24.1	34.1	23.1	23.1	17.1	18.1	16.1	25.6	dB(A
	shieldi	na	0				0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	SPL at		10				24.1	34.1	23.1	23.1	17.1	18.1	16.1	25.8	dB(A
			•								3,4.22	1-11			
7	Ahu 3-0	3 - sun	nlv				63	125	250	500	1000	2000	4000		
•	supply 8		Mark Street Communication Comm				61.0	70.0	46.0	42.0	42.0	46.0	44.0	55.6	
									,5.0	.2.0	12.0			00.0	
	end refl	ection	800mm	800mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
	3101011		Journal,	Joonali		Lw	57.0	69.0	46.0	42.0	42.0	46.0	44.0		
	Atmospi	here			distance	-	48.5	48.5	48.5	48.5	48.5	48.5	48.5		
	annosp	noro	direction		,150°, 800mm,		3.5	3.5	2.5	1.5	-11.0	-11.0	-11.0		
-			uncour	vay . 50	,130 , 00011111,	Lp	12.0	24.0	0.0	-5.0	-17.5	-13.5	-15.5	8.2	dB(A
	ehieldi	00	0			Lp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	UDU
-	shielding 0 SPL at housing		-			12.0	24.0	0.0	-5.0	-17.5	-13.5	-15.5	0.7	dB(A	
	SPL at	Housii	ıy				12.0	24.0	0.0	-5.0	-17.5	-13.5	-15.5	0.2	ODLA
							63	125	250	500	1000	2000	4000		
0	STATE OF STA	Ahu 3-03 - extract					57.0	69.0	250 57.0	58.0	53.0	2000 56.0	56.0	60.5	
	Extract air side (outlet)					0.16	09.0	37.0	30.0	33.0	0.00	30.0	62.5		
	end reflection, 800mm, 800mm						40	4.0	00	00	00	00	00		
	ena ren	ection,	euumm,	800mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
	***************************************					LW	53.0	68.0	57.0	58.0	53.0	56.0	56.0		
	Atmosp	nere			distance	Control of the second	49.8	49.8	49.8	49.8	49.8	49.8	49.8		
			directiv	vity: 30	1,150°, 800mm,	1	3.5	3.5	2.5	1.5	-11.0	-11.0	-11.0		
	-61 - 6					Lp	6.7	21.7	9.7	9.7	-7.8	-4.8	-4.8	10.1	dB(A
-	shieldi		0				0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	SPL at	nousir	ng				6.7	21.7	9.7	9.7	-7.8	-4.8	-4.8	10.2	dB(A
_	1.th-st		40/0												
9	kitchen			-			05.0	1016	00.0	70.0	04.6	00.0			
	outlet si		plus A1	1 2-06			85.0	104.0	85.0	79.0	81.0	0.08	76.0		
		CAICE attenuator ils					3.0	9.0	18.0	20.0	9.0	8.0	6.0		
	and the same of th	additional attenuation end reflection, 800mm, 800mm						8.0				0.0	0.0		
	ena reti	ection,	ouumm,	BUUMM			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
	***					LW	78.0	86.0	67.0	59.0	72.0	72.0	70.0		
	Atmosp	nere			distance		40.7	40.7	40.7	40.7	40.7	40.7	40.7		
			directiv	vity: 30	,150°, 800mm,		3.5	3.5	2.5	1.5	-11.0	-11.0	-11.0		
		trans.				Lp	40.8	48.8	28.8	19.8	20.3	20.3	18.3	33.7	dB(A
	shieldi	-	0				0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	SPL at	housir	ng				40.8	48.8	28.8	19.8	20.3	20.3	18.3	33.7	dB(A
							14.6	32.7	20.2	16.6	20.3	21.5	19.3		

	Casin	g Kadia	tion: L	D = SWL	10 log (4 pi r2	) = SWL - 20								
							Octave	Band (	Centre F	requenc	cy, Hz			
10	Kitche	n Extract	t break	out		63	125	250	500	1000	2000	4000		
	breako	out LW				82	97	81	73	68	66	60	82.1	
	r	30.59		20 log r		-29.7	-29.7	-29.7	-29.7	-29.7	-29.7	-29.7		
				-11		-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0		
	DI			3		3.0	3.0	3.0	3.0	3.0	3.0	3.0		
	enclo	sure	15	casing	breakout	15.0	15.0	15.0	15.0	15.0	15.0	15.0		
	Lp					29.3	44.3	28.3	20.3	15.3	13.3	7.3	29.4	dB(
11	AHU 2	-03-S				63	125	250	500	1000	2000	4000		
	breako	out LW				58.0	66.0	54.0	43.0	44.0	42.0	37.0	52.9	
	r	37.48		20 log r		-31.5	-31.5	-31.5	-31.5	-31.5	-31.5	-31.5		
				-11		-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0		
	DI			3		3.0	3.0	3.0	3.0	3.0	3.0	3.0		
	shield	ling	0			0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	Lp					18.5	26.5	14.5	3.5	4.5	2.5	-2.5	13.4	dB(
12	AHU 2	-02-S				63	125	250	500	1000	2000	4000		
	breakout LW					55.0	52.0	54.0	41.0	45.0	45.0	38.0	51.0	
	r	40.45		20 log r		-32.1	-32.1	-32.1	-32.1	-32.1	-32.1	-32.1		
				-11		-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0		
	DI			3		3.0	3.0	3.0	3.0	3.0	3.0	3.0		
	shield	ling	0			0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	Lp					14.9	11.9	13.9	0.9	4.9	4.9	-2.1	10.9	dB(
13	AHU 3	-02-S				63	125	250	500	1000	2000	4000		
	breako	out LW				67.0	75.0	66.0	53.0	51.0	48.0	42.0	62.2	
	r	45.40		20 log r		-33.1	-33.1	-33.1	-33.1	-33.1	-33.1	-33.1		
				-11		-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0		
	DI			3		3.0	3.0	3.0	3.0	3.0	3.0	3.0		
	shield	ling	0			0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	Lp					25.9	33.9	24.9	11.9	9.9	6.9	0.9	21.1	dB(
14	AHU 3	-01-E				63	125	250	500	1000	2000	4000		
	breako	breakout LW				67.0	75.0	66.0	53.0	51.0	48.0	42.0	62.2	
	r	60.30		20 log r		-35.6	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6		
				-11		-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0		
	DI			3		3.0	3.0	3.0	3.0	3.0	3.0	3.0		
	shield	ling	5			5.0	5.0	5.0	5.0	5.0	5.0	5.0		
	Lp					18.4	26.4	17.4	4.4	2.4	-0.6	-6.6	13.6	dB(