



MAYFIELD DEVELOPMENT PARTNERSHIP
LIMITED

ENERGY STATEMENT

The Republic



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MAYFIELD DEVELOPMENT PARTNERSHIP LIMITED

ENERGY STATEMENT

The Republic

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EXECUTIVE SUMMARY

This Energy Statement refers to the Republic office building located within the Mayfield scheme in Manchester. This report has been produced to support the planning application submitted to the Manchester City Council. The proposed development is a 13-storey office development including ground and mezzanine floors comprising Café/Cultural spaces with a circa 26,378 sq. m. (GIA).

This Energy Statement demonstrates that the proposed development meets the requirements of Policy EN 6, which sets out a target framework for CO₂ reductions from low or zero carbon energy supplies.

In line with the requirements of EN 6, the 'Lean, Clean, Green' approach to low carbon design has been implemented for the proposed development. Energy efficient building fabric and services have been included in the design. Renewable energy will be produced by 450 m² of PV panels generating 80.45 MWh per annum.

The results indicate that the proposed development has a 16.5% improvement over the Baseline Part L 2021 Building Regulations compliant building and satisfies the EN06 requirement.

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1 ENERGY AND CARBON TARGET

In line with policy EN 06, the proposed development falls into a 'micro generation area'. As such the following target applies:

- 15% beyond Part L 2010 (equivalent to a 3.5% improvement on Part L 2013, for deep plan office blocks).

For the current planning submission, the 2021 Building Regulations of Part L has to be complied with. This equates to roughly 27% of improvement over the 2013 Building Regulations. The Manchester council local plan doesn't set out a set requirement based on the latest Regulations. However, as a best practice, we have followed a margin of 10% improvement beyond Part L 2021.

2 BASELINE CARBON EMISSIONS

The first stage of the energy assessment is to establish the baseline site energy demand and CO₂ emissions.

Detailed energy modelling has been undertaken based on the methodology from Part L2A of the Building Regulations to establish the baseline carbon emissions for the proposed development. The figures below show renders of the energy model.

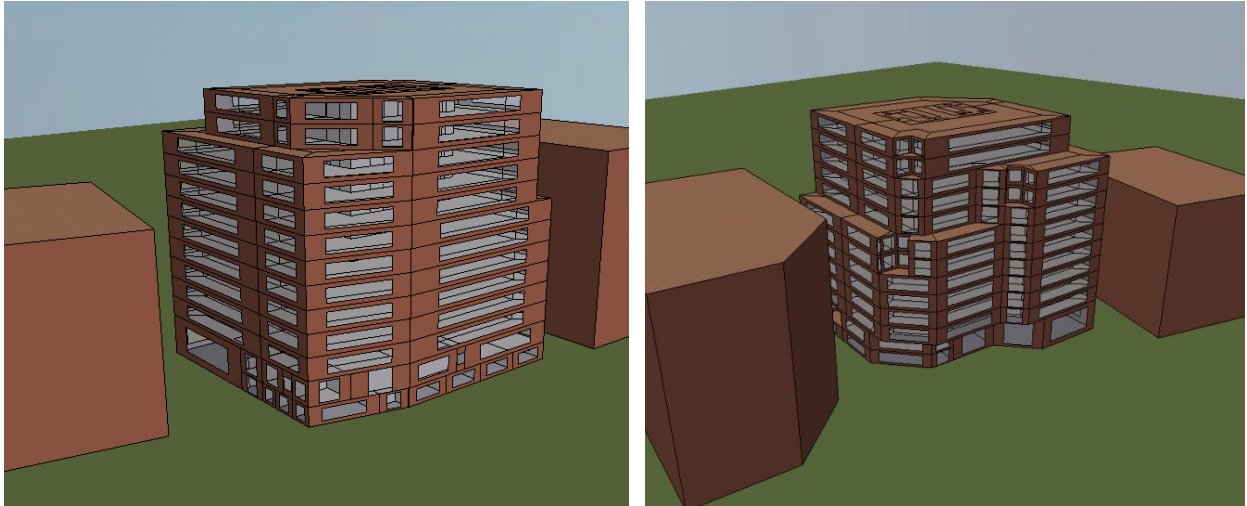


Figure 2-1 - Render of Thermal Model

Base line carbon emissions for the proposed development are as follows:

Table 2-1 – Baseline Carbon Emissions

	BER (Building Emissions Rate) (kgCO₂/m²)	TER (Target Emissions Rate) (kgCO₂/m²)	% Beyond Part L 2021
Baseline: Part L 2021 of the building regulations compliant development	4.0	4.0	0

3 BE LEAN: REDUCE ENERGY DEMAND

The first step to reducing carbon emissions is to reduce the energy demand associated with the proposed development. The following section provides details of the demand reduction measures specific to the development.

3.1 BUILDING FABRIC

During pre-planning design development, significant consideration has been given to how the building fabric will respond to its environment to reduce the energy consumption of the building as far as possible through passive means.

A façade optimisation exercise has been undertaken which included detailed analysis of g-values, U-values and shading and their impact on the cooling and heating requirements of the building.

The building fabric of the proposed development will be optimised to reduce heat loss in winter months and minimise heat gains in summer months. This will reduce the energy required to heat and cool the building.

Table 3-1 sets out the fabric performance parameters of the proposed building.

Table 3.1 – Fabric performance targets

Fabric Parameter	Target Performance
Glazing U-value (W/m ² .K)	1.3
Glazing g-value	0.30
External Wall U-value (W/m ² .K)	-
Ground floor U-value (W/m ² .K)	0.13
Roof U-value (W/m ² .K)	0.13
Air permeability (m ³ /hr/m ² @50pa)	3.0

3.2 BUILDING SERVICES

Heating and cooling to the office areas are provided by a central air-water heat pump and chiller located at roof level. A 4-pipe heat pump is proposed to be provided sized to match the building's simultaneous heating and cooling load to maximize energy recovery. Supplementary 2-pipe reversible heat pump/s are proposed sized to meet the remaining heating load. A high efficiency chiller is also proposed to be provided sized on the cooling load shortfall from the air-water heat pump proposed. The 4-pipe heat pump shall be setup to operate as lead unit whenever a simultaneous heating and cooling load is realized.

The ancillary spaces and the toilets/changing facilities will have heating provided by central radiators using a central ASHP.

Ventilation to office areas shall be provided via AHUs (air-handling units) located on the roof with a high efficiency thermal wheels providing heat recovery. The ventilation systems to the office areas shall operate as variable air-volume systems with CO2 sensors provided linked to variable air-volume dampers. Store rooms and refuse areas shall be provided with local mechanical ventilation. The toilets and changing facilities will have dedicated ventilation systems provided with heat recovery.

The hot water shall be generated via electric water heaters for toilets serving offices. The high hot water demand spaces like café and changing facilities will have heat pump for hot water.

The Calculations in this Energy Statement are based on the building utilising a 4-pipe to provide heating and cooling. As the design progresses however, other systems may be considered. Any alternative system will perform at least as well as the currently proposed system in terms of energy and carbon emissions.

PROPOSED ENERGY CONSERVATION MEASURES

Element	Design Rationale
Air Handling Plant	Ventilation is proposed to be through centralised high efficiency Air Handling Units (AHU) which will be provided to achieve low specific fan powers.
Energy Recovery	Air handling systems will incorporate heat recovery systems with a minimum efficiency of 75%. These transfer waste heat from the exhaust air stream to the supply air stream.
Cooling Plant	High efficiency cooling plant will have a minimum SEER (Seasonal Energy Efficiency Ratio) of 5.78
Terminal Units	Specific fan power of terminal units will be 0.2 W/l/s or lower.
Space Heating and domestic hot water	Heating is provided by a central air-water heat pump and domestic hot water is provided via air-water heat pump to the changing facilities and café while point of use electric for the toilets. This will minimise the heat losses from pipework.
Lighting Technology	High efficiency lighting will be provided throughout to significantly exceed the minimum requirements of the Non- Domestic Building Services Compliance Guide. This includes the use of high efficiency fluorescent and/or LED luminaires throughout.
Lighting Control	Occupancy and daylight sensing will be specified to an appropriate level throughout the different areas of the building. This will reduce the use of artificial lighting when areas are not occupied.

3.3 CARBON EMISSIONS REDUCTION

Based on the energy efficiency measures outlined, and excluding the contribution of any renewable technologies, the total carbon emissions are as per Table 3-1.

The carbon emissions from the development are shown to comply with the minimum requirements of the building regulations by energy efficiency measures alone. The BRUKL output demonstrating this can be found in the Appendices.

Table 3-1 - 'Be Lean' carbon dioxide emissions for non-domestic buildings (tonnes CO2 per annum)

	BER (Building Emissions Rate) (kgCO ₂ /m ²)
Baseline: Part L2021 of the building regulations compliant development	4.0
Emissions after Energy demand reduction	4.23

4 BE CLEAN: SUPPLY ENERGY EFFICIENTLY

After consumption has been reduced through the application of energy efficiency measures, the next step is to consider low carbon technologies in order to provide further reductions in carbon dioxide emissions.

An appraisal of an assessment of district heating networks and Combined Heat and Power (CHP).

There is no district heating network currently proposed for the Mayfield area and therefore connection to a network is not currently possible for the proposed development.

A combined heat and power feasibility analysis has been carried out to determine whether space heating and domestic hot water to the building can be generated by a centralised LTHW heating system led by a CHP engine.

The heat load profile of the building has been shown to be intermittent, and hence not suitable for efficient operation of a CHP (see Figure 4.1 below).

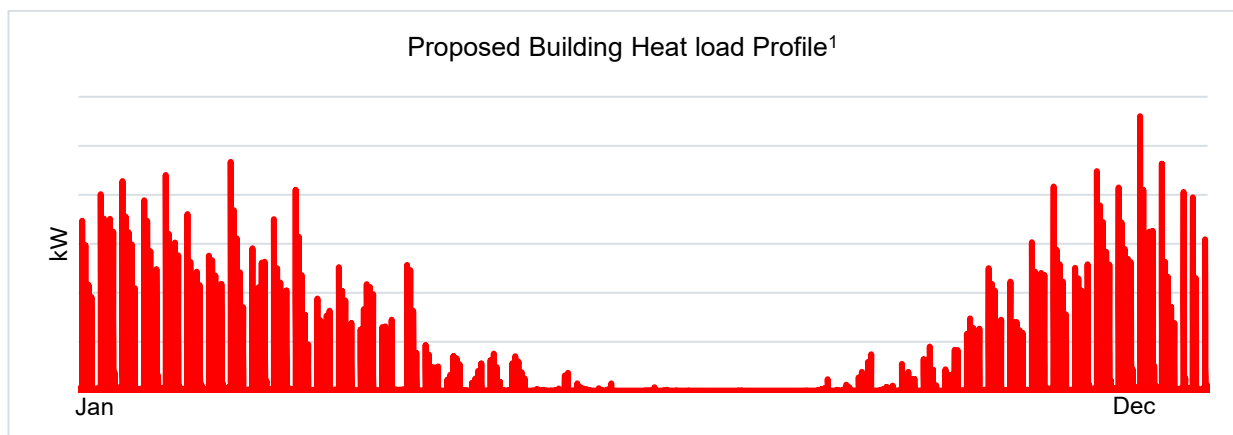


Figure 4-1 - Proposed Building Heat load Profile

In addition to this, the carbon emissions factor of electricity has come down significantly in recent years as the grid has decarbonised.

For this reason, the carbon savings available from a gas fired CHP solution have been significantly reduced. Hence a CHP solution is not considered appropriate for the proposed development.

¹ Estimated from Part L Thermal Model

5 BE GREEN: USE RENEWABLE ENERGY

In accordance with the requirements of EN 6, we have evaluated a number of renewable technologies to determine their potential applicability to the proposed development. A summary of the renewable feasibility study is included in the appendices.

5.1 PHOTOVOLTAIC PANELS

It has been determined that Photovoltaic (PV) panels are the most appropriate renewable technology to utilise at the proposed development. It is proposed that a roof mounted PV array generating 80.45MWh per year is installed on the roof of the proposed development. The Figure 5-1 depicts the capacity of roughly 450 m² of space for PV on the roof top.



Figure 5-1 - PV location on the roof

5.2 CARBON EMISSIONS REDUCTION

Savings from renewable energy are shown in Table 5-1 - 'Be Green' carbon dioxide emissions for non-domestic buildings (tonnes CO₂ per annum) below. An improvement of 16.5% is achieved in the be-Green stage.

Table 5-1 - 'Be Green' carbon dioxide emissions for non-domestic buildings (tonnes CO₂ per annum)

	BER (Building Emissions Rate) (kgCO₂/m²)	TER (Target Emissions Rate) (kgCO₂/m²)	% Beyond Part L 2021
Baseline: Part L2021 of the building regulations compliant development	4.0	4.0	-
Emissions after renewable energy	3.34	4.0	16.5

6 CONCLUSIONS

The design of the proposed development will maximise carbon reductions through the provision of:

- highly efficient building fabric,
- highly efficient building services,
- low energy lighting, and
- roof mounted PV

The proposed development has been shown to achieve a 16.5% reduction in carbon emissions compared to Part L 2021, exceeding the requirements of EN 6.

Appendix A

BRUKL-BE LEAN



Project name

Republic-Plot M

As designed

Date: Thu May 25 16:47:28 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.16

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.16

BRUKL compliance module version: v6.1.c.0

Foundation area [m²]: 1955.36The CO₂ 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 ² .annum	4
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	4.23
Target primary energy rate (TPER), kWh/m ² .annum	43.94
Building primary energy rate (BPER), kWh/m ² .annum	46.57
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 -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	-	-	UNKNOWN
Floors	0.18	0.13	0.13	LV000000:Surf[0]
Pitched roofs	0.16	-	-	No Pitched roofs in building
Flat roofs	0.18	0.13	0.13	LV000000:Surf[1]
Windows** and roof windows	1.6	1.3	1.3	LV000000:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No Vehicle access doors in building
High usage entrance doors	3	-	-	No High usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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	3

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP for stores

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	0.75
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

2- ASHP for ancillary areas

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	-
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

3- ASHP for toilet

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	0.75
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

4- ASHP with FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	2.64	0	1.9	0.75
Standard value	2.5*	N/A	N/A	2^	N/A
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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

5- ASHP for changing rooms

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	0.75
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

1- DHW-high demand

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.46	0.003
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

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
GF-Refuse Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Toilet	-	-	-	1.5	-	-	-	-	-	-	-	N/A
GF-Toilet	-	-	-	1.5	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Cafe Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF/MF-Reception	-	-	-	-	-	-	-	0.2	-	-	-	N/A
GF/MF-Cultural/Performance	-	-	-	-	-	-	-	0.2	-	-	-	N/A
MF-Changing Room	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-Changing Room	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-WCs	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
MF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
MF-WCs	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-Stairs	-	-	-	-	-	-	-	0.2	-	-	-	N/A
MF-Cafe Gallery	-	-	-	-	-	-	-	0.2	-	-	-	N/A
MF-Cultural	-	-	-	-	-	-	-	0.2	-	-	-	N/A
GF-Cultural	-	-	-	-	-	-	-	0.2	-	-	-	N/A
1F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
1F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
10F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
10F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
10F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
10F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
10F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
1F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
1F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
5F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
5F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
7F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 11)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
7F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
7F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
8F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
8F-Open Plan Office (Perimeter 11)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
8F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
8F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
8F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
8F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
8F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
2F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
2F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
2F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
3F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
3F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
3F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
3F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
4F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
4F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
4F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
6F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
6F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
9F-Open Plan Office (Perimeter 11)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
9F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
9F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
9F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
9F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
9F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
10F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
11F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
10F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
11F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
11F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A	
GF-Cafe/Retail	-	-	-	-	-	-	-	0.2	-	-	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
GF-PH Plant Room		120	-	-
GF-PH Plant Room 2		120	-	-
GF-Refuse Store		120	-	-
GF-Comms Room		120	-	-
GF-Main LV Switch Room		120	-	-
GF-Gas Intake Room		120	-	-
GF-LS Switch		120	-	-
GF-Generator Room		120	-	-
GF-Transformer		120	-	-
GF-Transformer		120	-	-
GF-Plant AHU		120	-	-
GF-Corridor		120	-	-

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	
GF-Toilet		120	-	-	
GF-Toilet		120	-	-	
GF-Stair		120	-	-	
GF-Store		120	-	-	
GF-Store		120	-	-	
GF-Stair		120	-	-	
GF-Store		120	-	-	
GF-Coridoor		120	-	-	
GF-Cafe Store		120	-	-	
GF-Store		120	-	-	
GF/MF-Coridoor		120	-	-	
GF/MF-Reception		120	120	0.9	
GF/MF-Cultural/Perforamance		120	-	-	
GF-Cafe/Retail Coridoor		120	-	-	
MF-Tenant Plant		120	-	-	
MF-Changing Room		120	-	-	
MF-Changing Room		120	-	-	
MF-WC Coridoor		120	-	-	
MF-WCs		120	-	-	
MF-Store		120	-	-	
MF-Cycle Store		120	-	-	
MF-Store		120	-	-	
MF-Stairs		120	-	-	
MF-WCs		120	-	-	
MF-Stairs		120	-	-	
MF-Coridoor		120	-	-	
MF-Stairs		120	-	-	
MF-Cafe Gallery		120	120	1	
MF-Cultural		120	-	-	
MF-Coridoor		120	-	-	
MF-Coridoor		120	-	-	
GF-Cultural		120	-	-	
GF-Cupboard2		120	-	-	
1F-Coridoor		120	-	-	
1F-Stair		120	-	-	
1F-Coridoor		120	-	-	
1F-Coridoor		120	-	-	
1F-Stair		120	-	-	
1F-Store		120	-	-	
1F-WC		120	-	-	
1F-WC		120	-	-	
10F-Coridoor		120	-	-	
10F-Stair		120	-	-	

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80		0.3
10F-Coridoor		120	-		-
10F-Coridoor		120	-		-
10F-Stair		120	-		-
10F-Store		120	-		-
10F-WC		120	-		-
10F-Store		120	-		-
10F-WC		120	-		-
10F-Store		120	-		-
1F-Open Plan Office (Perimeter 1)		120	-		-
1F-Open Plan Office (Perimeter 2)		120	-		-
1F-Open Plan Office (Perimeter 3)		120	-		-
1F-Open Plan Office (Perimeter 10)		120	-		-
1F-Open Plan Office (Perimeter 9)		120	-		-
1F-Open Plan Office (Perimeter 4)		120	-		-
1F-Open Plan Office (Core)		120	-		-
1F-Open Plan Office (Perimeter 6)		120	-		-
1F-Open Plan Office (Perimeter 7)		120	-		-
1F-Open Plan Office (Perimeter 8)		120	-		-
1F-Open Plan Office (Perimeter 5)		120	-		-
5F-Coridoor		120	-		-
5F-Stair		120	-		-
5F-Coridoor		120	-		-
5F-Coridoor		120	-		-
5F-Stair		120	-		-
5F-Store		120	-		-
5F-WC		120	-		-
5F-WC		120	-		-
5F-Open Plan Office (Perimeter 1)		120	-		-
5F-Open Plan Office (Perimeter 2)		120	-		-
5F-Open Plan Office (Perimeter 10)		120	-		-
5F-Open Plan Office (Perimeter 9)		120	-		-
5F-Open Plan Office (Core)		120	-		-
5F-Open Plan Office (Perimeter 6)		120	-		-
5F-Open Plan Office (Perimeter 7)		120	-		-
5F-Open Plan Office (Perimeter 8)		120	-		-
5F-Open Plan Office (Perimeter 5)		120	-		-
5F-Open Plan Office (Perimeter 3)		120	-		-
5F-Open Plan Office (Perimeter 4)		120	-		-
7F-Coridoor		120	-		-
7F-Stair		120	-		-
7F-Coridoor		120	-		-
7F-Coridoor		120	-		-
7F-Stair		120	-		-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80		0.3
7F-Store		120	-		-
7F-Open Plan Office (Perimeter 1)		120	-		-
7F-Open Plan Office (Perimeter 11)		120	-		-
7F-Open Plan Office (Perimeter 10)		120	-		-
7F-Open Plan Office (Perimeter 8)		120	-		-
7F-Open Plan Office (Perimeter 9)		120	-		-
7F-Open Plan Office (Core)		120	-		-
7F-Open Plan Office (Perimeter 7)		120	-		-
7F-Open Plan Office (Perimeter 6)		120	-		-
7F-Open Plan Office (Perimeter 2)		120	-		-
7F-Open Plan Office (Core)		120	-		-
7F-Open Plan Office (Perimeter 5)		120	-		-
7F-Open Plan Office (Perimeter 4)		120	-		-
7F-Open Plan Office (Perimeter 3)		120	-		-
7F-WC		120	-		-
7F-Store		120	-		-
7F-WC		120	-		-
7F-Store		120	-		-
8F-Corridor		120	-		-
8F-Stair		120	-		-
8F-Corridor		120	-		-
8F-Corridor		120	-		-
8F-Stair		120	-		-
8F-Store		120	-		-
8F-Open Plan Office (Perimeter 11)		120	-		-
8F-Open Plan Office (Perimeter 10)		120	-		-
8F-Open Plan Office (Perimeter 8)		120	-		-
8F-Open Plan Office (Perimeter 9)		120	-		-
8F-Open Plan Office (Core)		120	-		-
8F-Open Plan Office (Perimeter 7)		120	-		-
8F-Open Plan Office (Perimeter 6)		120	-		-
8F-Open Plan Office (Perimeter 2)		120	-		-
8F-Open Plan Office (Core)		120	-		-
8F-Open Plan Office (Perimeter 5)		120	-		-
8F-Open Plan Office (Perimeter 4)		120	-		-
8F-Open Plan Office (Perimeter 3)		120	-		-
8F-WC		120	-		-
8F-Store		120	-		-
8F-WC		120	-		-
8F-Store		120	-		-
8F-Open Plan Office (Perimeter 1)		120	-		-
10F-Open Plan Office (Perimeter 1)		120	-		-
10F-Open Plan Office (Perimeter 3)		120	-		-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80		0.3
10F-Open Plan Office (Core)		120	-		-
10F-Open Plan Office (Perimeter 8)		120	-		-
10F-Open Plan Office (Perimeter 4)		120	-		-
10F-Open Plan Office (Perimeter 7)		120	-		-
10F-Open Plan Office (Core)		120	-		-
10F-Open Plan Office (Perimeter 5)		120	-		-
10F-Open Plan Office (Perimeter 6)		120	-		-
10F-Open Plan Office (Perimeter 2)		120	-		-
2F-Corridor		120	-		-
2F-Stair		120	-		-
2F-Corridor		120	-		-
2F-Corridor		120	-		-
2F-Stair		120	-		-
2F-Store		120	-		-
2F-WC		120	-		-
2F-WC		120	-		-
2F-Open Plan Office (Perimeter 1)		120	-		-
2F-Open Plan Office (Perimeter 2)		120	-		-
2F-Open Plan Office (Perimeter 3)		120	-		-
2F-Open Plan Office (Perimeter 10)		120	-		-
2F-Open Plan Office (Perimeter 9)		120	-		-
2F-Open Plan Office (Perimeter 4)		120	-		-
2F-Open Plan Office (Core)		120	-		-
2F-Open Plan Office (Perimeter 6)		120	-		-
2F-Open Plan Office (Perimeter 7)		120	-		-
2F-Open Plan Office (Perimeter 8)		120	-		-
2F-Open Plan Office (Perimeter 5)		120	-		-
3F-Corridor		120	-		-
3F-Stair		120	-		-
3F-Corridor		120	-		-
3F-Corridor		120	-		-
3F-Stair		120	-		-
3F-Store		120	-		-
3F-WC		120	-		-
3F-WC		120	-		-
3F-Open Plan Office (Perimeter 1)		120	-		-
3F-Open Plan Office (Perimeter 2)		120	-		-
3F-Open Plan Office (Perimeter 3)		120	-		-
3F-Open Plan Office (Perimeter 10)		120	-		-
3F-Open Plan Office (Perimeter 9)		120	-		-
3F-Open Plan Office (Perimeter 4)		120	-		-
3F-Open Plan Office (Core)		120	-		-
3F-Open Plan Office (Perimeter 6)		120	-		-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3	
3F-Open Plan Office (Perimeter 7)		120	-	-	
3F-Open Plan Office (Perimeter 8)		120	-	-	
3F-Open Plan Office (Perimeter 5)		120	-	-	
4F-Corridor		120	-	-	
4F-Stair		120	-	-	
4F-Corridor		120	-	-	
4F-Corridor		120	-	-	
4F-Stair		120	-	-	
4F-Store		120	-	-	
4F-WC		120	-	-	
4F-WC		120	-	-	
4F-Open Plan Office (Perimeter 1)		120	-	-	
4F-Open Plan Office (Perimeter 2)		120	-	-	
4F-Open Plan Office (Perimeter 3)		120	-	-	
4F-Open Plan Office (Perimeter 10)		120	-	-	
4F-Open Plan Office (Perimeter 9)		120	-	-	
4F-Open Plan Office (Perimeter 4)		120	-	-	
4F-Open Plan Office (Core)		120	-	-	
4F-Open Plan Office (Perimeter 6)		120	-	-	
4F-Open Plan Office (Perimeter 7)		120	-	-	
4F-Open Plan Office (Perimeter 8)		120	-	-	
4F-Open Plan Office (Perimeter 5)		120	-	-	
6F-Corridor		120	-	-	
6F-Stair		120	-	-	
6F-Corridor		120	-	-	
6F-Corridor		120	-	-	
6F-Stair		120	-	-	
6F-Store		120	-	-	
6F-WC		120	-	-	
6F-WC		120	-	-	
6F-Open Plan Office (Perimeter 1)		120	-	-	
6F-Open Plan Office (Perimeter 2)		120	-	-	
6F-Open Plan Office (Perimeter 10)		120	-	-	
6F-Open Plan Office (Perimeter 9)		120	-	-	
6F-Open Plan Office (Core)		120	-	-	
6F-Open Plan Office (Perimeter 6)		120	-	-	
6F-Open Plan Office (Perimeter 7)		120	-	-	
6F-Open Plan Office (Perimeter 8)		120	-	-	
6F-Open Plan Office (Perimeter 5)		120	-	-	
6F-Open Plan Office (Perimeter 3)		120	-	-	
6F-Open Plan Office (Perimeter 4)		120	-	-	
9F-Corridor		120	-	-	
9F-Stair		120	-	-	

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	
9F-Coridoor		120	-	-	
9F-Coridoor		120	-	-	
9F-Stair		120	-	-	
9F-Store		120	-	-	
9F-Open Plan Office (Perimeter 11)		120	-	-	
9F-Open Plan Office (Perimeter 10)		120	-	-	
9F-Open Plan Office (Perimeter 8)		120	-	-	
9F-Open Plan Office (Perimeter 9)		120	-	-	
9F-Open Plan Office (Core)		120	-	-	
9F-Open Plan Office (Perimeter 7)		120	-	-	
9F-Open Plan Office (Perimeter 6)		120	-	-	
9F-Open Plan Office (Perimeter 2)		120	-	-	
9F-Open Plan Office (Core)		120	-	-	
9F-Open Plan Office (Perimeter 5)		120	-	-	
9F-Open Plan Office (Perimeter 4)		120	-	-	
9F-Open Plan Office (Perimeter 3)		120	-	-	
9F-WC		120	-	-	
9F-Store		120	-	-	
9F-WC		120	-	-	
9F-Store		120	-	-	
9F-Open Plan Office (Perimeter 1)		120	-	-	
11F-Coridoor		120	-	-	
11F-Stair		120	-	-	
11F-Coridoor		120	-	-	
11F-Coridoor		120	-	-	
11F-Stair		120	-	-	
11F-Store		120	-	-	
10F-WC		120	-	-	
11F-Store		120	-	-	
10F-WC		120	-	-	
11F-Store		120	-	-	
11F-Open Plan Office (Perimeter 1)		120	-	-	
11F-Open Plan Office (Perimeter 3)		120	-	-	
11F-Open Plan Office (Core)		120	-	-	
11F-Open Plan Office (Perimeter 8)		120	-	-	
11F-Open Plan Office (Perimeter 4)		120	-	-	
11F-Open Plan Office (Perimeter 7)		120	-	-	
11F-Open Plan Office (Core)		120	-	-	
11F-Open Plan Office (Perimeter 5)		120	-	-	
11F-Open Plan Office (Perimeter 6)		120	-	-	
11F-Open Plan Office (Perimeter 2)		120	-	-	
GF-Cafe/Retail		120	120	1	

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?
GF/MF-Reception	YES (+4.5%)	NO
GF/MF-Cultural/Performamance	NO (-2.9%)	NO
MF-Stairs	NO (-71.9%)	NO
MF-Cafe Gallery	NO (-53.3%)	NO
MF-Cultural	NO (-27.5%)	NO
GF-Cultural	NO (-92.6%)	NO
1F-Open Plan Office (Perimeter 1)	NO (-28.3%)	NO
1F-Open Plan Office (Perimeter 2)	NO (-34.5%)	NO
1F-Open Plan Office (Perimeter 3)	NO (-43.8%)	NO
1F-Open Plan Office (Perimeter 10)	NO (-35.3%)	NO
1F-Open Plan Office (Perimeter 9)	NO (-65.3%)	NO
1F-Open Plan Office (Perimeter 4)	NO (-72.4%)	NO
1F-Open Plan Office (Core)	NO (-95.4%)	NO
1F-Open Plan Office (Perimeter 6)	NO (-16.2%)	NO
1F-Open Plan Office (Perimeter 7)	NO (-13.5%)	NO
1F-Open Plan Office (Perimeter 8)	NO (-30.8%)	NO
1F-Open Plan Office (Perimeter 5)	NO (-70.3%)	NO
5F-Open Plan Office (Perimeter 1)	NO (-22.6%)	NO
5F-Open Plan Office (Perimeter 2)	NO (-33.1%)	NO
5F-Open Plan Office (Perimeter 10)	NO (-33.4%)	NO
5F-Open Plan Office (Perimeter 9)	NO (-45.4%)	NO
5F-Open Plan Office (Core)	NO (-94.9%)	NO
5F-Open Plan Office (Perimeter 6)	NO (-15.9%)	NO
5F-Open Plan Office (Perimeter 7)	NO (-13.3%)	NO
5F-Open Plan Office (Perimeter 8)	NO (-25%)	NO
5F-Open Plan Office (Perimeter 5)	NO (-63%)	NO
5F-Open Plan Office (Perimeter 3)	NO (-48.9%)	NO
5F-Open Plan Office (Perimeter 4)	NO (-61.9%)	NO
7F-Open Plan Office (Perimeter 1)	NO (-17.7%)	NO
7F-Open Plan Office (Perimeter 11)	NO (-30.6%)	NO
7F-Open Plan Office (Perimeter 10)	NO (-18.1%)	NO
7F-Open Plan Office (Perimeter 8)	NO (-12.7%)	NO
7F-Open Plan Office (Perimeter 9)	NO (-17.9%)	NO
7F-Open Plan Office (Core)	NO (-91.8%)	NO
7F-Open Plan Office (Perimeter 7)	NO (-15.1%)	NO
7F-Open Plan Office (Perimeter 6)	NO (-32.5%)	NO
7F-Open Plan Office (Perimeter 2)	NO (-24.3%)	NO
7F-Open Plan Office (Core)	NO (-92.9%)	NO
7F-Open Plan Office (Perimeter 5)	NO (-31.2%)	NO
7F-Open Plan Office (Perimeter 4)	NO (-25.2%)	NO
7F-Open Plan Office (Perimeter 3)	NO (-33%)	NO
8F-Open Plan Office (Perimeter 11)	NO (-30.2%)	NO
8F-Open Plan Office (Perimeter 10)	NO (-17.9%)	NO
8F-Open Plan Office (Perimeter 8)	NO (-12.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
8F-Open Plan Office (Perimeter 9)	NO (-17.8%)	NO
8F-Open Plan Office (Core)	NO (-91.1%)	NO
8F-Open Plan Office (Perimeter 7)	NO (-14.6%)	NO
8F-Open Plan Office (Perimeter 6)	NO (-19.9%)	NO
8F-Open Plan Office (Perimeter 2)	NO (-22.9%)	NO
8F-Open Plan Office (Core)	NO (-92.5%)	NO
8F-Open Plan Office (Perimeter 5)	NO (-18.9%)	NO
8F-Open Plan Office (Perimeter 4)	NO (-19.9%)	NO
8F-Open Plan Office (Perimeter 3)	NO (-31.9%)	NO
8F-Open Plan Office (Perimeter 1)	NO (-45.7%)	NO
10F-Open Plan Office (Perimeter 1)	NO (-30.7%)	NO
10F-Open Plan Office (Perimeter 3)	NO (-17%)	NO
10F-Open Plan Office (Core)	NO (-90.2%)	NO
10F-Open Plan Office (Perimeter 8)	NO (-17.5%)	NO
10F-Open Plan Office (Perimeter 4)	NO (-16.2%)	NO
10F-Open Plan Office (Perimeter 7)	NO (-17.3%)	NO
10F-Open Plan Office (Core)	NO (-89.2%)	NO
10F-Open Plan Office (Perimeter 5)	NO (-14.1%)	NO
10F-Open Plan Office (Perimeter 6)	NO (-9.1%)	NO
10F-Open Plan Office (Perimeter 2)	NO (-45%)	NO
2F-Open Plan Office (Perimeter 1)	NO (-27.3%)	NO
2F-Open Plan Office (Perimeter 2)	NO (-34.4%)	NO
2F-Open Plan Office (Perimeter 3)	NO (-43.3%)	NO
2F-Open Plan Office (Perimeter 10)	NO (-35.1%)	NO
2F-Open Plan Office (Perimeter 9)	NO (-62.6%)	NO
2F-Open Plan Office (Perimeter 4)	NO (-70.9%)	NO
2F-Open Plan Office (Core)	NO (-95.4%)	NO
2F-Open Plan Office (Perimeter 6)	NO (-16.1%)	NO
2F-Open Plan Office (Perimeter 7)	NO (-13.5%)	NO
2F-Open Plan Office (Perimeter 8)	NO (-30.6%)	NO
2F-Open Plan Office (Perimeter 5)	NO (-69.4%)	NO
3F-Open Plan Office (Perimeter 1)	NO (-26.4%)	NO
3F-Open Plan Office (Perimeter 2)	NO (-34.2%)	NO
3F-Open Plan Office (Perimeter 3)	NO (-42.4%)	NO
3F-Open Plan Office (Perimeter 10)	NO (-34.8%)	NO
3F-Open Plan Office (Perimeter 9)	NO (-60.2%)	NO
3F-Open Plan Office (Perimeter 4)	NO (-69.5%)	NO
3F-Open Plan Office (Core)	NO (-95.3%)	NO
3F-Open Plan Office (Perimeter 6)	NO (-16.1%)	NO
3F-Open Plan Office (Perimeter 7)	NO (-13.5%)	NO
3F-Open Plan Office (Perimeter 8)	NO (-29.1%)	NO
3F-Open Plan Office (Perimeter 5)	NO (-68.4%)	NO
4F-Open Plan Office (Perimeter 1)	NO (-25.1%)	NO
4F-Open Plan Office (Perimeter 2)	NO (-33.9%)	NO
4F-Open Plan Office (Perimeter 3)	NO (-41.1%)	NO
4F-Open Plan Office (Perimeter 10)	NO (-34.2%)	NO
4F-Open Plan Office (Perimeter 9)	NO (-54.1%)	NO
4F-Open Plan Office (Perimeter 4)	NO (-67%)	NO
4F-Open Plan Office (Core)	NO (-95.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F-Open Plan Office (Perimeter 6)	NO (-16%)	NO
4F-Open Plan Office (Perimeter 7)	NO (-13.4%)	NO
4F-Open Plan Office (Perimeter 8)	NO (-27.6%)	NO
4F-Open Plan Office (Perimeter 5)	NO (-67.1%)	NO
6F-Open Plan Office (Perimeter 1)	NO (-20.2%)	NO
6F-Open Plan Office (Perimeter 2)	NO (-32.5%)	NO
6F-Open Plan Office (Perimeter 10)	NO (-32.2%)	NO
6F-Open Plan Office (Perimeter 9)	NO (-31%)	NO
6F-Open Plan Office (Core)	NO (-94.3%)	NO
6F-Open Plan Office (Perimeter 6)	NO (-15.7%)	NO
6F-Open Plan Office (Perimeter 7)	NO (-13.1%)	NO
6F-Open Plan Office (Perimeter 8)	NO (-22.3%)	NO
6F-Open Plan Office (Perimeter 5)	NO (-55%)	NO
6F-Open Plan Office (Perimeter 3)	NO (-40.4%)	NO
6F-Open Plan Office (Perimeter 4)	NO (-53.4%)	NO
9F-Open Plan Office (Perimeter 11)	NO (-30%)	NO
9F-Open Plan Office (Perimeter 10)	NO (-17.9%)	NO
9F-Open Plan Office (Perimeter 8)	NO (-12.6%)	NO
9F-Open Plan Office (Perimeter 9)	NO (-17.8%)	NO
9F-Open Plan Office (Core)	NO (-90.9%)	NO
9F-Open Plan Office (Perimeter 7)	NO (-14.5%)	NO
9F-Open Plan Office (Perimeter 6)	NO (-16.5%)	NO
9F-Open Plan Office (Perimeter 2)	NO (-21.9%)	NO
9F-Open Plan Office (Core)	NO (-92.3%)	NO
9F-Open Plan Office (Perimeter 5)	NO (-15.8%)	NO
9F-Open Plan Office (Perimeter 4)	NO (-18.3%)	NO
9F-Open Plan Office (Perimeter 3)	NO (-30.7%)	NO
9F-Open Plan Office (Perimeter 1)	NO (-40.2%)	NO
11F-Open Plan Office (Perimeter 1)	NO (-30.4%)	NO
11F-Open Plan Office (Perimeter 3)	NO (-16.8%)	NO
11F-Open Plan Office (Core)	NO (-90.1%)	NO
11F-Open Plan Office (Perimeter 8)	NO (-17.4%)	NO
11F-Open Plan Office (Perimeter 4)	NO (-16.2%)	NO
11F-Open Plan Office (Perimeter 7)	NO (-17.3%)	NO
11F-Open Plan Office (Core)	NO (-89.2%)	NO
11F-Open Plan Office (Perimeter 5)	NO (-14.1%)	NO
11F-Open Plan Office (Perimeter 6)	NO (-9.1%)	NO
11F-Open Plan Office (Perimeter 2)	NO (-29.9%)	NO
GF-Cafe/Retail	NO (-60.4%)	NO

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]	26377.8	26377.8
External area [m ²]	14753.1	14753.1
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	13403.2	6462.04
Average U-value [W/m ² K]	0.91	0.44
Alpha value* [%]	1.16	10

* 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
5	Restaurants and Cafes/Drinking Establishments/Takeaways
95	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/m²]

	Actual	Notional
Heating	3.59	0.83
Cooling	6.11	3.65
Auxiliary	8.08	8.67
Lighting	7.08	11.16
Hot water	6.84	5.58
Equipment*	42.32	42.32
TOTAL **	31.71	29.9

* 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
Displaced electricity	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.02	69.19
Primary energy [kWh/m ²]	46.57	43.94
Total emissions [kg/m ²]	4.23	4

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] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	44.8	54.2	3.9	7.3	9	3.15	2.06	3.37	2.64
Notional	3.3	131.6	0.3	7.9	22	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	37.5	0	3.3	0	7.4	3.17	0	3.37	0
Notional	0	0	0	0	2.6	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	1.1	0	0.1	0	8.8	3.17	0	3.37	0
Notional	0.2	0	0	0	2.6	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	41.8	0	3.7	0	1	3.17	0	3.37	0
Notional	20.8	0	2.1	0	1	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	8.2	0	0.7	0	5.4	3.17	0	3.37	0
Notional	0.4	0	0	0	6.3	2.78	0	----	----
[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

Appendix B

BRUKL-BE GREEN



Project name

Republic-Plot M

As designed

Date: Thu May 25 16:30:50 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.16

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.16

BRUKL compliance module version: v6.1.c.0

Foundation area [m²]: 1955.36The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	4
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	3.34
Target primary energy rate (TPER), kWh/m ² .annum	43.94
Building primary energy rate (BPER), kWh/m ² .annum	36.17
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 -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	-	-	UNKNOWN
Floors	0.18	0.13	0.13	LV000000:Surf[0]
Pitched roofs	0.16	-	-	No Pitched roofs in building
Flat roofs	0.18	0.13	0.13	LV000000:Surf[1]
Windows** and roof windows	1.6	1.3	1.3	LV000000:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No Vehicle access doors in building
High usage entrance doors	3	-	-	No High usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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	3

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP for stores

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	0.75
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

2- ASHP for ancillary areas

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	-
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

3- ASHP for toilet

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	0.75
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

4- ASHP with FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	5.78	0	1.9	0.75
Standard value	2.5*	N/A	N/A	2^	N/A
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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

5- ASHP for changing rooms

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.37	-	0.2	-	0.75
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

1- DHW-high demand

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3	0.003
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

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
GF-Refuse Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Toilet	-	-	-	1.5	-	-	-	-	-	-	-	N/A
GF-Toilet	-	-	-	1.5	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Cafe Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
GF/MF-Reception	-	-	-	-	-	-	-	0.2	-	-	-	N/A
GF/MF-Cultural/Performance	-	-	-	-	-	-	-	0.2	-	-	-	N/A
MF-Changing Room	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-Changing Room	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-WCs	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
MF-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
MF-WCs	-	-	-	1.5	-	-	-	-	-	-	-	N/A
MF-Stairs	-	-	-	-	-	-	-	0.2	-	-	-	N/A
MF-Cafe Gallery	-	-	-	-	-	-	-	0.2	-	-	-	N/A
MF-Cultural	-	-	-	-	-	-	-	0.2	-	-	-	N/A
GF-Cultural	-	-	-	-	-	-	-	0.2	-	-	-	N/A
1F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
1F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
10F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
10F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
10F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
10F-WC	-	-	-	1.5	-	-	-	-	-	-	-	N/A
10F-Store	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
1F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
1F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
1F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
5F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
5F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
5F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
7F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 11)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
7F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
7F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
7F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
8F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
8F-Open Plan Office (Perimeter 11)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
8F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
8F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
8F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
8F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
8F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
8F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
10F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
2F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
2F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
2F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
2F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
3F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
3F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
3F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
3F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
3F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
4F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
4F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
4F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
4F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
6F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A
6F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A
6F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A
9F-Open Plan Office (Perimeter 11)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 10)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 9)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A
9F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
9F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A	
9F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
9F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
9F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
9F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
9F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
10F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
11F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
10F-WC	-	-	-	1.5	-	-	-	-	-	-	N/A	
11F-Store	-	-	0.5	-	-	-	-	-	-	-	N/A	
11F-Open Plan Office (Perimeter 1)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 3)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 8)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 4)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 7)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Core)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 5)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 6)	-	-	-	-	-	-	-	0.2	-	-	N/A	
11F-Open Plan Office (Perimeter 2)	-	-	-	-	-	-	-	0.2	-	-	N/A	
GF-Cafe/Retail	-	-	-	-	-	-	-	0.2	-	-	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
GF-PH Plant Room		120	-	-
GF-PH Plant Room 2		120	-	-
GF-Refuse Store		120	-	-
GF-Comms Room		120	-	-
GF-Main LV Switch Room		120	-	-
GF-Gas Intake Room		120	-	-
GF-LS Switch		120	-	-
GF-Generator Room		120	-	-
GF-Transformer		120	-	-
GF-Transformer		120	-	-
GF-Plant AHU		120	-	-
GF-Corridor		120	-	-

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
GF-Toilet		120	-	-
GF-Toilet		120	-	-
GF-Stair		120	-	-
GF-Store		120	-	-
GF-Store		120	-	-
GF-Stair		120	-	-
GF-Store		120	-	-
GF-Coridoor		120	-	-
GF-Cafe Store		120	-	-
GF-Store		120	-	-
GF/MF-Coridoor		120	-	-
GF/MF-Reception		120	120	0.9
GF/MF-Cultural/Perforamance		120	-	-
GF-Cafe/Retail Coridoor		120	-	-
MF-Tenant Plant		120	-	-
MF-Changing Room		120	-	-
MF-Changing Room		120	-	-
MF-WC Coridoor		120	-	-
MF-WCs		120	-	-
MF-Store		120	-	-
MF-Cycle Store		120	-	-
MF-Store		120	-	-
MF-Stairs		120	-	-
MF-WCs		120	-	-
MF-Stairs		120	-	-
MF-Coridoor		120	-	-
MF-Stairs		120	-	-
MF-Cafe Gallery		120	120	1
MF-Cultural		120	-	-
MF-Coridoor		120	-	-
MF-Coridoor		120	-	-
GF-Cultural		120	-	-
GF-Cupboard2		120	-	-
1F-Coridoor		120	-	-
1F-Stair		120	-	-
1F-Coridoor		120	-	-
1F-Coridoor		120	-	-
1F-Stair		120	-	-
1F-Store		120	-	-
1F-WC		120	-	-
1F-WC		120	-	-
10F-Coridoor		120	-	-
10F-Stair		120	-	-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80		0.3
10F-Coridoor		120	-		-
10F-Coridoor		120	-		-
10F-Stair		120	-		-
10F-Store		120	-		-
10F-WC		120	-		-
10F-Store		120	-		-
10F-WC		120	-		-
10F-Store		120	-		-
1F-Open Plan Office (Perimeter 1)		120	-		-
1F-Open Plan Office (Perimeter 2)		120	-		-
1F-Open Plan Office (Perimeter 3)		120	-		-
1F-Open Plan Office (Perimeter 10)		120	-		-
1F-Open Plan Office (Perimeter 9)		120	-		-
1F-Open Plan Office (Perimeter 4)		120	-		-
1F-Open Plan Office (Core)		120	-		-
1F-Open Plan Office (Perimeter 6)		120	-		-
1F-Open Plan Office (Perimeter 7)		120	-		-
1F-Open Plan Office (Perimeter 8)		120	-		-
1F-Open Plan Office (Perimeter 5)		120	-		-
5F-Coridoor		120	-		-
5F-Stair		120	-		-
5F-Coridoor		120	-		-
5F-Coridoor		120	-		-
5F-Stair		120	-		-
5F-Store		120	-		-
5F-WC		120	-		-
5F-WC		120	-		-
5F-Open Plan Office (Perimeter 1)		120	-		-
5F-Open Plan Office (Perimeter 2)		120	-		-
5F-Open Plan Office (Perimeter 10)		120	-		-
5F-Open Plan Office (Perimeter 9)		120	-		-
5F-Open Plan Office (Core)		120	-		-
5F-Open Plan Office (Perimeter 6)		120	-		-
5F-Open Plan Office (Perimeter 7)		120	-		-
5F-Open Plan Office (Perimeter 8)		120	-		-
5F-Open Plan Office (Perimeter 5)		120	-		-
5F-Open Plan Office (Perimeter 3)		120	-		-
5F-Open Plan Office (Perimeter 4)		120	-		-
7F-Coridoor		120	-		-
7F-Stair		120	-		-
7F-Coridoor		120	-		-
7F-Coridoor		120	-		-
7F-Stair		120	-		-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]		Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95		80	0.3
7F-Store		120		-	-
7F-Open Plan Office (Perimeter 1)		120		-	-
7F-Open Plan Office (Perimeter 11)		120		-	-
7F-Open Plan Office (Perimeter 10)		120		-	-
7F-Open Plan Office (Perimeter 8)		120		-	-
7F-Open Plan Office (Perimeter 9)		120		-	-
7F-Open Plan Office (Core)		120		-	-
7F-Open Plan Office (Perimeter 7)		120		-	-
7F-Open Plan Office (Perimeter 6)		120		-	-
7F-Open Plan Office (Perimeter 2)		120		-	-
7F-Open Plan Office (Core)		120		-	-
7F-Open Plan Office (Perimeter 5)		120		-	-
7F-Open Plan Office (Perimeter 4)		120		-	-
7F-Open Plan Office (Perimeter 3)		120		-	-
7F-WC		120		-	-
7F-Store		120		-	-
7F-WC		120		-	-
7F-Store		120		-	-
8F-Corridor		120		-	-
8F-Stair		120		-	-
8F-Corridor		120		-	-
8F-Corridor		120		-	-
8F-Stair		120		-	-
8F-Store		120		-	-
8F-Open Plan Office (Perimeter 11)		120		-	-
8F-Open Plan Office (Perimeter 10)		120		-	-
8F-Open Plan Office (Perimeter 8)		120		-	-
8F-Open Plan Office (Perimeter 9)		120		-	-
8F-Open Plan Office (Core)		120		-	-
8F-Open Plan Office (Perimeter 7)		120		-	-
8F-Open Plan Office (Perimeter 6)		120		-	-
8F-Open Plan Office (Perimeter 2)		120		-	-
8F-Open Plan Office (Core)		120		-	-
8F-Open Plan Office (Perimeter 5)		120		-	-
8F-Open Plan Office (Perimeter 4)		120		-	-
8F-Open Plan Office (Perimeter 3)		120		-	-
8F-WC		120		-	-
8F-Store		120		-	-
8F-WC		120		-	-
8F-Store		120		-	-
8F-Open Plan Office (Perimeter 1)		120		-	-
10F-Open Plan Office (Perimeter 1)		120		-	-
10F-Open Plan Office (Perimeter 3)		120		-	-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80		0.3
10F-Open Plan Office (Core)		120	-		-
10F-Open Plan Office (Perimeter 8)		120	-		-
10F-Open Plan Office (Perimeter 4)		120	-		-
10F-Open Plan Office (Perimeter 7)		120	-		-
10F-Open Plan Office (Core)		120	-		-
10F-Open Plan Office (Perimeter 5)		120	-		-
10F-Open Plan Office (Perimeter 6)		120	-		-
10F-Open Plan Office (Perimeter 2)		120	-		-
2F-Corridor		120	-		-
2F-Stair		120	-		-
2F-Corridor		120	-		-
2F-Corridor		120	-		-
2F-Stair		120	-		-
2F-Store		120	-		-
2F-WC		120	-		-
2F-WC		120	-		-
2F-Open Plan Office (Perimeter 1)		120	-		-
2F-Open Plan Office (Perimeter 2)		120	-		-
2F-Open Plan Office (Perimeter 3)		120	-		-
2F-Open Plan Office (Perimeter 10)		120	-		-
2F-Open Plan Office (Perimeter 9)		120	-		-
2F-Open Plan Office (Perimeter 4)		120	-		-
2F-Open Plan Office (Core)		120	-		-
2F-Open Plan Office (Perimeter 6)		120	-		-
2F-Open Plan Office (Perimeter 7)		120	-		-
2F-Open Plan Office (Perimeter 8)		120	-		-
2F-Open Plan Office (Perimeter 5)		120	-		-
3F-Corridor		120	-		-
3F-Stair		120	-		-
3F-Corridor		120	-		-
3F-Corridor		120	-		-
3F-Stair		120	-		-
3F-Store		120	-		-
3F-WC		120	-		-
3F-WC		120	-		-
3F-Open Plan Office (Perimeter 1)		120	-		-
3F-Open Plan Office (Perimeter 2)		120	-		-
3F-Open Plan Office (Perimeter 3)		120	-		-
3F-Open Plan Office (Perimeter 10)		120	-		-
3F-Open Plan Office (Perimeter 9)		120	-		-
3F-Open Plan Office (Perimeter 4)		120	-		-
3F-Open Plan Office (Core)		120	-		-
3F-Open Plan Office (Perimeter 6)		120	-		-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]		Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95		80	0.3
3F-Open Plan Office (Perimeter 7)		120		-	-
3F-Open Plan Office (Perimeter 8)		120		-	-
3F-Open Plan Office (Perimeter 5)		120		-	-
4F-Corridor		120		-	-
4F-Stair		120		-	-
4F-Corridor		120		-	-
4F-Corridor		120		-	-
4F-Stair		120		-	-
4F-Store		120		-	-
4F-WC		120		-	-
4F-WC		120		-	-
4F-Open Plan Office (Perimeter 1)		120		-	-
4F-Open Plan Office (Perimeter 2)		120		-	-
4F-Open Plan Office (Perimeter 3)		120		-	-
4F-Open Plan Office (Perimeter 10)		120		-	-
4F-Open Plan Office (Perimeter 9)		120		-	-
4F-Open Plan Office (Perimeter 4)		120		-	-
4F-Open Plan Office (Core)		120		-	-
4F-Open Plan Office (Perimeter 6)		120		-	-
4F-Open Plan Office (Perimeter 7)		120		-	-
4F-Open Plan Office (Perimeter 8)		120		-	-
4F-Open Plan Office (Perimeter 5)		120		-	-
6F-Corridor		120		-	-
6F-Stair		120		-	-
6F-Corridor		120		-	-
6F-Corridor		120		-	-
6F-Stair		120		-	-
6F-Store		120		-	-
6F-WC		120		-	-
6F-WC		120		-	-
6F-Open Plan Office (Perimeter 1)		120		-	-
6F-Open Plan Office (Perimeter 2)		120		-	-
6F-Open Plan Office (Perimeter 10)		120		-	-
6F-Open Plan Office (Perimeter 9)		120		-	-
6F-Open Plan Office (Core)		120		-	-
6F-Open Plan Office (Perimeter 6)		120		-	-
6F-Open Plan Office (Perimeter 7)		120		-	-
6F-Open Plan Office (Perimeter 8)		120		-	-
6F-Open Plan Office (Perimeter 5)		120		-	-
6F-Open Plan Office (Perimeter 3)		120		-	-
6F-Open Plan Office (Perimeter 4)		120		-	-
9F-Corridor		120		-	-
9F-Stair		120		-	-

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
9F-Corridor		120	-	-
9F-Corridor		120	-	-
9F-Stair		120	-	-
9F-Store		120	-	-
9F-Open Plan Office (Perimeter 11)		120	-	-
9F-Open Plan Office (Perimeter 10)		120	-	-
9F-Open Plan Office (Perimeter 8)		120	-	-
9F-Open Plan Office (Perimeter 9)		120	-	-
9F-Open Plan Office (Core)		120	-	-
9F-Open Plan Office (Perimeter 7)		120	-	-
9F-Open Plan Office (Perimeter 6)		120	-	-
9F-Open Plan Office (Perimeter 2)		120	-	-
9F-Open Plan Office (Core)		120	-	-
9F-Open Plan Office (Perimeter 5)		120	-	-
9F-Open Plan Office (Perimeter 4)		120	-	-
9F-Open Plan Office (Perimeter 3)		120	-	-
9F-WC		120	-	-
9F-Store		120	-	-
9F-WC		120	-	-
9F-Store		120	-	-
9F-Open Plan Office (Perimeter 1)		120	-	-
11F-Corridor		120	-	-
11F-Stair		120	-	-
11F-Corridor		120	-	-
11F-Corridor		120	-	-
11F-Stair		120	-	-
11F-Store		120	-	-
10F-WC		120	-	-
11F-Store		120	-	-
10F-WC		120	-	-
11F-Store		120	-	-
11F-Open Plan Office (Perimeter 1)		120	-	-
11F-Open Plan Office (Perimeter 3)		120	-	-
11F-Open Plan Office (Core)		120	-	-
11F-Open Plan Office (Perimeter 8)		120	-	-
11F-Open Plan Office (Perimeter 4)		120	-	-
11F-Open Plan Office (Perimeter 7)		120	-	-
11F-Open Plan Office (Core)		120	-	-
11F-Open Plan Office (Perimeter 5)		120	-	-
11F-Open Plan Office (Perimeter 6)		120	-	-
11F-Open Plan Office (Perimeter 2)		120	-	-
GF-Cafe/Retail		120	120	1

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?
GF/MF-Reception	YES (+4.5%)	NO
GF/MF-Cultural/Performamance	NO (-2.9%)	NO
MF-Stairs	NO (-71.9%)	NO
MF-Cafe Gallery	NO (-53.3%)	NO
MF-Cultural	NO (-27.5%)	NO
GF-Cultural	NO (-92.6%)	NO
1F-Open Plan Office (Perimeter 1)	NO (-28.3%)	NO
1F-Open Plan Office (Perimeter 2)	NO (-34.5%)	NO
1F-Open Plan Office (Perimeter 3)	NO (-43.8%)	NO
1F-Open Plan Office (Perimeter 10)	NO (-35.3%)	NO
1F-Open Plan Office (Perimeter 9)	NO (-65.3%)	NO
1F-Open Plan Office (Perimeter 4)	NO (-72.4%)	NO
1F-Open Plan Office (Core)	NO (-95.4%)	NO
1F-Open Plan Office (Perimeter 6)	NO (-16.2%)	NO
1F-Open Plan Office (Perimeter 7)	NO (-13.5%)	NO
1F-Open Plan Office (Perimeter 8)	NO (-30.8%)	NO
1F-Open Plan Office (Perimeter 5)	NO (-70.3%)	NO
5F-Open Plan Office (Perimeter 1)	NO (-22.6%)	NO
5F-Open Plan Office (Perimeter 2)	NO (-33.1%)	NO
5F-Open Plan Office (Perimeter 10)	NO (-33.4%)	NO
5F-Open Plan Office (Perimeter 9)	NO (-45.4%)	NO
5F-Open Plan Office (Core)	NO (-94.9%)	NO
5F-Open Plan Office (Perimeter 6)	NO (-15.9%)	NO
5F-Open Plan Office (Perimeter 7)	NO (-13.3%)	NO
5F-Open Plan Office (Perimeter 8)	NO (-25%)	NO
5F-Open Plan Office (Perimeter 5)	NO (-63%)	NO
5F-Open Plan Office (Perimeter 3)	NO (-48.9%)	NO
5F-Open Plan Office (Perimeter 4)	NO (-61.9%)	NO
7F-Open Plan Office (Perimeter 1)	NO (-17.7%)	NO
7F-Open Plan Office (Perimeter 11)	NO (-30.6%)	NO
7F-Open Plan Office (Perimeter 10)	NO (-18.1%)	NO
7F-Open Plan Office (Perimeter 8)	NO (-12.7%)	NO
7F-Open Plan Office (Perimeter 9)	NO (-17.9%)	NO
7F-Open Plan Office (Core)	NO (-91.8%)	NO
7F-Open Plan Office (Perimeter 7)	NO (-15.1%)	NO
7F-Open Plan Office (Perimeter 6)	NO (-32.5%)	NO
7F-Open Plan Office (Perimeter 2)	NO (-24.3%)	NO
7F-Open Plan Office (Core)	NO (-92.9%)	NO
7F-Open Plan Office (Perimeter 5)	NO (-31.2%)	NO
7F-Open Plan Office (Perimeter 4)	NO (-25.2%)	NO
7F-Open Plan Office (Perimeter 3)	NO (-33%)	NO
8F-Open Plan Office (Perimeter 11)	NO (-30.2%)	NO
8F-Open Plan Office (Perimeter 10)	NO (-17.9%)	NO
8F-Open Plan Office (Perimeter 8)	NO (-12.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
8F-Open Plan Office (Perimeter 9)	NO (-17.8%)	NO
8F-Open Plan Office (Core)	NO (-91.1%)	NO
8F-Open Plan Office (Perimeter 7)	NO (-14.6%)	NO
8F-Open Plan Office (Perimeter 6)	NO (-19.9%)	NO
8F-Open Plan Office (Perimeter 2)	NO (-22.9%)	NO
8F-Open Plan Office (Core)	NO (-92.5%)	NO
8F-Open Plan Office (Perimeter 5)	NO (-18.9%)	NO
8F-Open Plan Office (Perimeter 4)	NO (-19.9%)	NO
8F-Open Plan Office (Perimeter 3)	NO (-31.9%)	NO
8F-Open Plan Office (Perimeter 1)	NO (-45.7%)	NO
10F-Open Plan Office (Perimeter 1)	NO (-30.7%)	NO
10F-Open Plan Office (Perimeter 3)	NO (-17%)	NO
10F-Open Plan Office (Core)	NO (-90.2%)	NO
10F-Open Plan Office (Perimeter 8)	NO (-17.5%)	NO
10F-Open Plan Office (Perimeter 4)	NO (-16.2%)	NO
10F-Open Plan Office (Perimeter 7)	NO (-17.3%)	NO
10F-Open Plan Office (Core)	NO (-89.2%)	NO
10F-Open Plan Office (Perimeter 5)	NO (-14.1%)	NO
10F-Open Plan Office (Perimeter 6)	NO (-9.1%)	NO
10F-Open Plan Office (Perimeter 2)	NO (-45%)	NO
2F-Open Plan Office (Perimeter 1)	NO (-27.3%)	NO
2F-Open Plan Office (Perimeter 2)	NO (-34.4%)	NO
2F-Open Plan Office (Perimeter 3)	NO (-43.3%)	NO
2F-Open Plan Office (Perimeter 10)	NO (-35.1%)	NO
2F-Open Plan Office (Perimeter 9)	NO (-62.6%)	NO
2F-Open Plan Office (Perimeter 4)	NO (-70.9%)	NO
2F-Open Plan Office (Core)	NO (-95.4%)	NO
2F-Open Plan Office (Perimeter 6)	NO (-16.1%)	NO
2F-Open Plan Office (Perimeter 7)	NO (-13.5%)	NO
2F-Open Plan Office (Perimeter 8)	NO (-30.6%)	NO
2F-Open Plan Office (Perimeter 5)	NO (-69.4%)	NO
3F-Open Plan Office (Perimeter 1)	NO (-26.4%)	NO
3F-Open Plan Office (Perimeter 2)	NO (-34.2%)	NO
3F-Open Plan Office (Perimeter 3)	NO (-42.4%)	NO
3F-Open Plan Office (Perimeter 10)	NO (-34.8%)	NO
3F-Open Plan Office (Perimeter 9)	NO (-60.2%)	NO
3F-Open Plan Office (Perimeter 4)	NO (-69.5%)	NO
3F-Open Plan Office (Core)	NO (-95.3%)	NO
3F-Open Plan Office (Perimeter 6)	NO (-16.1%)	NO
3F-Open Plan Office (Perimeter 7)	NO (-13.5%)	NO
3F-Open Plan Office (Perimeter 8)	NO (-29.1%)	NO
3F-Open Plan Office (Perimeter 5)	NO (-68.4%)	NO
4F-Open Plan Office (Perimeter 1)	NO (-25.1%)	NO
4F-Open Plan Office (Perimeter 2)	NO (-33.9%)	NO
4F-Open Plan Office (Perimeter 3)	NO (-41.1%)	NO
4F-Open Plan Office (Perimeter 10)	NO (-34.2%)	NO
4F-Open Plan Office (Perimeter 9)	NO (-54.1%)	NO
4F-Open Plan Office (Perimeter 4)	NO (-67%)	NO
4F-Open Plan Office (Core)	NO (-95.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F-Open Plan Office (Perimeter 6)	NO (-16%)	NO
4F-Open Plan Office (Perimeter 7)	NO (-13.4%)	NO
4F-Open Plan Office (Perimeter 8)	NO (-27.6%)	NO
4F-Open Plan Office (Perimeter 5)	NO (-67.1%)	NO
6F-Open Plan Office (Perimeter 1)	NO (-20.2%)	NO
6F-Open Plan Office (Perimeter 2)	NO (-32.5%)	NO
6F-Open Plan Office (Perimeter 10)	NO (-32.2%)	NO
6F-Open Plan Office (Perimeter 9)	NO (-31%)	NO
6F-Open Plan Office (Core)	NO (-94.3%)	NO
6F-Open Plan Office (Perimeter 6)	NO (-15.7%)	NO
6F-Open Plan Office (Perimeter 7)	NO (-13.1%)	NO
6F-Open Plan Office (Perimeter 8)	NO (-22.3%)	NO
6F-Open Plan Office (Perimeter 5)	NO (-55%)	NO
6F-Open Plan Office (Perimeter 3)	NO (-40.4%)	NO
6F-Open Plan Office (Perimeter 4)	NO (-53.4%)	NO
9F-Open Plan Office (Perimeter 11)	NO (-30%)	NO
9F-Open Plan Office (Perimeter 10)	NO (-17.9%)	NO
9F-Open Plan Office (Perimeter 8)	NO (-12.6%)	NO
9F-Open Plan Office (Perimeter 9)	NO (-17.8%)	NO
9F-Open Plan Office (Core)	NO (-90.9%)	NO
9F-Open Plan Office (Perimeter 7)	NO (-14.5%)	NO
9F-Open Plan Office (Perimeter 6)	NO (-16.5%)	NO
9F-Open Plan Office (Perimeter 2)	NO (-21.9%)	NO
9F-Open Plan Office (Core)	NO (-92.3%)	NO
9F-Open Plan Office (Perimeter 5)	NO (-15.8%)	NO
9F-Open Plan Office (Perimeter 4)	NO (-18.3%)	NO
9F-Open Plan Office (Perimeter 3)	NO (-30.7%)	NO
9F-Open Plan Office (Perimeter 1)	NO (-40.2%)	NO
11F-Open Plan Office (Perimeter 1)	NO (-30.4%)	NO
11F-Open Plan Office (Perimeter 3)	NO (-16.8%)	NO
11F-Open Plan Office (Core)	NO (-90.1%)	NO
11F-Open Plan Office (Perimeter 8)	NO (-17.4%)	NO
11F-Open Plan Office (Perimeter 4)	NO (-16.2%)	NO
11F-Open Plan Office (Perimeter 7)	NO (-17.3%)	NO
11F-Open Plan Office (Core)	NO (-89.2%)	NO
11F-Open Plan Office (Perimeter 5)	NO (-14.1%)	NO
11F-Open Plan Office (Perimeter 6)	NO (-9.1%)	NO
11F-Open Plan Office (Perimeter 2)	NO (-29.9%)	NO
GF-Cafe/Retail	NO (-60.4%)	NO

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]	26377.8	26377.8
External area [m ²]	14753.1	14753.1
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	13403.2	6462.04
Average U-value [W/m ² K]	0.91	0.44
Alpha value* [%]	1.16	10

* 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
5	Restaurants and Cafes/Drinking Establishments/Takeaways
95	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/m²]

	Actual	Notional
Heating	3.59	0.83
Cooling	2.79	3.65
Auxiliary	8.08	8.67
Lighting	7.08	11.16
Hot water	6.01	5.58
Equipment*	42.32	42.32
TOTAL **	27.56	29.9

* 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	3.05	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>3.05</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.02	69.19
Primary energy [kWh/m ²]	36.17	43.94
Total emissions [kg/m ²]	3.34	4

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] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	44.8	54.2	3.9	3.3	9	3.15	4.5	3.37	5.78
Notional	3.3	131.6	0.3	7.9	22	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	37.5	0	3.3	0	7.4	3.17	0	3.37	0
Notional	0	0	0	0	2.6	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	1.1	0	0.1	0	8.8	3.17	0	3.37	0
Notional	0.2	0	0	0	2.6	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	41.8	0	3.7	0	1	3.17	0	3.37	0
Notional	20.8	0	2.1	0	1	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	8.2	0	0.7	0	5.4	3.17	0	3.37	0
Notional	0.4	0	0	0	6.3	2.78	0	----	----
[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



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