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Energy Strategy

Potters Bar

12618

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1. Executive Summary

This Energy Assessment has been prepared by Whitecode Consulting Ltd on behalf of Chase New Homes ('the Applicant') in support of an application for full planning permission for the development of Potters Bar ('the Site'), within the Borough of Hertsmere.

The development is the partial demolition of existing buildings (with retention of existing two-storey car park and substation) and redevelopment of the site to provide a mixed-use development comprising residential apartments (Class C3) and flexible commercial floorspace (Class E) across 4 Blocks and associated internal roads, parking, drainage, landscaping, amenity space and associated works.

The creation of four residential blocks (A, B, D & E) located around central courtyards and ranging between 4 – 15 storeys in height.

The new build residential dwellings have been assessed against Part L1A 2021 of the Building Regulations using the Standard Assessment Procedure (SAP) 10.2 methodology. The non-residential elements have been assessed under Part L2A 2021 of the Building Regulations using SBEM methodology and IESVE software. The strategy outlines the proposed energy strategy for the site following the energy hierarchy Be Lean – Be Clean – Be Green.

Energy efficiency is the first stage of the energy hierarchy. Energy demand should be reduced as far as possible before the heating strategy and installation of low-carbon and renewable technologies is considered. This is important in protecting consumers from high prices.

This report concludes that the proposed **site-wide** development will achieve a 66% improvement over Part L 2021 of the Building Regulations.

The report follows the energy hierarchy to ensure a carbon reduction is achieved on site as follows.



- **Be Lean** – improved building fabric specification to exceed that of the notional building, low air permeability target, thermal bridging details and selection of energy efficient services
- **Be Clean** – connection to a district heat network and installation of Combined Heat and Power (CHP) has been investigated for the site and no existing networks are available
- **Be Green** – heat pump hot water cylinders are to be installed to apartments

This report concludes that the proposed development will achieve a **66% improvement** over Part L 2021 of the Building Regulations.

The following tables demonstrate the overall reduction in regulated carbon emissions of the development after each stage of the energy hierarchy.

	Carbon dioxide emissions for domestic buildings (tonnes CO ₂ per annum)	Carbon dioxide emissions for non-domestic buildings (tonnes CO ₂ per annum)
Baseline: Part L 2021	257	13.5
After energy demand reduction (be lean)	239	12.5
After heat network/CHP (be clean)	239	12.5
After renewable energy (be green)	79.4	12.4

Table 1.1: Carbon emissions after each stage of the energy hierarchy

	Regulated domestic carbon dioxide savings		Regulated non-domestic carbon dioxide savings	
	(tonnes CO ₂ per annum)	(%)	(tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	18	7%	1	7%
Be clean: savings from heat network/CHP	0	0%	0	0%
Be green: savings from renewable energy	159.6	62%	0.1	1%
Cumulative on-site savings	177.6	69%	1.1	8%
Annual saving from off-set payment	79.4	-	12.4	-
(tonnes CO ₂)				
Cumulative savings for off-set	2,383	-	372	-
Cash in-lieu contribution (£)	226,351	-	35,331	-

Table 1.2: Regulated carbons savings after each stage of the energy hierarchy

	Total regulated emissions (tonnes CO ₂ /year)	CO ₂ /year (tonnes CO ₂ /year)	Percentage saving (%)
Part L 2021 baseline	270.5		
Be lean	251.6	18.9	7%
Be clean	251.6	0	0%
Be green	91.8	159.8	59%
Total savings	-	178.7	66%
	-	CO ₂ savings offset (tonnes CO ₂)	-
Off-set	-	2,754.5	-

Table 1.3: Site wide carbon savings

2. Introduction

The purpose of this report is to show how the client can address the relevant energy conditions for the proposed development located at Potters Bar. These conditions are highlighted below.

2.1. National Planning Policy and Targets

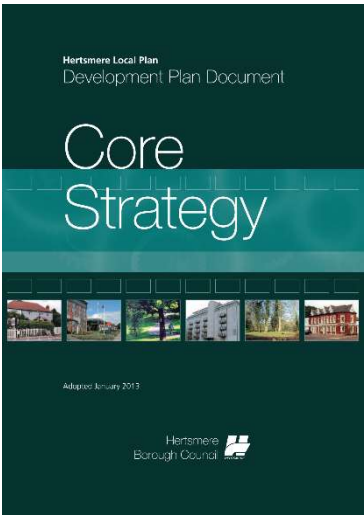
The proposed development will be constructed to be compliant with Part L 2021 of the Building Regulations. The proposed development consists of new build dwellings, under Part L 2021 of the Building Regulations. They mandate that the design of the building demonstrably causes lower carbon dioxide (CO₂) emissions than a notional equivalent of given specifications.

The National Planning Policy Framework (NPPF) was updated in February 2025, which re-emphasises the Government's commitment to sustainable development and states the need for planning authorities to take an approach based on integrating the four aims of sustainable development. The document also refers to the Government's energy policies and objectives. It sets out key principles that regional planning bodies and local planning authorities should adhere to in their approach to planning for renewable energy.

2.2. Local Planning Policies

The proposed development lies in Hertsmere; therefore, the applicable Local Planning Policy is the Local Plan 2012-2027 Core Strategy (adopted January 2013). The Draft Local Plan (2026) is under early public consultation for initial ideas and no further information have been provided.

The planning policies of relevance to energy and sustainability in the Local Plan are as follows:



- o Policy CS12: The Enhancement of the Natural Environment
- o Policy CS14: Protection or Enhancement of Heritage Assets
- o Policy CS16: Environmental Impact of the Development
- o Policy CS17: Energy and CO₂ Reductions
- o Policy CS25: Accessibility and Parking
- o Policy CS26: Promoting Alternatives to the Car

A Draft Carbon Offsetting Supplementary Planning Document (September 2022), adopted as interim guidance on 15 September 2022, explains how Hertsmere LPA will apply existing development plan policies until a new Local Plan is in place. It requires developments above the carbon threshold (more than five residential units) to assess and minimise both embodied and operational carbon emissions through a Whole Life Carbon Assessment (WLCA). Any remaining carbon emissions should then be offset, typically via a contribution to the Carbon Offset Fund (COF). Whilst Hertsmere is not enforcing the Carbon Offsetting SPD until the new Local Plan has been adopted, applicants are expected take this into consideration.

Energy use should be prioritised in line with the Energy Hierarchy. The first priority is to be lean. This is to ensure less overall energy use with good building design and high energy efficiency using passive design measures, such as building orientation, internal and external building layout, and the size and location of windows.

The second priority is to be clean; to use energy that is supplied efficiently. Developments should consider connecting to decentralised energy networks (energy generated off the energy grid). This can include technologies such as solar energy and water, heat pumps, biomass-fuelled energy generation and larger-scale schemes, such as Combined Heat and Power (CHP) systems.

The final priority is to be green and use renewable low or zero carbon energy sources. To reduce the impact on the environment and contribute towards the borough becoming carbon neutral, energy generation using sustainable sources is strongly encouraged.

2.3. The Development

The Development is for the partial demolition of existing buildings (with retention of existing two-storey car park and substation) and redevelopment of the site to provide a mixed-use development comprising residential apartments (Class C3) and flexible commercial floorspace (Class E) across 4 Blocks and associated internal roads, parking, drainage, landscaping, amenity space and associated works.

The creation of four residential blocks (A, B, D & E) located around central courtyards and ranging between 4 – 15 storeys in height.

The dwellings have been modelled using the Standard Assessment Procedure (SAP) 10.2 methodology. The commercial units have been modelled using Dynamic Simulation Modelling (DSM) in IESVE.



Figure 2.1 Proposed Site Plan

The site consists of:

- 1,742 sqm flexible Class E
- 293 residential units
 - 14 x studio
 - 83 x 1-bed
 - 150 x 2-bed
 - 46 x 3-bed

3. Baseline Energy Consumption & Carbon Emissions

An assessment of the site's potential energy use was conducted in compliance with the minimum requirements of Part L1A 2021 of the Building Regulations.

The energy assessment must first establish the regulated CO₂ emissions baseline assuming the development complied with Part L 2021 of the Building Regulations using Building Regulations approved compliance software.

Regulated energy is calculated as follows:

Residential: Dwelling CO₂ Emissions Rates (DER) have been calculated through Part L 2021 of the Building Regulations methodology SAP 10.2. A representative sample of dwellings has been selected to model covering all unit types, orientations and floor levels.

Non-residential: Building CO₂ Emissions Rates (BER) have been calculated through Part L 2021 of the Building Regulations methodology based on the National Calculation Methodology (NCM) and implemented through Dynamic Simulation Modelling (DSM) v7.0.21

To determine the CO₂ emissions baseline, the Target Emission Rate (TER) from the Be Lean model is used.

Regulated carbon dioxide emissions (tonnes CO ₂ per annum)	Site wide
Baseline: Part L 2021 of the Building Regulations compliant development	270.5

Table 3.1 Baseline carbon emissions

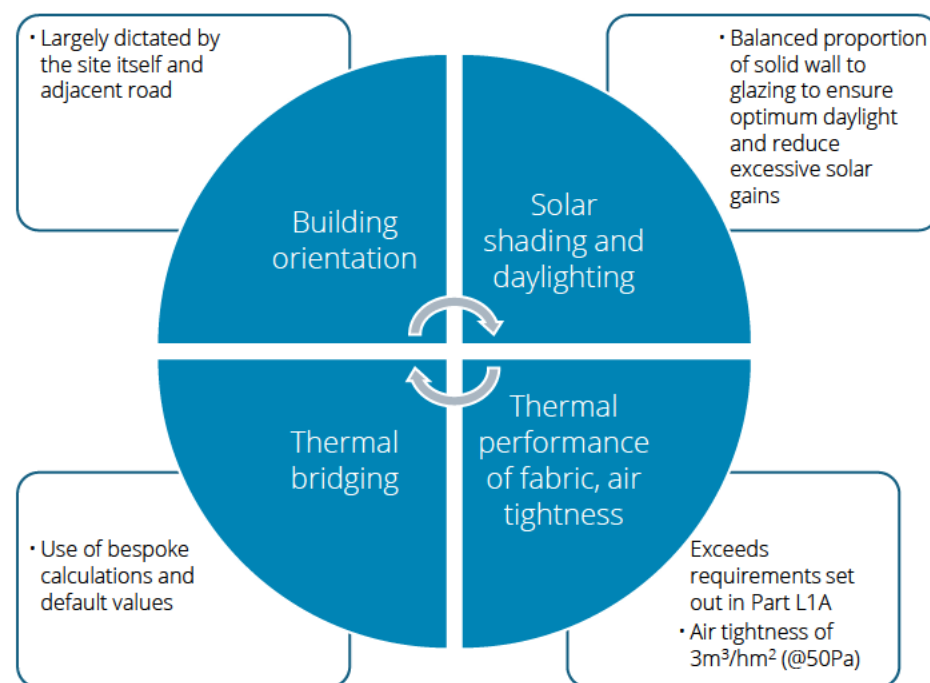
4. 'Be Lean' – Energy Efficient Design

An assessment of the site's potential energy use was conducted in compliance with the minimum requirements of Part L1 2021 of the Building Regulations.

Local planning guidelines require a reduction in the CO2 emissions of the proposed scheme by energy-efficient measures. A number of energy-efficient measures are considered below.

4.1. Passive Design Measures

Passive design measures involve adapting building massing, layout and glazing to best respond to the local climate and annual sun path in order to reduce energy demands.



The table 4.1 shows the proposed building fabric against Part L of the Building Regulations. Blocks A, B, and D are proposed to utilise a steel frame external wall construction, while Block E will be constructed using a traditional brick and block build up. Approximately 50% of heat is lost through the fabric of a building. This includes walls, floors, windows, roofs and the thermal bridges connecting them. The remaining 50% is lost through uncontrolled ventilation through gaps around doors, windows, and any service penetrations.

Element:	Part L 2021 Limiting Values (W/m2K)	Domestic design u-values (W/m2K)	Non-domestic design u-values (W/m2K)
Ground floor	0.18	0.10	0.10
Exposed floor	0.18	0.13	n/a
External Wall (Block E)	0.26	0.18	0.18
External Wall (Blocks A, B, C, D)	0.26	0.15	0.15
Communal Walls	0.26	0.18	0.15
Roof	0.16	0.11	0.11
Front Doors	1.60	1.20	n/a
Glazing	1.60	1.20	1.0 (includes glazed front doors)
Glazing frame factor	N/A	20%	10%
Glazing g-value	N/A	0.40	0.45
Air Permeability Rate	8 m³/hm² (@50Pa)	3 m³/hm² (@50Pa)	3 m³/hm² (@50Pa)

Table 4.1 Proposed U-values

A thermal bridge, also called a cold bridge, is an area of a building construction which has a significantly higher heat transfer than the surrounding materials. This is typically where there is either a break in the insulation, less insulation or the insulation is penetrated by an element with a higher thermal conductivity. Where the building is situated in a cold climate (such as the UK) this can result in additional heat loss at these points.

Around 30% of the total heat loss through a building's fabric can be caused by thermal bridging. Indications are that better detailing and improved air tightness can reduce a dwelling's annual CO2 emissions by up to 10%.

This development will use a range of default construction details as well as bespoke calculations for the psi values.

Thermal bridge	SFS target psi value	Brick and Block target psi value
E2, Lintel	0.05	0.024
E3, Sill	0.05	0.022
E4, Jamb	0.05	0.017
E5, Ground floor	0.20	0.089
E20, Exposed floor	0.16	0.069
E7, Intermediate floor	0.07	0.037
E23, Balcony	0.20	0.200
E14, Flat roof	Default	Default
E15, Parapet	Default	Default
E16, Corner	0.09	0.046
E17, Inverted corner	Default	-0.088
E18, Party corner	0.07	0.040
E25, Staggered corner	0.07	0.030
P1, Party ground floor	0.16	0.108
P3, Party floor	Default	Default
P7, Party exposed floor	0.10	0.240
P4, Party roof	0.10	0.101

Table 4.2 Proposed psi values

4.2. Active Design Measures

After addressing the passive design measures the next step is to use energy efficient building services, lighting, and controls throughout the scheme to reduce fuel consumption.

Space heating and hot water

- Apartments: Electric panels heaters and heat pump hot water cylinders
- Class E Units: VRF system (heat pump) and instantaneous hot water

Ventilation

- The apartments will be provided with mechanical ventilation with heat recovery (MVHR) with purge fans to all plots to assist with reducing the risk of overheating (due to acoustic restrictions)
- Non-domestic spaces are proposed ventilation with heat recovery.

Building services insulation

- All building services, tanks, pipes and ducts will be insulated to a high standard.

Lighting

- Internal lighting has a significant impact on the Dwelling Emission Rate (DER). Therefore, it is recommended that 100% of all internal light fittings will be low energy in order to reduce CO₂ emissions and the overall energy used (typical tungsten bulbs can use up to 300% more energy).
- Lighting in residential has assumed to be LED / CFL (Lm/W = 75)
- Lighting in commercial 110lm/cW, auto on-off for WC and storage

4.3. Be Lean Results

A sample of SAP calculations have been carried out for the proposed development using the 'Be Lean' specification outlined previously.

There has been a 7% reduction in domestic carbon emissions at 'Be Lean' stage due to the passive and active energy efficiency measures listed above.

Regulated carbon dioxide emissions (tonnes CO ₂ per annum)	Domestic tonnes CO ₂ per annum
Baseline: Part L 2021 of the Building Regulations compliant development	257
After energy demand reduction (be lean)	239
Carbon savings over baseline	18
Carbon reduction over baseline	7%

Table 4.3: Be Lean results

5. Cooling Due to Potential Summer Overheating

5.1. Cooling Hierarchy

The cooling hierarchy has been followed in order to reduce the demand for cooling. The following categories have been considered:

1. [Minimising internal heat generation through energy efficient design](#) – minimised heat distribution infrastructure within the buildings.
2. [Reducing the amount of heat entering the building during summer](#) – the location, proportion and specification of the glazing should aim to balance natural light and 'beneficial' solar gain whilst ensuring that levels of heat gain are not excessive.
3. [Use of thermal mass and high ceilings to manage heat within the building](#) – higher thermal mass construction enables heat to be absorbed in the day and then released at night, however, a balance must be struck. Lightweight structures without the energy-absorption potential are often at risk of overheating.
4. [Passive ventilation](#) – providing openable windows to allow natural ventilation and night-time cooling to comply with Part F of the Building Regulations. Low temperature air from external is allowed into the building during the night and circulates throughout the building cooling the building fabric.
5. [Mechanical ventilation](#) – MVHR with purge fans are specified to mitigate overheating risk due to acoustic restrictions.

The scheme has been designed in line with the cooling hierarchy above and has been investigated for compliance with Part O. This has been investigated in an accompanying overheating report.

6. 'Be Clean' – Heating Infrastructure

6.1. District Heating – Connection to Existing Scheme

The site has been investigated for connection to an existing or proposed heat network, in line with the heating hierarchy.

There are no local heat networks in the area for connection.

Due to the lack of an available network nearby connection to an existing district heating network was deemed unfeasible. The embodied carbon associated with installing a heat network on the site would be significantly higher than installing individual systems. In order to keep the efficiency of the heat pumps at their maximum it is recommended that individual heat pumps are more appropriate for the site.

Highly efficient heat pumps are proposed for the hot water for the apartments. This is explored in the 'Be Green' section.

6.2. 'Be Clean' Results

Since there are no changes proposed, the 'be clean' results are identical to those at the end of the 'be lean' stage.

7. 'Be Green' – Renewable Energy

7.1. Heat Pumps

Heat pumps collect low-temperature heat from renewable sources and “concentrate” it to a usable temperature. Grid electricity is generally required to operate the pumps and the renewable component of the output is therefore by convention taken as the difference between the output energy and the input energy.

With the decarbonisation of the grid, the carbon factor associated with electricity is much lower, as we rely more heavily on renewable sources such as wind power, over fossil fuel fired power stations. This makes heat pumps a low carbon energy source. A typical heat pump will deliver 4-5 kWh of useful energy for every 1 kWh of input energy. A heat pump operating in this way can therefore be deemed to have delivered 3-4 kWh of renewable energy.

Air Source Hot Water Cylinders have been identified as the most appropriate technology for the hot water for the apartments. Using a reverse refrigeration cycle, it extracts ambient heat from the air to rapidly heat water with minimal environmental impact.

The units have been designed to ensure there are minimal heat losses through a fabric first approach and low air permeability target.

7.2. 'Be Green' Results

A sample of SAP calculations for the dwellings and Dynamic Simulation Modelling (DSM) for the non-domestic areas have been completed using the 'Be Green' specification of air source heat pumps, to achieve a 66% carbon reduction on site.

	Carbon dioxide emissions (tonnes CO ₂ per annum)
	Domestic
Baseline: Part L 2021 of the Building Regulations compliant development	270.5
After renewable energy (be green)	91.8
% carbon reduction	66%

Table 7.1 Sitewide carbon savings

8. Conclusion

This energy strategy outlines the key features and strategies adopted by the design team to reduce energy use and carbon emissions for the scheme. It demonstrates compliance with the building regulations Part L1A, Part L2A and Part L2B, as well as the Hertsmere Local Plan.

The strategy for reducing energy and associated carbon emissions follows the energy hierarchy:

- Be Lean** – improved building fabric specification to exceed that of the notional building, low air permeability target, thermal bridging details and selection of energy efficient services
- Be Clean** – connection to a district heat network and installation of Combined Heat and Power (CHP) have been investigated for the site and have not been deemed either available or appropriate at this time.
- Be Green** – heat pump hot water cylinders are to be installed to apartments

This report concludes that the proposed development at Potters Bar will achieve a 66% improvement over Part L1 2021 of the Building Regulations.

The final specification to meet the 66% carbon reduction on site is as follows:

	Specification	
	Domestic - apartments	Non-domestic
Heating	Direct electric	VRF
Hot water	Air source (heat pump) hot water cylinder	Instantaneous hot water
Emitter	Underfloor	VRF
Cooling	N/A	VRF
Ventilation	MVHR with purge fans	Mechanical ventilation with heat recovery
Lighting	100% low energy 75lm/cW	100% low energy 110lm/cW

Table 8.1 Summary of specification to meet the building regulations

Appendix A – Renewable Energy Considerations

Solar hot water heating

Solar water heating is an excellent renewable energy source as it can cater for almost 80% of the hot water load of a dwelling. A South facing 1m² highly efficient evacuated tube solar array will provide approximately 520-850kWh/m²/year of hot water, saving approximately 103kgCO₂ /m²/year. Depending on the system size, type and nature of installation solar water heating can cost approximately £1,000/m².

For a block of apartments there are a number of design complications. If solar water heating systems are required to serve residential units other than those on the top floor, there is the requirement for long runs of pipework to serve them. This results in access issues, adds to the long-term maintenance of the system and reduces efficiencies due to pipe losses.

Also, if a communal system is to be implemented, then a buffer vessel, expansion vessels and commercial pumps will be required, all of which require a large amount of plant space and maintenance. Within the residential units themselves, a large solar hot water cylinder will be required.

There is sufficient space on the roof of the development to install solar hot water panels, however the carbon saving and overall benefit to the development is limited. Therefore, this technology has been considered as not feasible for the proposed development.

Wind turbines

Wind turbines convert the wind's kinetic energy into electrical power. They can be building mounted or free-standing. Where large wind turbines work they can deliver the best CO₂ emission savings for the initial investment.

The installation of a large wind turbine at Stoke Road, Hoo is practically impossible, as there is no available space to position or mount such a large piece of equipment. Opting for smaller roof-mounted turbines, such as those manufactured by Quiet Revolution (which are more aesthetically pleasing) could be an option.

A typical 6kW large turbine in a suburban environment could generate 6,765kWh/year and hence save 3,843kgCO₂/year. 6 turbines are required to achieve the 20% renewables target, and with a minimum of 10m

between each turbine this would account for a significant alteration to the development. A 6kW turbine can cost between £21,000-£30,000, equating to an estimated total cost of £150,000 for the proposed development.

Due to the space required for both pole-mounted and building-mounted wind turbines this type of technology is considered as not feasible for the proposed development. They can also cause “flickering” to neighbouring buildings which can cause discomfort.

Biomass boiler

Whilst traditionally most suited to lower density situations (mainly due to the supply and storage of the fuel), more high-density developments are considering this technology. A biomass boiler is best incorporated within a district heating scheme. However, there are issues regarding fuel storage and air pollution.

A separate area would be required for the fuel store. Woodchip is the preferred fuel as opposed to pellets due to the embedded energy involved in transporting pellets from the continent – there are doubts as to whether wood pellets are in fact a carbon-neutral fuel. Woodchips can be sourced locally and therefore are more readily available, as well as being more carbon-friendly. The store would need to be adjacent to the plant room where the biomass boiler is located.

This type of technology is considered as not feasible for Stoke Road, Hoo as there is not sufficient space required for the boiler and the delivery and storage of fuel and waste ash. The use of biomass fuel would also release high levels of NO_x emissions, impacting on the local air quality.

Ground source heat pump

Ground Source Heat Pumps (GSHPs) absorb heat from the ground at low temperatures into a fluid inside a loop of pipe buried underground. This fluid then passes through a compressor that raises it to a higher temperature used for heating the water for the space heating and hot water circuits. GSHPs perform better when connected to heating systems that have been specifically designed for low temperature hot water.

GSHP's can provide very high efficiencies, with COP's over 5 in most applications. It also removed the need for roof plant located at roof level.

The pipe in the ground can be buried horizontally or vertically. They cannot be placed underneath the building or an impermeable area, due to heat transfer and access requirements. A 50m x 1.5m horizontal loop trench can produce 39,600kWh/year of heat, saving approximately 7,680kgCO₂/year, depending on the suitability of the ground in the local area.

Vertical loop systems also require a lot of space, especially for the drilling equipment to produce the borehole. Boreholes are also very expensive costing between £16,000 to £20,000 per borehole.

Due to the location of the proposed development and limited space required for this type of technology, GSHPs are considered as not feasible.

Some other reasons why these are not suitable for the development are as follows. Ground source heat pumps can cause energy in-balance within the ground. This basically means that if there is a local site also being developed with ground source heat pumps, then it could absorb all the heat and not allow enough heat for this site. The environmental agency could restrict the ground use at any time, meaning you cannot extract energy from the scheme. The boreholes would require significant coordination between all below ground services, landscape, structure, TFL services, etc.

The system would require specialist design to ensure the system is balanced with the environmental injection and abstraction of the ground. Very expensive dig costs, installation, equipment, and maintenance required.

Appendix B – SAP Outputs

Summary for Input Data

Plot Reference	BB 1 bed W GF	Issued on Date	18/06/2026
Assessment Reference	BB 1 bed W GF	Plot Type Ref	Flat 82
Plot Address	Flat 82	SAP Version	10.2

SAP Rating	85 B	DER	4.60	TER	15.12
Environmental	97 A	% DER < TER			69.58
CO ₂ Emissions (t/year)	0.2	DFEE	30.42	TFEE	33.85
Compliance Check	See BREL	% DFEE < TFEE			10.12
% DPER < TPER	41.75	DPER	47.94	TPER	82.30

Assessor Details		Assessor ID	V831-0001
Client	Pentland Homes, Pentland Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2026
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	0.00 kJ/m ² K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter 16.30 m	Internal Floor Area 54.28 m ²	Average Storey Height 2.50 m
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8.0 Living Area	29.60 m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall brick	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	17.24	8.91	0.00	None	8.33	Enter Gross Area
Communal wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	28.11	26.22	0.00	None	1.89	Enter Gross Area
External Wall column	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	0.70	0.70	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill	0.00	140.00	44.69	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	107.30

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	54.28

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
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Summary for Input Data

Ground floor Ground Floor - Solid Lowest occupied Slab on ground, screed over insulation 0.10 None 0.00 110.00 54.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.40		0.80	1.20
Int door	Manufacturer	Door to Corridor				0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Int door	Int door	Communal wall	West	1.89	
W1 - E	Window	External Wall brick	East	8.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.51	0.02	0.02	No
E4 Jamb	Independently assessed	13.40	0.02	0.02	No
E5 Ground floor (normal)	Independently assessed	16.30	0.09	0.09	No
E18 Party wall between dwellings	Independently assessed	8.49	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.30	0.04	0.04	No
E16 Corner (normal)	Independently assessed	5.65	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.65	-0.09	-0.09	No
P1 Party wall - Ground floor	Independently assessed	15.82	0.11	0.11	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
E25 Staggered party wall between dwellings	Independently assessed	2.83	0.03	0.03	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500140
Configuration	1
Manufacturer SFP	0.76
Duct Type	Rigid
MVHR Efficiency	91.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 2

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀ 3.00 m³/(h.m²) @ 50 Pa

Summary for Input Data

Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	10.00	750.00	15

24.0 Main Heating 1

SAP table

Percentage of Heat %

Fuel Type

SAP Code

Controls SAP Code

25.0 Main Heating 2

Database

Percentage of Heat %

Database Ref. No.

Fuel Type

Model Name

Manufacturer

Controls

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

Immersion Only Heating Hot Water

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
1	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Internal Store

Insulation Type

Cylinder Volume L

Loss kWh/day

34.0 Small-scale Hydro

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures
None

Further measures to achieve even higher standards
None

Summary for Input Data

Plot Reference	BB 1 bed W GF	Issued on Date	18/06/2026
Assessment Reference	BB 1 bed W GF	Plot Type Ref	Flat 82
Plot Address	Flat 82	SAP Version	10.2

SAP Rating	83 B	DER	14.61	TER	15.81
Environmental	90 B	% DER < TER			7.59
CO ₂ Emissions (t/year)	0.73	DFEE	30.42	TFEE	33.85
Compliance Check	See BREL	% DFEE < TFEE			10.12
% DPER < TPER	1.96	DPER	84.29	TPER	85.98

Assessor Details		Assessor ID	V831-0001
Client	Pentland Homes, Pentland Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2026
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	0.00 kJ/m²K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter 16.30 m	Internal Floor Area 54.28 m²	Average Storey Height 2.50 m
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8.0 Living Area	29.60 m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall brick	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	17.24	8.91	0.00	None	8.33	Enter Gross Area
Communal wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	28.11	26.22	0.00	None	1.89	Enter Gross Area
External Wall column	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	0.70	0.70	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill	0.00	140.00	44.69	0.00	None

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	107.30

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	54.28

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
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Summary for Input Data

Ground floor Ground Floor - Solid Lowest occupied Slab on ground, screed over insulation 0.10 None 0.00 110.00 54.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.40		0.80	1.20
Int door	Manufacturer	Door to Corridor				0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Int door	Int door	Communal wall	West	1.89	
W1 - E	Window	External Wall brick	East	8.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.51	0.02	0.02	No
E4 Jamb	Independently assessed	13.40	0.02	0.02	No
E5 Ground floor (normal)	Independently assessed	16.30	0.09	0.09	No
E18 Party wall between dwellings	Independently assessed	8.49	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.30	0.04	0.04	No
E16 Corner (normal)	Independently assessed	5.65	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.65	-0.09	-0.09	No
P1 Party wall - Ground floor	Independently assessed	15.82	0.11	0.11	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
E25 Staggered party wall between dwellings	Independently assessed	2.83	0.03	0.03	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500140
Configuration	1
Manufacturer SFP	0.76
Duct Type	Rigid
MVHR Efficiency	91.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 2

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀ 3.00 m³/(h.m²) @ 50 Pa

Summary for Input Data

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name
Lighting 1

Efficacy
75.00

Power
10.00

Capacity
750.00

Count
15

24.0 Main Heating 1

Manufacturer

Percentage of Heat

100.00

%

Fuel Type

Mains gas

SAP Code

113

In Winter

88.90

In Summer

80.30

Model Name

tbc

Manufacturer

tbc

Controls SAP Code

2105

Delayed Start Stat

Yes

Burner Control

Modulating

Flue Type

None or Unknown

Fan Assisted Flue

No

Is MHS Pumped

Pump in heated space

Heating Pump Age

2013 or later

Heat Emitter

Underfloor

Underfloor Heating

Yes - Pipes in Wood

Flow Temperature

Enter value

Flow Temperature Value

45.00

Boiler Interlock

Yes

Combi boiler type

Standard Combi

Combi keep hot type

None

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating

Main Heating 1

SAP Code

901

Flue Gas Heat Recovery System

No

Waste Water Heat Recovery Instantaneous System 1

No

Waste Water Heat Recovery Instantaneous System 2

No

Waste Water Heat Recovery Storage System

No

Solar Panel

No

Water use <= 125 litres/person/day

Yes

Cold Water Source

From mains

Bath Count

1

28.1 Showers

Description

Shower Type

Flow Rate
[l/min]

Rated Power
[kW]

Connected

Connected To

1

Combi boiler or unvented hot water system

8.00

No

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

None

Summary for Input Data



34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Summary for Input Data

Plot Reference	BB 1 bed W Mid	Issued on Date	18/06/2026
Assessment Reference	BB 1 bed W Mid	Plot Type Ref	Flat 82
Plot Address	Flat 82	SAP Version	10.2

SAP Rating	89 B	DER	3.47	TER	12.94
Environmental	98 A	% DER < TER			73.18
CO ₂ Emissions (t/year)	0.15	DFEE	22.19	TFEE	23.52
Compliance Check	See BREL	% DFEE < TFEE			5.65
% DPER < TPER	48.18	DPER	36.56	TPER	70.54

Assessor Details		Assessor ID	V831-0001
Client	Pentland Homes, Pentland Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Mid-floor flat
Which Floor	5
2.0 Number of Storeys	1
3.0 Date Built	2026
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	0.00 kJ/m²K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter 16.30 m	Internal Floor Area 54.28 m²	Average Storey Height 2.50 m
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8.0 Living Area	29.60 m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall brick	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	17.24	8.91	0.00	None	8.33	Enter Gross Area
Communal wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	28.11	26.22	0.00	None	1.89	Enter Gross Area
External Wall column	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	0.70	0.70	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill	0.00	140.00	44.69	0.00	None

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	107.30

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	54.28

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
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Summary for Input Data

Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 54.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.40		0.80	1.20
Int door	Manufacturer	Door to Corridor				0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Int door	Int door	Communal wall	West	1.89	
W1 - E	Window	External Wall brick	East	8.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.51	0.02	0.02	No
E4 Jamb	Independently assessed	13.40	0.02	0.02	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.20	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	8.49	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.30	0.04	0.04	No
E16 Corner (normal)	Independently assessed	5.65	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.65	-0.09	-0.09	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
E25 Staggered party wall between dwellings	Independently assessed	2.83	0.03	0.03	No
E9 Balcony between dwellings, wall insulation continuous	Table K1 - Default	3.10	0.15	0.15	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500140
Configuration	1
Manufacturer SFP	0.76
Duct Type	Rigid
MVHR Efficiency	91.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 2

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

No

Summary for Input Data

22.0 Pressure Testing

Designed AP ₅₀	Yes	
Test Method	3.00	m³/(h.m²) @ 50 Pa
	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Lighting 1	75.00	10.00	750.00	15

24.0 Main Heating 1

.0 Main Heating 1		SAP table	
Percentage of Heat	100.00		%
Fuel Type	Electricity		
SAP Code	425		
Controls SAP Code	2704		

25.0 Main Heating 2

10 Main Heating 2	Database	
Percentage of Heat	0.00	%
Database Ref. No.	109583	
Fuel Type	Electricity	
Model Name	HPP200M7	
Manufacturer	Haier	
Controls	2100	

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 2
SAP Code	914
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains
Bath Count	1
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
1	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

0.0 Hot Water Cylinder	Internal Store	
Insulation Type	Measured Loss	
Cylinder Volume	194.00	L
Loss	1.36	kWh/day

34.0 Small-scale Hydro

None											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures	None
Further measures to achieve even higher standards	None

Summary for Input Data

Plot Reference	BB 1 bed W Mid	Issued on Date	18/06/2026
Assessment Reference	BB 1 bed W Mid	Plot Type Ref	Flat 82
Plot Address	Flat 82	SAP Version	10.2

SAP Rating	84 B	DER	13.18	TER	13.52
Environmental	91 B	% DER < TER			2.51
CO ₂ Emissions (t/year)	0.68	DFEE	22.19	TFEE	23.52
Compliance Check	See BREL	% DFEE < TFEE			5.65
% DPER < TPER	-3.96	DPER	76.61	TPER	73.69

Assessor Details		Assessor ID	V831-0001
Client	Pentland Homes, Pentland Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Mid-floor flat
Which Floor	5
2.0 Number of Storeys	1
3.0 Date Built	2026
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	0.00 kJ/m²K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter 16.30 m	Internal Floor Area 54.28 m²	Average Storey Height 2.50 m
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8.0 Living Area	29.60 m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall brick	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	17.24	8.91	0.00	None	8.33	Enter Gross Area
Communal wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	28.11	26.22	0.00	None	1.89	Enter Gross Area
External Wall column	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	0.70	0.70	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill	0.00	140.00	44.69	0.00	None

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	107.30

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	54.28

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
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Summary for Input Data

Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 54.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.40		0.80	1.20
Int door	Manufacturer	Door to Corridor				0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Int door	Int door	Communal wall	West	1.89	
W1 - E	Window	External Wall brick	East	8.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.51	0.02	0.02	No
E4 Jamb	Independently assessed	13.40	0.02	0.02	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.20	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	8.49	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	16.30	0.04	0.04	No
E16 Corner (normal)	Independently assessed	5.65	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.65	-0.09	-0.09	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
E25 Staggered party wall between dwellings	Independently assessed	2.83	0.03	0.03	No
E9 Balcony between dwellings, wall insulation continuous	Table K1 - Default	3.10	0.15	0.15	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500140
Configuration	1
Manufacturer SFP	0.76
Duct Type	Rigid
MVHR Efficiency	91.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 2

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

No

Summary for Input Data

22.0 Pressure Testing

Designed AP ₅₀	Yes	
Test Method	3.00	m³/(h.m²) @ 50 Pa
	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name Lighting 1	Efficacy 75.00	Power 10.00	Capacity 750.00	Count 15

24.0 Main Heating 1

Manufacturer		
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	113	
In Winter	88.90	
In Summer	80.30	
Model Name	tbc	
Manufacturer	tbc	
Controls SAP Code	2105	
Delayed Start Stat	Yes	
Burner Control	Modulating	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Underfloor	
Underfloor Heating	Yes - Pipes in Wood	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
1	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

Summary for Input Data



29.0 Hot Water Cylinder

None

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Summary for Input Data

Plot Reference	BB 1 bed W Top	Issued on Date	18/06/2026
Assessment Reference	BB 1 bed W Top	Plot Type Ref	Flat 82
Plot Address	Flat 82	SAP Version	10.2

SAP Rating	83 B	DER	5.11	TER	15.43
Environmental	97 A	% DER < TER			66.88
CO ₂ Emissions (t/year)	0.22	DFEE	33.47	TFEE	35.01
Compliance Check	See BREL	% DFEE < TFEE			4.39
% DPER < TPER	36.68	DPER	53.14	TPER	83.93

Assessor Details		Assessor ID	V831-0001
Client	Pentland Homes, Pentland Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	10	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	0.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter 16.30 m	Internal Floor Area 54.28 m²	Average Storey Height 2.50 m
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8.0 Living Area	29.60	m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall brick	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	17.24	8.91	0.00	None	8.33	Enter Gross Area
Communal wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	28.11	26.22	0.00	None	1.89	Enter Gross Area
External Wall column	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	0.70	0.70	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill	0.00	140.00	44.69	0.00	None

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	107.30

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Main roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	54.28	54.28	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data



Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete planks floor, screed, carpeted	40.00	54.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.40		0.80	1.20
Int door	Manufacturer	Door to Corridor				0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Int door	Int door	Communal wall	West	1.89	
W1 - E	Window	External Wall brick	East	8.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.51	0.02	0.02	No
E4 Jamb	Independently assessed	13.40	0.02	0.02	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.20	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	8.49	0.04	0.04	No
E14 Flat roof	Table K1 - Default	9.95	0.16	0.16	No
E16 Corner (normal)	Independently assessed	5.65	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.65	-0.09	-0.09	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	15.82	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.83	0.03	0.03	No
E9 Balcony between dwellings, wall insulation continuous	Table K1 - Default	3.10	0.15	0.15	No
E15 Flat roof with parapet	Table K1 - Default	6.35	0.30	0.30	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present: Yes

Approved Installation: No

Mechanical Ventilation data Type: Database

Type: Balanced mechanical ventilation with heat recovery

MV Reference Number: 500140

Configuration: 1

Manufacturer SFP: 0.76

Duct Type: Rigid

MVHR Efficiency: 91.00

Wet Rooms: 1

SFP from Installer Commissioning Certificate: No

MVHR System Location: Inside heated envelope (installed exclusively)

Duct Installation Specification: Level 2

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys: 0

Number of open flues: 0

Number of chimneys/flues attached to closed fire: 0

Number of flues attached to solid fuel boiler: 0

Number of flues attached to other heater: 0

Number of blocked chimneys: 0

Number of intermittent extract fans: 0

Number of passive vents: 0

Number of flueless gas fires: 0

Summary for Input Data

21.0 Fixed Cooling System		No									
22.0 Pressure Testing		Yes									
Designed AP ₅₀		3.00								m ³ /(h.m ²) @ 50 Pa	
Test Method		Blower Door									
22.0 Lighting		No									
No Fixed Lighting		No									
		Name	Efficacy	Power	Capacity	Count					
		Lighting 1	75.00	10.00	750.00	15					
24.0 Main Heating 1		SAP table									
Percentage of Heat		100.00								%	
Fuel Type		Electricity									
SAP Code		425									
Controls SAP Code		2704									
25.0 Main Heating 2		Database									
Percentage of Heat		0.00								%	
Database Ref. No.		109583									
Fuel Type		Electricity									
Model Name		HPP200M7									
Manufacturer		Haier									
Controls		2100									
26.0 Heat Networks		None									
27.0 Secondary Heating		None									
28.0 Water Heating		Main Heating 2									
Water Heating		Main Heating 2									
SAP Code		914									
Flue Gas Heat Recovery System		No									
Waste Water Heat Recovery Instantaneous System 1		No									
Waste Water Heat Recovery Instantaneous System 2		No									
Waste Water Heat Recovery Storage System		No									
Solar Panel		No									
Water use <= 125 litres/person/day		Yes									
Cold Water Source		From mains									
Bath Count		1									
Immersion Only Heating Hot Water		No									
28.1 Showers											
Description	Shower Type	Flow Rate	Rated Power	Connected	Connected To						
1	Combi boiler or unvented hot water system	8.00		No							
28.3 Waste Water Heat Recovery System											
29.0 Hot Water Cylinder		Internal Store									
Insulation Type		Measured Loss									
Cylinder Volume		194.00								L	
Loss		1.36								kWh/day	
34.0 Small-scale Hydro		None									
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recommendations											
Lower cost measures											
None											
Further measures to achieve even higher standards											

None

Summary for Input Data

Plot Reference	BB 1 bed W Top	Issued on Date	18/06/2026
Assessment Reference	BB 1 bed W Top	Plot Type Ref	Flat 82
Plot Address	Flat 82	SAP Version	10.2

SAP Rating	83 B	DER	15.32	TER	16.08
Environmental	89 B	% DER < TER			4.73
CO ₂ Emissions (t/year)	0.76	DFEE	33.47	TFEE	35.01
Compliance Check	See BREL	% DFEE < TFEE			4.39
% DPER < TPER	-0.73	DPER	88.10	TPER	87.46

Assessor Details		Assessor ID	V831-0001
Client	Pentland Homes, Pentland Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	10	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	0.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter 16.30 m	Internal Floor Area 54.28 m ²	Average Storey Height 2.50 m
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8.0 Living Area	29.60	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall brick	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	17.24	8.91	0.00	None	8.33	Enter Gross Area
Communal wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	28.11	26.22	0.00	None	1.89	Enter Gross Area
External Wall column	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.18	190.00	0.70	0.70	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill	0.00	140.00	44.69	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	107.30

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Main roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	54.28	54.28	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete planks floor, screed, carpeted	40.00	54.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.40		0.80	1.20
Int door	Manufacturer	Door to Corridor				0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Int door	Int door	Communal wall	West	1.89	
W1 - E	Window	External Wall brick	East	8.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.51	0.02	0.02	No
E4 Jamb	Independently assessed	13.40	0.02	0.02	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.20	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	8.49	0.04	0.04	No
E14 Flat roof	Table K1 - Default	9.95	0.16	0.16	No
E16 Corner (normal)	Independently assessed	5.65	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.65	-0.09	-0.09	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.82	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	15.82	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.83	0.03	0.03	No
E9 Balcony between dwellings, wall insulation continuous	Table K1 - Default	3.10	0.15	0.15	No
E15 Flat roof with parapet	Table K1 - Default	6.35	0.30	0.30	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present: Yes

Approved Installation: No

Mechanical Ventilation data Type: Database

Type: Balanced mechanical ventilation with heat recovery

MV Reference Number: 500140

Configuration: 1

Manufacturer SFP: 0.76

Duct Type: Rigid

MVHR Efficiency: 91.00

Wet Rooms: 1

SFP from Installer Commissioning Certificate: No

MVHR System Location: Inside heated envelope (installed exclusively)

Duct Installation Specification: Level 2

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys: 0

Number of open flues: 0

Number of chimneys/flues attached to closed fire: 0

Number of flues attached to solid fuel boiler: 0

Number of flues attached to other heater: 0

Number of blocked chimneys: 0

Number of intermittent extract fans: 0

Number of passive vents: 0

Number of flueless gas fires: 0

Summary for Input Data

21.0 Fixed Cooling System	No					
22.0 Pressure Testing	Yes					
Designed AP ₅₀	3.00					m ³ /(h.m ²) @ 50 Pa
Test Method	Blower Door					
22.0 Lighting	No					
No Fixed Lighting	No					
	Name	Efficacy	Power	Capacity	Count	
	Lighting 1	75.00	10.00	750.00	15	
24.0 Main Heating 1	Manufacturer					
Percentage of Heat	100.00					%
Fuel Type	Mains gas					
SAP Code	113					
In Winter	88.90					
In Summer	80 30					
Model Name	tbc					
Manufacturer	tbc					
Controls SAP Code	2105					
Delayed Start Stat	Yes					
Burner Control	Modulating					
Flue Type	None or Unknown					
Fan Assisted Flue	No					
Is MHS Pumped	Pump in heated space					
Heating Pump Age	2013 or later					
Heat Emitter	Underfloor					
Underfloor Heating	Yes - Pipes in Wood					
Flow Temperature	Enter value					
Flow Temperature Value	45.00					
Boiler Interlock	Yes					
Combi boiler type	Standard Combi					
Combi keep hot type	None					
25.0 Main Heating 2	None					
26.0 Heat Networks	None					
27.0 Secondary Heating	None					
28.0 Water Heating	Main Heating 1					
Water Heating	Main Heating 1					
SAP Code	901					
Flue Gas Heat Recovery System	No					
Waste Water Heat Recovery Instantaneous System 1	No					
Waste Water Heat Recovery Instantaneous System 2	No					
Waste Water Heat Recovery Storage System	No					
Solar Panel	No					
Water use <= 125 litres/person/day	Yes					
Cold Water Source	From mains					
Bath Count	1					
28.1 Showers						
Description	Shower Type	Flow Rate	Rated Power	Connected	Connected To	
1	Combi boiler or unvented hot water system	8.00	[kW]	No		

Summary for Input Data



28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

None

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Appendix C – BRUKL Output

Project name

Potters Bar - Block A - Be Green**As designed**

Date: Wed Jun 17 14:54:33 2026

Administrative information

Building Details

Address: TBC

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.31

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.31

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 175.73The 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	8.59
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	7.87
Target primary energy rate (TPER), kWh _{PE} /m ² annum	93.54
Building primary energy rate (BPER), kWh _{PE} /m ² annum	85.78
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	0.19	0.26	RM000003:Surf[3]
Floors	0.18	0.15	0.22	RM000003:Surf[5]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.11	0.18	RM000003:Surf[4]
Windows** and roof windows	1.6	1.14	1.6	RM000003: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	5

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	<0.9

1- 001| VRF + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6	0	1.6	0.8
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.					

1- 100| DHW IPOU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

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
Concierge Shower	110	-	-
Concierge Office	110	-	-
Concierge Store	110	-	-
Concierge Reception	110	80	1.35
Concierge Store	110	-	-
Room 007	110	80	1.5

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?
Concierge Shower	N/A	N/A
Concierge Office	N/A	N/A
Concierge Store	N/A	N/A
Concierge Reception	NO (-50.4%)	NO
Concierge Store	NO (-69%)	NO
Room 007	NO (-35%)	NO

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

	Actual	Notional
Floor area [m ²]	175.7	175.7
External area [m ²]	939.9	939.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	163.82	197.83
Average U-value [W/m ² K]	0.17	0.21
Alpha value* [%]	43.83	10

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

Building Use

% Area	Building Type
38	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
62	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	3.37	3.55
Cooling	3.75	3.05
Auxiliary	2.97	7.6
Lighting	8.72	11.29
Hot water	37.88	37.88
Equipment*	16.97	16.97
TOTAL **	56.69	63.38

* 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
<i>Displaced electricity</i>	<i>0</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	101.49	86.41
Primary energy [kWh _{PE} /m ²]	85.78	93.54
Total emissions [kg/m ²]	7.87	8.59

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] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	47.5	54	3.4	3.7	3	3.92	4	4	6
Notional	35.5	50.9	3.5	3.1	7.6	2.78	4.63	----	----

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

Project name

Potters Bar - Block A - Be Lean**As designed**

Date: Wed Jun 17 14:44:57 2026

Administrative information

Building Details

Address: TBC

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.31

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.31

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 175.73The 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	8.59
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	8.09
Target primary energy rate (TPER), kWh _{PE} /m ² annum	93.54
Building primary energy rate (BPER), kWh _{PE} /m ² annum	87.97
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	0.19	0.26	RM000003:Surf[3]
Floors	0.18	0.15	0.22	RM000003:Surf[5]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.11	0.18	RM000003:Surf[4]
Windows** and roof windows	1.6	1.14	1.6	RM000003: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_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element 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	5

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	<0.9

1- 001| VRF + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.09	6	0	1.6	0.8
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.					

1- 100| DHW IPOU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

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
Concierge Shower	110	-	-
Concierge Office	110	-	-
Concierge Store	110	-	-
Concierge Reception	110	80	1.35
Concierge Store	110	-	-
Room 007	110	80	1.5

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?
Concierge Shower	N/A	N/A
Concierge Office	N/A	N/A
Concierge Store	N/A	N/A
Concierge Reception	NO (-50.4%)	NO
Concierge Store	NO (-69%)	NO
Room 007	NO (-35%)	NO

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

	Actual	Notional
Floor area [m ²]	175.7	175.7
External area [m ²]	939.9	939.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	163.82	197.83
Average U-value [W/m ² K]	0.17	0.21
Alpha value* [%]	43.83	10

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

Building Use

% Area	Building Type
38	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
62	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	4.75	3.55
Cooling	3.75	3.05
Auxiliary	2.97	7.6
Lighting	8.72	11.29
Hot water	37.88	37.88
Equipment*	16.97	16.97
TOTAL **	58.07	63.38

* 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
<i>Displaced electricity</i>	<i>0</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	101.49	86.41
Primary energy [kWh _{PE} /m ²]	87.97	93.54
Total emissions [kg/m ²]	8.09	8.59

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] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	47.5	54	4.7	3.7	3	2.78	4	3.09	6
Notional	35.5	50.9	3.5	3.1	7.6	2.78	4.63	----	----

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

Project name

Shell and Core

Potters Bar Block B - Be Green

As designed

Date: Wed Apr 29 10:55:38 2026

Administrative information

Building Details

Address: TBC

Certifier details

Name: Ben Talbutt

Telephone number: 01322 289977

Address: 26-27 The Hill, Gravesend, DA11 9EU

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

Foundation area [m²]: 927.89The 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	12.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	11.87
Target primary energy rate (TPER), kWh _{PE} /m ² annum	141.06
Building primary energy rate (BPER), kWh _{PE} /m ² annum	130.33
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	0.15	0.15	B0000000:Surf[7]
Floors	0.18	0.1	0.1	B0000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.11	0.11	B0000000:Surf[1]
Windows** and roof windows	1.6	1	1	B0000000: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	1	1	B0000000:Surf[5]

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- 001| VRF + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6	0	1.6	0.8
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.					

1- 100| DHW SWH

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	0.005
Standard value	1	N/A

2- 100| DHW IPOU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

Shell and core configuration

Zone	Assumed shell?
B.00 - Class E Unit 01	NO
B.00 - Class E Unit 02	NO
B.00 - Class E Unit 03	NO
B.00 - Class E Unit 04	NO
B.00 - Class E Unit 05	NO
B.00 - Class E Unit 06	NO

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
B.00 - Class E Unit 01		110	80	1.5
B.00 - Class E Unit 02		110	80	1.5
B.00 - Class E Unit 03		110	80	1.5
B.00 - Class E Unit 04		110	80	1.5
B.00 - Class E Unit 05		110	80	1.5
B.00 - Class E Unit 06		110	80	1.5

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?
B.00 - Class E Unit 01	NO (-73.2%)	NO
B.00 - Class E Unit 02	NO (-23.2%)	NO
B.00 - Class E Unit 03	YES (+7%)	NO
B.00 - Class E Unit 04	YES (+13.8%)	NO
B.00 - Class E Unit 05	NO (-6.2%)	NO
B.00 - Class E Unit 06	NO (-12.7%)	NO

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

	Actual	Notional
Floor area [m ²]	927.9	927.9
External area [m ²]	1604.9	1954.4
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	385.47	595.61
Average U-value [W/m ² K]	0.24	0.3
Alpha value* [%]	25	10

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

Building Use

% Area	Building Type
54	Retail/Financial and Professional Services
46	Restaurants and Cafes/Drinking Establishments/Takeaways
	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	1.49	2.55
Cooling	9.1	5.78
Auxiliary	5.78	14.58
Lighting	15.94	19.11
Hot water	54.12	53.75
Equipment*	64.02	64.02
TOTAL **	86.44	95.76

* 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]	152.16	121.81
Primary energy [kWh _{PE} /m ²]	130.33	141.07
Total emissions [kg/m ²]	11.87	12.9

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] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	21	131.1	1.5	9.1	5.8	3.92	4	4	6	
Notional	25.5	96.3	2.5	5.8	14.6	2.78	4.63	----	----	

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

Project name

Shell and Core

Potters Bar Block B - Be Lean

As designed

Date: Wed Apr 29 11:01:48 2026

Administrative information

Building Details

Address: TBC

Certifier details

Name: Ben Talbutt

Telephone number: 01322 289977

Address: 26-27 The Hill, Gravesend, DA11 9EU

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

Foundation area [m²]: 927.89The 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	12.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	11.97
Target primary energy rate (TPER), kWh _{PE} /m ² annum	141.06
Building primary energy rate (BPER), kWh _{PE} /m ² annum	131.3
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	0.15	0.15	B0000000:Surf[7]
Floors	0.18	0.1	0.1	B0000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.11	0.11	B0000000:Surf[1]
Windows** and roof windows	1.6	1	1	B0000000: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	1	1	B0000000:Surf[5]

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- 001| VRF + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.09	6	0	1.6	0.8
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.					

1- 100| DHW SWH

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	0.005
Standard value	1	N/A

2- 100| DHW IPOU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

Shell and core configuration

Zone	Assumed shell?
B.00 - Class E Unit 01	NO
B.00 - Class E Unit 02	NO
B.00 - Class E Unit 03	NO
B.00 - Class E Unit 04	NO
B.00 - Class E Unit 05	NO
B.00 - Class E Unit 06	NO

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
B.00 - Class E Unit 01		110	80	1.5
B.00 - Class E Unit 02		110	80	1.5
B.00 - Class E Unit 03		110	80	1.5
B.00 - Class E Unit 04		110	80	1.5
B.00 - Class E Unit 05		110	80	1.5
B.00 - Class E Unit 06		110	80	1.5

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?
B.00 - Class E Unit 01	NO (-73.2%)	NO
B.00 - Class E Unit 02	NO (-23.2%)	NO
B.00 - Class E Unit 03	YES (+7%)	NO
B.00 - Class E Unit 04	YES (+13.8%)	NO
B.00 - Class E Unit 05	NO (-6.2%)	NO
B.00 - Class E Unit 06	NO (-12.7%)	NO

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

	Actual	Notional
Floor area [m ²]	927.9	927.9
External area [m ²]	1604.9	1954.4
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	385.47	595.61
Average U-value [W/m ² K]	0.24	0.3
Alpha value* [%]	25	10

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

Building Use

% Area	Building Type
54	Retail/Financial and Professional Services
46	Restaurants and Cafes/Drinking Establishments/Takeaways
	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	2.1	2.55
Cooling	9.1	5.78
Auxiliary	5.78	14.58
Lighting	15.94	19.11
Hot water	54.12	53.75
Equipment*	64.02	64.02
TOTAL **	87.05	95.76

* 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]	152.16	121.81
Primary energy [kWh _{PE} /m ²]	131.3	141.07
Total emissions [kg/m ²]	11.97	12.9

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] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	21	131.1	2.1	9.1	5.8	2.78	4	3.09	6	
Notional	25.5	96.3	2.5	5.8	14.6	2.78	4.63	----	----	

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

Project name

Shell and Core

Potters Bar Block D - Be Green

As designed

Date: Wed Apr 29 12:19:25 2026

Administrative information

Building Details

Address: TBC

Certifier details

Name: Ben Talbutt

Telephone number: 01322 289977

Address: 26-27 The Hill, Gravesend, DA11 9EU

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

Foundation area [m²]: 631.18The 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	11.48
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	10.98
Target primary energy rate (TPER), kWh _{PE} /m ² annum	125.36
Building primary energy rate (BPER), kWh _{PE} /m ² annum	120.3
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	0.18	0.22	D000000C:Surf[28]
Floors	0.18	0.1	0.1	D000000C:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.11	0.11	D000000C:Surf[1]
Windows** and roof windows	1.6	1	1	D000000C:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [^]	1.6	1.6	1.6	D000000C:Surf[24]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1	1	D000000C:Surf[18]

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- 001| VRF + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6	0	1.6	0.8
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.					

1- 100| DHW IPOU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	-
Standard value	1	N/A

2- 100| DHW SWH

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1.05	0.005
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

Shell and core configuration

Zone	Assumed shell?
D.00 - Commercial 1	NO
D.00 - Commercial 2	NO
D.00 - Commercial 3	NO

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
D.00 - Commercial 1	110	80	1.5
D.00 - Commercial 2	110	80	1.5
D.00 - Commercial 3	110	80	1.5

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?
D.00 - Commercial 1	NO (-58.2%)	NO
D.00 - Commercial 2	NO (-63.9%)	NO
D.00 - Commercial 3	NO (-91.3%)	NO

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

	Actual	Notional
Floor area [m ²]	631.2	631.2
External area [m ²]	1439.8	1322.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	306.64	428.86
Average U-value [W/m ² K]	0.21	0.32
Alpha value* [%]	25.11	10

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

Building Use

% Area	Building Type
60	Retail/Financial and Professional Services
40	Restaurants and Cafes/Drinking Establishments/Takeaways
	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	1.62	3.28
Cooling	6.41	5.18
Auxiliary	5.59	12.89
Lighting	18.44	16.55
Hot water	47.67	47.13
Equipment*	58.46	58.46
TOTAL **	79.73	85.03

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	115.29	119.19
Primary energy [kWh _{PE} /m ²]	120.31	125.36
Total emissions [kg/m ²]	10.98	11.48

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	22.9	92.4	1.6	6.4	5.6	3.92	4	4	6
	Notional	32.8	86.3	3.3	5.2	12.9	2.78	4.63	----	----
[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

Project name

Shell and Core

Potters Bar Block D - Be Lean

As designed

Date: Wed Apr 29 12:15:17 2026

Administrative information

Building Details

Address: TBC

Certifier details

Name: Ben Talbutt

Telephone number: 01322 289977

Address: 26-27 The Hill, Gravesend, DA11 9EU

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

Foundation area [m²]: 631.18The 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	11.48
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	11.08
Target primary energy rate (TPER), kWh _{PE} /m ² annum	125.36
Building primary energy rate (BPER), kWh _{PE} /m ² annum	121.36
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	0.18	0.22	D000000C:Surf[28]
Floors	0.18	0.1	0.1	D000000C:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.11	0.11	D000000C:Surf[1]
Windows** and roof windows	1.6	1	1	D000000C:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [^]	1.6	1.6	1.6	D000000C:Surf[24]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1	1	D000000C:Surf[18]

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

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1- 001| VRF + MVHR

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This system	3.09	6	0	1.6	0.8
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.					
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	Water heating efficiency	Storage loss factor [kWh/litre per day]
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