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Ventilation Calculations

For

Camden Hostels, Camden Road

On behalf of

MORGAN SINDALL

DOCUMENT NUMBER: 123007-AGL-CA-XX-CA-M-0001					
REV	DESCRIPTION	CHECKED		STATUS	DATE
		DESIGN	QA		
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Project Name	Camden Road
Project No.	LE0270
Title	ESP Calculations.xlsx
Date:	27/10/2023
By	Leon Amoah
QA'd By	

Unit Chosen	LGH-RVXT-E_-_PL_2022 200
Q-AIRE-V125 (Valve - Filterless)	125
Maximum Pa of Unit	175

External Static Pressure Calculations

Apartment	Ductwork Pressure Losses (Index Run)	Total Bend Pressure Losses	Attenuator Pressure Loss (Index Run)	Louvre / Air Brick Pressure Loss	Ceiling Grille Pressure Loss	Total ESP	10% Margin
Landlord Area	11.0	5.5	20	?	3.4	**39.9**	**43.9**
	9.7	10.7	20		2	**42.4**	**Pa**
	15.1	14.4	20		13	**62.5**	**Pa**
	9.5	13.5	20		3.7	**46.7**	**Pa**

Landlord Area Index Run - Extract

Index Run Ductwork Section	Duct Size	Air Flow Rate (l/s)	Duct Length (m)	Pressure Loss / metre (Pa/m)	Pressure Loss (Pa)	
Section 1	150Ø	32	2.14	0.37	0.8	
Section 2	150Ø	32	11.4	0.37	4.2	
Section 3	150Ø	32	0.96	0.37	0.4	
Section 4	200Ø	64	3.61	0.32	1.2	
Section 5	250Ø	79	6.45	0.16	1.0	
Section 6	250Ø	109	3.7	0.28	1.0	
Section 7	250Ø	109	0.74	0.28	0.2	
Section 8	250Ø	109	0.51	0.28	0.1	
Section 9	250Ø	109	0.86	0.28	0.2	
Section 10	250Ø	109	1.8	0.28	0.5	
Section 11	250Ø	109	4.8	0.28	1.3	
				TOTAL	**11.0**	**Pa**

Landlord Area - Bends

Bend	Air Flow Rate (l/s)	Pressure Loss (Pa)	
1- Bend	32	0.5	Pa
2- Bend	32	0.5	Pa
3 - T Bend	64	0.5	Pa
4 - T Bend	79	0.5	Pa
5 - T Bend	109	0.5	Pa
6 - Bend	109	0.5	Pa
7 - Bend	109	0.5	Pa
8 - Adapter	109	0.5	Pa
9 - Adapter	109	0.5	Pa
10 - Bend	109	0.5	Pa
11 - Bend	109	0.5	Pa
	TOTAL	**5.5**	**Pa**

Camden Studio Index Run

Index Run Ductwork Section	Duct Size	Air Flow Rate (l/s)	Duct Length (m)	Pressure Loss / metre (Pa/m)	Pressure Loss (Pa)	
Section 1	204x60	21	0.41	0.9	0.4	
Section 2	204x60	21	5.85	0.9	5.3	
Section 3	204x60	21	0.52	0.9	0.5	
Section 4	204x60	21	1.2	0.9	1.1	
Section 5	204x60	21	2.83	0.9	2.5	
				TOTAL	**9.7**	**Pa**

Camden Studio Apartment

Bend	Air Flow Rate (l/s)	Pressure Loss (Pa)	
1 - Spigot	21	3	
2 - Bend	21	2.9	Pa
3 - Adapter	21	1	
4 - Adapter	21	1	
5 - Bend	21	2.9	Pa
6 - Bend	21	2.9	Pa
	TOTAL	**10.7**	**Pa**

Camden 2Bed Apartment

Index Run Ductwork Section	Duct Size	Air Flow Rate (l/s)	Duct Length (m)	Pressure Loss / metre (Pa/m)	Pressure Loss (Pa)	
Section 1	204x60	7	5.12	0.2	1.0	
Section 2	204x60	7	1.92	0.2	0.4	
Section 3	204x60	14	3.83	0.5	1.9	
Section 4	204x60	21	1.42	0.9	1.3	
Section 5	204x60	21	2.25	0.9	2.0	
Section 6	204x60	21	1.22	0.9	1.1	
Section 7	204x60	21	6.41	0.9	5.8	
Section 8	204x60	21	1.82	0.9	1.6	
				TOTAL	**15.1**	**Pa**

Camden 2Bed Bends Apartment

Bend	Air Flow Rate (l/s)	Pressure Loss (Pa)	
1 - Spigot	7	0.6	Pa
2 - Bend	7	0.2	Pa
3 - T Bend	14	1.1	Pa
4 - T Bend	21	2.1	Pa
5 - Bend	21	3	Pa
6 - Bend	21	3	Pa
7 - Adapter	21	1	Pa
8 - Adapter	21	1	Pa
9 - Bend	21	3	Pa
	TOTAL	**14.4**	**Pa**

Camden - Wheelchair Unit

Index Run Ductwork Section	Duct Size	Air Flow Rate (l/s)	Duct Length (m)	Pressure Loss / metre (Pa/m)	Pressure Loss (Pa)	
Section 1	204x60	11	0.41	0.3	0.1	
Section 2	204x60	11	3.5	0.3	1.1	
Section 3	204x60	22	0.98	0.8	0.8	
Section 4	204x60	22	2.04	0.8	1.6	
Section 5	204x60	22	3.52	0.8	2.8	
Section 6	204x60	22	2.98	0.8	2.4	
Section 7	204x60	22	0.85	0.8	0.7	
				TOTAL	**9.5**	**Pa**

Camden - Wheelchair Unit Bends

Bend	Air Flow Rate (l/s)	Pressure Loss (Pa)	
1- Spigot	11	0.7	Pa
2 - Bend	11	1	Pa
3 - T Bend	22	0.6	Pa
4 - Bend	22	3	Pa
5 - Adapter	22	1.1	Pa
6 - Adapter	22	1.1	Pa
7 - Bend	22	3	Pa
8 - Bend	22	3	Pa
	TOTAL	**13.5**	**Pa**

Camden Road
New Dwelling Ventilation Rates

Continuous Extract Rates
Part F Table 1.2a

Ref	Kitchen	Bathroom	En-suite	Utility	Total l/s
Studio	1	1	0	0	21
Wheelchair Unit	1	1	0	0	21

Extract Ventilation rates

Kitchen	13 l/s
Bathroom	8 l/s
En-suite	8 l/s
Utility	8 l/s

Table 1.2 Minimum extract ventilation rates for continuous extract systems[1]

Room	High rate (l/s)	Continuous rate
Kitchen	13	The sum of all extract ventilation in the dwelling on its continuous rate should be at least the whole dwelling ventilation rate given in Table 1.3
Utility room	8	
Bathroom	8	
Sanitary accommodation	6	

NOTE:
1. If the continuous rate of ventilation provided in a room is equal to or higher than the minimum high rate specified in the table, no extra ventilation is needed.

Whole Dwelling Ventilation Rates
Part F Claus 1.24

Ref	No. of Bedrooms	Total l/s
Studio	1	19
Wheelchair Unit	1	19

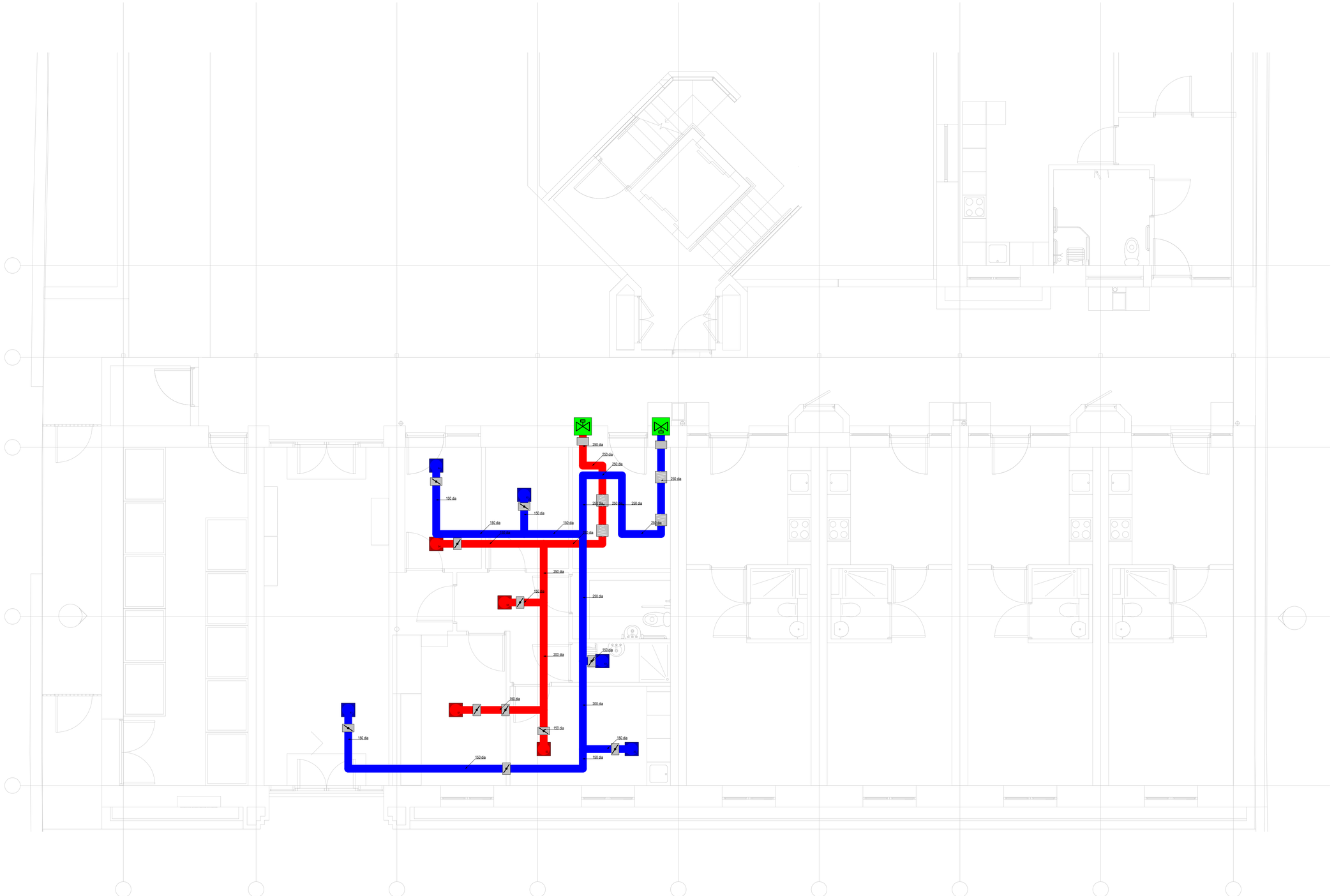
Minimum Ventilation Rate
Part F Table 1.3

Ref	Area	Total l/s
Studio	29	9
Wheelchair Unit	59.86	18

Table 1.3 Minimum whole dwelling ventilation rates determined by the number of bedrooms

Number of bedrooms[1][2]	Minimum ventilation rate by number of bedrooms (l/s)
1	19
2	25
3	31
4	37
5	43

NOTES:
1. If the dwelling only has one habitable room, a minimum ventilation rate of 13l/s should be used.
2. For each additional bedroom, add 6l/s to the values in Table 1.3.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Supply duct sizing - Landlord Supply

Section	Duct type	Flow rate (m^3/s)	Size (mm)	Velocity (m/s)	Length (m)	Pressure drop (N/m^2)
1	Circular	0.109	250	2.22	5	43.52
2	Circular	0.016	150	0.91	3.75	12.78
3	Circular	0.093	250	1.89	1.5	3.18
4	Circular	0.064	200	2.04	2.75	1
5	Circular	0.029	150	1.64	2	16.68
6	Circular	0.032	150	1.81	2	14.52
7	Circular	0.032	150	1.81	3.25	18.78

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Duct system Supply : index run

System resistance	66.48	N/m²
Total flow rate	0.109	m³/s
Index run to outlet	S1	
on floor	0	

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Supply duct damper losses - Landlord Supply

Section	Available pressure	Required pressure	Additional loss required (N/m²)	Damper specified
2	22.96	12.78	10.18	Yes
5	19.78	16.68	3.1	Yes
6	18.78	14.52	4.26	Yes
7	18.78	18.78	0	Yes

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Ductwork quantities, supply system : Landlord Supply

Component type	Description	Size mm	Quantity
Tee	Circular Standard tee	250 : 150 : 250	1
Adaptor	Circular Ceiling diffuser	150	4
Tee	Circular Standard tee	250 : 200 : 150	1
Tee	Circular Standard tee	200 : 150 : 150	1
Bend 90	Circular 1 piece long	250	3
Fitting	Circular Attenuator	250	2
Fitting	Circular Damper	150	5
Bend 90	Circular 1 piece long	150	4
Ductwork	Circular	250	6.50
Ductwork	Circular	150	11.00
Ductwork	Circular	200	2.75

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Supply duct sizing : Data input - Landlord Supply

Section no.	Duct type	End fitting	Upstream duct no.	Length (m)	Size limit	Additional loss	Maximum velocity	Fittings
1	Circular	Tee : Std	-	5	250	PD=40	-	3x1LG, 2xATT
2	Circular	Diffuser	1	3.75	150	PD=10	-	DMN, 1LG
3	Circular	Tee : Std	1	1.5	250	-	-	
4	Circular	Tee : Std	3	2.75	200	-	-	
5	Circular	Diffuser	3	2	150	PD=10	-	DMN, 1LG
6	Circular	Diffuser	4	2	150	PD=10	-	DMN, 1LG
7	Circular	Diffuser	4	3.25	150	PD=10	-	2xDMN, 1LG

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Extract duct sizing - Landlord

Section	Duct type	Flow rate (m^3/s)	Size (mm)	Velocity (m/s)	Length (m)	Pressure drop (N/m^2)
1	Circular	0.109	250	2.22	7.75	30
2	Circular	0.079	250	1.61	3.25	1.55
3	Circular	0.03	150	1.7	1.5	1.71
4	Circular	0.064	200	2.04	2.25	1.5
5	Circular	0.015	150	0.85	1.5	10.83
6	Circular	0.016	150	0.91	5	12.4
7	Circular	0.014	150	0.79	2	11.41
8	Circular	0.032	150	1.81	9	20.72
9	Circular	0.032	150	1.81	2.25	15.98

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Duct system Exhaust : index run

System resistance	53.78	N/m²
Total flow rate	0.109	m³/s
Index run to inlet	X1	
on floor	0	

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Extract duct damper losses - Landlord

Section	Available pressure	Required pressure	Additional loss required (N/m²)	Damper specified
3	23.78	14.11	9.67	No
5	22.23	10.83	11.39	Yes
6	12.4	12.4	0	Yes
7	12.4	11.41	0.99	Yes
8	20.72	20.72	0	Yes
9	20.72	15.98	4.74	Yes

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Ductwork quantities, extract system : Landlord

Component type	Description	Size mm	Quantity
Tee	Circular Standard tee	250 : 250 : 150	1
Tee	Circular Standard tee	250 : 200 : 150	1
Tee	Circular Standard tee	150 : 150 : 150	1
Tee	Circular Standard tee	200 : 150 : 150	1
Adaptor	Circular Ceiling diffuser	150	5
Fitting	Circular Attenuator	250	2
Bend 90	Circular 1 piece long	250	4
Fitting	Circular Damper	150	6
Bend 90	Circular 1 piece long	150	8
Ductwork	Circular	250	11.00
Ductwork	Circular	150	21.25
Ductwork	Circular	200	2.25

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Supply duct sizing : Data input - Landlord

Section no.	Duct type	End fitting	Upstream duct no.	Length (m)	Size limit	Additional loss	Maximum velocity	Fittings
1	Circular	Tee : Std	-	7.75	-	PD=25	-	2xATT, 4x1LG
2	Circular	Tee : Std	1	3.25	250	-	-	
3	Circular	Tee : Std	1	1.5	150	-	-	
4	Circular	Tee : Std	2	2.25	-	-	-	
5	Circular	Diffuser	2	1.5	150	PD=10	-	DMN, 1LG
6	Circular	Diffuser	3	5	150	PD=10	-	2x1LG, DMN
7	Circular	Diffuser	3	2	150	PD=10	-	DMN, 1LG
8	Circular	Diffuser	4	9	150	PD=10	-	3x1LG, 2xDMN
9	Circular	Diffuser	4	2.25	150	PD=10	-	DMN, 1LG