L2 ENERGY Consulting
Established 2008

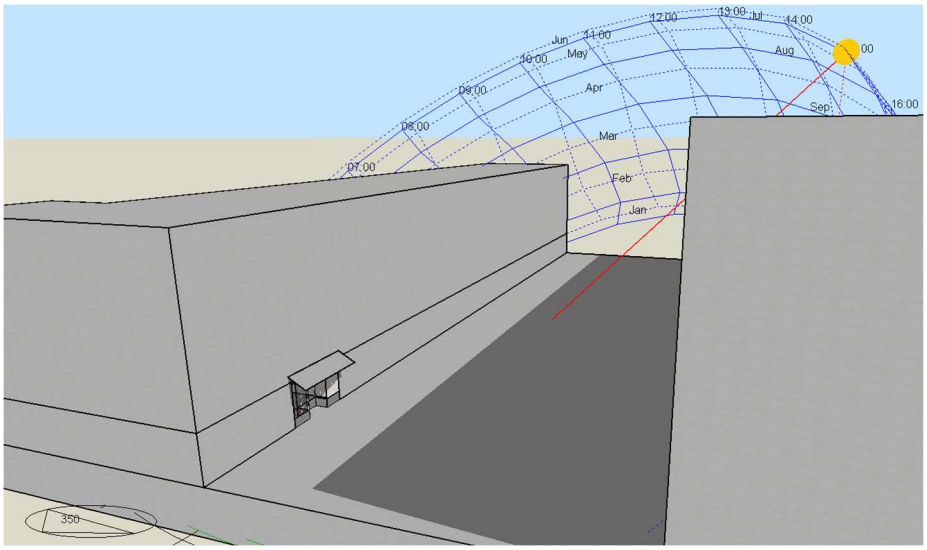
SUSTAINABILITY:
Overheating Risk & Energy Assessment

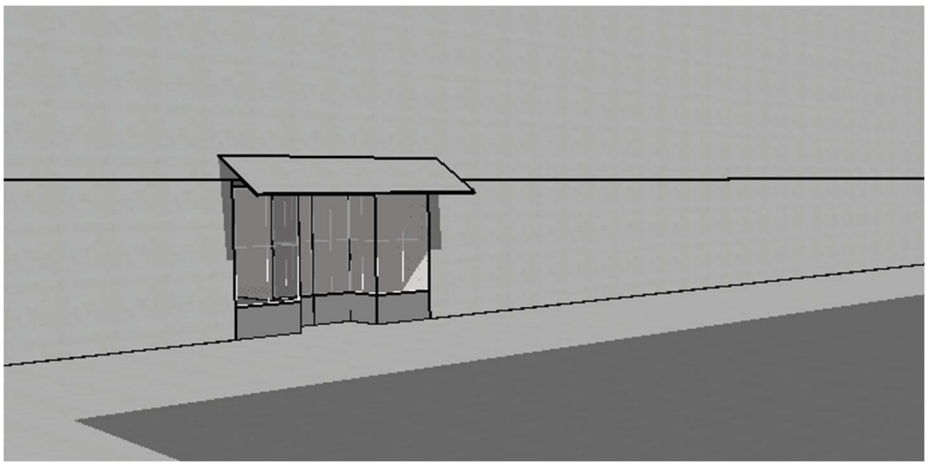
For

76 Southampton Row
Camden
London
WC1B 4BB

Date: 02 October 2024

EXISTING CAFÉ / RESTAURANT
76 SOUTHAMPTON ROW, WC1B 4BB





Modelled in DesignBuilder 7.2.0.032 Utilizing Energyplus Version 9.4.0.002 in accordance with CIBSE AM11 using guidance outlined in CIBSE TM52.

CONTENTS

EXECUTIVE SUMMARY

This report seeks to demonstrate whether the existing Sushi Restaurant at 76 Southampton Row, Camden, London meets the requirements of TM52: The limits of thermal comfort, avoiding overheating in European buildings. If the requirements of TM52 are shown not to be met, installing Air Conditioning is an option which may be sought providing the requirements of the Cooling Hierarchy within the Camden Local Plan are investigated and other methods of achieving acceptable comfort levels cannot be introduced as an alternative. As Air Conditioning has already been installed as part of recent fit-out works this report is in support of a retrospective planning application for its justification for installation.

Furthermore, the report will also demonstrate that as a result of the fit-out, using air source heating and cooling technology rather than inefficient alternatives, energy use has been vastly reduced and therefore carbon emissions have also been reduced

Compliance Criteria for Overheating

The following three criteria within CIBSE TM52, taken together, provide a robust yet balanced assessment of the risk of overheating of buildings in the UK and Europe. A room or building that fails any two of the three criteria is classed as overheating.

1. The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1 K or more during the occupied hours of a typical non-heating season (1 May to 30 Sept).

2. The second criterion deals with the severity of overheating within any one day, which can be as important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit for acceptability.

3. The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable.

Results Overview

The results obtained from the thermal model demonstrate that each area tested fails the requirements of TM52.

CALCULATION PARAMETERS

U-Values

External Walls, solid brick 350mm	1.68 W/m²K
Flat Roofs, lightweight	1.53 W/m²K
Ground Floor uninsulated	0.58 W/m²K
Windows & Glazed Doors	5.50 W/m²K

Glazing

Windows and glazed doors with an anticipated g-value of 0.70 and light transmission of 0.80 has been allowed for.

Room and Glazing Sizes

On-site survey performed by L2 Energy Consulting to obtain full measurements

Thermal Mass

Medium-weight construction to ground and basement floor elements.

Ventilation Strategy

Openable windows available to the rear at ground floor level.

Mechanical Ventilation provided to the main kitchen area to given 40 Air Changes per Hour

Lighting

Lighting has been allowed for at 10 W/m² provided by LED fittings throughout.

Air Permeability

Due to the age of the building Air permeability has been set at 25.0 m³/(h.m²) at 50 Pa.

Internal Gains

In accordance with TM59

Room Ref:	Occupancy Gains	Lighting Gains W/m²	Equipment Gains W/m²
Restaurant	20*	10.0	2700W Peak Load*
Kitchen	4*	10.0	2000W Peak Load*
Basement Kitchen	1*	10.0	2000W Peak Load*
Office	1*	10.0	450W Peak Load*

*Adjusted in accordance with TM52 for differing time periods of the day.

Occupied Times

9.30 – 23.00 Mon – Sun (Staff)

11.00 – 22.30 Mon – Sun (Opening Hours)

Weather File

London Central DSY1 2020s, high emissions, 50% percentile scenario in accordance with TM52

OVERHEATING

Compliance is based on passing *two out of three* of the following criteria:

1. The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1 K or more during the occupied hours of a typical non-heating season (1 May to 30 Sept).

2. The second criterion deals with the severity of overheating within any one day, which can be as important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit for acceptability.

3. The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable.

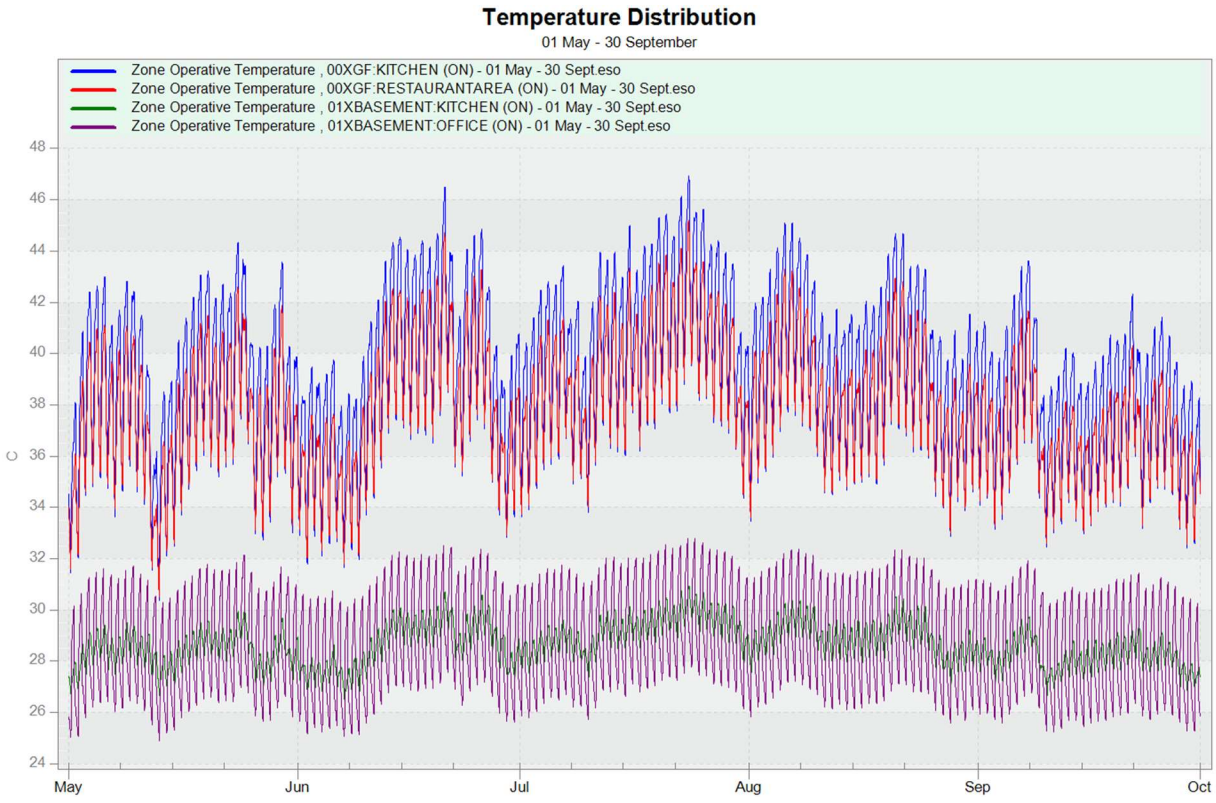
Results of the above calculations can be viewed below and can be seen that all occupied space fails the required benchmark of CIBSE TM52.

Results

Commercial Premises	Level	Zone	Criterion 1 (%)	Criterion 2 (K.hr)	Criterion 3 (hr)	Pass / Fail
76 Southampton Row	Grd Flr	Kitchen	100	252.5	2730.17	Fail
	Grd Flr	Restaurant Area	100	201.17	2431.33	Fail
	Basement Flr	Kitchen	15.8	46.33	0.00	Fail
	Basement Flr	Office	76.7	42.50	0.00	Fail

Indoor Temperature Distribution

01 May – 30 September



COOLING HIERARCHY

In accordance with Camden Local Plan air conditioning will only be permitted where dynamic thermal modelling demonstrates there is a clear need for it after all of the preferred measures are incorporated in line with the cooling hierarchy.

The cooling hierarchy includes:

- Minimise internal heat generation through energy efficient design;
- Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;
- Manage the heat within the building through exposed internal mass and high ceilings;
- Passive ventilation;
- Mechanical ventilation;
- Active cooling.

The property has been newly fitted out to suit the occupiers needs, thermal quality has not been improved as this would increase overheating as heatloss would be significantly reduced.

Orientation and window sizes could not have been changed as the fit-out needed to be in keeping with the surrounding buildings. A large external canopy to the frontage has been installed in an attempt to reduce solar gains.

The building already offers large amounts of internal mass via concrete floors and solid brick walls, no further massing could be included.

Opening windows to the rear allow adequate passive ventilation, these have been modelled as open during operating hours.

Passive shading has been added to the front by way of a canopy, this has been allowed for within the calculations to reduce solar gains.

Mechanical Ventilation has been added to the main commercial kitchen area at a rate of 40 Air Changes per Hour to reduce the cooling load.

ENERGY REDUCTION

This section will provide an overview of the energy reduction and CO2 emission reduction achieved following the latest fit-out undertaken, efficient LED lighting and including the introduction of a highly efficient Air Source Heat Pump in lieu of electric over door fan heaters to heat the property along with a new domestic hot water heater.

Results have been created using SBEM

Energy Use

	Pre Fit-Out KWh/year	Post Fit-Out KWh/year
Space heating	25,156	11,193
Water heating	10,534	7,534
Space cooling	0	4,393
Fans & Pumps	6,707	6,298
Lighting	25,422	7,243
	67,819	36,661

The above results represent a 46% reduction in energy use as a result of the recent fit-out works undertaken.

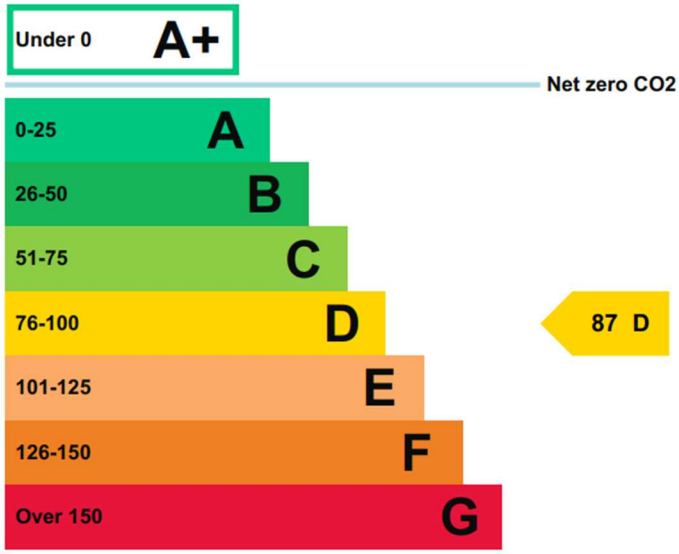
CO2 Emissions

	Pre-Refurbishment	Post Refurbishment
Total Kg CO2/year	9,223	4,986

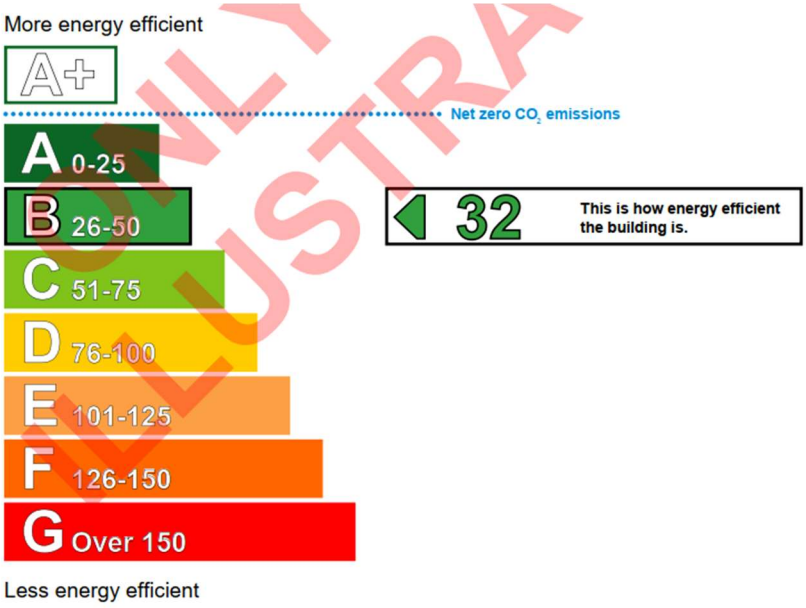
The above results also represent a 46% reduction in CO2 emissions as a result of the fit-out works undertaken, this reduction is largely achieved by the use of the installed air conditioning and energy efficient lighting.

EPC Improvement

EPC rating prior to Fit-Out



Indicative EPC post Fit-Out



CONCLUSION

It can be viewed from the results within this report that overheating is expected within the building even following the fit-out works and external canopy shading. When considering the cooling hierarchy of the Camden Local Plan much of the recommendations to mitigate the need for mechanical cooling have been introduced, however overheating is still expected and therefore it is believed that retrospective planning permission for comfort cooling should not be withheld.

The report demonstrates that the inclusion of comfort cooling does not adversely affect energy use or therefore CO2 emissions. The extensive fit-out has vastly reduced the energy consumption as a whole and further adding weight for the inclusion of comfort cooling being permitted.

The EPC rating has been significantly improved as a result of the fit-out.

SBEM CALCULATION PRINTOUTS

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

76 Southampton Row - Post FitOut

As designed

Date: Wed Oct 02 11:27:02 2024

Administrative information

Building Details

Address: 76 Southampton Row, London, WC1B 4AR

Certifier details

Name: Jason Oliver Cook

Telephone number: 01202 485235

Address: www.L2energy.co.uk, ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Foundation area [m^2]: 76.34

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2annum$	15.12	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	27.37	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	163.1	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	294.18	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	1.69	1.71	01. Basement - WC_W_6
Floors	0.18	0.89	2.93	01. Basement - WC_F_4
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	1.53	1.53	01. Basement - WC_R_5
Windows** and roof windows	1.6	5.5	5.5	00. GF - Restaurant Area_G_11
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	2.82	2.82	00. GF - Restaurant Area_D_12
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]

$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	15*

* Buildings with less than 500 m^2 total useful floor area may avoid the need for a pressure test provided that the air permeability used to calculate the BER and BPER is taken as 15 $m^3/(h.m^2)$ at 50 Pa.

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Electric Panel Heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

2- Split AC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	3.09	-	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- Ariston VLS Evo 80L

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.003
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
00. GF - Kitchen	1.5	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
00. GF - Circulation	100	-	-
01. Basement - Circulation	100	-	-
01. Basement - WC	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
00. GF - Kitchen	100	-	-
00. GF - Restaurant Area	100	100	1.5
01. Basement - Office	100	-	-
01. Basement - Kitchen	100	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00. GF - Kitchen	N/A	N/A
00. GF - Restaurant Area	YES (+44.3%)	NO
01. Basement - Office	N/A	N/A
01. Basement - Kitchen	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	190	190
External area [m^2]	389.3	389.3
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	15	3
Average conductance [W/K]	655.89	87.31
Average U-value [W/m^2K]	1.68	0.22
Alpha value* [%]	4.84	25.85

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
100	**Restaurants and Cafes/Drinking Establishments/Takeaways**
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	58.91	16.35
Cooling	23.12	20.96
Auxiliary	33.15	8.84
Lighting	38.12	32.48
Hot water	39.65	37.11
Equipment*	156.25	156.25
TOTAL**	**192.96**	**115.75**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	5.67
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*5.67*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	899	530.53
Primary energy [kWh_{PE}/m^2]	294.18	163.1
Total emissions [kg/m^2]	27.37	15.12

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] No Heating or Cooling										
	Actual	1095.1	88.8	0	0	0	0	0	0	0
	Notional	246.8	36	0	0	0	0	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	2886.4	0	1002.2	0	0	0.8	0	1	0
	Notional	548	91.2	113.6	0	0	1.34	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	519.9	235.4	39.7	29.8	42.7	3.63	2.19	3.9	3.09
	Notional	161.4	427.9	17	27	11.4	2.64	4.4	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

76 Southampton Row - Pre FitOut

As designed

Date: Wed Oct 02 11:37:30 2024

Administrative information

Building Details

Address: 76 Southampton Row, London, WC1B 4AR

Certifier details

Name: Jason Oliver Cook

Telephone number: 01202 485235

Address: www.L2energy.co.uk, ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Foundation area [m^2]: 76.34

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2annum$	13.02	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	51.56	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	137.92	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	547.65	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	1.69	1.71	01. Basement - WC_W_6
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Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	1.53	1.53	01. Basement - WC_R_5
Windows** and roof windows	1.6	5.5	5.5	00. GF - Restaurant Area_G_11
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	2.82	2.82	00. GF - Restaurant Area_D_12
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	15*

* Buildings with less than 500 m^2 total useful floor area may avoid the need for a pressure test provided that the air permeability used to calculate the BER and BPER is taken as 15 $m^3/(h.m^2)$ at 50 Pa.

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Electric Panel Heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

2- Electric Fan Heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- Old 80L Unit

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.143
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
00. GF - Kitchen	1.5	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
00. GF - Circulation	28	-	-
01. Basement - Circulation	28	-	-
01. Basement - WC	28	-	-
00. GF - Kitchen	28	-	-
00. GF - Restaurant Area	28	60	2.5

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
01. Basement - Office	28	-	-
01. Basement - Kitchen	28	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00. GF - Restaurant Area	YES (+37.4%)	NO
01. Basement - Office	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	190	190
External area [m^2]	389.3	389.3
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	15	3
Average conductance [W/K]	655.89	87.31
Average U-value [W/m^2K]	1.68	0.22
Alpha value* [%]	4.84	25.85

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
100	**Restaurants and Cafes/Drinking Establishments/Takeaways**
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	132.4	27.36
Cooling	0	0
Auxiliary	35.3	8.84
Lighting	133.8	32.48
Hot water	55.44	37.11
Equipment*	156.25	156.25
TOTAL**	**356.94**	**105.79**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	13.41
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*13.41*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	963.71	521.95
Primary energy [kWh_{PE}/m^2]	547.66	137.92
Total emissions [kg/m^2]	51.56	13.02

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] No Heating or Cooling										
	Actual	999.9	108.4	0	0	0	0	0	0	0
	Notional	246.8	36	0	0	0	0	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	2568.2	29.2	891.7	0	0	0.8	0	1	0
	Notional	548	91.2	113.6	0	0	1.34	0	----	----
[ST] Other local room heater - fanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	398.8	469.4	138.5	0	45.5	0.8	0	1	0
	Notional	150.3	427.9	31.2	0	11.4	1.34	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type