

Project name

IMRI Wing - BE GREEN

As designed

Date: Wed May 03 19:01:20 2017

Administrative information

Building Details

Address: LONDON,

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.3.a.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v5.0.3

BRUKL compliance check version: v5.3.a.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Levent Ulfet

Telephone number: 020 8150 8288

Address: The Enterprise Centre Cranborne Road, Potters Bar, EN6 3DQ

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	78.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	78.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	65.5
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	Level 03 - MRI B3322_W_5
Floor	0.25	0.15	0.15	Level 03 - MRI B3322_F_4
Roof	0.25	0.15	0.15	Level 03 - Prep Rm B3312_R_5
Windows***, roof windows, and rooflights	2.2	2.2	2.2	Level 03 - Control Rm B3324_G_6
Personnel doors	2.2	2.2	2.2	Level 02 - GAIT B2322_D_8
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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- AHU 02 (CHP & Chiller)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.88	3.35	-	1.14	0.71
Standard value	0.91*	N/A	N/A	1.6^	0.5
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.					
^ Allowed SFP may be increased by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

2- AHU 01 (CHP & Chiller)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.88	3.35	-	1.34	0.71
Standard value	0.91*	N/A	N/A	1.6^	0.5
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.					
^ Allowed SFP may be increased by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

3- LST Radiators

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.88	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
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.					

1- HWS from CHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

1- CHP 1

	CHPQA quality index	CHP electrical efficiency
This building	110	0.78
Standard value	105	0.2

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		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Level 04 - Plant Rm B4312	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - Bunded Area	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - Corridor B4300	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - LV Switch B4306	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - MRI Equip B4310	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - UPS B4308	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - Generator B4304	-	-	-	-	-	-	-	-	-	-	N/A
Level 04 - Duct B4302	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - MRI B3322	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Anaesthetic Rm B3320	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Control Rm B3324	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Theatre B3314	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Prep Rm B3312	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Anaesthetic Rm B3318	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Corridor B2300	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - IT Hub B2302	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Disposal Rm B2304	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Changing B2306	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Store B2309	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Stairway B2308	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Reception B2312	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Consultant 01 B2316	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Store B2310	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Corridor B2314	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - GAIT B2322	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - WC B2324	-	-	0.5	-	-	-	-	-	-	-	N/A
Level 02 - Cleaners B2328	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Gym B2330	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Store B2331	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Consultant 02 B2318	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Plaster Rm B2320	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - Store B2321	-	-	-	-	-	-	-	-	-	-	N/A
Level 02 - WC B2326	-	-	0.5	-	-	-	-	-	-	-	N/A
Level 03 - Corridor B3308	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Dirty Utility B3310	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Corridor B3306	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Stairway B3ST-06	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Metal Check B3326	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - Corridor B3300	-	-	-	-	-	-	-	-	-	-	N/A
Level 03 - WC B3304	-	-	0.5	-	-	-	-	-	-	-	N/A
Level 03 - Store B3302	-	-	-	-	-	-	-	-	-	-	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	
Level 04 - Plant Rm B4312		100	-	-	264
Level 04 - Bunded Area		100	-	-	70
Level 04 - Corridor B4300		-	100	-	53
Level 04 - LV Switch B4306		100	-	-	60
Level 04 - MRI Equip B4310		100	-	-	50
Level 04 - UPS B4308		100	-	-	32
Level 04 - Generator B4304		100	-	-	50
Level 04 - Duct B4302		96	-	-	14
Level 03 - MRI B3322		-	60	-	1673
Level 03 - Anaesthetic Rm B3320		-	95	-	399
Level 03 - Control Rm B3324		-	95	-	448
Level 03 - Theatre B3314		-	95	-	1061
Level 03 - Prep Rm B3312		-	95	-	357
Level 03 - Anaesthetic Rm B3318		-	95	-	411
Level 02 - Corridor B2300		-	82	-	59
Level 02 - IT Hub B2302		106	-	-	18
Level 02 - Disposal Rm B2304		107	-	-	26
Level 02 - Changing B2306		-	106	-	24
Level 02 - Store B2309		96	-	-	17
Level 02 - Stairway B2308		-	82	-	77
Level 02 - Reception B2312		-	83	83	368
Level 02 - Consultant 01 B2316		-	107	-	152
Level 02 - Store B2310		96	-	-	14
Level 02 - Corridor B2314		-	82	-	50
Level 02 - GAIT B2322		-	83	-	252
Level 02 - WC B2324		-	86	-	61
Level 02 - Cleaners B2328		86	-	-	44
Level 02 - Gym B2330		-	83	-	480
Level 02 - Store B2331		107	-	-	51
Level 02 - Consultant 02 B2318		-	107	-	150
Level 02 - Plaster Rm B2320		107	-	-	49
Level 02 - Store B2321		86	-	-	43
Level 02 - WC B2326		-	86	-	32
Level 03 - Corridor B3308		-	66	-	100
Level 03 - Dirty Utility B3310		95	-	-	53
Level 03 - Corridor B3306		-	84	-	48
Level 03 - Stairway B3ST-06		-	86	-	61
Level 03 - Metal Check B3326		-	95	-	314
Level 03 - Corridor B3300		-	66	-	108
Level 03 - WC B3304		-	86	-	50
Level 03 - Store B3302		95	-	-	92

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?
Level 03 - MRI B3322	N/A	N/A
Level 03 - Anaesthetic Rm B3320	N/A	N/A
Level 03 - Control Rm B3324	NO (-82.5%)	NO
Level 03 - Theatre B3314	N/A	N/A
Level 03 - Prep Rm B3312	NO (-71.7%)	NO
Level 03 - Anaesthetic Rm B3318	N/A	N/A
Level 02 - Reception B2312	NO (-80%)	NO
Level 02 - Consultant 01 B2316	NO (-44.8%)	NO
Level 02 - GAIT B2322	NO (-79.1%)	NO
Level 02 - Gym B2330	NO (-81.6%)	NO
Level 02 - Consultant 02 B2318	NO (-60.3%)	NO
Level 03 - Metal Check B3326	NO (-86.8%)	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?	YES
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 [m ²]	919	919
External area [m ²]	2208.1	2208.1
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	548.3	696.75
Average U-value [W/m ² K]	0.25	0.32
Alpha value* [%]	72.22	9.68

* 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
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution
C1 Hotels
99 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
1 Others: Miscellaneous 24hr activities
Others: Car Parks 24 hrs
Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	54.98	49.01
Cooling	64.41	28.53
Auxiliary	44.45	49.13
Lighting	38.3	53.41
Hot water	6.51	5.91
Equipment*	251.72	251.72
TOTAL **	165.78	186

* Energy used by equipment does not count towards the total for 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	42.86	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	719.78	685.72
Primary energy* [kWh/m ²]	383.9	459.35
Total emissions [kg/m ²]	65.5	78.2

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] No Heating or Cooling									
Actual	106.2	2.1	0	0	0	0	0	0	0
Notional	54.9	4.9	0	0	0	0	0	----	----
[ST] Constant volume system (fixed fresh air rate), [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	2.5	2650	0.7	368.4	148.2	0.92	2	0.88	3.35
Notional	32.8	2085.1	11.1	160.9	146.3	0.82	3.6	----	----
[ST] Constant volume system (fixed fresh air rate), [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	20.9	1554.8	6.2	223.3	241.4	0.94	1.93	0.88	3.35
Notional	246.3	1314.2	83.5	101.4	295.9	0.82	3.6	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	27.2	148.1	9.1	0	4.7	0.83	0	0.88	0
Notional	213.4	291.1	72.4	0	3.2	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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	Level 03 - MRI B3322_W_5
Floor	0.2	0.15	Level 03 - MRI B3322_F_4
Roof	0.15	0.15	Level 03 - Prep Rm B3312_R_5
Windows, roof windows, and rooflights	1.5	2.2	Level 03 - Control Rm B3324_G_6
Personnel doors	1.5	2.2	Level 02 - GAIT B2322_D_8
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5