BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

13 Fitzroy Street Proposed rev2

As designed

Date: Thu May 05 10:07:44 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

The building does not comply with England Building Regulations Part L 2013

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	21.8
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	21.8
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	22.1
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	0.37	5.88	LG000015:Surf[1]
Floor	0.25	0.22	0.22	VD000000:Surf[0]
Roof	0.25	0.24	0.25	NT000000:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.81	1.83	5F000002:Surf[0]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{a\text{-}Limit}$ = 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- Core and WC - Proposed

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
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- Main system VRV - Proposed

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	4.5	0	1.93	0.85
Standard value	2.5*	3.2	N/A	1.6^	0.65
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. 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- MVHR - Proposed

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	1.6	0.87
Standard value	N/A	N/A	N/A	1.5^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

^ 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.

4- Meeting room VRV - Proposed

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	4.5	0	1.52	0.82
Standard value	2.5*	3.2	N/A	1.6^	0.65
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. 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.

5- UFH - Proposed

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.73	4.5	0	1.93	0.87
Standard value	2.5*	3.2	N/A	1.6^	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. 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.

6- Server Room - Proposed

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	4	-	0	-
Standard value	0.91*	3.2	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 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.

"No HWS in project, or hot water is provided by HVAC system"

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
LGF - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
LGF - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
LGF - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
LGF - Security	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
GF - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
GF - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
1F - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
1F - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
1F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
2F - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
2F - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
2F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
3F - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
3F - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
3F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
4F - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
4F - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
4F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
5F - Male WC	-	-	0.3	-	-	-	-	-	-	-	N/A
5F - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
5F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
6F - Male WC	-	-	0.3	-	-	-	-	-	-	-	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
6F - Female WC	-	-	0.3	-	-	-	-	-	-	-	N/A
6F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
6F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
6F - Disable WC	-	-	0.3	-	-	-	-	-	-	-	N/A
1F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
1F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
1F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
2F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
2F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
2F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
3F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
3F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
3F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
4F - Disabled WC	-	-	0.3	-	-	-	-	-	-	-	N/A
4F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
4F - Unisex WC	-	-	0.3	-	-	-	-	-	-	-	N/A
5F - Office Z3 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z3 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z2 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z2 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z3 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z3 Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z3 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
2F -Office Z3 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
2F -Office Z3 - Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
2F -Office Z3 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Office Z2 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z2 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z3 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z3 - Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z3 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z3 - Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z3 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z2 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z3 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Office Unit 02	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - FM Office	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - FM WC	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - FM Facilities	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Servery	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z3 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z3 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z3 - Middle	-	-	-	-	-	-	-	0.4	-	-	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
6F - Office Z2 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Office Unit 03 Block C	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Block B Office Perimeter	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Block B Office	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Block B Office Perimeter	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z1 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z1 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z1 - Perimeter W2	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z1 - Perimeter W1	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z1 Perimeter W2	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z1 Perimeter W1	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z1 - Perimeter W1	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z1 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z1 - Perimeter W2	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z1 - Perimeter W1	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z1 Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z1 Perimeter W2	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Office Z1 - Perimeter W1	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Office Z1 - Perimeter W2	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Office Z1 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z1 - Perimeter W1	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z1 - Perimeter W2	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Office Unit 02 Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Office Unit 02 Perimeter W	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Block B Office Perimeter	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Block B Office	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z1 - Perimeter S	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z1	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z2 - Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Office Z2 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Office Z1	-	-	-	-	-	-	-	0.4	-	-	N/A
2F -Office Z2 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
2F -Office Z2 - Perimeter Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z1	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z2 Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Office Z2 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z1	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z2 - Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Office Z2 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z1	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z2 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z1	-	-	-	-	-	-	-	0.4	-	-	N/A
6F - Office Z2 Middle	-	-	-	-	-	-	-	0.4	-	-	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
6F - Office Z2 - Perimeter N	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z2 Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
5F - Office Z3 Middle	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Office Unit 01	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Meeting Room 1	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Meeting Room 2	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Cafe	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Engineering workshop Store	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Cafe	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - OPEN TO BELOW	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Block B Office Perimeter	-	-	-	-	-	-	-	0.4	-	-	N/A
2F - Block B Office	-	-	-	-	-	-	-	0.4	-	-	N/A
1F - Block B Office	-	-	-	-	-	-	-	0.4	-	-	N/A
3F - Block B Office	-	-	-	-	-	-	-	0.4	-	-	N/A
4F - Block B Office	-	-	-	-	-	-	-	0.4	-	-	N/A
GF - Office Unit 03	-	-	-	-	-	-	-	0.4	-	-	N/A
LGF - Server/IT	-	-	-	0.4	-	-	-	-	-	-	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	
LGF - Core	-	60	-	74
LGF - Bike Storage	60	-	-	41
LGF - Core	-	60	-	50
LGF - Male WC	-	60	-	135
LGF - Female WC	-	60	-	110
LGF - Disabled WC	-	60	-	45
LGF - Corridor	-	60	-	87
LGF - Substation Roms	60	-	-	518
LGF - Core	-	60	-	43
LGF - Generator Room	60	-	-	222
LGF - Security	90	-	-	82
GF - Core	-	60	-	50
GF - Male WC	-	60	-	135
GF - Female WC	-	60	-	110
GF - Disabled WC	-	60	-	45
GF - Core	-	60	-	43
GF - Corridor	-	60	-	87
GF - Corridor	-	60	-	57
GF - Core	-	60	-	74
1F - Core	-	60	-	50
1F - Male WC	-	60	-	135
1F - Female WC	-	60	-	110

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
1F - Disabled WC	-	60	-	45
1F - Core	-	60	-	43
1F - Corridor	-	60	-	87
1F - Corridor	-	60	-	57
1F - Core	-	60	-	74
2F - Core	-	60	-	50
2F - Male WC	-	60	-	135
2F - Female WC	-	60	-	110
2F - Disabled WC	-	60	-	45
2F - Core	-	60	-	43
2F - Corridor	-	60	-	87
2F - Corridor	-	60	-	57
2F - Core	-	60	-	74
3F - Core	-	60	-	50
3F - Male WC	-	60	-	135
3F - Female WC	-	60	-	110
3F - Disabled WC	-	60	-	45
3F - Core	-	60	-	43
3F - Corridor	-	60	-	87
3F - Corridor	-	60	-	57
3F - Core	-	60	-	74
4F - Core	-	60	-	50
4F - Male WC	-	60	-	135
4F - Female WC	-	60	-	110
4F - Disabled WC	-	60	-	45
4F - Core	-	60	-	43
4F - Corridor	-	60	-	87
4F - Corridor	-	60	-	57
4F - Core	-	60	-	74
5F - Core	-	60	-	50
5F - Male WC	-	60	-	135
5F - Female WC	-	60	-	110
5F - Disabled WC	-	60	-	45
5F - Core	-	60	-	43
5F - Corridor	-	60	-	87
5F - Corridor	-	60	-	57
6F - Core	-	60	-	50
6F - Male WC	-	60	-	135
6F - Female WC	-	60	-	110
6F - Disabled WC	-	60	-	45
6F - Core	-	60	-	43
6F - Corridor	-	60	-	57
Roof - Core	-	60	-	43

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
LGF - Storage	60	-	-	16
LGF - Substation	60	-	-	107
LGF - Corridor	-	60	-	65
Roof - Core 1	-	60	-	107
Roof - Plant	60	-	-	222
Roof - Plant	60	-	-	72
Roof - Plant	60	-	-	216
B - Core	-	60	-	74
B - Plant	60	-	-	636
B - Plant	60	-	-	463
B - Plant	60	-	-	127
6F - Corridor	-	60	-	72
6F - Corridor	-	60	-	42
6F - Unisex WC	-	60	-	39
6F - Disable WC	-	60	-	50
6F - Corridor WC	-	60	-	23
6F - Corridor	-	60	-	47
5F - Disabled WC	-	60	-	48
5F - Corridor	-	60	-	30
5F - Unisex WC	-	60	-	37
5F - Unisex WC	-	60	-	36
5F - Corridor	-	60	-	69
LGF - Core 3 Corridor	-	60	-	57
LGF - Store	60	-	-	12
GF - Unisex WCs	-	60	-	128
GF - Corridor	-	60	-	67
1F - Disabled WC	-	60	-	49
1F - Corridor WC	-	60	-	30
1F - Unisex WC	-	60	-	36
1F - Unisex WC	-	60	-	37
2F - Disabled WC	-	60	-	49
2F - Unisex WC	-	60	-	36
2F - Unisex WC	-	60	-	37
2F - Corridor WC	-	60	-	30
3F - Disabled WC	-	60	-	49
3F - Unisex WC	-	60	-	36
3F - Unisex WC	-	60	-	37
3F - Corridor WC	-	60	-	30
3F - Corridor	-	60	-	82
4F - Disabled WC	-	60	-	49
4F - Unisex WC	-	60	-	36
4F - Unisex WC	-	60	-	37
4F - Corridor WC	-	60	-	30

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
4F - Corridor	-	60	-	82
2F - Corridor	-	60	-	82
1F - Corridor	-	60	-	76
5F - Office Z3 - Perimeter N	90	-	-	635
5F - Office Z3 - Perimeter S	90	-	-	717
5F - Office Z2 - Perimeter S	90	-	-	681
3F - Office Z2 - Perimeter S	90	-	-	681
3F - Office Z3 - Perimeter S	90	-	-	716
3F - Office Z3 Middle	90	-	-	946
3F - Office Z3 - Perimeter N	90	-	-	648
2F -Office Z3 - Perimeter S	90	-	-	716
2F -Office Z3 - Middle	90	-	-	946
2F -Office Z3 - Perimeter N	90	-	-	650
2F - Office Z2 - Perimeter S	90	-	-	681
1F - Office Z2 - Perimeter S	90	-	-	685
1F - Office Z3 - Perimeter N	90	-	-	649
1F - Office Z3 - Middle	90	-	-	946
1F - Office Z3 - Perimeter S	90	-	-	716
4F - Office Z3 - Middle	90	-	-	946
4F - Office Z3 - Perimeter S	90	-	-	716
4F - Office Z2 - Perimeter S	90	-	-	681
4F - Office Z3 - Perimeter N	90	-	-	647
GF - Breakout Space 1	-	60	-	221
GF - Office Unit 02	90	-	-	528
LGF - Corridor	-	60	-	151
LGF - Male Changing Room	-	60	-	129
LGF - F Lockers	90	-	-	212
LGF - Female Changing Rooms	-	60	-	127
LGF - FM Office	90	-	-	151
LGF - FM WC	90	-	-	58
LGF - FM Facilities	90	-	-	86
LGF - Servery	-	60	-	327
LGF - Plantroom	60	-	-	234
LGF - Drying Room	-	60	-	78
LGF - Bike Storage	60	-	-	96
6F - Office Z3 - Perimeter N	90	-	-	635
6F - Office Z3 - Perimeter S	90	-	-	710
6F - Office Z3 - Middle	90	-	-	581
6F - Office Z2 - Perimeter S	90	-	-	676
LGF - M Lockers	-	60	-	76
GF - Office Unit 03 Block C	90	-	-	1220
GF - Block B Office Perimeter	90	-	-	761
GF - Block B Office	90	-	-	744

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
2F - Block B Office Perimeter	90	-	-	761
6F - Office Z1 - Perimeter S	90	-	-	271
5F - Office Z1 - Perimeter S	90	-	-	346
6F - Office Z1 - Perimeter W2	90	-	-	304
6F - Office Z1 - Perimeter W1	90	-	-	382
5F - Office Z1 Perimeter W2	90	-	-	380
5F - Office Z1 Perimeter W1	90	-	-	612
4F - Office Z1 - Perimeter W1	90	-	-	613
4F - Office Z1 - Perimeter S	90	-	-	346
4F - Office Z1 - Perimeter W2	90	-	-	375
3F - Office Z1 - Perimeter W1	90	-	-	613
3F - Office Z1 Perimeter S	90	-	-	346
3F - Office Z1 Perimeter W2	90	-	-	374
2F - Office Z1 - Perimeter W1	90	-	-	614
2F - Office Z1 - Perimeter W2	90	-	-	378
2F - Office Z1 - Perimeter S	90	-	-	346
1F - Office Z1 - Perimeter W1	90	-	-	535
1F - Office Z1 - Perimeter W2	90	-	-	431
GF - Office Unit 02 Perimeter S	90	-	-	349
GF - Office Unit 02 Perimeter W	90	-	-	397
3F - Block B Office Perimeter	90	-	-	761
4F - Block B Office	90	-	-	761
1F - Office Z1 - Perimeter S	90	-	-	353
1F - Office Z1	90	-	-	702
1F - Office Z2 - Middle	90	-	-	913
1F - Office Z2 - Perimeter N	90	-	-	783
2F - Office Z1	90	-	-	657
2F -Office Z2 - Perimeter N	90	-	-	776
2F -Office Z2 - Perimeter Middle	90	-	-	912
3F - Office Z1	90	-	-	656
3F - Office Z2 Middle	90	-	-	913
3F - Office Z2 - Perimeter N	90	-	-	776
4F - Office Z1	90	-	-	656
4F - Office Z2 - Middle	90	-	-	913
4F - Office Z2 - Perimeter N	90	-	-	774
5F - Office Z1	90	-	-	657
5F - Office Z2 - Perimeter N	90	-	-	697
6F - Office Z1	90	-	-	381
6F - Office Z2 Middle	90	-	-	566
6F - Office Z2 - Perimeter N	90	-	-	700
5F - Office Z2 Middle	90	-	-	913
5F - Office Z3 Middle	90	-	-	947
LGF - FM Lockers	-	60	-	23

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
GF - Office Unit 01	90	-	-	571
LGF - Meeting Room 1	90	-	-	269
LGF - Meeting Room 2	90	-	-	227
LGF - Cafe	-	60	-	80
LGF - Bike Storage	60	-	-	83
LGF - Bike Storage	60	-	-	69
LGF - Engineering workshop Store	90	-	-	257
LGF - AHU Plant	60	-	-	394
LGF - Services	60	-	-	104
GF - Entrance	-	60	-	267
GF - Breakout Space 3	-	60	-	202
LGF - Cafe	-	60	-	1118
GF - OPEN TO BELOW	-	60	-	168
1F - Block B Office Perimeter	90	-	-	761
2F - Block B Office	90	-	-	1026
1F - Block B Office	90	-	-	1026
3F - Block B Office	90	-	-	1026
4F - Block B Office	90	-	-	1024
GF - Breakout Space 2	-	60	-	211
GF - Feature stair	-	60	-	52
GF - Core	-	60	-	47
GF - Office Unit 03	90	-	-	2119
LGF - Server/IT	60	-	-	171
LGF - Plantroom	60	-	-	320

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?
LGF - Security	N/A	N/A
5F - Office Z3 - Perimeter N	NO (-7.2%)	NO
5F - Office Z3 - Perimeter S	NO (-43.6%)	NO
5F - Office Z2 - Perimeter S	NO (-45%)	NO
3F - Office Z2 - Perimeter S	NO (-68.2%)	NO
3F - Office Z3 - Perimeter S	NO (-65.2%)	NO
3F - Office Z3 Middle	NO (-79.8%)	NO
3F - Office Z3 - Perimeter N	NO (-14.2%)	NO
2F -Office Z3 - Perimeter S	NO (-68%)	NO
2F -Office Z3 - Middle	NO (-80.8%)	NO
2F -Office Z3 - Perimeter N	NO (-21.1%)	NO
2F - Office Z2 - Perimeter S	NO (-71.2%)	NO
1F - Office Z2 - Perimeter S	NO (-72.6%)	NO
1F - Office Z3 - Perimeter N	NO (-32.9%)	NO
1F - Office Z3 - Middle	NO (-83%)	NO
1F - Office Z3 - Perimeter S	NO (-69.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F - Office Z3 - Middle	NO (-77%)	NO
4F - Office Z3 - Perimeter S	NO (-60.1%)	NO
4F - Office Z2 - Perimeter S	NO (-63.1%)	NO
4F - Office Z3 - Perimeter N	NO (-1.4%)	NO
GF - Office Unit 02	YES (+3.8%)	NO
LGF - F Lockers	N/A	N/A
LGF - FM Office	NO (-57.3%)	NO
LGF - FM WC	N/A	N/A
LGF - FM Facilities	N/A	N/A
LGF - Servery	N/A	N/A
6F - Office Z3 - Perimeter N	YES (+1.3%)	NO
6F - Office Z3 - Perimeter S	NO (-32%)	NO
6F - Office Z3 - Middle	NO (-46.2%)	NO
6F - Office Z2 - Perimeter S	NO (-29.9%)	NO
GF - Office Unit 03 Block C	NO (-72.4%)	NO
GF - Block B Office Perimeter	NO (-63.4%)	NO
GF - Block B Office	NO (-81.7%)	NO
2F - Block B Office Perimeter	NO (-57.8%)	NO
6F - Office Z1 - Perimeter S	NO (-39.5%)	NO
5F - Office Z1 - Perimeter S	NO (-37.8%)	NO
6F - Office Z1 - Perimeter W2	NO (-67.5%)	NO
6F - Office Z1 - Perimeter W1	NO (-34.5%)	NO
5F - Office Z1 Perimeter W2	NO (-54%)	NO
5F - Office Z1 Perimeter W1	NO (-44.8%)	NO
4F - Office Z1 - Perimeter W1	NO (-64.3%)	NO
4F - Office Z1 - Perimeter S	NO (-54%)	NO
4F - Office Z1 - Perimeter W2	NO (-73.6%)	NO
3F - Office Z1 - Perimeter W1	NO (-65.1%)	NO
3F - Office Z1 Perimeter S	NO (-59.9%)	NO
3F - Office Z1 Perimeter W2	NO (-74.3%)	NO
2F - Office Z1 - Perimeter W1	NO (-63.8%)	NO
2F - Office Z1 - Perimeter W2	NO (-71.4%)	NO
2F - Office Z1 - Perimeter S	NO (-63%)	NO
1F - Office Z1 - Perimeter W1	NO (-59.7%)	NO
1F - Office Z1 - Perimeter W2	NO (-73.2%)	NO
GF - Office Unit 02 Perimeter S	NO (-67.7%)	NO
GF - Office Unit 02 Perimeter W	NO (-64.9%)	NO
3F - Block B Office Perimeter	NO (-66.4%)	NO
4F - Block B Office	NO (-63.4%)	NO
1F - Office Z1 - Perimeter S	NO (-62.7%)	NO
1F - Office Z1	NO (-85.3%)	NO
1F - Office Z2 - Middle	NO (-89.6%)	NO
1F - Office Z2 - Perimeter N	NO (-86.7%)	NO
2F - Office Z1	NO (-85.6%)	NO
2F -Office Z2 - Perimeter N	NO (-84.5%)	NO
2F -Office Z2 - Perimeter Middle	NO (-88.6%)	NO
3F - Office Z1	NO (-84.6%)	NO
3F - Office Z2 Middle	NO (-87.6%)	NO
3F - Office Z2 - Perimeter N	NO (-79.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F - Office Z1	NO (-82.7%)	NO
4F - Office Z2 - Middle	NO (-85%)	NO
4F - Office Z2 - Perimeter N	NO (-70%)	NO
5F - Office Z1	NO (-72.9%)	NO
5F - Office Z2 - Perimeter N	NO (-28.4%)	NO
6F - Office Z1	NO (-63.1%)	NO
6F - Office Z2 Middle	NO (-50.4%)	NO
6F - Office Z2 - Perimeter N	NO (-19.6%)	NO
5F - Office Z2 Middle	NO (-68.4%)	NO
5F - Office Z3 Middle	NO (-66.4%)	NO
GF - Office Unit 01	NO (-72.3%)	NO
LGF - Meeting Room 1	NO (-55.2%)	NO
LGF - Meeting Room 2	NO (-56.5%)	NO
LGF - Cafe	N/A	N/A
LGF - Engineering workshop Store	N/A	N/A
LGF - Cafe	NO (-95.2%)	NO
GF - OPEN TO BELOW	NO (-57%)	NO
1F - Block B Office Perimeter	NO (-59.9%)	NO
2F - Block B Office	YES (+134.4%)	NO
1F - Block B Office	YES (+125.2%)	NO
3F - Block B Office	YES (+101.1%)	NO
4F - Block B Office	YES (+127.7%)	NO
GF - Office Unit 03	NO (-60.4%)	NO
LGF - Server/IT	N/A	N/A

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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	11346.2	11346.2
External area [m^2]	8994.7	8994.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	5953.52	4006.43
Average U-value [W/m^2K]	0.66	0.45
Alpha value* [%]	10.97	10

* 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
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
100	**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/m^2]

	Actual	Notional
Heating	5.12	3.24
Cooling	4.18	7.02
Auxiliary	15.99	9.09
Lighting	9.99	18.73
Hot water	8.3	5.99
Equipment*	46.75	46.75
TOTAL**	**43.58**	**44.06**

* 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	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/m^2]	87.82	109.91
Primary energy* [kWh/m^2]	130.43	127.03
Total emissions [kg/m^2]	22.1	21.8

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	38.1	65.3	3	5.5	21.4	3.5	3.28	3.5	4.5
	Notional	8.6	127.6	0.9	9.4	12.1	2.56	3.79	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	48.1	0	16.7	0	0.2	0.8	0	1	0
	Notional	48.7	0	15.7	0	0.4	0.86	0	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	38.3	124.8	4.3	6.9	15.7	2.45	5	2.73	4.5
	Notional	0.1	137	0	10	8.3	2.7	3.79	----	----
[ST] Single room cooling system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	0	0	0	0	0	3.5	4.5	3.5	4
	Notional	0	0	0	0	0	0.86	3.79	----	----
[ST] Central heating using air distribution, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	52.2	0	16	0	7.1	0.91	0	1	0
	Notional	32.5	0	10.5	0	5.7	0.86	0	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	65.9	49.5	5.2	2.8	20.2	3.5	5	3.5	4.5
	Notional	20	93.7	2.2	6.9	11.9	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	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	0.28	2F000018:Surf[0]
Floor	0.2	0.22	VD000000:Surf[0]
Roof	0.15	0.18	3F000016:Surf[0]
Windows, roof windows, and rooflights	1.5	1.53	GF000008:Surf[3]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\text{-}Typ}$ = 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