7- VFR with Mechanical Ventilation - Rest (B-REST 1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	3.6	-	0.8	0.7
Standard value	0.91*	2.6	N/A	1.6^	0.6
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

8- Nat Vent - Circulation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	-
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					YES

1- Point of Use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.84	0
Standard value	0.9*	N/A

* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.

2- Direct Electric Cylinder

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.84	0
Standard value	0.9*	N/A

* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
B-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
B-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
B-REST 1	-	-	-	-	0.8	-	-	-	-	-	N/A
B-WC 4	-	1	-	-	-	-	-	-	-	-	N/A
GF-KI 1	-	-	-	-	1.5	-	-	-	-	-	N/A

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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
01-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
01-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
01-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
02-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
02-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
02-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
03-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
03-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
03-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
04-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
04-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
04-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
GF-REST 1	-	-	-	-	0.8	-	-	-	-	-	N/A
GF-REST 2	-	-	-	-	0.8	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
B-OF 1	-	-	-	238
B-ST 1	-	-	-	137
B-ST 2	-	-	-	13
B-ST 3	-	-	-	40
B-ST 4	-	-	-	29
B-WC 1	-	-	-	20
B-WC 2	-	-	-	9
B-WC 3	-	-	-	20
B-CL 1	-	-	-	93
B-REST 1	-	-	22	157
B-ST 5	-	-	-	17
B-WC 4	-	-	-	8
B-CL 2	-	-	-	279
B-CL 3	-	-	-	82
GF-ST 1	-	-	22	37
01-ST 1	-	-	-	11
02-ST 1	-	-	-	7
03-ST 1	-	-	-	9
04-ST 1	-	-	-	31
GF-KI 1	-	-	-	299
01-OF 1	-	-	-	284
01-OF 2	-	-	-	730
01-OF 3	-	-	-	105
02-OF 1	-	-	-	288
02-OF 2	-	-	-	751

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
02-OF 3	-	-	-	105
03-OF 1	-	-	-	106
03-OF 2	-	-	-	751
03-OF 3	-	-	-	288
04-OF 1	-	-	-	129
04-OF 2	-	-	-	144
04-OF 3	-	-	-	754
01-WC 1	-	-	-	37
01-WC 2	-	-	-	16
01-WC 3	-	-	-	15
02-WC 1	-	-	-	35
02-WC 2	-	-	-	16
02-WC 3	-	-	-	15
03-WC 1	-	-	-	38
03-WC 2	-	-	-	15
03-WC 3	-	-	-	14
04-WC 1	-	-	-	36
04-WC 2	-	-	-	15
04-WC 3	-	-	-	14
GF-CL 1	-	-	-	191
GF-CL 2	-	-	-	134
GF-CL 3	-	-	-	193
01-CL 1	-	-	-	89
01-CL 2	-	-	-	55
02-CL 1	-	-	-	72
02-CL 2	-	-	-	54
03-CL 1	-	-	-	72
03-CL 2	-	-	-	55
04-CL 1	-	-	-	76
04-CL 2	-	-	-	30
GF-REST 1	-	-	22	135
GF-REST 2	-	-	22	315
04-OF 4	-	-	-	105

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B-REST 1	N/A	N/A
GF-ST 1	N/A	N/A
GF-KI 1	NO (-60%)	NO
01-OF 1	NO (-78%)	NO
01-OF 2	NO (-80%)	NO
01-OF 3	NO (-96%)	NO
02-OF 1	NO (-79%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02-OF 2	NO (-79%)	NO
02-OF 3	NO (-97%)	NO
03-OF 1	NO (-97%)	NO
03-OF 2	NO (-77%)	NO
03-OF 3	NO (-79%)	NO
04-OF 1	NO (-85%)	NO
04-OF 2	NO (-74%)	NO
04-OF 3	NO (-72%)	NO
GF-REST 1	NO (-16%)	NO
GF-REST 2	NO (-42%)	NO
04-OF 4	NO (-97%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	1301	1301
External area [m²]	1632	1632
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	5	3
Average conductance [W/K]	730	978
Average U-value [W/m²K]	0.45	0.6
Alpha value* [%]	34.35	34.35

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
12	**A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways**
88	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	27.82	22.61
Cooling	16.19	20.42
Auxiliary	6.44	3.73
Lighting	19.51	21.82
Hot water	14.44	12.45
Equipment*	42.89	42.89
TOTAL**	**84.41**	**81.03**

* 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/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	285.8	348.7
Primary energy* [kWh/m²]	179.47	180.26
Total emissions [kg/m²]	30.7	30.9

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	19.2	61.9	6.5	5.3	7.6	0.82	3.24	0.91	3.6
	Notional	18.7	129.7	6.3	10	3.5	0.82	3.6	----	----
[ST] No Heating or Cooling										
	Actual	99.4	0	27.6	0	0	1	0	1	0
	Notional	83.9	0	28.4	0	0	0.82	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	0	4137.8	0	354.8	30.1	0	3.24	0	3.6
	Notional	0	5096.3	0	393.2	18.7	0	3.6	----	----
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	64.4	0	21.8	0	4.8	0.82	0	0.91	0
	Notional	68.4	0	23.2	0	2.9	0.82	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	498.9	31	169.2	2.7	10.5	0.82	3.24	0.91	3.6
	Notional	458.1	50.7	155.4	3.9	12.2	0.82	3.6	----	----
[ST] No Heating or Cooling										
	Actual	76.9	0	26.1	0	0	0.82	0	0.91	0
	Notional	89.5	0	30.4	0	0	0.82	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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.3	External Wall (existing)-basement
Floor	0.2	0.18	Ground Floor
Roof	0.15	-	No roofs in project
Windows, roof windows, and rooflights	1.5	1.62	GL_00_04
Personnel doors	1.5	1.66	DR_00_02
Vehicle access & similar large doors	1.5	-	No vehicle doors in project
High usage entrance doors	1.5	-	No high usage entrance doors in project
$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)]			$U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	5

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Flitcroft House Refurbishment Be Green As designed

Date: Tue Jul 26 15:30:46 2022

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

BRUKL compliance check version: v5.6.b.0

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	32.2
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	32.2
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	28.9
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.3	0.3	External Wall (existing)
Floor	0.25	0.25	0.25	Ground Floor/C_F-1
Roof	0.25	-	-	No roofs in project
Windows***, roof windows, and rooflights	2.2	1.8	2.14	A Fourth Floor (top)
Personnel doors	2.2	1.8	2.01	DR_00_01
Vehicle access & similar large doors	1.5	-	-	No vehicle doors in project
High usage entrance doors	3.5	-	-	No high usage entrance doors in project

$U_{a\text{-}Limit}$ = 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 [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- VRF with Mechanical Ventilation - Offices (B-OF 1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.69	-	-	2	0.8
Standard value	2.5*	N/A	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- VRF with Mechanical Ventilation - Offices (13 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.69	5.1	-	2	0.8
Standard value	2.5*	2.6	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

3- Nat Vent - Store

	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					YES

4- VRF with Mechanical Ventilation - Rest Kitchen (GF-KI 1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0	5.1	-	1.5	-
Standard value	N/A	2.6	N/A	1.6^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

5- Extract Only - WC (16 Zones)

	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					YES

6- VFR with Mechanical Ventilation - Rest (2 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.69	-	-	0.8	0.7
Standard value	2.5*	N/A	N/A	1.6^	0.6
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

7- VFR with Mechanical Ventilation - Rest (B-REST 1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.69	5.1	-	0.8	0.7
Standard value	2.5*	2.6	N/A	1.6^	0.6
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

8- Nat Vent - Circulation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	-
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					YES

1- Point of Use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

2- Direct Electric Cylinder

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
B-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
B-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
B-REST 1	-	-	-	-	0.8	-	-	-	-	-	N/A
B-WC 4	-	1	-	-	-	-	-	-	-	-	N/A
GF-KI 1	-	-	-	-	1.5	-	-	-	-	-	N/A
01-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
01-WC 2	-	1	-	-	-	-	-	-	-	-	N/A

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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
01-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
02-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
02-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
02-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
03-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
03-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
03-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
04-WC 1	-	1	-	-	-	-	-	-	-	-	N/A
04-WC 2	-	1	-	-	-	-	-	-	-	-	N/A
04-WC 3	-	1	-	-	-	-	-	-	-	-	N/A
GF-REST 1	-	-	-	-	0.8	-	-	-	-	-	N/A
GF-REST 2	-	-	-	-	0.8	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
B-OF 1	-	-	-	238
B-ST 1	-	-	-	137
B-ST 2	-	-	-	13
B-ST 3	-	-	-	40
B-ST 4	-	-	-	29
B-WC 1	-	-	-	20
B-WC 2	-	-	-	9
B-WC 3	-	-	-	20
B-CL 1	-	-	-	93
B-REST 1	-	-	22	157
B-ST 5	-	-	-	17
B-WC 4	-	-	-	8
B-CL 2	-	-	-	279
B-CL 3	-	-	-	82
GF-ST 1	-	-	22	37
01-ST 1	-	-	-	11
02-ST 1	-	-	-	7
03-ST 1	-	-	-	9
04-ST 1	-	-	-	31
GF-KI 1	-	-	-	299
01-OF 1	-	-	-	284
01-OF 2	-	-	-	730
01-OF 3	-	-	-	105
02-OF 1	-	-	-	288
02-OF 2	-	-	-	751
02-OF 3	-	-	-	105
03-OF 1	-	-	-	106

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
03-OF 2	-	-	-	751
03-OF 3	-	-	-	288
04-OF 1	-	-	-	129
04-OF 2	-	-	-	144
04-OF 3	-	-	-	754
01-WC 1	-	-	-	37
01-WC 2	-	-	-	16
01-WC 3	-	-	-	15
02-WC 1	-	-	-	35
02-WC 2	-	-	-	16
02-WC 3	-	-	-	15
03-WC 1	-	-	-	38
03-WC 2	-	-	-	15
03-WC 3	-	-	-	14
04-WC 1	-	-	-	36
04-WC 2	-	-	-	15
04-WC 3	-	-	-	14
GF-CL 1	-	-	-	191
GF-CL 2	-	-	-	134
GF-CL 3	-	-	-	193
01-CL 1	-	-	-	89
01-CL 2	-	-	-	55
02-CL 1	-	-	-	72
02-CL 2	-	-	-	54
03-CL 1	-	-	-	72
03-CL 2	-	-	-	55
04-CL 1	-	-	-	76
04-CL 2	-	-	-	30
GF-REST 1	-	-	22	135
GF-REST 2	-	-	22	315
04-OF 4	-	-	-	105

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B-REST 1	N/A	N/A
GF-ST 1	N/A	N/A
GF-KI 1	NO (-60%)	NO
01-OF 1	NO (-78%)	NO
01-OF 2	NO (-80%)	NO
01-OF 3	NO (-96%)	NO
02-OF 1	NO (-79%)	NO
02-OF 2	NO (-79%)	NO
02-OF 3	NO (-97%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03-OF 1	NO (-97%)	NO
03-OF 2	NO (-77%)	NO
03-OF 3	NO (-79%)	NO
04-OF 1	NO (-85%)	NO
04-OF 2	NO (-74%)	NO
04-OF 3	NO (-72%)	NO
GF-REST 1	NO (-16%)	NO
GF-REST 2	NO (-42%)	NO
04-OF 4	NO (-97%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	1301	1301
External area [m²]	1632	1632
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	5	3
Average conductance [W/K]	730	978
Average U-value [W/m²K]	0.45	0.6
Alpha value* [%]	34.35	34.35

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
12	**A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways**
88	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	11.1	12.51
Cooling	10.83	20.42
Auxiliary	6.44	3.73
Lighting	19.51	21.82
Hot water	11.5	12.45
Equipment*	42.89	42.89
TOTAL**	**59.38**	**70.93**

* 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/m²]

	Actual	Notional
Photovoltaic systems	2.17	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	285.8	348.7
Primary energy* [kWh/m²]	177.74	174.78
Total emissions [kg/m²]	28.9	32.2

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	19.2	61.9	1.5	3.6	7.6	3.51	4.85	3.69	5.1
	Notional	18.7	129.7	2.1	10	3.5	2.43	3.6	----	----
[ST] No Heating or Cooling										
	Actual	99.4	0	27.6	0	0	1	0	1	0
	Notional	83.9	0	28.4	0	0	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	4137.8	0	237.2	30.1	0	4.85	0	5.1
	Notional	0	5096.3	0	393.2	18.7	0	3.6	----	----
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity										
	Actual	64.4	0	17.9	0	4.8	1	0	1	0
	Notional	68.4	0	23.2	0	2.9	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	498.9	31	39.5	1.8	10.5	3.51	4.85	3.69	5.1
	Notional	458.1	50.7	52.4	3.9	12.2	2.43	3.6	----	----
[ST] No Heating or Cooling										
	Actual	76.9	0	24.7	0	0	0.86	0	0.91	0
	Notional	89.5	0	30.4	0	0	0.82	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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.3	External Wall (existing)-basement
Floor	0.2	0.18	Ground Floor
Roof	0.15	-	No roofs in project
Windows, roof windows, and rooflights	1.5	1.62	GL_00_04
Personnel doors	1.5	1.66	DR_00_02
Vehicle access & similar large doors	1.5	-	No vehicle doors in project
High usage entrance doors	1.5	-	No high usage entrance doors in project
$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)]			$U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	5

Energy and Sustainability Statement

Flitcroft House, Camden

Appendix 2: Low and Zero Carbon technologies

Source	Low Zero Carbon Technology	Lifespan (years)	Lifecycle Carbon Savings* (tCO2/yr)	Applicable Grants	Life Cycle Cost*	Space Use	Local Planning Criteria	Noise	Feasibility of Export	Technology Appropriate for the site	Reasons for Inclusion/Exclusion
Solar	Photovoltaics	15-25	Low (325 $kgCO_2$/yr per 1 kWpel)	-	Medium	Suitable (roof spaces available)	Suitable	Suitable	Possible (export of power to the local grid)	Yes	Solar Photovoltaic panels (PVs) convert sunlight into usable electricity. Due to the relatively low efficiencies of this system, a large area is often required to provide a reasonable quantity of power. PV cells also provide their peak power during the summer months and therefore larger installations need to be carefully considered. Paybacks are now within a reasonable range of 11 to 15 years. The use of the energy on-site remains a priority to achieve the payback as the rate at which surplus power can be sold to the grid is low. 106 PVs totalling approximately 170 m^2 at a 30^o inclination across all available roof area are proposed to maximise the development's renewable energy generation capability.
	Solar thermal	15-25	Low	-	Low	Suitable (roof spaces available)	Suitable	Suitable	Possible export of heat to future district heat network	No	Solar water heating is traditionally one of the more simplistic and affordable renewable technologies. Solar energy is converted to heat via panels that absorb the high-frequency heat radiation emitted from the sun. Advanced technology utilising 'heat pipes' (tubes utilising refrigerant technology) maximise useful heat extraction even on cold, cloudy days. However, the carbon saving of solar hot water depends on the fuel being displaced. The installation of photovoltaic panels is prioritised on available roof space, while inconsistent load profiles due to the building type of use will require significant solar thermal storage and associated plant space. This technology is not considered appropriate for the development.

Source	Low Zero Carbon Technology	Lifespan (years)	Lifecycle Carbon Savings* (tCO2/yr)	Applicable Grants	Life Cycle Cost*	Space Use	Local Planning Criteria	Noise	Feasibility of Export	Technology Appropriate for the site	Reasons for Inclusion/Exclusion
Wind power	Wind turbines	20	Low (0.5 t/kWe per yr)	-	High	Not suitable (suitable space for stand-alone of a roof-mounted wind turbine cannot be found for the scheme)	Not Suitable due to central London location of development, height restriction, significant visual impact, flicker..	Potentially not suitable due to noise from the turbine's generator.	Possible (export of power to the local grid)	No	Wind turbines produce electrical energy by absorbing wind energy. They are typically available in a vertical or horizontal axis. The quantity of energy generated is directly related to the 'swept area' of the blades and as such size is of immense importance. However, smaller systems are becoming increasingly more common as well as more accepted and have been used to power schools, sports centres and business parks. For wind turbines to operate effectively, the average wind speed for the site needs to be above a threshold level of 6 m/s. Wind speeds in built-up urban areas are not reliable and therefore this technology is not considered suitable for the scheme. The central London location of the development is not deemed appropriate for wind power for planning reasons.
Biofuels	Biomass boilers	20	Medium	RHI	Low-Medium	Not suitable (large space required for fuel storage)	Not suitable due to potential air quality issues	Vehicle noise during regular fuel deliveries and also removal of ash from combustion	Possible export of heat to future district heat network	No	Biomass is an organic matter of recent origin which can be replenished at the rate at which it is used. It does not include fossil fuels, which have formed over millions of years and thus of finite supply. The CO_2 released when energy is generated from biomass is balanced by that absorbed during the fuel's production. This is termed a carbon-neutral process, but only when the source of the fuels is renewable, as a sustainable rotation coppice woodland. Such fuels include logs, compressed sawdust pellets, vegetable oil and ethanol. On-site fuel storage requirements requiring additional space, along with regular access to the on-site fuel storage area. A biomass/biofuel boiler is not considered viable as high load requirements (peak heating load) would require big biofuel/biomass storage for this scheme. Due to the intensive nature of biofuel use on-site in respect of deliveries,
	Biomass Co-generation (CHP)	20	Medium-High	ROCs & RHI	Medium	Not suitable (large space required for fuel storage)	Not suitable due to potential air quality issues	Vehicle noise during regular fuel deliveries and also removal of ash from combustion	Possible export of heat to future district heat network	No	

Source	Low Zero Carbon Technology	Lifespan (years)	Lifecycle Carbon Savings* (tCO2/yr)	Applicable Grants	Life Cycle Cost*	Space Use	Local Planning Criteria	Noise	Feasibility of Export	Technology Appropriate for the site	Reasons for Inclusion/Exclusion
											maintenance, dust and equipment responsiveness, biofuels are not considered appropriate for this site and have been discounted in favour of more reliable equipment.
District heating & cooling	District heating and cooling (based on gas-fired CHP/ CCHP)	25+	Medium-High	Renewable Heat Incentive (RHI) + possible Feed-In Tariff (FiT)	Medium	Suitable	Suitable	Suitable	n/a	No (currently), but will be reviewed in the future	There is currently no district heating network in the vicinity of the proposed development.
Heat pumps	Ground source heat pumps (closed-loop system)	25 (50+ earth heat exchangers)	Medium (30-50% compared to a gas heating system)	Renewable Heat Incentive (RHI)	Medium-High	Not suitable (space not sufficient for a horizontal or vertical system)	Suitable	Suitable	Possible but unlikely	No	Ground source heat pumps are an established technology which operates like a refrigerator, consisting of a vapour compression cycle heat pump, linked to a heat exchanger buried in the ground. Heat pumps utilising low-grade heat from the ground as a thermal resource have been reviewed in the context of this proposed scheme. They are not considered viable for this scheme for the following key reasons: - There is insufficient space around the building for a horizontal system that can cover the anticipated energy demand; and - It is not considered economically or practically feasible to integrate pile/loop under the building (space not sufficient to allow for required distance between bore-holes). Ground source heat pumps are therefore not proposed for this scheme.
	Ground source heat pumps (open loop system)	25 (50+ boreholes)	Medium (40-60% compared to a gas heating system)	Renewable Heat Incentive (RHI)	Medium	Not suitable (space not sufficient to allow for required distance between boreholes)	Suitable	Suitable	Possible but unlikely	No	
	Air source/ Exhaust air heat pumps	20	Low-Medium (20-40% compared to a gas heating system)	N/A	Low	Suitable	Suitable	Suitable (Acoustically insulated engine)	Possible but unlikely	Yes	Air source heat pump systems can efficiently elevate low-grade environmental heat from the air to the level required for space heating and even domestic hot

Source	Low Zero Carbon Technology	Lifespan (years)	Lifecycle Carbon Savings* (tCO2/yr)	Applicable Grants	Life Cycle Cost*	Space Use	Local Planning Criteria	Noise	Feasibility of Export	Technology Appropriate for the site	Reasons for Inclusion/Exclusion
											water system (albeit at low efficiency). Heat pumps work much more efficiently at lower temperatures than standard boiler systems and are hence more suitable to "low-energy" underfloor heating systems or larger low-temperature radiator and fan-coil systems that are also considered low-response systems as they give out heat at lower temperatures over longer periods of time. Air source heat pumps are an established technology which operates as a refrigerator by extracting heat from the outside air and are operable even at low temperatures. Although run on electricity, the heat extracted from the air is constantly being renewed naturally. Air source heat pumps are proposed for the development. They are considered particularly suitable for the scheme for the following reasons: - They can provide simultaneously space heating and cooling in a very efficient way. - Heat pumps are relatively quiet in operation and are typically contained within plant spaces without any significant impact on the local environment.

Source	Low Zero Carbon Technology	Lifespan (years)	Lifecycle Carbon Savings* (tCO2/yr)	Applicable Grants	Life Cycle Cost*	Space Use	Local Planning Criteria	Noise	Feasibility of Export	Technology Appropriate for the site	Reasons for Inclusion/Exclusion
Co Generation	Gas-fired Co-generation (CHP)	15	Medium (30% CO_2 reduction compared to condensing boilers)	N/A	Low-Medium	Suitable	Not suitable due to potential air quality issues	Suitable (acoustically insulated engine)	Possible export of heat to future district heat network	No	A CHP engine produces both heating and electrical power for a building. The benefit of generating the electricity on-site is that the waste heat that is usually rejected at power stations can be used to serve the heating and power requirements of a building or wider community. Smaller single-site systems generally utilise fossil fuels such as gas to operate a spark-ignition engine or turbine to turn a generator. Biodiesels can be used which includes correctly processed waste vegetable oil. The main vital pre-requisite of a CHP system is that demand for both power and heat is required at the same time and a baseload exists for CHP plant to operate efficiently and cost-effectively. CHP plant often has an impact on local air quality. The proposed development seeks to minimise the generation of air pollution by pursuing a heat pump led heating system as such a system not only provides an efficient source of heat energy but does not contribute to local air pollution whilst in operation. Also, they use fossil fuels and are incompatible with national net zero targets.
Heat recovery & energy storage	Waste heat recovery	15	Low-Medium	N/A	Low	Not suitable	Suitable	Suitable	N/A	No	Insufficient waste heat available.
	Energy storage	15 (50+ for seasonal storage)	Low-Medium (technology dependent)	N/A	Medium-High (dependant on technology)	Not suitable	Suitable	Suitable	Possible (integration within district network)	No	Large space required, energy use such that storage is required is not applicable.

Appendix 3: Overheating Assessment Full Results

Adaptive Overheating (CIBSE TM54) Ventilation
DSY 1

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
B-REST 1	1683	50	976	33	92	Fail
B-OF 1	1530	45	1011	30	314	Fail
01-OF 1	1530	45	1515	29	1236	Fail
01-OF 2	1530	45	1515	29	1234	Fail
01-OF 3	1530	45	1508	29	1183	Fail
02-OF 1	1530	45	1522	28	1330	Fail
02-OF 2	1530	45	1523	29	1348	Fail
02-OF 3	1530	45	1521	28	1315	Fail
03-OF 1	1530	45	1524	29	1398	Fail
03-OF 2	1530	45	1525	29	1419	Fail
03-OF 3	1530	45	1525	29	1401	Fail
04-OF 1	1530	45	1523	29	1398	Fail
04-OF 2	1530	45	1528	13	1479	Fail
04-OF 3	1530	45	1528	15	1489	Fail
04-OF 4	1530	45	1527	16	1477	Fail
05-OF 1	1530	45	1527	27	1450	Fail
05-OF 2	1530	45	1529	22	1504	Fail
05-OF 3	1530	45	1529	20	1511	Fail
05-OF 4	1530	45	1529	18	1507	Fail
06-OF 1	1530	45	1528	28	1482	Fail
06-OF 2	1530	45	1528	14	1498	Fail
06-OF 3	1530	45	1529	16	1501	Fail
GF-REST 1	1683	50	1551	30	1005	Fail
GF-REST 2	1683	50	1515	30	923	Fail

Adaptive Overheating (CIBSE TM54) Ventilation
DSY 2

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
B-REST 1	1683	50	943	33	377	Fail
B-OF 1	1530	45	1050	28	436	Fail
01-OF 1	1530	45	1441	26	1177	Fail
01-OF 2	1530	45	1448	26	1184	Fail
01-OF 3	1530	45	1415	26	1160	Fail
02-OF 1	1530	45	1474	27	1211	Fail
02-OF 2	1530	45	1491	27	1219	Fail
02-OF 3	1530	45	1476	26	1204	Fail
03-OF 1	1530	45	1498	28	1242	Fail
03-OF 2	1530	45	1507	28	1259	Fail
03-OF 3	1530	45	1500	26	1247	Fail
04-OF 1	1530	45	1498	28	1236	Fail
04-OF 2	1530	45	1518	26	1318	Fail
04-OF 3	1530	45	1520	28	1332	Fail
04-OF 4	1530	45	1518	28	1302	Fail
05-OF 1	1530	45	1513	27	1320	Fail
05-OF 2	1530	45	1525	24	1404	Fail
05-OF 3	1530	45	1525	26	1406	Fail
05-OF 4	1530	45	1525	25	1385	Fail
06-OF 1	1530	45	1521	25	1366	Fail
06-OF 2	1530	45	1523	27	1360	Fail
06-OF 3	1530	45	1525	26	1390	Fail
GF-REST 1	1683	50	1435	31	1053	Fail
GF-REST 2	1683	50	1408	33	984	Fail

Adaptive Overheating (CIBSE TM54) Ventilation
DSY 3

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
B-REST 1	1683	50	1082	33	186	Fail
B-OF 1	1530	45	1026	28	348	Fail
01-OF 1	1530	45	1464	30	1054	Fail
01-OF 2	1530	45	1467	30	1051	Fail
01-OF 3	1530	45	1437	29	1009	Fail
02-OF 1	1530	45	1484	27	1129	Fail
02-OF 2	1530	45	1494	27	1151	Fail
02-OF 3	1530	45	1481	28	1110	Fail
03-OF 1	1530	45	1501	26	1184	Fail
03-OF 2	1530	45	1505	27	1212	Fail
03-OF 3	1530	45	1500	26	1191	Fail
04-OF 1	1530	45	1496	28	1183	Fail
04-OF 2	1530	45	1516	27	1285	Fail
04-OF 3	1530	45	1517	27	1298	Fail
04-OF 4	1530	45	1512	27	1267	Fail
05-OF 1	1530	45	1511	25	1301	Fail
05-OF 2	1530	45	1520	25	1393	Fail
05-OF 3	1530	45	1522	27	1400	Fail
05-OF 4	1530	45	1522	28	1351	Fail
06-OF 1	1530	45	1516	24	1339	Fail
06-OF 2	1530	45	1521	27	1321	Fail
06-OF 3	1530	45	1521	26	1347	Fail
GF-REST 1	1683	50	1413	31	975	Fail
GF-REST 2	1683	50	1373	31	930	Fail

Adaptive Overheating (CIBSE TM54) Cooling
DSY 1

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
B-REST 1	1683	50	0	0	0	Pass
B-OF 1	1530	45	0	0	0	Pass
01-OF 1	1530	45	0	0	0	Pass
01-OF 2	1530	45	0	0	0	Pass
01-OF 3	1530	45	0	0	0	Pass
02-OF 1	1530	45	0	0	0	Pass
02-OF 2	1530	45	0	0	0	Pass
02-OF 3	1530	45	0	0	0	Pass
03-OF 1	1530	45	0	0	0	Pass
03-OF 2	1530	45	0	0	0	Pass
03-OF 3	1530	45	0	0	0	Pass
04-OF 1	1530	45	0	0	0	Pass
04-OF 2	1530	45	0	0	0	Pass
04-OF 3	1530	45	0	0	0	Pass
04-OF 4	1530	45	0	0	0	Pass
05-OF 1	1530	45	0	0	0	Pass
05-OF 2	1530	45	0	0	0	Pass
05-OF 3	1530	45	0	0	0	Pass
05-OF 4	1530	45	0	0	0	Pass
06-OF 1	1530	45	0	0	0	Pass
06-OF 2	1530	45	0	0	0	Pass
06-OF 3	1530	45	0	0	0	Pass
GF-REST 1	1683	50	0	0	0	Pass
GF-REST 2	1683	50	0	0	0	Pass

Adaptive Overheating (CIBSE TM54) Cooling
DSY 2

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
B-REST 1	1683	50	0	0	0	Pass
B-OF 1	1530	45	0	0	0	Pass
01-OF 1	1530	45	0	0	0	Pass
01-OF 2	1530	45	0	0	0	Pass
01-OF 3	1530	45	0	0	0	Pass
02-OF 1	1530	45	0	0	0	Pass
02-OF 2	1530	45	0	0	0	Pass
02-OF 3	1530	45	0	0	0	Pass
03-OF 1	1530	45	0	0	0	Pass
03-OF 2	1530	45	0	0	0	Pass
03-OF 3	1530	45	0	0	0	Pass
04-OF 1	1530	45	0	0	0	Pass
04-OF 2	1530	45	0	0	0	Pass
04-OF 3	1530	45	0	0	0	Pass
04-OF 4	1530	45	0	0	0	Pass
05-OF 1	1530	45	0	0	0	Pass
05-OF 2	1530	45	0	0	0	Pass
05-OF 3	1530	45	0	0	0	Pass
05-OF 4	1530	45	0	0	0	Pass
06-OF 1	1530	45	0	0	0	Pass
06-OF 2	1530	45	0	0	0	Pass
06-OF 3	1530	45	0	0	0	Pass
GF-REST 1	1683	50	0	0	0	Pass
GF-REST 2	1683	50	0	0	0	Pass

Adaptive Overheating (CIBSE TM54) Cooling
DSY 3

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
B-REST 1	1683	50	0	0	0	Pass
B-OF 1	1530	45	0	0	0	Pass
01-OF 1	1530	45	0	0	0	Pass
01-OF 2	1530	45	0	0	0	Pass
01-OF 3	1530	45	0	0	0	Pass
02-OF 1	1530	45	0	0	0	Pass
02-OF 2	1530	45	0	0	0	Pass
02-OF 3	1530	45	0	0	0	Pass
03-OF 1	1530	45	0	0	0	Pass
03-OF 2	1530	45	0	0	0	Pass
03-OF 3	1530	45	0	0	0	Pass
04-OF 1	1530	45	0	0	0	Pass
04-OF 2	1530	45	0	0	0	Pass
04-OF 3	1530	45	0	0	0	Pass
04-OF 4	1530	45	0	0	0	Pass
05-OF 1	1530	45	0	0	0	Pass
05-OF 2	1530	45	0	0	0	Pass
05-OF 3	1530	45	0	0	0	Pass
05-OF 4	1530	45	0	0	0	Pass
06-OF 1	1530	45	0	0	0	Pass
06-OF 2	1530	45	0	0	0	Pass
06-OF 3	1530	45	0	0	0	Pass
GF-REST 1	1683	50	0	0	0	Pass
GF-REST 2	1683	50	0	0	0	Pass

Frequency Cooling
DSY 1

Zone Name	x ≥ 25.0	x ≥ 26.0
B-REST 1	0	0
B-OF 1	0	0
01-OF 1	0	0
01-OF 2	0	0
01-OF 3	0	0
02-OF 1	0	0
02-OF 2	0	0
02-OF 3	0	0
03-OF 1	0	0
03-OF 2	0	0
03-OF 3	0	0
04-OF 1	0	0
04-OF 2	0	0
04-OF 3	0	0
04-OF 4	0	0
05-OF 1	0	0
05-OF 2	74	0
05-OF 3	120	0
05-OF 4	0	0
06-OF 1	171	0
06-OF 2	0	0
06-OF 3	69	0
GF-REST 1	7	0
GF-REST 2	0	0

Frequency Cooling
DSY 2

Zone Name	x ≥ 25.0	x ≥ 26.0
B-REST 1	0	0
B-OF 1	0	0
01-OF 1	0	0
01-OF 2	0	0
01-OF 3	0	0
02-OF 1	0	0
02-OF 2	0	0
02-OF 3	0	0
03-OF 1	0	0
03-OF 2	0	0
03-OF 3	0	0
04-OF 1	0	0
04-OF 2	0	0
04-OF 3	0	0
04-OF 4	0	0
05-OF 1	0	0
05-OF 2	99	0
05-OF 3	134	0
05-OF 4	0	0
06-OF 1	174	2
06-OF 2	0	0
06-OF 3	122	0
GF-REST 1	16	0
GF-REST 2	0	0

Frequency Cooling
DSY 3

Zone Name	x ≥ 25.0	x ≥ 26.0
B-REST 1	0	0
B-OF 1	0	0
01-OF 1	0	0
01-OF 2	0	0
01-OF 3	0	0
02-OF 1	0	0
02-OF 2	0	0
02-OF 3	0	0
03-OF 1	0	0
03-OF 2	0	0
03-OF 3	0	0
04-OF 1	0	0
04-OF 2	0	0
04-OF 3	0	0
04-OF 4	0	0
05-OF 1	1	0
05-OF 2	128	0
05-OF 3	172	0
05-OF 4	0	0
06-OF 1	224	1
06-OF 2	0	0
06-OF 3	165	0
GF-REST 1	23	0
GF-REST 2	0	0