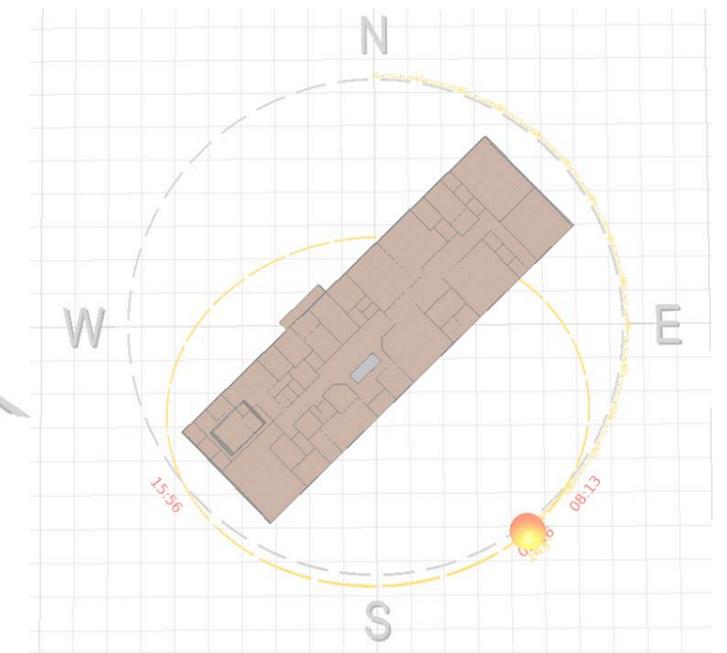
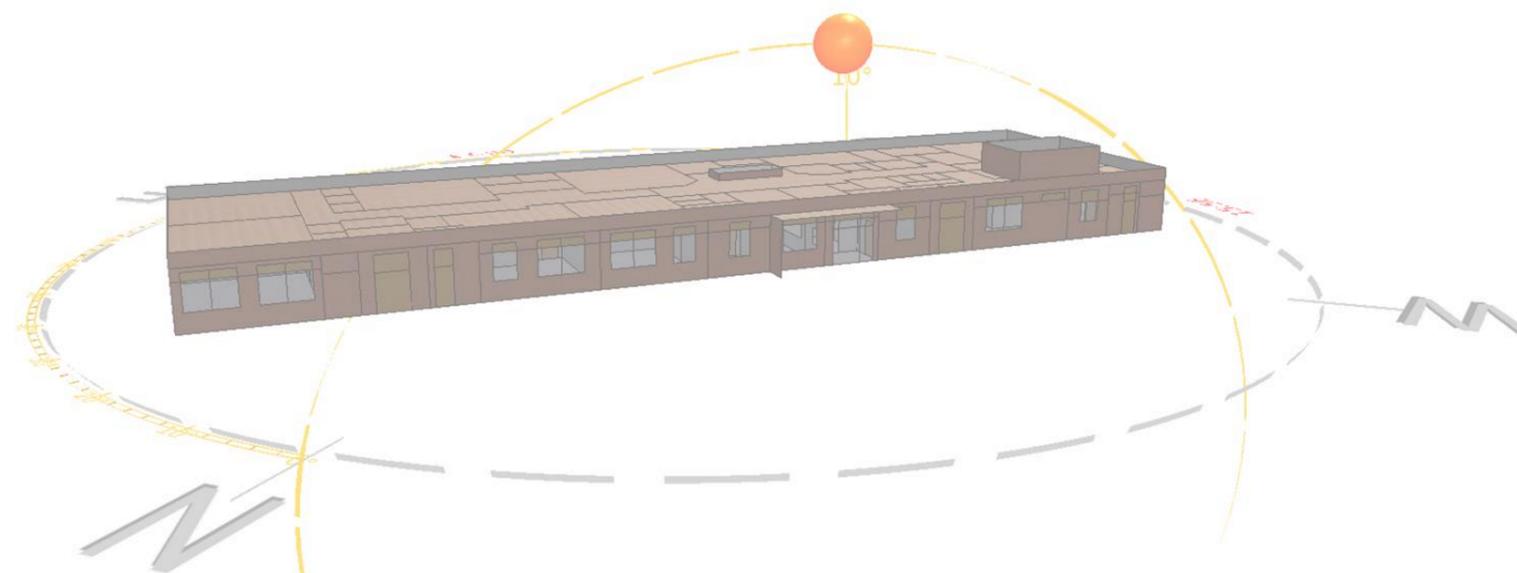




# Bexley Road Transitional Learning Centre Energy Compliance & EPC Report

BTLC-MEP-XX-XX-RP-ME-3001



Design MEP in association with:



Design MEP

Registered in England: 10913084

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## Executive Summary

Design MEP was appointed by Galliford Try (GT) to produce an **Energy Compliance & EPC Report** for **Bexley Road Transitional Learning Centre** to achieve their target of **NZCiO2050**.

<b>Report Type</b>	Energy Compliance & EPC Report
<b>Building Name</b>	Bexley Road Transitional Learning Centre
<b>Building Location</b>	77 Bexley Road, Eltham
<b>Building GIFA</b>	1,116 m <sup>2</sup>
<b>Company</b>	Galliford Try
<b>Proposed Works</b>	Demolition; Newbuild School
<b>RIBA Stage</b>	Stage 3

Dynamic Simulation Modelling (DSM) was undertaken in **IES Virtual Environment 2025** in accordance with:

- **Building Regulations Part L (2021)** – Volume 2: Conservation of Fuel and Power
- **CIBSE AM11 (2020)** – Building Performance Modelling

The analysis compared the proposed design to the notional NCM baseline to determine energy performance, regulated carbon emissions, and primary energy demand.

### Key Design Features

The proposed building adopts a **fabric-first, all-electric strategy** comprising:

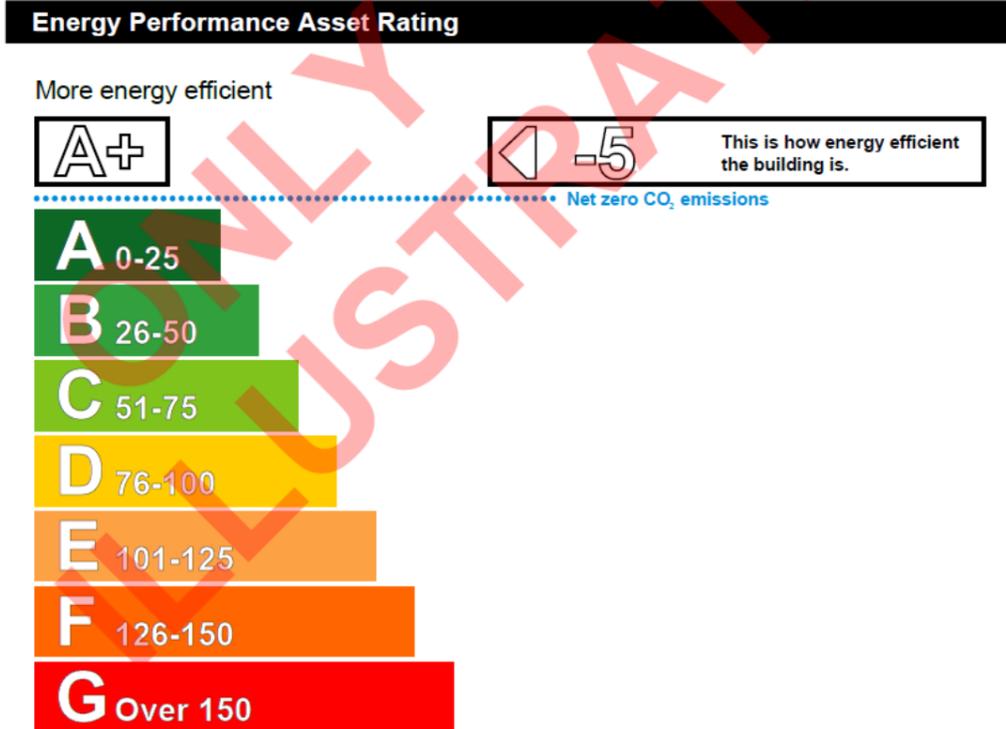
- High-performance envelope (U-values  $\leq 0.15$  W/m<sup>2</sup>·K; air permeability 3 m<sup>3</sup>/m<sup>2</sup>·h @ 50 Pa).
- **Air Source Heat Pump (ASHP)** serving LTHW distribution for NVHRs, radiant panels, and radiators (SCoP  $\approx 3.8$ ).
- **Hybrid and mechanical ventilation** with low SFPs ( $\leq 1.5$  W/l-s) and up to 80 % thermal heat recovery for MVHRs and 0.09 SFPs for NVHRs with 51% thermal heat recovery.
- **Demand-Controlled Ventilation** via CO<sub>2</sub> and temperature sensors integrated with the BMS.
- **No comfort cooling**, except for a small server room DX unit (SEER 7.25, EER 3.5).
- **Efficient LED lighting** with daylight sensing and occupancy controls.

### Part L: Energy Performance & Building Compliance Results

#### Part L regulated Carbon Emissions

Scenario	TER (kg CO <sub>2</sub> /m <sup>2</sup> /yr)	BER (kg CO <sub>2</sub> /m <sup>2</sup> /yr)	Compliance	Improvement
No PVs	3.47	2.48	PASS	28.53%
With PVs	3.47	-1.42	PASS	149.23%

### Predicted Energy Performance Rating



### Net Zero Carbon in Operation

The design achieves operational net zero in accordance with **DfE Technical Annex 2J** and the **UKGBC Net Zero Carbon Buildings Framework**. TM54 modelling has been used to calculate the operation energy and subsequent quantity of PV's required to reach NZCiO.

The **39.4 kWp PV** system which is equivalent to approximately  $\approx$  to 174.3 m<sup>2</sup> of net PV area will generate approximately **37,461 kWh/yr**. 39.4 kWp of PV will offset all the building's entire operational energy demand and is forecasted to reduce carbon emissions by up to  $\approx$  **5.095 t CO<sub>2</sub> per annum**.

### Summary

The proposed **Bexley Road Transitional Learning Centre** demonstrates a **high-performing, low-carbon design** that:

- Exceeds Part L (2021) requirements for both carbon emissions and primary energy.
- Delivers a **fabric-first, all-electric** energy strategy using **ASHP + hybrid ventilation**.
- Integrates on-site **solar PV** generation to achieve **Net Zero Carbon in Operation**.
- Fully complies with **DfE** and the **UKGBC Net Zero** framework.
- Shows full **GLA** reporting to the **Energy Hierarchy**

This ensures that the new school will operate efficiently, meet long-term sustainability goals, and support the Council's **Net Zero 2050 target**.

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## Glossary of Terms

<b>DfE</b>	Department for Education	<b>SEND</b>	Special Educational Needs and Disabilities
<b>BB101</b>	Building Bulletin 101 – guidance on ventilation, thermal comfort & IAQ in schools	<b>NVHR</b>	Natural Ventilation with Heat Recovery
<b>IAQ</b>	Indoor Air Quality	<b>MVHR</b>	Mechanical Ventilation with Heat Recovery
<b>TM52</b>	CIBSE Technical Memorandum 52 – Limits of Thermal Comfort	<b>UHI</b>	Urban Heat Island – elevated temperatures in urban areas
<b>TM54</b>	CIBSE Technical Memorandum 54 – Evaluating Operational Energy	<b>ACH</b>	Air Changes per Hour – measure of ventilation/airtightness
<b>DSM</b>	Dynamic Simulation Modelling	<b>G-Value</b>	Solar gain coefficient of glazing
<b>IES VE</b>	Integrated Environmental Solutions Virtual Environment (modelling software)	<b>LT Value</b>	Light Transmission value of glazing
<b>AM11</b>	CIBSE Application Manual 11 – Building Performance Modelling	<b>BMS</b>	Building Management System – controls HVAC and services
<b>He</b>	Hours of Exceedance – overheating criterion	<b>LTHW</b>	Low Temperature Hot Water – used in heating systems
<b>We</b>	Daily Weighted Exceedance – short-term discomfort measure	<b>MFSV900</b>	Reference model for hybrid roof ventilation unit
<b>ΔT</b>	Temperature difference from comfort threshold	<b>ppm</b>	Parts per million – unit for CO <sub>2</sub> concentration
<b>Tupp</b>	Upper Limit Temperature – max allowable deviation from comfort band	<b>Tmax</b>	Maximum acceptable indoor temperature (adaptive comfort)
<b>Trm</b>	Running Mean Temperature – average external temperature over time	<b>EUI</b>	Energy Use Intensity – annual energy per floor area (kWh/m <sup>2</sup> /yr)
<b>SCOP / SEER</b>	Seasonal Coefficient of Performance / Seasonal Energy Efficiency Ratio for heating/cooling	<b>PV</b>	Photovoltaic panels – onsite renewable electricity generation
<b>TER / BER</b>	Target Emission Rate / Building Emission Rate (kgCO <sub>2</sub> /m <sup>2</sup> /yr) – Part L compliance metrics	<b>TPER / BPER</b>	Target / Building Primary Energy Rate (kWh/m <sup>2</sup> /yr) – Part L compliance metrics
<b>NZCIO</b>	Net Zero Carbon in Operation – balance of energy demand and renewable generation	<b>UKGBC</b>	UK Green Building Council – publishes Net Zero Carbon Buildings Framework

## 1. Introduction

**Design MEP** was appointed by Galliford Try to produce an Energy Compliance & EPC Report for **Bexley Road Transitional Learning Centre** to achieve their target of NZCiO2050. This Energy Compliance & EPC Report has been prepared to support planning approval and demonstrate compliance with Building Regulations Part L (2021), and local planning policy requirements on energy and sustainability.

Site Context	
Name	Bexley Road Transitional Learning Centre
Building Location	77 Bexley Road, Eltham
Post Code	SE9 2PE
Company	Galliford Try
Building GIFA	1,116 m <sup>2</sup>
No. of Storeys	1
Site Type	Suburban
Proposed Works	Demolition; Newbuild School
RIBA Stage	Stage 3

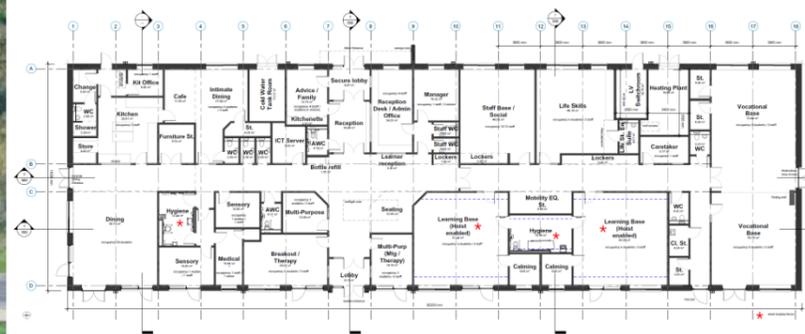


Figure 1. Site image (left) & plan (right).

Section	Description
<b>Methodology</b>	Describes modelling approach & regulatory performance criteria & standards to be achieved.
<b>Building Information</b>	Summarises all information relevant to Part L BRUKL such as site context, constructions, HVAC, & lighting.
<b>Part L: Energy Performance &amp; Building Compliance Results</b>	Demonstrates compliance with Building Regulations Part L (2021) through DSM modelling, reporting on carbon emissions, primary energy use, and the impact of PVs against TER/BER and TPER/BPER targets.

## 2. Methodology

### 2.1. Standards & Guidelines

The assessment follows these core standards:

- **Building Regulations Part L (2021)** – Volume 2: Conservation of Fuel and Power
- **CIBSE AM11 (2020)** – Building Performance Modelling

The scheme is required to achieve Building Regulation compliance and **net zero carbon in operation (NZCIO)**. This is demonstrated through the details in this report and the **CIBSE TM54 operational energy assessment (BTLC-DMEP-XX-XX-CE-V-3004)** with on-site PVs.

**Note on scope:** Part L compliance modelling reports only on *regulated* energy for conditioning the building (BER/BPER). TM54 captures the total operational energy (regulated + unregulated) and therefore provides the definitive baseline for PV/LZC offset sizing and for meeting the project's NZCIO objective.

### 2.2. Performance Criteria

Two compliance tests were applied in line with **Approved Document L (2021)**:

1. **Carbon Emissions Test** – Building Emission Rate (BER) ≤ Target Emission Rate (TER)
2. **Primary Energy Test** – Building Primary Energy Rate (BPER) ≤ Target Primary Energy Rate (TPER)

The **notional building** is a hypothetical version of the proposed design that shares the same geometry, orientation, zoning, and activity profiles but is assigned predefined, high-efficiency envelope and service parameters as set out in the National Calculation Methodology (NCM). See sections 2.2.2, 2.2.3 and 2.2.4 for the notional building specifications.

Performance of the **proposed (actual)** building is compared against this notional benchmark. To demonstrate compliance, the proposed design must achieve:

- Fabric U-values, airtightness, and thermal mass that perform **better than minimum regulatory standards**; and
- **High-efficiency services and LZC technologies** that reduce both regulated CO<sub>2</sub> emissions and primary energy use.

### 2.2.1. Part L Notional building's Opaque Constructions

Opaque Construction	Notional Building	
	U-Value (W/m <sup>2</sup> K)	Thermal Mass (kJ/(m <sup>2</sup> K))
External Wall(s)	0.18	21.80
Ground Floor	0.15	77.70
Roof(s)	0.15	88.30
Glazing	1.40	-
Rooflights	2.10	-
Doors	1.90	54.60
Internal Ceiling(s)	1.00	71.80 / 66.6
Internal Wall(s)	1.80	8.80
<b>Air Permeability</b>	<b>3 m<sup>3</sup>/m<sup>2</sup>-hr</b>	<b>(≈ 0.15 ach)</b>

### 2.2.2. Part L Notional building's Glazed Constructions

Glazed Construction	Notional Building		
	G-Value	LT Value	Frame Factor
All Elevations	0.29	0.60	10%

## 2.3. Analysis & Modelling Approach

Dynamic Simulation Modelling (DSM) was undertaken by CIBSE Level 5 Accredited Energy Assessors using **IES Virtual Environment 2025** to evaluate building energy performance against the notional building.

The simulation procedure followed the **CIBSE and NCM methodology**, as summarised below:

**Model Setup** – 3D model created in *IES Model IT* from Stage 3 drawings.

1. **Weather File** – *London TRY (CIBSE 2020)* used as the representative climate dataset.
2. **Constructions** – Fabric performance defined per Stage 3 design.
3. **Internal Conditions** – Occupancy schedules and gains assigned per **NCM methodology**.
4. **Systems & Controls** – HVAC and lighting defined as per Stage 3 design.
5. **Simulation** – Annual DSM runs using *Apache Sim* to determine total energy use (heating, cooling, lighting, auxiliary). Additionally, the Suncast module was used for solar shading and Radiance for daylight harvesting. These additional modules will capture the benefits of passive heating and daylight.
6. **Comparison** – Energy and CO<sub>2</sub> outputs compared between *Actual* and *Notional* models to determine savings attributable to passive design.

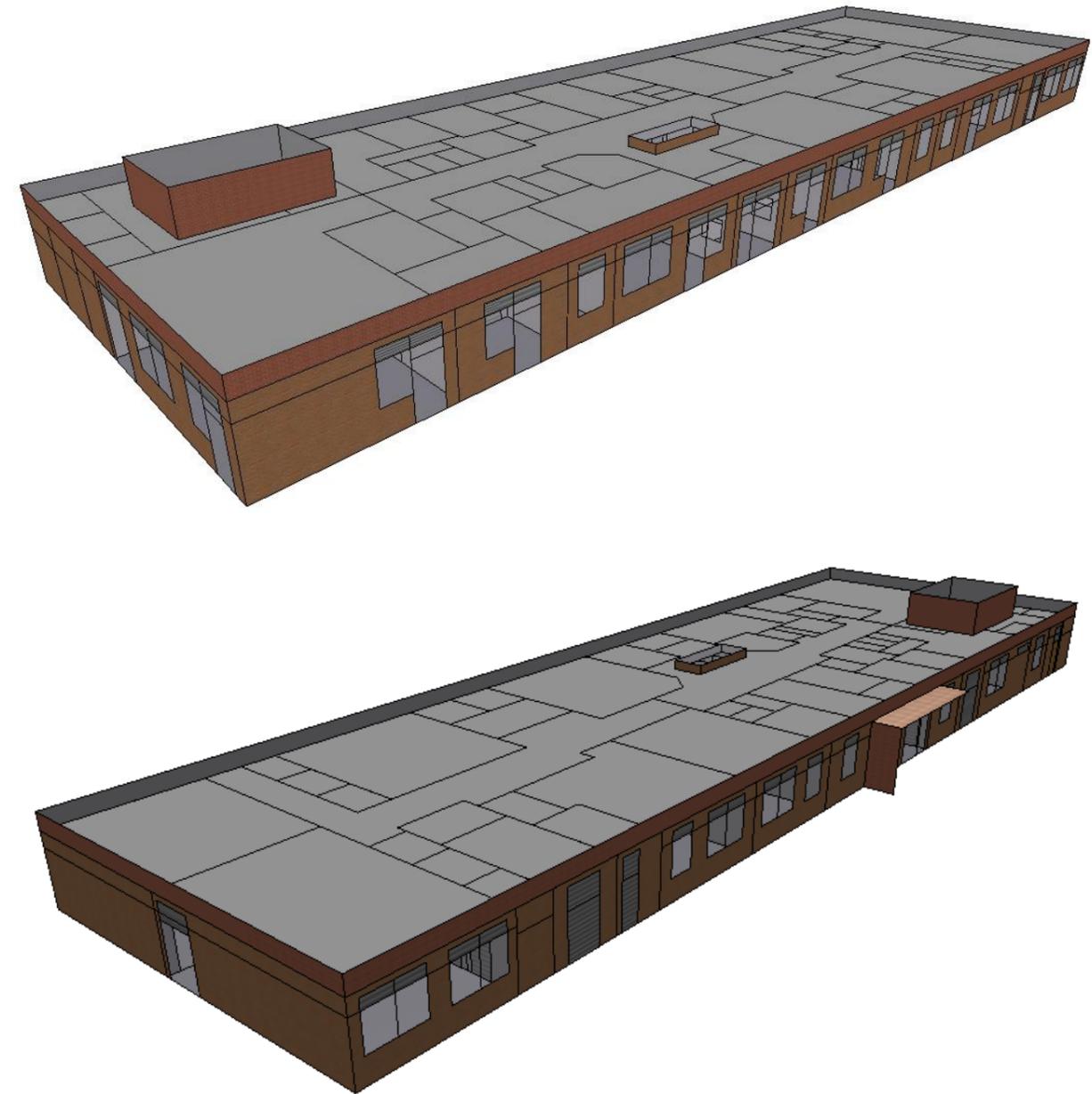


Figure 2. IES VE Model.

## 2.4. Proposed Building's Modelling Data Inputs Summary

CONSTRUCTION	U-VALUES	HEATING		VENTILATION		MANAGEMENT AND CONTROL FEATURES	
External walls	0.15	NVHR (hybrid units) (ASHP to LTHW heating coil)	SCOP = 3.8 Radiant Fraction = 0	MVHR SFP MVHR Thermal Efficiency	1.50 80%	Power factor (PFC)	0.9<=PF<=0.95
Internal walls	As per architects drawings	Wet Radiators (ASHP to LTHW)	SCOP = 3.8 Radiant Fraction = 0.20	NVHR low SFP (W/l/s) NVHR Thermal efficiency	0.09 50.10%	Metering for HVAC and Lighting system	Yes
Ground floor	0.12	Radiant Heating Panels (ASHP to LTHW)	SCOP = 3.8 Radiant Fraction = 0.67	Zonal Extract Fans SFP (W/l/s)	0.50	BMS- With out-of-range alarms For Lighting system	No
Flat Roof	0.12			Kitchen's fan supply SFP Kitchen's cooker hood extract SFP	0.70 0.60	BMS- With out-of-range alarms For HVAC	Yes
Solid doors	1.10	DHW				DCV ventilation Speed drives to pumps and fans	Yes
Roof lights	1.10	ASHP Storage (2x 300L) (Food prep),	SCOP = 3.2	CEN leakage classification Ductwork, AHUs	B, L2	LZCs	
Windows	U = 1.10, g=0.36, LT=0.66	Storage Cleaners' cub.	30L	Demand Control Ventilation (DCV) used for NVHRs	CO <sub>2</sub> and temperature sensors	On site zero or low carbon technology	ASHP
Internal ceiling/floors	As per architects drawings	Storage losses (kWh/day/L) Food prep	0.048			District Heating	n/a
Internal blinds	No	Storage losses (kWh/day/L) Cleaners' cupboard	0.022	VRFs and DX		Other on site zero or low carbon technology CHP, PVs, Biomass, etc.	PVs
		Secondary circulation Circulation losses (W/m) (Food prep.)	9	DX cooling (IT server room) SEER, EER	7.25, 3.5	Planning Class	
Fabric air permeability	3	Secondary circulation Pump power (W) (Food prep.)	20			Main Planning class	D1: Learning Centre
		Secondary circulation DHW pipework (m) (food prep.)	5				

### 3. Building Information

#### 3.1. Site Constraints & Opportunities

Site constraints are features of the building which may determine or prevent certain design choices within this report and further into the project.

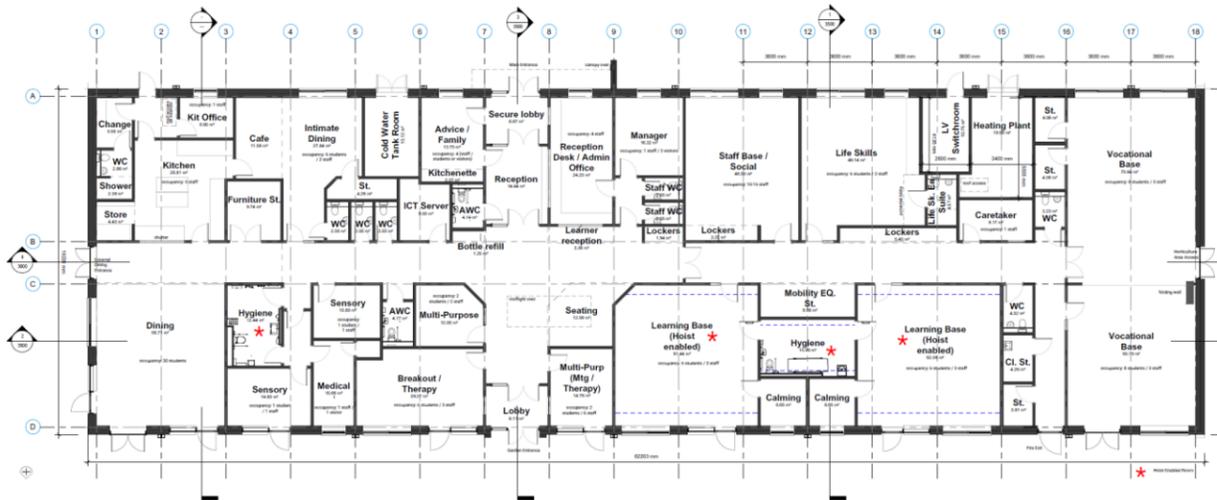


Figure 3. Site Plan.

Constraints	
<b>Orientation/Plot</b>	Southeast & Southwest facing spaces have greater overheating risk.
<b>Location Type</b>	Suburban – Urban Heat Island (UHI) effect likely
<b>Weather/Airflow</b>	Predictive weather files & airflow conditions are location-dependent with more extreme temperatures in the South & higher airflow in the west.
<b>External Air Quality</b>	Busy roads nearby can restrict natural ventilation due to air & noise pollution.

Opportunities	
<b>Orientation/Plot</b>	South-facing facades allow for controlled daylighting & solar gains when balanced with shading. North-facing facades for even daylight & low overheating risks.
<b>Natural Ventilation</b>	Prevailing wind direct can support effective passive ventilation e.g. cross-ventilation and night cooling.
<b>Shading</b>	Opportunity to integrate planting, trees, etc on large site area to provide shading & improve air quality.

#### 3.2. Building Occupancy

The total estimated number of people within the building is 60 including students and staff. Different room types are categorised by occupancy levels which impacts the internal heat gains (people, lighting, cooking etc) assumed for that room. Occupancies are set as per the following with profiles following NCM schedules e.g. 9:00 – 16:00 for classrooms.

<b>Unoccupied</b>	Stores, Circulation, Plant Rooms, WCs, risers, voids
<b>Occupied</b>	Classrooms, Offices, Assembly Hall, Staff Rooms, Reception Areas, Kitchen food prep.

Occupancy & internal gains profiles for different room types follow NCM profiles.

- 00) Sensory/Therapy-Breakout/Calming
- 10) Learning spaces
- 01) Reception-Admin office Desk
- 11) Hyg
- 02) Admin office
- 12) Medical
- 03) Admin Meeting
- 13) Staff Base/Social
- 05) Circulation Spaces
- 14) Caretaker
- 06) Storage Spaces
- 15) ICT server
- 07) Toilets
- 16) Kitchen
- 08) Cafe
- 17) Plant rooms
- 09) Dining
- 18) Cleaners Store

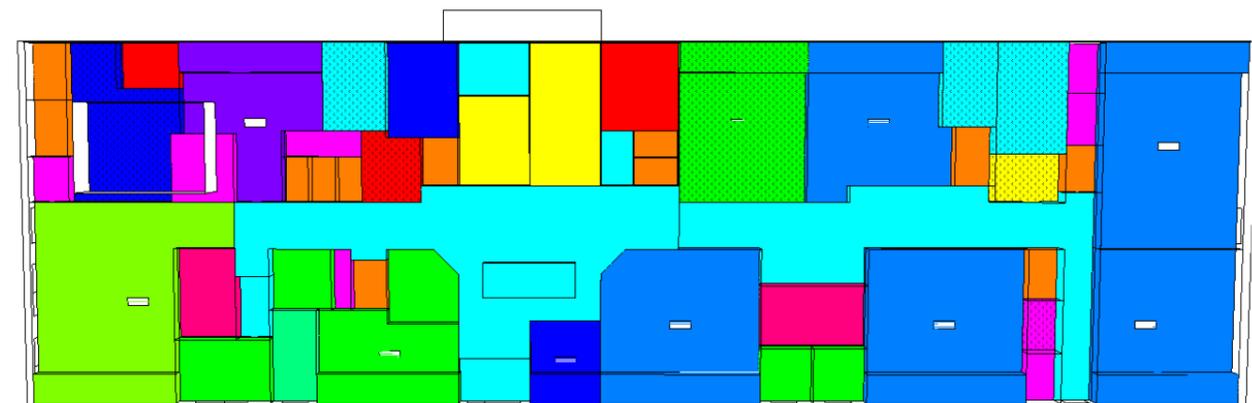


Figure 4. NCM Part L Room Activity Types.

### 3.3. Constructions

In line with ADL Part L, energy performance was assessed by comparing a **baseline “notional building”** with the **actual building**.

Opaque Construction	Actual Building		Notional Building	
	U-Value (W/m <sup>2</sup> K)	Thermal Mass (kJ/(m <sup>2</sup> K))	U-Value (W/m <sup>2</sup> K)	Thermal Mass (kJ/(m <sup>2</sup> K))
External Wall(s)	0.15	12	0.18	21.80
Ground Floor	0.12	240	0.15	77.70
Flat Roof	0.12	186.30	0.15	88.30
Glazing	1.10	-	1.40	-
Rooflights	1.10	-	2.10	-
Metal Louvres	1.10	53.00		
External Doors	1.10	21.72	1.90	54.60
Internal Ceiling(s)	2.30	2.50	1.00	71.80 / 66.6
Internal Wall(s)	0.63	10.00	1.80	8.80
<b>Air Permeability</b>	3.00 m <sup>3</sup> /m <sup>2</sup> -hr	≈0.15 ach	3 m <sup>3</sup> /m <sup>2</sup> -hr	≈0.15 ach

The **brick façade** contributes to durability and improved thermal stability. Moderate–high thermal mass reinforced concrete floors and substructure help smooth internal temperature swings, storing daytime gains for release during cooler evening periods.

- Bexley Road -Louvres \_U=1.1\_TM=53 (BASEEW01)
- Bexley Road\_Acoustic Ceiling Tile 13mm\_U=2.3\_TM= 2.5 (ACOUSTCT)
- Bexley Road\_Ext Wall 01 -U=0.15\_TM=300 (FXLY0005)
- Bexley Road\_Ext Wall 02 -U=0.15\_TM=12 (FXLY0016)
- Bexley Road\_External Door\_U=1.1 (DOOR1)
- Bexley Road\_Flat roof\_U=0.12\_TM=230 (BXLY0000)
- Bexley Road\_Ground Floor\_U=0.12\_TM=240 (FXLY0004)
- Bexley Road\_Light Internal partition\_15mm PB+25mm Ins\_U=0.63\_TM=10 (FXLY0001)
- Bexley Road\_Internal timber Door\_U=3 (FXLY0000)
- Monodraught HVR Quantum Damper (HVRD0000)

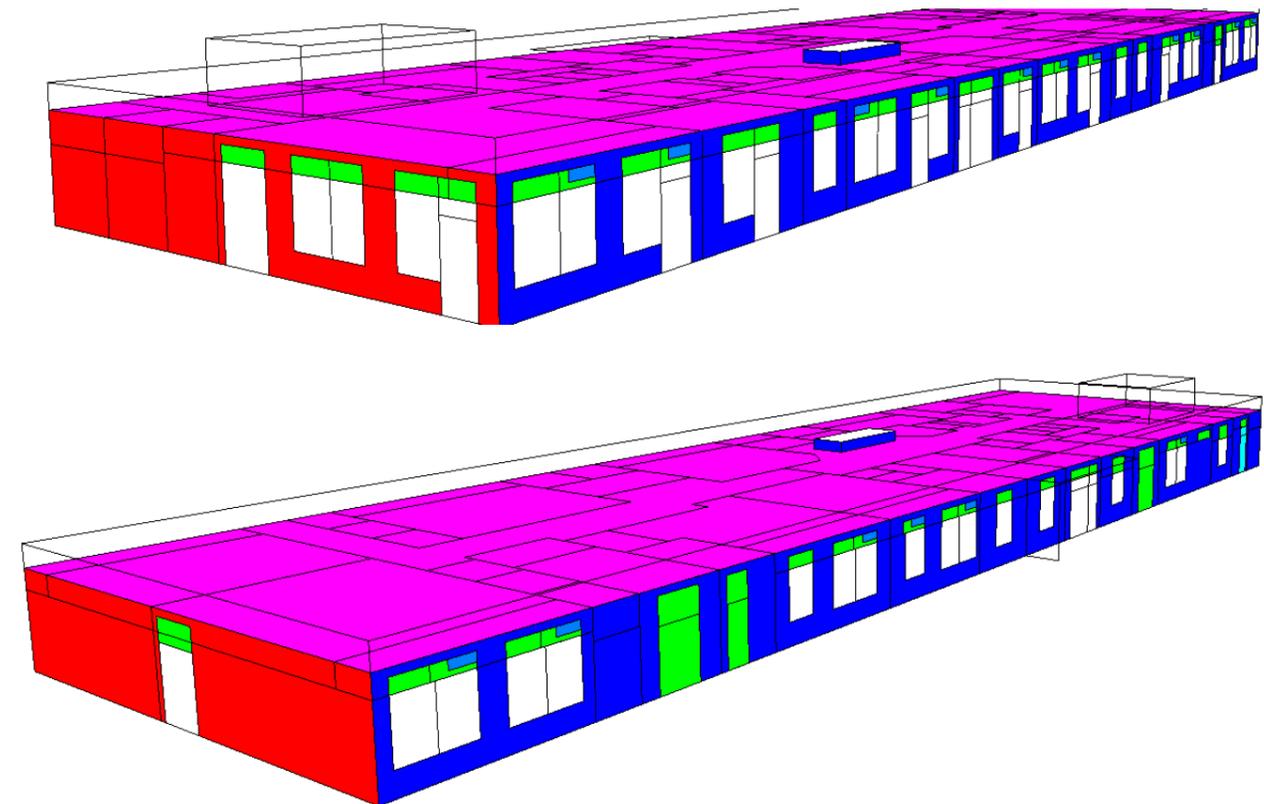


Figure 5. IES Model Building Constructions.

**3.3.1. Glazed Constructions & Solar Control**

Glazed Construction	Actual Building			Notional Building		
	G-Value	LT Value	Shading	G-Value	LT Value	Shading
All Elevations	0.36	0.66	Louvres	0.29	0.60	As per proposed

Local shades due to windows recesses have been included in the construction data to consider local shading benefits in mitigating risks of summer overheating. Internal blinds have also been used.

- Bexley Road\_Rooflight U=1.1\_G=0.5\_LT=0.68\_FF=20% (RGDPK6)
- Bexley Road\_External Window+BLINDS\_U=1.10\_G=0.36\_LT=0.66\_FF=20% (FXLY0002)
- Bexley Road\_External Window\_U=1.10\_G=0.36\_LT=0.66\_FF=20% (FXLY0007)
- Bexley Road\_Internal Window\_U=1.65\_G=0.80\_LT=0.80 (STD\_INT1)

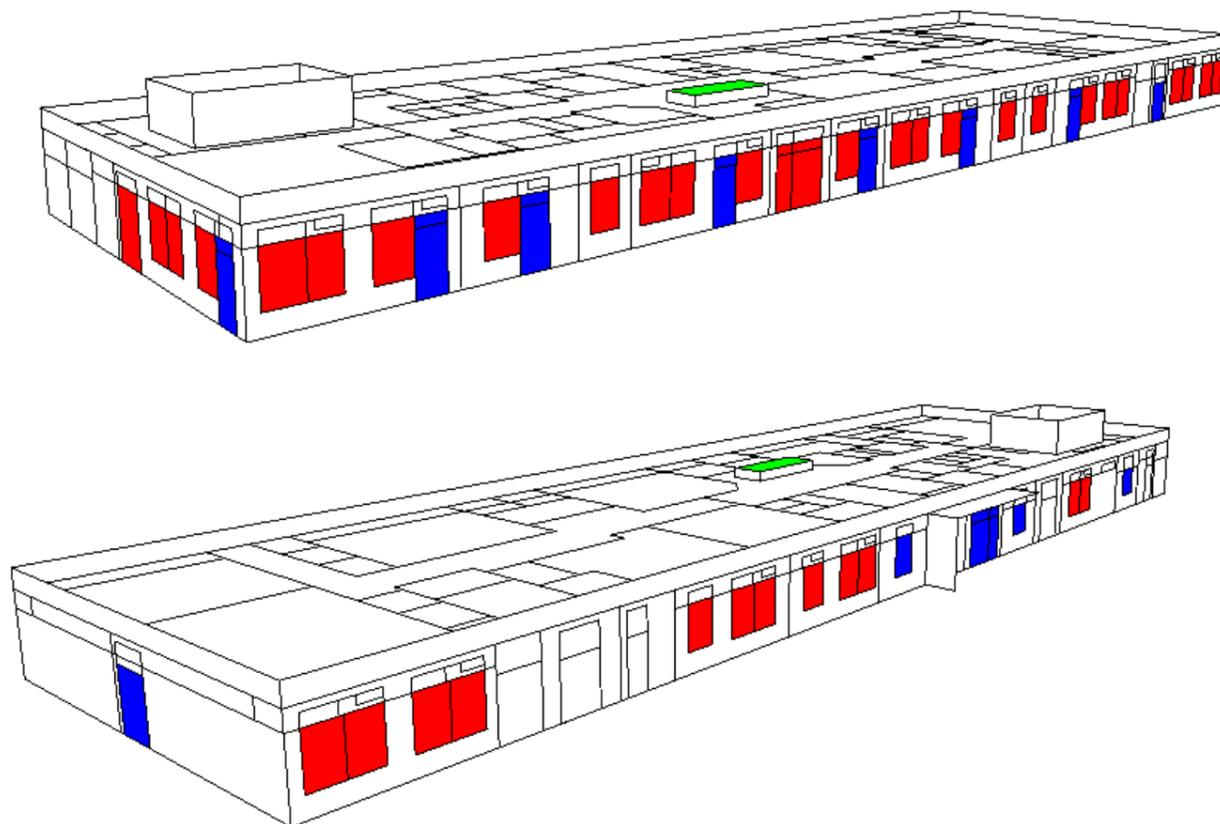


Figure 6. IES Model Glazed Constructions.

**3.4. HVAC Strategy**

The HVAC design for **Bexley Road Transitional Learning Centre** provides high levels of comfort, air quality, and energy efficiency consistent with **Approved Document L (2021)** and **DfE Technical Annex 2F**. The Stage 3 design adopts a mixed-mode approach, combining a NVHRs, radiant and radiators fed by **air-source heat pump (ASHP)**, natural, hybrid, and mechanical ventilation systems controlled via the central **BMS**.

- 00) NVHRs (Heating Coils)
- 01) Ceiling Radiant Panels\_LTHW (ASHP)
- 02) Radiator\_LTHW (ASHP)
- 03) IT Server DX Split Unit (Cooling)
- 04) Unheated Spaces (none)

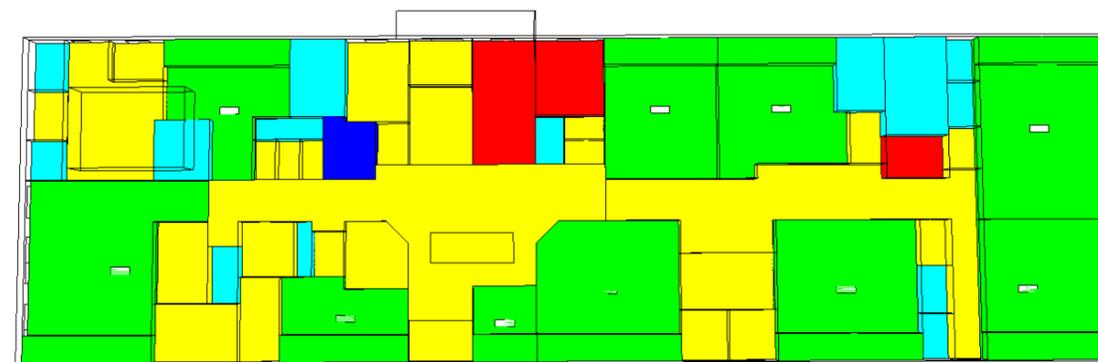


Figure 7. NCM Part L Heating & Cooling Systems.

**3.4.1. Heating**

**Primary Heat Source**

- **Air Source Heat Pump (ASHP)** – closed-loop water-to-water system.
- **Seasonal Coefficient of Performance (SCoP): 3.8**
- Supplies LTHW to NVHR coils, MVHR coils, radiant panels, and radiators.
- Nominal flow temperature ≈ 45 °C.

Space Type	Heating Emitters	Notes
Classrooms, Dining, and Breakout Rooms	LTHW coil within NVHR (Monodraught HVRZero APX)	Provides heated air in Winter
Admin/Office	Wall-mounted LTHW radiators	ASHP-fed
Circulation & Kitchen	Ceiling radiant panels	ASHP-fed
Plant Rooms	Electric frost-protection panels	Local only
Storage	None	None

**Refrigerant Type**

Refrigerant type, **(R-32) with a GWP of 675** is used which is low Global Warming Potential (GWP) HFC refrigerant blend. The **Global Warming Potential (GWP)** of a refrigerant is a measure of how much heat a greenhouse gas traps in the atmosphere over a specific time (typically 100 years), compared to carbon dioxide (CO<sub>2</sub>), which has a GWP of 1. In (ASHP) systems, the refrigerant’s GWP is an important environmental consideration because any leakage during operation, servicing, or end-of-life disposal can contribute to climate change. Although ASHPs are highly efficient and deliver significant reductions in operational carbon emissions compared to fossil-fuel heating systems, the **choice of refrigerant influences their overall environmental impact.**

**3.4.2. Cooling**

Active cooling is limited to essential IT server equipment load only. No comfort cooling is provided to other occupied spaces.

Space	Cooling Type	Equipment	Efficiency
IT Server Room	Single-split DX (active mechanical cooling)	Wall-mounted indoor + outdoor condenser	SEER = 7.25, EER = 3.5
All other spaces	None (passive cooling)	Night-purge via windows / NVHR	-

No comfort cooling is provided elsewhere; thermal comfort is maintained through exposed thermal mass, night purge, hybrid ventilation operation, external shading, low g-value and Windows’s natural ventilation.

**3.4.3. DHW**

- Electric POU heaters to Cleaners Storage (30L), estimated storage loss 0.022 kWh/day/L
- ASHP electric (2x 300 L) immersion calorifier serving kitchen food prep with estimated storage loss 0.048 kWh/day/l.
- Minimum DHW Secondary circulation loss ≈ 9 W/m.

**3.4.4. Ventilation**

The ventilation design maximises passive and hybrid systems where site noise levels (< 60 dB per E3P survey) allow window opening. Mechanical ventilation with heat recovery serves enclosed or acoustically sensitive zones. Demand controlled ventilation (DCV) using CO<sub>2</sub> sensors, is present in NVHR Hybrid ventilation spaces only including classrooms, the library, and the assembly hall (Cd = 0.95).

- 00) NVHRs
- 01) MVHRs
- 02) NV\_Louvered doors
- 03) NV\_Open Windows
- 04) Kitchen\_Supply & Extract
- 05) Extract Only
- 06) Infiltrations

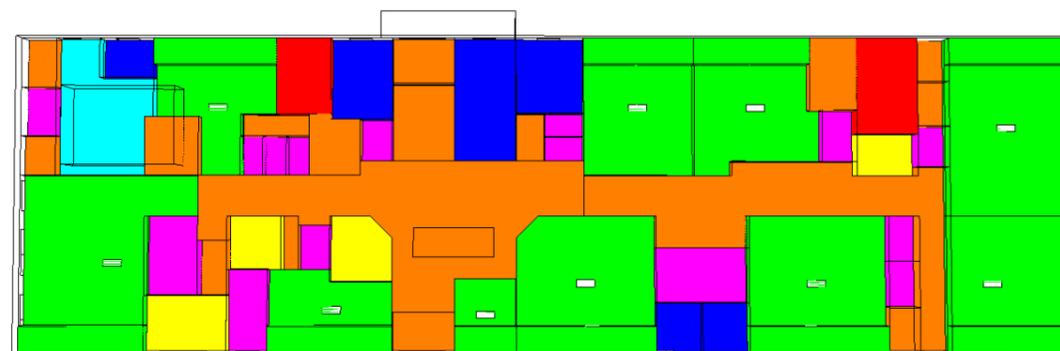


Figure 8. NCM Part L Ventilation Systems.

System	Typical Application	Max Flow (L/s)	SFP (W/l-s)	Heat Recovery (%)	Model / Supplier
<b>NVHR</b>	Teaching spaces, Dining	180/unit	<b>0.09</b>	<b>51%</b>	Monodraught HVRZero APX
<b>MVHR</b>	Calming, Sensory and Caretaker rooms	120	<b>1.5</b>	<b>80%</b>	Nuaire XBC+ Series
<b>Natural Ventilation only</b>	Offices, Advice and family room	-	-	-	-
<b>Extract fans</b>	WCs, Showers, Stores	18	<b>0.5</b>	-	Nuaire DE/XS Series
<b>Extract fans</b>	Hygiene	120	<b>0.5</b>	-	
<b>Supply fan Extract fan (incl. cooker hood)</b>	Kitchen,	165	<b>0.7, 0.6</b>	-	Specialist design

**Natural Ventilation (Openable Windows)**

- Limited to only occupied Office spaces and the Advice and family room.
- **Large windows:** lower sills starting at 1100 mm
- **Acoustic restrictions** on all Southwest and Southeast facades.
- **Operation modelled in IES:**  
Large & small windows: **09:00–16:00 (occupied hours)**.

**NVHRs, Louvres & Passive Stack**

- Louvres of ground floor windows enable airflow across teaching spaces
- NVHRs include **low-energy fans** (temperature & CO<sub>2</sub> controlled) for boost and night purge.
- LTHW heating coils for winter efficiency to boost the heat recovery exchanges from the classrooms' internal heat gains.



Figure 9: Illustration of NVHRs type HVR APX unit by Monodraught Ltd.

**3.4.5. Mechanical Ventilation**

Balanced supply & extract with **heat recovery**.

Controlled by **BMS** with CO<sub>2</sub> and temperature sensors.

**Features:**

- Night purge cooling during hot weather.
- Energy recovery (heat, cooling, moisture).
- Free cooling when outdoor temp < indoor temp.
- Reduced energy consumption with **DC fan motors**.
- Demand-controlled ventilation with optional **CO<sub>2</sub> sensors**.

**Reference model:** *MVHR\_01-XBC25-120*



Figure 10. Nuair XBC+ Series MVHR.

### 3.5. Lighting Strategy

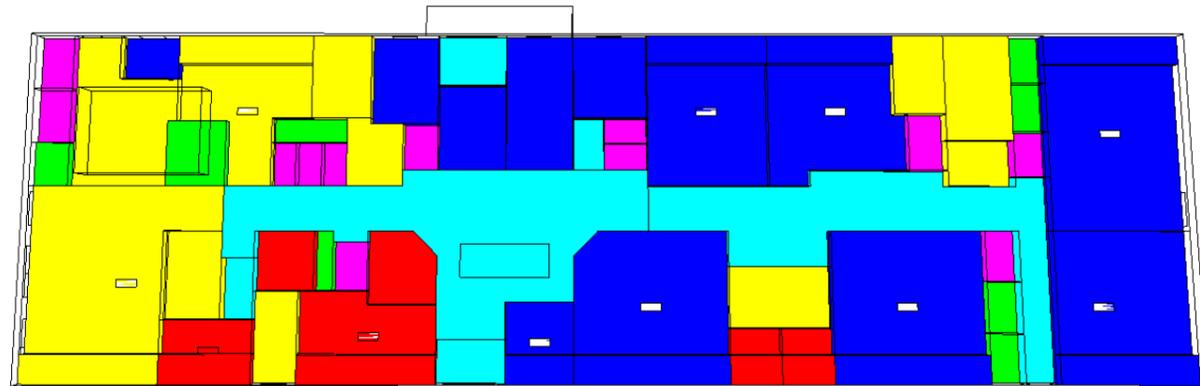
The lighting strategy for **Bexley Road Transitional Learning Centre** has been developed to comply with **Approved Document Part L (2021), BS EN 12464-1:2021** (lighting of indoor workplaces) and the **DfE Output Specification – Technical Annex 2E Daylight & Electric Lighting**.

At RIBA Stage 3, the lighting design has been progressed to luminaire selection and implemented in the model. Most occupied spaces will benefit from glazing for daylight supplemented with very efficient artificial lighting. Automatic control systems are provided to reduce unnecessary electrical consumption while maintaining visual comfort and compliance with **DfE Annex 2E**

Total average luminaire-lumens efficacy is in the excess of 128.6 L/cW, evidence for a very efficient artificial lighting design. In addition to this, effective lighting controls are implemented to reduce lighting use.

Lighting controls will have PIRs sensors for presence detection to storerooms, and absence detection in interview room, admin, teaching spaces. PIRs daylight dimming to all teaching spaces with perimeter windows. Use of IES radiance module was implemented in order to capture better artificial lighting electricity's savings. A modulating profile was set to capture occupied days with sufficient and high natural daylight in perimeter zones. When outdoor lux levels exceed the 300-lux margin, electricity PIRs daylight sensors dim artificial lighting.

- 00) 142 lm/cW
- 01) 140 lm/cW
- 02) 137 lm/cW
- 03) 135 lm/cW
- 04) 132 lm/cW
- 05) 100 lm/cW



- 00) Manual Controls Only
- 01) Presence Detection (PIR Auto On Auto Off)
- 03) Presence Detection (PIRs+ Daylight Dimming)
- 04) Absence Detection( PIRs+ Daylight Dimming)

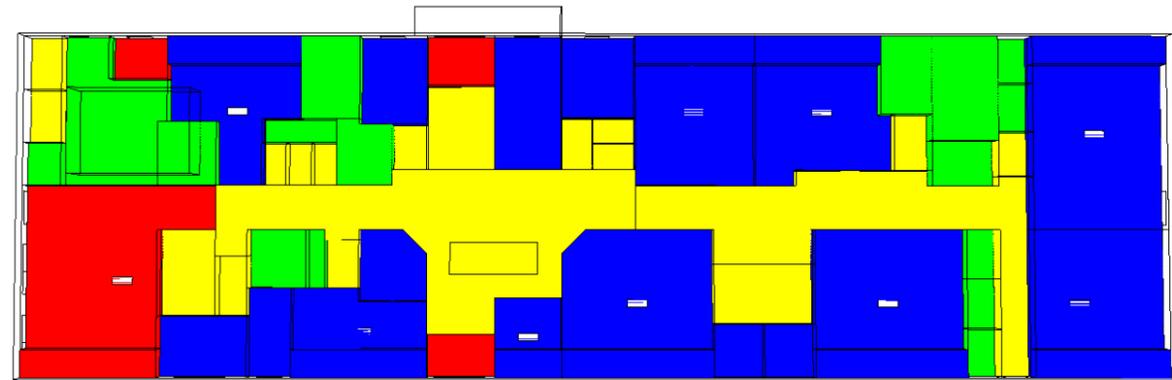


Figure 11. IES Model Lighting Controls to ground and first floors.

## 4. Part L: Energy Performance & Building Compliance

The full Energy Compliance & EPC Report has been produced by Design MEP:  
BTLC-DMEP-XX-XX-CE-V-3001.

### 4.1. Part L Methodology

### 4.2. Results

- **Compliance:** Passes **all Part L criteria** without PVs.
- Fabric (U-values, air permeability) & system efficiencies are compliant.

#### 4.1.1. Regulated Part L Carbon Emissions

Scenario	TER (kgCO <sub>2</sub> /m <sup>2</sup> /yr)	BER (kgCO <sub>2</sub> /m <sup>2</sup> /yr)	Compliance	Improvement
No PVs	3.47	2.48	PASS	28.53%
With PVs	3.47	-1.42	PASS	140.92%

#### 4.2.1. Regulated Part L Primary Energy

Scenario	TPER (kWh/m <sup>2</sup> /yr)	BPER (kWh/m <sup>2</sup> /yr)	Compliance	Improvement
No PVs	36.85	26.42	PASS	28.30%
With PVs	36.85	-18.14	PASS	149.23%

#### 4.3. Fabric Compliance

Opaque Construction	Proposed Building		Notional Building	
	U-Value (W/m <sup>2</sup> K)	Thermal Mass (kJ/(m <sup>2</sup> K))	U-Value (W/m <sup>2</sup> K)	Thermal Mass (kJ/(m <sup>2</sup> K))
External Wall(s)	0.15	12	0.18	21.80
Ground Floor	0.12	240	0.15	77.70
Flat Roof	0.12	186.30	0.15	88.30
Glazing	1.10	-	1.40	-
Rooflights	1.10	-	2.10	-
Metal Louvres	1.10	53.00		
External Doors	1.10	21.72	1.90	54.60
Internal Ceiling(s)	2.30	2.50	1.00	71.80 / 66.6
Internal Wall(s)	0.63	10.00	1.80	8.80
<b>Air Permeability</b> m <sup>3</sup> /(m <sup>2</sup> ·hr) @50Pa	3	≈0.15 ach	3	≈0.15 ach

### 4.4. EPC Rating

#### Energy Performance Asset Rating

More energy efficient



This is how energy efficient the building is.

Net zero CO<sub>2</sub> emissions

#### 4.1. PVs system data summary

In accordance with **DfE Technical Annex 2J** and the **UKGBC Net Zero Carbon Buildings Framework**, all operational energy must be offset by *onsite* renewable generation. The proposed **roof-mounted solar PV system (~39.4 kWp)** is sized to offset the full annual operational energy demand predicted by TM54 methodology. The below table shows the solar roof mounted PVs systems parameters implemented into the Part L compliance thermal model. This has helped derive the regulated carbon emissions savings shown in the table below.

Bexley Road Transitional Learning Centre, PVs data summary	
TER KgCO <sub>2</sub> /m <sup>2</sup> /y (Notional base line)	3.47
BER KgCO <sub>2</sub> /m <sup>2</sup> /y (without PVs)	2.48
BER KgCO <sub>2</sub> /m <sup>2</sup> /y (with PVs)	-1.42
BER vs TER improvement % (with NO PVs input)	28.53%
BER vs TER improvement % (with PVs contribution)	140.92%
Conditioned Building (BRUKL certificate GIFA can differ slightly from this value), [m <sup>2</sup> ]	1,116
Net total operational EUI for the building [kWh/m <sup>2</sup> ]	33.57
<b>Corrected equivalent PV energy required target [kWh/y]</b>	<b>37,461</b>
Corrected min PV Peak power needed [kWp]	39.4
Approx. Equivalent PV area (this area may differ from the PV specialist value) [m <sup>2</sup> ]	174.3
Azimuth (degrees clockwise from north)	135
Tilt angle from horizontal	35
PV module type	Monocrystalline
PVs Module nominal efficiency [%]	22.60
Shading Factor (PV system accounts for some losses due to shading from adjacencies)	0.95
Inverter converter efficiency [%]	98
PV module NOCT [°C]	42
Pmax (Temp Coeff for Module Efficiency) [%/°C]	-0.36
Number of PV Panels using a 450 W panels (this may differ from final PV specialist to suit target)	88
CO <sub>2</sub> Carbon Factor SAP 10.2 (kg.CO <sub>2</sub> /kWh)	0.1360
Predicted approx. Total carbon offset for NZCIO (kg of CO <sub>2</sub> ) for year 1 of operation	5.095
Predicted approx. Total carbon offset for NZCIO (Tonnes of CO <sub>2</sub> ) for year 1 of operation	5.095

Table 1: PV system and regulated carbon saving data

## 4. Additional Local Planning Policies:

### 4.1. GLA Energy Hierarchy

The summary results for **Bexley Road Transitional Learning Centre** reported through the GLA Energy Hierarchy can be seen in the table below. The full results and GLA report spreadsheet can be found in Appendix D.

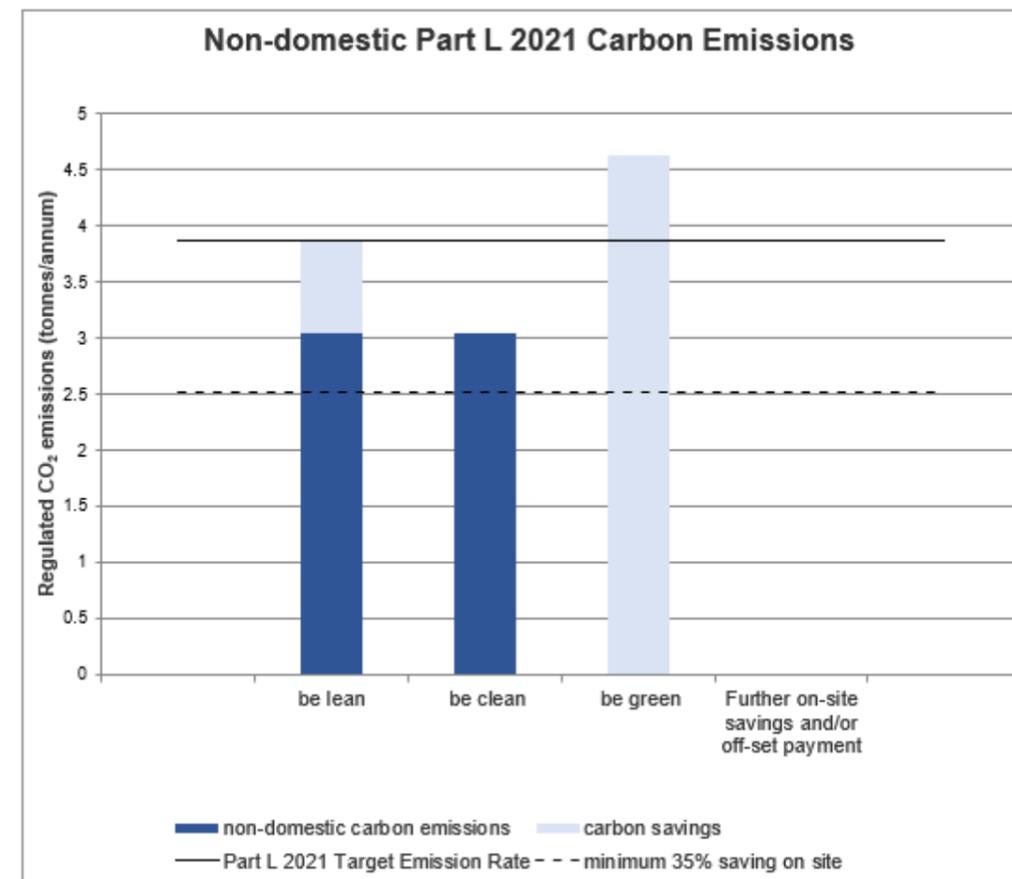
Scenario	BER (kgCO <sub>2</sub> /m <sup>2</sup> /yr)	Emissions	Cumulative Improvement
Baseline	3.47	3.9	Baseline
Be Lean	2.73	3.2	21%
Be Clean	2.73	3.2	21%
Be Green	-1.42	-1.6	120%
Total Savings	-	-1.6	141%

While encouraged to achieve 15% carbon reduction at Be Lean stage as part of the SSPD, the current model achieves 21% reduction at Stage 3. However, it then shows that **the proposed development achieves 141% with PV**. Additionally, a TM54 assessment was undertaken by DMEP (*BTLC-DMEP-XX-XX-CE-V-3004*) which reports that the development achieves Net Zero Carbon in Operation (NZCiO).

### 4.2. Energy Use Intensity

The **Bexley Road Transitional Learning Centre** TM54 (*BTLC-DMEP-XX-XX-CE-V-3004*) also reports the Energy Use Intensity (EUI) of the development. While the SSPD encourages a EUI of 60-70(kWh/m<sup>2</sup>/yr) for schools, the DfE standards are a minimum of 50 (kWh/m<sup>2</sup>/yr).

**The EUI that Bexley Road achieves is 33.57 (kWh/m<sup>2</sup>/yr), which exceeds all requirements** and indicates that the development to be highly energy efficient based on the targets set by the DfE and SSPD.



## Appendix A: Architectural drawings

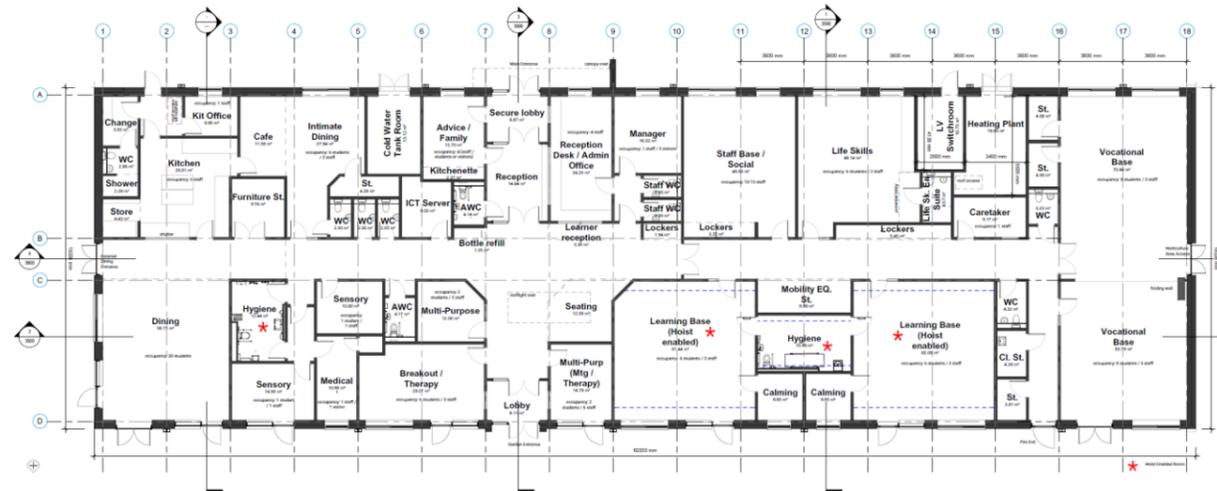


Figure 12. Ground Floor Plan. Courtesy: Pozzoni Architects

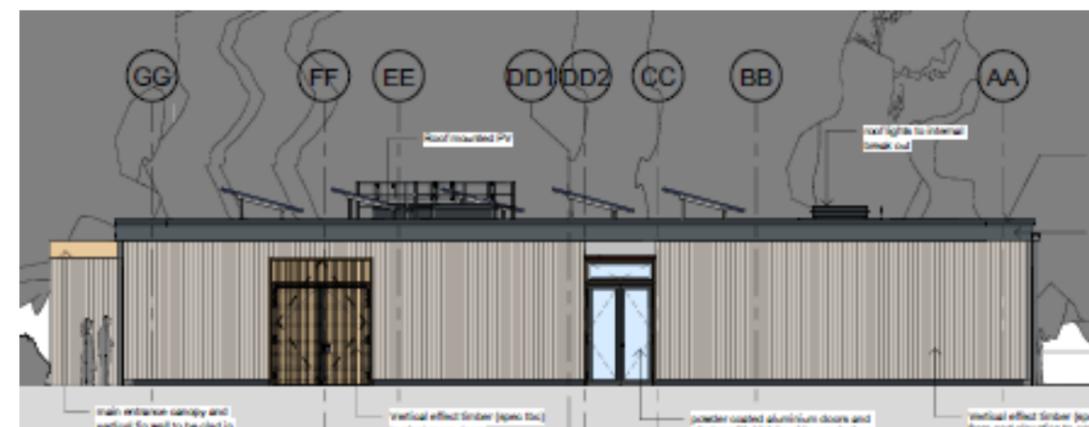


Figure 13. Architectural Elevations. Courtesy: Pozzoni Architects

## Appendix B: IES Thermal Model Images

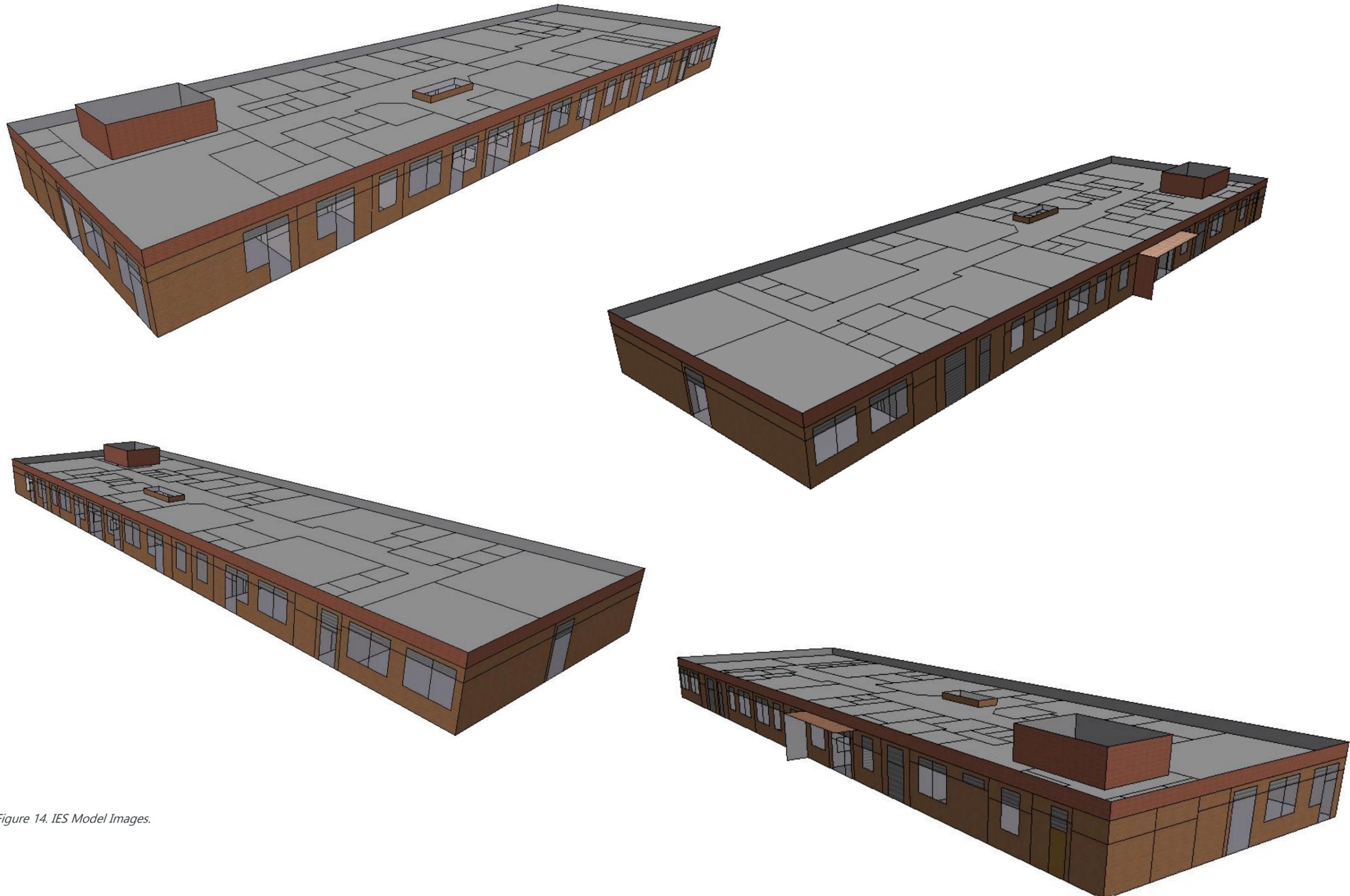


Figure 14. IES Model Images.

## Appendix C: BRUKL & EPC Certificates

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

<b>Project name</b>	
<b>Bexley Rd TLC (Be-Green)</b>	<b>As designed</b>
<b>Date:</b> Tue Feb 03 11:26:27 2026	

Administrative information	
<b>Building Details</b> Address: LONDON, SE9 2PE  <b>Certifier details</b> Name: AB Telephone number: 0116 218 2922 Address: 23 Rawson Street, Leicester, LE1 6UP	<b>Certification tool</b> Calculation engine: Apache Calculation engine version: 7.0.30 Interface to calculation engine: IES Virtual Environment Interface to calculation engine version: 7.0.30 BRUKL compliance module version: v6.1.e.1  <div style="border: 1px solid black; padding: 2px; display: inline-block;">Foundation area [m<sup>2</sup>]: 1139.12</div>

**The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets**

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.47
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	-1.42
Target primary energy rate (TPER), kWh <sub>e</sub> /m <sup>2</sup> annum	36.85
Building primary energy rate (BPER), kWh <sub>e</sub> /m <sup>2</sup> annum	-18.14
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 <sub>a-Limit</sub>	U <sub>a-Calc</sub>	U <sub>i-Calc</sub>	First surface with maximum value
Walls*	0.26	0.15	0.15	00000000:Surf[1]
Floors	0.18	0.12	0.12	00000003:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.12	0.12	00000000:Surf[0]
Windows** and roof windows	1.6	1.1	1.1	00000014:Surf[1]
Rooflights***	2.2	1.1	1.1	00000003:Surf[2]
Personnel doors^	1.6	1.06	1.1	BX000020:Surf[1]
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<sub>a-Limit</sub> = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]  
 U<sub>a-Calc</sub> = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]  
 U<sub>i-Calc</sub> = Calculated maximum individual element U-values [W/(m<sup>2</sup>K)]  
 \* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.  
 \*\* Display windows and similar glazing are excluded from the U-value check. \*\*\* Values for rooflights refer to the horizontal position.  
 ^ For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K  
 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 <sup>3</sup> /(h.m <sup>2</sup> ) 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	NO
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- 02-a\_ASHP\_LTHW-Ceiling Radiant Panels\_NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0.67	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

2- 01\_ASHP\_HVRs-NVHRs\_APXs

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0	-	0.5
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

3- 02-b\_ASHP\_LTHW-Ceiling Radiant Panels\_EXTRACT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0.67	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

4- 03-b\_ASHP\_LTHW-Radiators\_NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0.2	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

5- 02-c\_ASHP\_LTHW-Ceiling Radiant Panels\_MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0.67	-	0.8
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

6- 03-a\_ASHP\_LTHW-Radiators\_MVHRs

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0.2	-	0.8
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

7- 04-IT Server DX Split Cooling Unit

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	7.25	0	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

8- 05-Food-Prep-Heating\_AHU-SUP+Hood-EX

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.8	-	0.67	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- 00\_DHW-INSTANT-NO STORAGE

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

2- 00-1\_DHW (Food Prep)-ASHP-STORAGE (2x300L)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	3.2	0.005
<b>Standard value</b>	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

3- 00-2\_DHW (Cleaners)-ELEC-STORAGE (30L)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	0.022
<b>Standard value</b>	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
00_Dining	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Vocational Base 02	-	-	-	-	-	0.1	-	-	-	-	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
<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
00_Intimate Dining	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_WC and Shower	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Staff Base / Social	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Staff WC 01	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_WC 02	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_WC 03	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_WC 04	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Calming 01	-	1.5	-	-	-	-	-	-	-	-	N/A	
00_Calming 02	-	1.5	-	-	-	-	-	-	-	-	N/A	
00_Multi-Purpose -Room	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Hygiene 01	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Learning Base 02	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Vocational Base 01	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Sensory 01	-	1.5	-	-	-	-	-	-	-	-	N/A	
00_Medical	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_WC 01	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Caretaker	-	1.5	-	-	-	-	-	-	-	-	N/A	
00_Staff WC 02	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_AWC 02	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Staff WC 03	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Kitchen	-	-	-	0.7	-	-	-	-	0.6	-	N/A	
00_Life skills	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Learning Base 01	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_WC 05	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Storage 03 (Cleaners St)	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Breakout / therapy 02	-	-	-	-	-	0.1	-	-	-	-	N/A	
00_Hygiene 02	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_AWC 01	-	-	0.5	-	-	-	-	-	-	-	N/A	
00_Multi-Purpose/Therapy	-	1.5	-	-	-	-	-	-	-	-	N/A	
00_Sensory 02	-	-	-	-	-	0.1	-	-	-	-	N/A	

Zone name	General lighting and display lighting	General luminaire	Display light source	
		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
<b>Standard value</b>	95	80	0.3	
00_Corridor 02	132	-	-	
00_Dining	140	-	-	
00_Vocational Base 02	135	-	-	
00_Corridor 01	132	-	-	
00_Intimate Dining	140	-	-	
00_WC and Shower	100	-	-	
00_Staff Base / Social	135	-	-	
00_Corridor 04	132	-	-	
00_Reception Desk and Admin office	135	140	0.771	

General lighting and display lighting Zone name	General luminaire	Display light source	
	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
Standard value	95	80	0.3
00_Managers office	135	-	-
00_Staff WC 01	100	-	-
00_WC 02	100	-	-
00_WC 03	100	-	-
00_WC 04	100	-	-
00_Furniture Storage	142	-	-
00_Kitchen office	135	-	-
00_Storage 01	142	-	-
00_Calming 01	137	-	-
00_Calming 02	137	-	-
00_Multi-Purpose -Room	135	-	-
00_Hygiene 01	140	-	-
00_Learning Base 02	135	-	-
00_Vocational Base 01	135	-	-
00_Sensory 01	137	-	-
00_Medical	140	-	-
00_WC 01	100	-	-
00_Storage 02	142	-	-
00_Heating Plant	140	-	-
00_Caretaker	140	-	-
00_LV Switchroom	140	-	-
00_Staff WC 02	100	-	-
00_Secure Lobby	132	-	-
00_Reception/circulation	135	135	1
00_Advice and Family	135	-	-
00_ICT Server	140	-	-
00_AWC 02	100	-	-
00_Cold watertank room	140	-	-
00_Staff WC 03	100	-	-
00_Storage 06	142	-	-
00_Kitchen	140	-	-
00_Changing	100	-	-
00_Life skills	135	-	-
00_Storage 07	142	-	-
00_Storage 04	142	-	-
00_Learning Base 01	135	-	-
00_WC 05	100	-	-
00_Storage 03 (Cleaners St)	142	-	-
00_Lobby Corridor 01	132	-	-
00_Breakout / therapy 02	137	-	-
00_Hygiene 02	140	-	-
00_AWC 01	100	-	-
00_Corridor 03	132	-	-

General lighting and display lighting Zone name	General luminaire	Display light source	
	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
Standard value	95	80	0.3
00_Multi-Purpose/Therapy	137	-	-
00_Storage 05	142	-	-
00_Sensory 02	137	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_Dining	NO (-33.3%)	YES
00_Vocational Base 02	NO (-72.4%)	YES
00_Intimate Dining	NO (-77.3%)	YES
00_Staff Base / Social	NO (-62.9%)	YES
00_Reception Desk and Admin office	NO (-69.7%)	NO
00_Managers office	NO (-73.5%)	NO
00_Furniture Storage	N/A	N/A
00_Kitchen office	NO (-72.4%)	NO
00_Storage 01	N/A	N/A
00_Calming 01	NO (-64.9%)	YES
00_Calming 02	NO (-64.5%)	YES
00_Multi-Purpose -Room	NO (-18.7%)	YES
00_Hygiene 01	N/A	N/A
00_Learning Base 02	NO (-38.9%)	YES
00_Vocational Base 01	NO (-72%)	YES
00_Sensory 01	N/A	N/A
00_Medical	NO (-59.5%)	YES
00_Storage 02	N/A	N/A
00_Caretaker	N/A	N/A
00_Reception/circulation	NO (-86.8%)	NO
00_Advice and Family	NO (-75.7%)	NO
00_ICT Server	N/A	N/A
00_Storage 06	N/A	N/A
00_Life skills	NO (-64.6%)	YES
00_Storage 07	NO (-99.9%)	NO
00_Storage 04	N/A	N/A
00_Learning Base 01	NO (-38.7%)	YES
00_Breakout / therapy 02	NO (-31.4%)	YES
00_Hygiene 02	N/A	N/A
00_Multi-Purpose/Therapy	NO (-98.3%)	NO
00_Storage 05	N/A	N/A
00_Sensory 02	NO (-39%)	YES

#### Regulation 25A: Consideration of high efficiency 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?	YES
Are any such measures included in the proposed design?	YES

### Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Floor area [m <sup>2</sup> ]	1116	1116		Retail/Financial and Professional Services
External area [m <sup>2</sup> ]	2778.5	2778.5		Restaurants and Cafes/Drinking Establishments/Takeaways
Weather	LON	LON		Offices and Workshop Businesses
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	3	3		General Industrial and Special Industrial Groups
Average conductance [W/K]	508.6	645.81		Storage or Distribution
Average U-value [W/m <sup>2</sup> K]	0.18	0.23		Hotels
Alpha value* [%]	15.69	10		Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				
				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
			99	<b>Non-residential Institutions: Education</b>
				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
			1	<b>Others: Miscellaneous 24hr Activities</b>
				Others: Car Parks 24 hrs
				Others: Stand Alone Utility Block

### Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	3.64	6.81
Cooling	0.65	0.57
Auxiliary	1.68	2.87
Lighting	2.97	6.83
Hot water	8.49	7.58
Equipment*	36.41	36.41
<b>TOTAL**</b>	<b>17.44</b>	<b>24.64</b>

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

### Energy Production by Technology [kWh/m<sup>2</sup>]

	Actual	Notional
Photovoltaic systems	30.27	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	30.27	0

### Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	56.35	77.54
Primary energy [kWh <sub>pe</sub> /m <sup>2</sup> ]	-18.14	36.85
Total emissions [kg/m <sup>2</sup> ]	-1.42	3.47

### 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
<b>[ST] Other local room heater - fanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	49.2	0	4.3	0	0.3	3.2	0	3.8	0
Notional	108.5	0	10.8	0	2.8	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	57.6	0	4.5	0	4.3	3.57	0	3.8	0
Notional	47.1	0	4.7	0	1.5	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	36	0	2.8	0	1.1	3.57	0	3.8	0
Notional	32.3	0	3.2	0	1.1	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	82.4	0	6.4	0	0.6	3.57	0	3.8	0
Notional	70	0	7	0	0.6	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	0.3	0	0	0	4.3	3.57	0	3.8	0
Notional	7	0	0.7	0	1.5	2.78	0	---	---
<b>[ST] Single room cooling system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	0	1403.2	0	71.9	0	3.73	5.42	3.8	7.25
Notional	0	1046.5	0	62.8	0	2.78	4.63	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	46.6	0	3.6	0	11.1	3.57	0	3.8	0
Notional	42.7	0	4.3	0	13.1	2.78	0	---	---
<b>[ST] Other local room heater - fanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	90.7	0	7.9	0	4.6	3.2	0	3.8	0
Notional	8.1	0	0.8	0	2.2	2.78	0	---	---
<b>[ST] No Heating or Cooling</b>									
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

# Energy Performance Certificate

## Non-Domestic Building



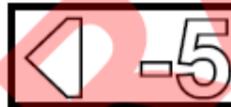
77 Bexley Road  
LONDON  
SE9 2PE

**Certificate Reference Number:**  
8084-0736-0996-1765-0602

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at [www.gov.uk/government/collections/energy-performance-certificates](http://www.gov.uk/government/collections/energy-performance-certificates).

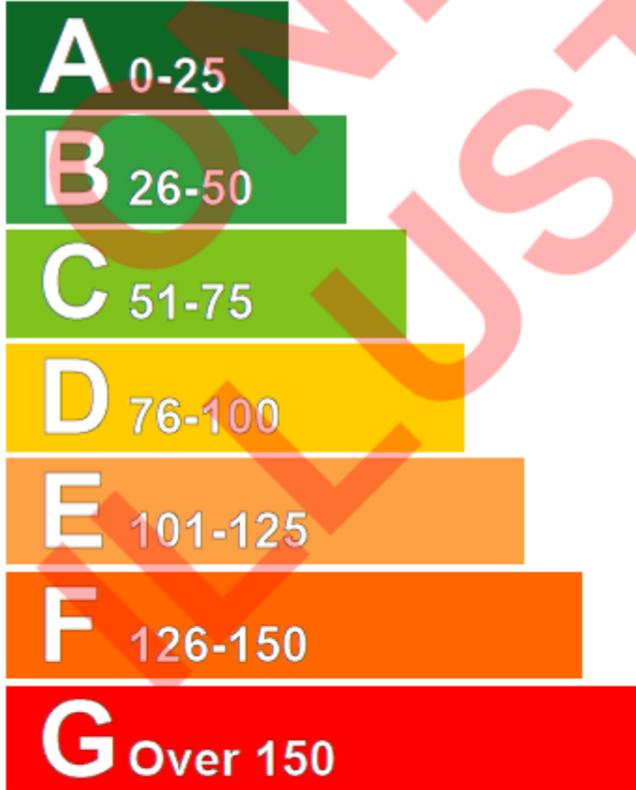
### Energy Performance Asset Rating

More energy efficient



This is how energy efficient the building is.

Net zero CO<sub>2</sub> emissions



Less energy efficient

### Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Heating and Mechanical Ventilation
Total useful floor area (m <sup>2</sup> ):	1115.982
Building complexity:	Level 5
Building emission rate (kgCO <sub>2</sub> /m <sup>2</sup> per year):	-1.37
Primary energy use (kWh <sub>PE</sub> /m <sup>2</sup> per year):	-17.4

### Benchmarks

Buildings similar to this one could have ratings as follows:

- 13** If newly built
- 53** If typical of the existing stock

## Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

**Assessment Software:** Virtual Environment v7.0.30 using calculation engine ApacheSim v7.0.30

**Property Reference:**

**Assessor Name:** AB

**Assessor Number:** LCEA124753

**Accreditation Scheme:** CIBSE Certification Limited

**Assessor Qualifications:** NOS5

**Employer/Trading Name:** Design MEP Ltd

**Employer/Trading Address:** 23 Rawson Street

**Issue Date:** 02 Feb 2026

**Valid Until:** 01 Feb 2036 (unless superseded by a later certificate)

**Related Party Disclosure:** Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 9326-4963-6985-8203-5288

## About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at [www.cibsecertification.com](http://www.cibsecertification.com).

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at [www.ndepcregister.com](http://www.ndepcregister.com). The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at [www.opendatacommunities.org](http://www.opendatacommunities.org).

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit [www.ndepcregister.com](http://www.ndepcregister.com). To opt out of having information about your building made publicly available, please visit [www.ndepcregister.com/optout](http://www.ndepcregister.com/optout).

There is more information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government website at: [www.gov.uk/government/collections/energy-performance-certificates](http://www.gov.uk/government/collections/energy-performance-certificates). It explains the content and use of this document and advises on how to identify the authenticity of a certificate and how to make a complaint.

## Opportunity to benefit from a Green Deal on this property

The Green Deal can help you cut your energy bills by making energy efficiency improvements at no upfront costs. Use the Green Deal to find trusted advisors who will come to your property, recommend measures that are right for you and help you access a range of accredited installers. Responsibility for repayments stays with the property - whoever pays the energy bills benefits so they are responsible for the payments.

To find out how you could use Green Deal finance to improve your property please call 0300 123 1234.

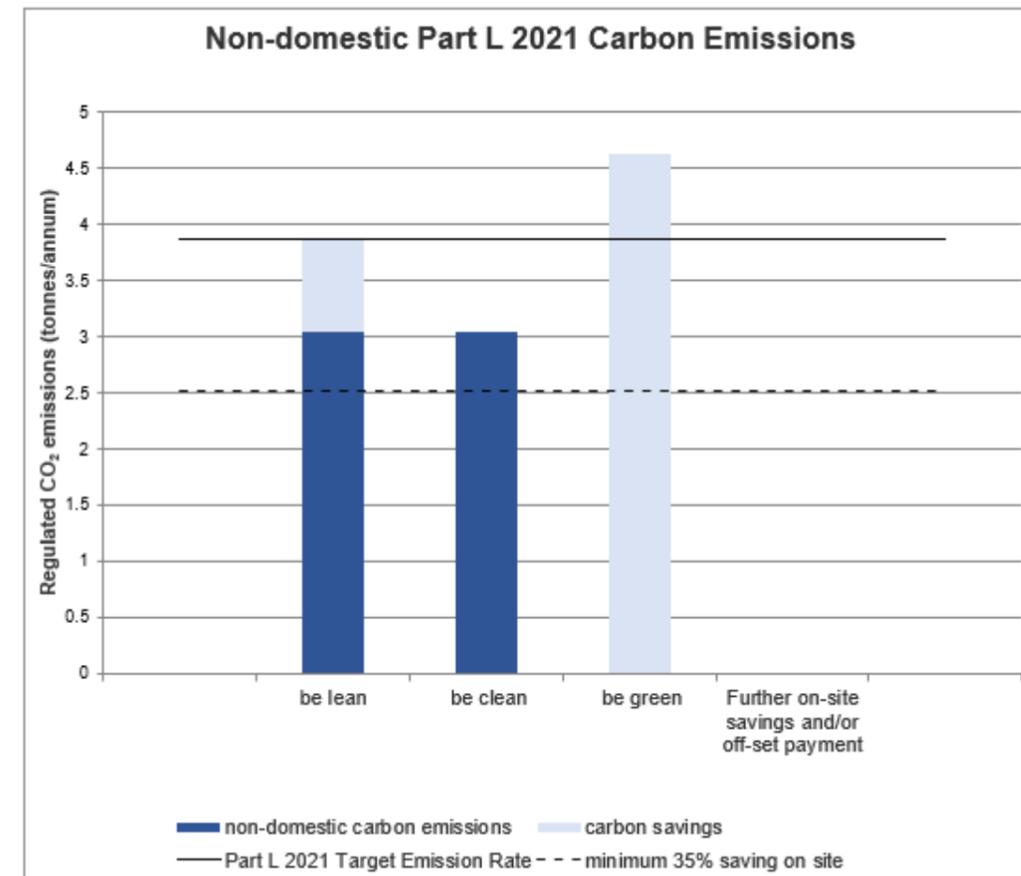
## Appendix D: GLA Energy Hierarchy

Scenario	BER (kgCO <sub>2</sub> /m <sup>2</sup> /yr)	Emissions	Cumulative Improvement
Baseline	3.47	3.9	Baseline
Be Lean	2.73	3.2	21%
Be Clean	2.73	3.2	21%
Be Green	-1.42	-1.6	120%
Total Savings	-	-1.6	141%

Building Use	Model Area (m <sup>2</sup> )	Number of units	Total area represented by model (m <sup>2</sup> )	Baseline		'Be Lean'	'Be Clean'	'Be Green'
				BRUKL TER (kgCO <sub>2</sub> / m <sup>2</sup> )	BRUKL Displaced electricity (-) (kWh / m <sup>2</sup> )	BRUKL BER (kgCO <sub>2</sub> / m <sup>2</sup> )	BRUKL BER (kgCO <sub>2</sub> / m <sup>2</sup> )	BRUKL BER (kgCO <sub>2</sub> / m <sup>2</sup> )
DfE	1116	1	1116	3.47		2.73	2.73	-1.42
<b>Sum</b>		<b>1</b>	<b>1,116</b>	<b>3.5</b>	<b>0.0</b>	<b>2.7</b>	<b>2.7</b>	<b>-1.4</b>
<b>SITE-WIDE ENERGY CONSUMPTION AND CO<sub>2</sub> ANALYSIS</b>								
<b>Total Sum</b>			<b>1,116</b>	-	-	-	-	-

### SITE-WIDE

	Total regulated emissions (Tonnes CO <sub>2</sub> / year)	CO <sub>2</sub> savings (Tonnes CO <sub>2</sub> / year)	Percentage savings (%)
Part L 2021 baseline	3.9		
Be lean	3.0	0.8	21%
Be clean	3.0	0.0	0%
Be green	-1.6	4.6	120%
Total Savings	-	5.5	141%
	-	CO <sub>2</sub> savings off-set (Tonnes CO <sub>2</sub> )	-
Off-set	-	-47.5	-



## Appendix E: GLA Be Lean BRUKL

### BRUKL Output Document HM Government Compliance with England Building Regulations Part L 2021

Project name

**Bexley Rd TLC (Be-Lean)** As designed

Date: Mon Feb 02 18:36:32 2026

#### Administrative information

##### Building Details

Address: LONDON, SE9 2PE

##### Certification tool

Calculation engine: Apache  
Calculation engine version: 7.0.30  
Interface to calculation engine: IES Virtual Environment  
Interface to calculation engine version: 7.0.30  
BRUKL compliance module version: v6.1.e.1

##### Certifier details

Name: AB  
Telephone number: 0116 218 2922  
Address: 23 Rawson Street, Leicester, LE1 6UP

Foundation area [m<sup>2</sup>]: 1139.12

#### The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.47
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	2.73
Target primary energy rate (TPER), kWh <sub>pe</sub> /m <sup>2</sup> annum	36.85
Building primary energy rate (BPER), kWh <sub>pe</sub> /m <sup>2</sup> annum	29
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 <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	First surface with maximum value
Walls*	0.26	0.15	0.15	00000000:Surf[1]
Floors	0.18	0.12	0.12	00000003:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.12	0.12	00000000:Surf[0]
Windows** and roof windows	1.6	1.1	1.1	00000014:Surf[1]
Rooflights***	2.2	1.1	1.1	00000003:Surf[2]
Personnel doors <sup>^</sup>	1.6	1.06	1.1	BX000020:Surf[1]
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<sub>a</sub>-Limit = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]  
U<sub>a</sub>-Calc = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]  
U<sub>i</sub>-Calc = Calculated maximum individual element U-values [W/(m<sup>2</sup>K)]  
\* 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.  
<sup>^</sup> For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K  
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 <sup>3</sup> /(h.m <sup>2</sup> ) 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	NO
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

##### 1- Ln\_02-a\_ASHP\_LTHW-Ceiling Radiant Panels\_NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0.67	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

##### 2- Ln\_01\_ASHP\_HVRs-NVHRs\_APXs

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0	-	0.5
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

##### 3- Ln\_02-b\_ASHP\_LTHW-Ceiling Radiant Panels\_EXTRACT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0.67	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

##### 4- Ln\_03-b\_ASHP\_LTHW-Radiators\_N

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0.2	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

##### 5- Ln\_02-c\_ASHP\_LTHW-Ceiling Radiant Panels\_MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0.67	-	0.8
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

##### 6- Ln\_03-a\_ASHP\_LTHW-Radiators\_MVHRs

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0.2	-	0.8
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

7- Ln\_04-IT Server DX Split Cooling Unit

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	7.25	0	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

8- Ln\_05-Food-Prep-Heating\_AHU-SUP+Hood-EX

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.64	-	0.67	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- 00\_DHW-INSTANT-NO STORAGE

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

2- Ln\_00-1\_DHW (Food Prep)-ASHP-STORAGE (2x300L)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	2.86	0.005
<b>Standard value</b>	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

3- 00-2\_DHW (Cleaners)-ELEC-STORAGE (30L)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	0.022
<b>Standard value</b>	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

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

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
00_Dining	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Vocational Base 02	-	-	-	-	-	-	0.1	-	-	-	-	N/A

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
00_Intimate Dining	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_WC and Shower	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Staff Base / Social	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Staff WC 01	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_WC 02	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_WC 03	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_WC 04	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Calming 01	-	1.5	-	-	-	-	-	-	-	-	-	N/A
00_Calming 02	-	1.5	-	-	-	-	-	-	-	-	-	N/A
00_Multi-Purpose -Room	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Hygiene 01	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Learning Base 02	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Vocational Base 01	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Sensory 01	-	1.5	-	-	-	-	-	-	-	-	-	N/A
00_Medical	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_WC 01	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Caretaker	-	1.5	-	-	-	-	-	-	-	-	-	N/A
00_Staff WC 02	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_AWC 02	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Staff WC 03	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Kitchen	-	-	-	0.7	-	-	-	-	0.6	-	-	N/A
00_Life skills	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Learning Base 01	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_WC 05	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Storage 03 (Cleaners St)	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Breakout / therapy 02	-	-	-	-	-	-	0.1	-	-	-	-	N/A
00_Hygiene 02	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_AWC 01	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00_Multi-Purpose/Therapy	-	1.5	-	-	-	-	-	-	-	-	-	N/A
00_Sensory 02	-	-	-	-	-	-	0.1	-	-	-	-	N/A

Zone name	General lighting and display lighting	General luminaire	Display light source	
		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	<b>Standard value</b>	95	80	0.3
00_Corridor 02		132	-	-
00_Dining		140	-	-
00_Vocational Base 02		135	-	-
00_Corridor 01		132	-	-
00_Intimate Dining		140	-	-
00_WC and Shower		100	-	-
00_Staff Base / Social		135	-	-
00_Corridor 04		132	-	-
00_Reception Desk and Admin office		135	140	0.771

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
00_Managers office		135	-	-
00_Staff WC 01		100	-	-
00_WC 02		100	-	-
00_WC 03		100	-	-
00_WC 04		100	-	-
00_Furniture Storage		142	-	-
00_Kitchen office		135	-	-
00_Storage 01		142	-	-
00_Calming 01		137	-	-
00_Calming 02		137	-	-
00_Multi-Purpose -Room		135	-	-
00_Hygiene 01		140	-	-
00_Learning Base 02		135	-	-
00_Vocational Base 01		135	-	-
00_Sensory 01		137	-	-
00_Medical		140	-	-
00_WC 01		100	-	-
00_Storage 02		142	-	-
00_Heating Plant		140	-	-
00_Caretaker		140	-	-
00_LV Switchroom		140	-	-
00_Staff WC 02		100	-	-
00_Secure Lobby		132	-	-
00_Reception/circulation		135	135	1
00_Advice and Family		135	-	-
00_ICT Server		140	-	-
00_AWC 02		100	-	-
00_Cold watertank room		140	-	-
00_Staff WC 03		100	-	-
00_Storage 06		142	-	-
00_Kitchen		140	-	-
00_Changing		100	-	-
00_Life skills		135	-	-
00_Storage 07		142	-	-
00_Storage 04		142	-	-
00_Learning Base 01		135	-	-
00_WC 05		100	-	-
00_Storage 03 (Cleaners St)		142	-	-
00_Lobby Corridor 01		132	-	-
00_Breakout / therapy 02		137	-	-
00_Hygiene 02		140	-	-
00_AWC 01		100	-	-
00_Corridor 03		132	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
00_Multi-Purpose/Therapy		137	-	-
00_Storage 05		142	-	-
00_Sensory 02		137	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_Dining	NO (-33.3%)	YES
00_Vocational Base 02	NO (-72.4%)	YES
00_Intimate Dining	NO (-77.3%)	YES
00_Staff Base / Social	NO (-62.9%)	YES
00_Reception Desk and Admin office	NO (-69.7%)	NO
00_Managers office	NO (-73.5%)	NO
00_Furniture Storage	N/A	N/A
00_Kitchen office	NO (-72.4%)	NO
00_Storage 01	N/A	N/A
00_Calming 01	NO (-64.9%)	YES
00_Calming 02	NO (-64.5%)	YES
00_Multi-Purpose -Room	NO (-18.7%)	YES
00_Hygiene 01	N/A	N/A
00_Learning Base 02	NO (-38.9%)	YES
00_Vocational Base 01	NO (-72%)	YES
00_Sensory 01	N/A	N/A
00_Medical	NO (-59.5%)	YES
00_Storage 02	N/A	N/A
00_Caretaker	N/A	N/A
00_Reception/circulation	NO (-86.8%)	NO
00_Advice and Family	NO (-75.7%)	NO
00_ICT Server	N/A	N/A
00_Storage 06	N/A	N/A
00_Life skills	NO (-64.6%)	YES
00_Storage 07	NO (-99.9%)	NO
00_Storage 04	N/A	N/A
00_Learning Base 01	NO (-38.7%)	YES
00_Breakout / therapy 02	NO (-31.4%)	YES
00_Hygiene 02	N/A	N/A
00_Multi-Purpose/Therapy	NO (-98.3%)	NO
00_Storage 05	N/A	N/A
00_Sensory 02	NO (-39%)	YES

**Regulation 25A: Consideration of high efficiency 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?	YES
Are any such measures included in the proposed design?	YES

### Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Floor area [m <sup>2</sup> ]	1116	1116		Retail/Financial and Professional Services
External area [m <sup>2</sup> ]	2778.5	2778.5		Restaurants and Cafes/Drinking Establishments/Takeaways
Weather	LON	LON		Offices and Workshop Businesses
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	3	3		General Industrial and Special Industrial Groups
Average conductance [W/K]	508.6	645.81		Storage or Distribution
Average U-value [W/m <sup>2</sup> K]	0.18	0.23		Hotels
Alpha value* [%]	15.69	10		Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				
				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
			99	<b>Non-residential Institutions: Education</b>
				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
			1	<b>Others: Miscellaneous 24hr Activities</b>
				Others: Car Parks 24 hrs
				Others: Stand Alone Utility Block

### Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	5.24	6.81
Cooling	0.65	0.57
Auxiliary	1.68	2.87
Lighting	2.97	6.83
Hot water	8.53	7.58
Equipment*	36.41	36.41
<b>TOTAL**</b>	<b>19.09</b>	<b>24.64</b>

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

### Energy Production by Technology [kWh/m<sup>2</sup>]

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

### Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	56.35	77.54
Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ]	29	36.85
Total emissions [kg/m <sup>2</sup> ]	2.73	3.47

### 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
<b>[ST] Other local room heater - fanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	49.2	0	6.1	0	0.3	2.22	0	2.64	0
Notional	108.5	0	10.8	0	2.8	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	36	0	4	0	1.1	2.48	0	2.64	0
Notional	32.3	0	3.2	0	1.1	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	46.6	0	5.2	0	11.1	2.48	0	2.64	0
Notional	42.7	0	4.3	0	13.1	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	57.6	0	6.5	0	4.3	2.48	0	2.64	0
Notional	47.1	0	4.7	0	1.5	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	0.3	0	0	0	4.3	2.48	0	2.64	0
Notional	7	0	0.7	0	1.5	2.78	0	---	---
<b>[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	82.4	0	9.2	0	0.6	2.48	0	2.64	0
Notional	70	0	7	0	0.6	2.78	0	---	---
<b>[ST] Single room cooling system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	0	1403.2	0	71.9	0	2.59	5.42	2.64	7.25
Notional	0	1046.5	0	62.8	0	2.78	4.63	---	---
<b>[ST] Other local room heater - fanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
Actual	90.7	0	11.3	0	4.6	2.22	0	2.64	0
Notional	8.1	0	0.8	0	2.2	2.78	0	---	---
<b>[ST] No Heating or Cooling</b>									
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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