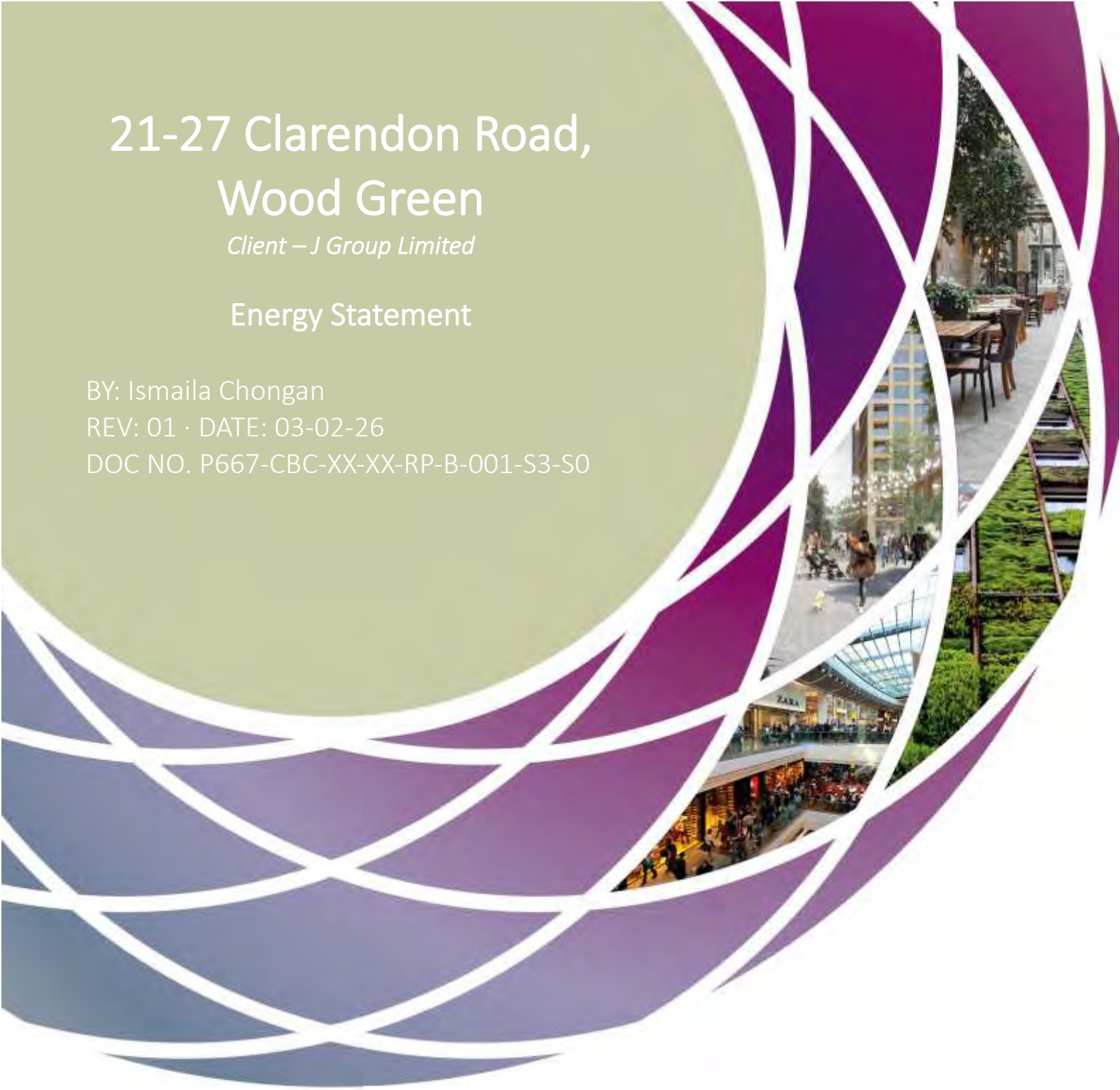
21-27 Clarendon Road, Wood Green

Client – J Group Limited

Energy Statement

BY: Ismaila Chongan

REV: 01 · DATE: 03-02-26
DOC NO. P667-CBC-XX-XX-RP-B-001-S3-S0



ENGINEERING SOLUTIONS FOR THE FUTURE

Cudd Bentley Consulting

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RECORD OF REVISIONS

Date.	Revision.	Author.	Reviewer.	Description of change.
03/02/2026	P01	IC	HM	First Issue

1. EXECUTIVE SUMMARY

This report considers the energy efficient measures to be incorporated within the 21-27 Clarendon Road, Wood Green development. This document complies with the requirements at both national and local level, as set out in the National Planning Policy Framework (2024), The London Plan (March 2021) and within the London Borough of Haringey Council's Local Plan (2013).

The recommended sustainability measures for the Proposed Development, as determined through a Part L1 SAP 10.2 model and Part L2 OpenBuildings model, achieves a **65%** reduction in carbon emissions compared to a Part L 2021 baseline. This equates to an annual saving of approximately 77.6 tonnes of CO_2 per annum. The development complies with the Haringey Local Plan by incorporating a combination of passive design measures and a high-efficiency air source heat pump system, resulting in an overall 62.75% reduction in regulated energy consumption. The energy and carbon savings are to be achieved through passive design, energy efficient measures incorporating design features such as energy efficient lighting, submetering of relevant areas, upgrading of 'U' values and occupancy sensing in relative areas, as well as the incorporation of an Air Source Heat Pump.

This report includes annualised baseline calculations which predict the likely energy consumption and associated CO2 emissions for this development. The total baseline energy and carbon emissions for the development, taking into account regulated energy demands are:

- **769,879.01 kWh/annum**
- **119.9 Tonnes CO2/annum**

Unregulated energy use is not covered by existing regulations and includes energy consumed by the occupants through activities and appliances; in this case it would typically be small power usage (appliances, computers, equipment etc.). The following unregulated energy use for the development was calculated:

- **307,952 kWh/annum**
- **48 Tonnes CO2/annum**

The following energy hierarchy from London Plan 2021 has been adhered to in order to determine the most appropriate strategy for the development:

1. Be Lean, Reduce energy and carbon emissions through the use of passive design and energy efficiency measures;
2. Be Clean, Reduce energy and carbon emissions by investigating the possibility of installing a site wide Combined Heat and Power (CHP) system or connecting to an existing decentralised CHP network;
3. Be Green, Reduce energy and carbon emissions by installing Low or Zero Carbon Technologies such as Heat Pumps, Solar panels, Photovoltaics (PV), Wind Turbines etc.

Be Lean

In order to initially reduce carbon emissions from a base Part L 2021 compliant development, the following passive design and energy efficiency measures have been incorporated:

- Improved double glazing with low G values and shading co-efficient to limit the effects of solar gain;
- Mechanical Whole House Ventilation with Heat Recovery (in areas where required);
- The provision of energy efficient lighting;
- The provision of zonal thermal and lighting controls;
- The provision of variable speed pumps and fans;
- The enhancement of pipework and ductwork, thermal insulation;
- The provision of time and temperature zone control on HVAC systems;
- Improved specific fan powers;
- Electric power factor >0.95 (commercial element only);
- Sub metering of energy and lighting (commercial element only).

Further examples of the proposed measures to be provided are in Section 5.0 'Passive Design and Energy Efficiency Measures' of this report.

Following the above measures being incorporated the total baseline energy and carbon emissions for the development, taking into account regulated energy demands, are reduced to:

- **711,118.45 kWh/annum**
- **101.8 Tonnes CO2/annum**

Through the implementation of passive measures, site-wide carbon emissions have been reduced by **15%**. When broken down by use, the passive savings are as follows:

- **Residential: 15%**
- **Non-residential: 16%**

Be Clean

The following 'be clean' strategies have been considered for the development:

1. Connection to an existing Combined Cooling Heat and Power (CCHP)/ Combined Heat and Power (CHP) distribution Networks.
   - There are currently no existing CHP distribution networks available to connect to

Be Green

A range of low or zero carbon technologies have been considered for incorporation within the proposed development; it has been proposed in this case that an Air Source Heat Pump (ASHP) system and Photovoltaic (PV) Panels are feasible and have been utilised.

Further details of the feasibility analysis of low or zero carbon technologies are in section 7.0 'Renewable Energy' of this report.

Following the inclusion of the on-site renewable technologies, the total baseline energy and carbon emissions for the development, taking into account regulated energy demands have further reduced to:

- **286,784.18 kWh/annum**
- **42.4 Tonnes CO2/annum**

2. INTRODUCTION

Cudd Bentley Consulting have been instructed to prepare an Energy and Sustainability Statement for the proposed 21-27 Clarendon Road, Wood Green project.

The proposal is for a **mixed-use co-living and workspace development**. The design responds positively to the local context and has been carefully developed to reflect the existing and emerging character of a neighbourhood undergoing transition.

The scheme will deliver **222 co-living rooms**, providing accommodation that is supported by the GLA and in high demand within the Borough. In addition, the development will include **new affordable workspace at ground-floor level**, creating employment opportunities and supporting local businesses.

Government policies now require significant energy reductions from proposed buildings. Building a greener future sets a planned trajectory outlined via Part L 2021 of the Building Regulations. These commitments have been the key focus point in addressing policies and strategies to reduce energy use and carbon emissions through energy efficiency and low or zero carbon technologies (LZC).

The recommended strategy takes into consideration the site layout and requirements for the building to produce a design that incorporates the most appropriate technologies available to the site that are commercially viable, whilst targeting compliance with all policies applicable to this development.

A CGI of the development, prepared by the architect is shown below in Figure 2.1.



Figure 2.1: CGI of the Proposed Development

3. DEVELOPMENT APPROACH

This report adopts the following approach to provide compliance with the Local and National Planning Policies:

1. To propose to improve building fabric from minimum Part L (2021) Building Regulations requirements.
2. To propose to reduce energy consumption and carbon dioxide emissions through passive and energy efficiency measures.
3. Investigate the possibility of connection into existing District Heating / Cooling Networks.
4. To propose to reduce energy consumption and carbon dioxide emissions further through the use of on-site renewable / LZC energy technologies.

Table 3.1 below outlines the Part L Building Regulations that the development shall be assessed under:

Building Element	Part L Building Regulations Applicable
Sui Generis (Large-scale Purpose-Built Shared Living) and Use Class E	Part L1 and L2 (2021)

Table 3.1 Part L Building Regulations Applicable

4. ASSESSMENT OF BASELINE ENERGY

Government policies require significant energy reductions from buildings. Building a Greener Future sets a planned trajectory (delivered via Part L of the building regulations 2021) with an aspiration for all non-domestic new buildings to be zero carbon by 2020. The Climate Change Act (Nov 2008) sets the UK targets of; CO_2 reduction of 26% by 2020 and CO_2 reduction of 100% by 2050.

4.1. DEVELOPMENT SUSTAINABILITY FEATURES

The primary energy demands of the development will be:

- *Heating*
- *Lighting*
- *Hot water*
- *General Power*

To assess the preliminary energy consumption of the proposed development, residential calculations were carried out using Elmhurst's approved SAP 10.2 software, and commercial elements were done on the Hevacomp software. The calculations generate annualised energy consumption for the buildings, from which the "carbon footprint" can be assessed.

The total baseline energy and carbon emissions for the entire development, taking into account regulated energy demands are:

- **769,879.01 kWh/annum**
- **119.9 Tonnes CO2/annum**

(A full set of calculations supporting these figures included in Appendix A of this document)

5. BE LEAN - ENERGY EFFICIENT MEASURES

The proposed development incorporates a range of passive and active design measures to reduce energy demand for space conditioning, domestic hot water, and lighting. The scheme exceeds the GLA requirements of **10% 'Be Lean' savings for residential uses** and **15% for non-residential uses**. Further details are provided in **Appendix A**.

5.1. PASSIVE DESIGN MEASURES

Enhanced U-Values

The heat loss of different building fabric elements is dependent upon their U-value. A building with low U-values provides better levels of insulation and reduced heating demand during the cooler months.

The proposed development will incorporate high levels of insulation and high-performance glazing beyond Part L1 and L2 2021 targets in order to reduce the demand for space heating.

Tables 5.1 and 5.2 demonstrate the enhanced performance of the proposed building fabric, exceeding the minimum requirements of the Building Regulations for both the residential and non-residential elements of the development.

Residential	
Building Element	**U-Value ($W/m^2 \cdot K$)**
External Walls	0.15
Party Walls to Unheated Spaces	0.15
Exposed Floors to Level 0	0.13
Exposed Roof	0.12
Personnel Door	1.0
Glazing	Standard Triple Glazed Windows - 0.9 (g - 0.40) Opaque Panels - 0.4
Air Permeability	3 $m^3/hr/m^2$@ 50 Pa

Table 5.1 U – Values targeted in the residential part of the development

Commercial	
Building Element	**U-Value ($W/m^2 \cdot K$)**
External Walls	0.15
Ground Floor	0.13
Exposed Roof	0.12
Glazing	1.4 (g= 0.4)
Air Permeability	3 $m^3/hr/m^2$@ 50 Pa

Table 5.2 U – Values targeted in the commercial part of the development

Thermal Bridging:

The thermal bridging strategy for the development has been informed by detailed SAP modelling. At this stage, specific Ψ-values and the resulting heat loss calculations have not yet been fully finalised. However, the design intent is to ensure that all junctions meet or exceed the requirements of **Part L fabric energy efficiency standards**.

Final Ψ-values and associated thermal performance will be confirmed following completion of detailed modelling and finalisation of construction specifications. The selected Ψ-values are generally in line with those set out in the **Stage 2 Energy Statement** prepared by Integration Consultancy Ltd, with additional review undertaken by **Cudd Bentley Consulting**, who have proposed alternative values for certain junctions to ensure compliance. These final PSI Values chosen are summarised in **Table 5.3**.

Construction Evidence:
The contractor is required to take photographic evidence during construction in accordance with Elmhurst Technical Bulletin *TB157_A_Guide_to_Photographic_Evidence_for_New_Homes*. These records will be collated for EPC lodgement upon project completion.

Windows:
All residential windows are to be sourced from a **BFRC-certified supplier** to ensure compliance with recognised energy performance standards.

Glazing within the non-residential/commercial areas are expected to be incorporated with **blinds** in order to mitigate overheating due to solar gain exceedances discovered within the model.

Mechanical **Services:**
All mechanical equipment is to be installed by a **government-approved installer** to ensure compliance and maintain performance standards.

In addition, appropriate metering provisions are expected to be included, with an electrical power factor greater than 0.95.

In addition, for the MVHR system it is anticipated that the manufacturer's stated SFP will be confirmed through an installer commissioning certificate, with a target minimum value of 0.4 W/l/s, to ensure efficient ventilation within the dwellings and to support the achievement of energy-efficient performance.

The table below details the thermal bridging values used in the residential part of the development and the minimum standards to aim for.

Sap Ref	Junction Detail	Ψ Value (W/mK)	Source
E2	Other Lintels (Including other steel lintels)	0.02	Unilin Insulation UK Ltd (Government Approved Source)
E3	Sill	0.04	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E4	Jamb	0.05	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E7	Intermediate Floor between dwellings (in blocks of flats)	0.07	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E15	Roof With Parapet	0.111	Unilin Insulation UK Ltd (Government Approved Source)
E16	Corner (normal)	0.09	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E17	Corner (inverted)	0	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E18	Party wall between dwellings	0.08	Unilin Insulation UK Ltd (Government Approved Source)
E20	Exposed Floor	0.047	Knauf Insulation (Government Approved Source)
E25	Staggered Party Wall Between Dwellings	0.12	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
P3	Intermediate floor between dwellings (in blocks of flats)	0	Table K1 Default
P4	Party Wall (Roof)	0.12	No Source – Minimum target figure needed

P7	Party Exposed Floor	0.12	No Source – Minimum target figure needed

Table 5.3 U – Proposed Thermal Bridging Values

By implementing the proposed thermal bridging values listed in Table 5.3, together with an air permeability of 3 $m^3/(h \cdot m^2)$, the residential part of the development achieves an average Dwelling Fabric Energy Efficiency (DFEE) improvement of **26%** over the Target Fabric Energy Efficiency (TFEE), ensuring enhanced fabric performance and overall energy efficiency.

AIR PERMEABILITY IMPROVEMENT

Heat loss may also occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing, and the use of best practice construction techniques can minimise the amount of air infiltration.

The proposed development will aim to improve upon the Part L 2021 minimum standards for air permeability by targeting air permeability rates of 3 $m^3/hr/m^2$ at 50Pa.

5.2. ACTIVE DESIGN MEASURES

High Efficacy Lighting

The development intends to incorporate low energy lighting fittings throughout the spaces. All light fittings will be specified as low energy lighting and will accommodate LED with lighting efficacy as shown below table 5.4.

Lighting	
Lighting Type	**lumens per circuit watt**
LED	**Dwellings and storage areas:** 110 lm/W **Other commercial / non-residential areas:** 140 lm/W

Table 5.4 Lighting efficacy targeted in the development.

Reducing The Need For Artificial Lighting

The development has been designed for good levels of daylight in all habitable spaces as a way of improving the health and wellbeing of its occupants.

All of the habitable areas will benefit from large areas of glazing to increase the amount of daylight within the internal spaces where possible. This is expected to reduce the need for artificial lighting whilst delivering pleasant, healthy spaces for occupants.

6. BE CLEAN – SUPPLY ENERGY EFFICIENTLY

Be Clean energy refers to energy that is generated off the main grid, which may include micro-renewables, heating and cooling. It can refer to energy from waste plants, combined heat and power, district heating and cooling, as well as geothermal, biomass or solar energy.

Connection To an Existing Heat Network

It was investigated to establish if there were any existing decentralised energy networks near the proposed site using the Department of Energy and Climate Change CHP database. It has been concluded that there are no suitable existing nearby CHP systems or source of waste heat or power to which a connection may be possible. The CHP availability map can be seen below in figure 6.1.

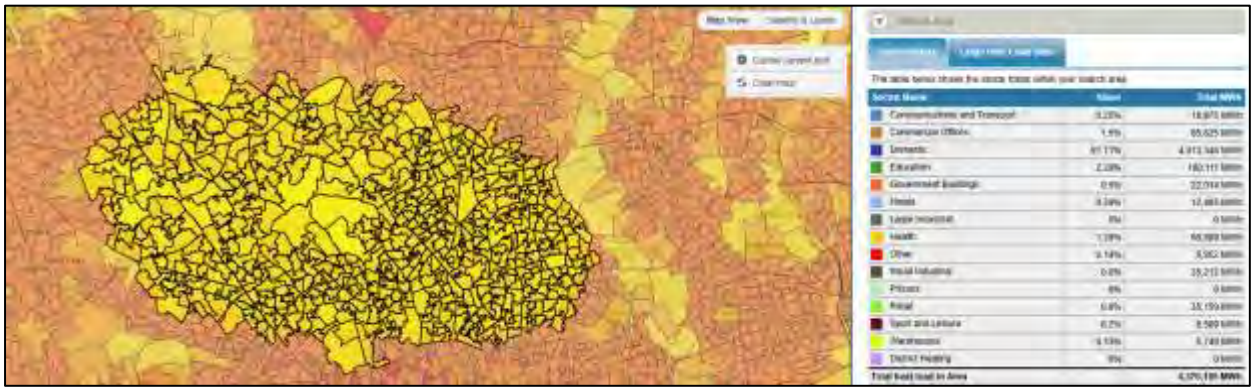


Figure 6.1 CHP availability Search Area

BE CLEAN CO2 EMISSIONS

Given that it has not been found feasible or viable for the proposed development to incorporate the supply of low carbon heating and cooling via connection to a District Energy Network, no carbon savings are achieved for this step of the Energy Hierarchy.

7. BE GREEN - RENEWABLE ENERGY

The use of renewable and low or zero carbon (LZC) technologies within the development has been addressed and the following, Table 7.1, reviews the primary options for generation of on-site renewable / LZC energy and considers their suitability for use on the development.

Renewable Technology Feasibility Assessment		Viable?
Bio Fuel Boilers 	Bio-fuel boilers are specifically designed to burn solid biomass or liquid bio-fuel in order to heat water, or raise steam. This can then be used for space heating or Domestic Hot Water (DHW) supply. Bio-fuel boilers could potentially provide the annual space heating and DHW demand for the development, however they are not recommended for this development for the following reasons:- 1. Biomass boilers generate increased Oxides of Nitrogen (NOx) and particulates (PM10) which would affect air quality. 2. The storage requirements for the biofuel would require a large plant space, with an auxiliary storage facility to allow for a two week period where delivery of fuel might not be available.	No
Land Use Large volumes of storage is required for fuel at ground level or basement level with sufficient vehicular access for fuel delivered. Noise Noise levels are generated by the operation of the bio-fuel boiler and associated deliveries of the bio-fuel. The plant room enclosure will have to be attenuated to acceptable levels imposed by planning and Acoustician recommendations.		
Wind Turbines 	Wind turbines convert the kinetic energy in the wind into mechanical energy which is then converted into electricity. Wind turbines can provide electrical power either directly to a load or via a battery system. The use of wind turbines is not recommended for this development for the following reasons:- 1. Wind turbines, of a size necessary to make a contribution to the Units renewable energy requirements are considered inappropriate on spatial, planning, aesthetic and noise grounds. Noise pollution from commercial wind turbines can be quiet significant within a few hundred metres. 2. The site is not ideal; an ideal site is a hill with a flat, clear exposure. It should be free from strong turbulence and obstructions like large trees, houses or other buildings. As the development is surrounded by same type of buildings, turbulent wind flow will be experienced across the site which is not ideal for wind turbine installations. 3. Wind turbines, can cause electrical interference within a 2km radius. 4. Finally, the main disadvantage is down to the winds unreliability factor. The wind strength is often too low in many areas, where this site is located the wind speed is 4.4 m/s at 10m, as can be seen in the wind map presented in Appendix C, in order for the wind turbines to be feasible, wind speeds of greater than 5.5m/s are required.	No

Renewable Technology Feasibility Assessment		Viable?
Land Use There would be an adverse visual impact on the site which will be dependent on the height at which the wind turbines are located. Noise Noise levels are generated by the rotating blades; these noise levels will vary dependent on wind velocity and will need to be in acceptable levels imposed by planning and Acoustician recommendations.		
Ground Source Heat Pumps 	Space heating can be provided by circulating water cooled or heated directly by the ground or via subterranean water. Ground water heating through the use of aquifers makes use of the relatively stable ground/ water temperature which is available at a temperature range of 10 – 14°C. The use of Ground Source Heat Pumps is not recommended for this development for the following reasons:- 1. Cost of boreholes may be prohibitive (subject to site geological conditions). 2. Favourable ground conditions may not exist. 3. Problems can arise with boreholes silting up (open-loop). 4. Changes in local ground conditions could affect water quality and the amount that can be extracted (open-loop).	No
Water Source Heat Pump	The development is not located in a groundwater source protection zone and as a result, is unlikely to require EA approval. However, use of water source heat pump would not be feasible for the following reasons: 1. A closed loop system would require an enquiry to be made to assess any potential effects on the water temperatures and consequently the wildlife. 2. Closed loop systems may contain thermal transfer fluids (which are toxic). If these are leaked, they could potentially pollute the canal. 3. These are typical homes which do not have high heating and hot water demand.	No
Land Use This installation would require Environmental Agency approval. Ground and Hydrology analysis would be required to investigate if favourable conditions exist. Noise There are no noise issues generated by this technology.		
Solar Water Heating 	Solar Water Heating systems use radiant energy from the sun to heat water. Systems comprise of a roof mounted heat collector piped to a coil located within a hot water storage cylinder.	No
Land Use Roof space is better served for the installation of Photovoltaic panels. Noise Noise levels are generated by pumps at roof level, these are insignificant so should pose no issues.		

Renewable Technology Feasibility Assessment		Viable?
Air Source Heat Pumps 	An Air Source Heat Pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15°C and typically draws approximately a quarter to a third of the electricity of a standard resistance heater for the same amount of heating, reducing utility bills. This typical efficiency compares to 70-95% for a fossil-fuel powered boiler. Air Source Heat Pumps (ASHP) are proposed for use within the dwelling and commercial areas to provide the heating requirements. The benefits of ASHP are as follows: • *They are ideally suited to serve the dwellings within the development during periods when they may require heating. The times when heating is required may differ for different space depending on their use, occupancy period and levels, the operation of individual air source heat pumps would allow individual control and can be efficiently accommodated within the building design;* • *The heat pump unit can be configured to provide internal heat reclaim from dissimilar environmental zones, reducing energy consumption and carbon emissions.*	**Yes**
Land Use Air Source Heat Pumps can be installed on ground mounted, roof mounted or wall mounted frames. When installing Air Source Heat Pumps there are various factors to consider; Heat Pumps should be positioned to provide shelter from high winds which can reduce efficiency by causing defrost problems. Noise Noise levels are generated by fans, and compressors causing vibrations. The noise levels are dependent on manufacturer and vary accordingly, these will need to be in acceptable levels imposed by planning and Acousticians recommendations.		
Photovoltaics 	• Photovoltaic (PV) modules convert sunlight directly into DC electricity. The solar cells will be sourced from AIKO, providing panels with an output of 450–500 Wp. • Available roof space will be fully utilised for the installation of PV panels, which offer several advantages. • The total PV array will generate **18 kWp**, which will be supplied to the commercial areas. 1. Photovoltaic panels can be situated at roof level, south facing, to provide a source of renewable energy. 2. Panels can be grid connected to sell surplus electricity produced. 3. Low maintenance issues.	**Yes**
Land Use There are no land issues or adverse visual impacts as the photovoltaic panels are roof mounted. Noise There are no noise issues generated by this technology.		

Table 7.1 Renewable Energy Options

7.1. BE GREEN RESULTS

After the inclusion of Passive and ASHP measures, the total energy consumption and carbon emissions for the development, taking into account regulated energy demands have further reduced to:

- **286,784.18 kWh/annum**
- **42.4 Tonnes CO2/annum**

The energy strategy for the development is shown in table 7.2 and 7.3 below.

Residential Energy Strategy	
Heating	A communal Air Source Heat Pump (ASHP) system will be installed to provide space heating within the dwellings.
Hot water (DHW)	Domestic hot water (DHW) will be supplied via the ASHP, with a 10,000-litre storage cylinder in the plant room (approximately 45 litres allocated per flat).
Ventilation	A Mechanical Ventilation with Heat Recovery (MVHR) system will provide balanced ventilation with high-efficiency heat recovery.
Lighting	Energy-efficient LED lighting will be installed throughout, achieving a luminous efficacy of 110 lm/W.

Table 7.2 Proposed Energy Strategy for the residential part of development

Commercial Energy Strategy	
Heating	An air source heat pump (ASHP) system will provide space heating to the communal areas, including lounge areas and the gym.
Cooling	A An air source heat pump (ASHP) system will provide space cooling to the communal areas, including lounge areas and the gym.
Hot water (DHW)	Hot Water will be supplied to the commercial areas through its ASHP system
Ventilation	Extract fans will be provided to WCs and kitchens, with communal areas served by MVHR systems.
Lighting	Lighting within communal areas will achieve a minimum efficacy of **140 lm/W**, with lighting in storage areas achieving **110 lm/W**.

Table 7.3 Proposed Energy Strategy for the commercial part of development

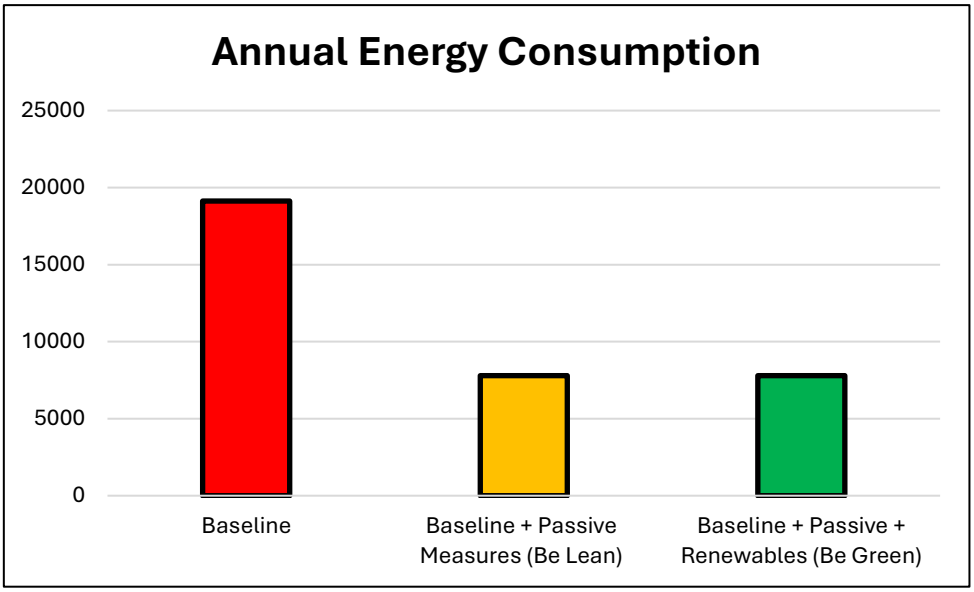


Figure 7.1 Annual Energy Consumption for the development

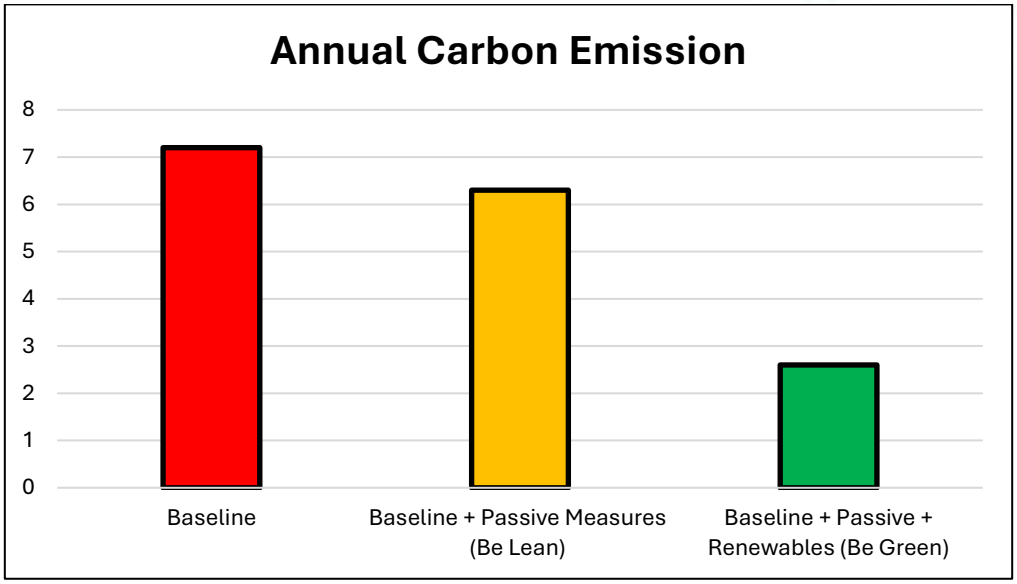


Figure 7.2 Annual Carbon Emissions for the development

To illustrate the end-use energy consumption, **Figure 7.3** below presents a detailed breakdown of the results.

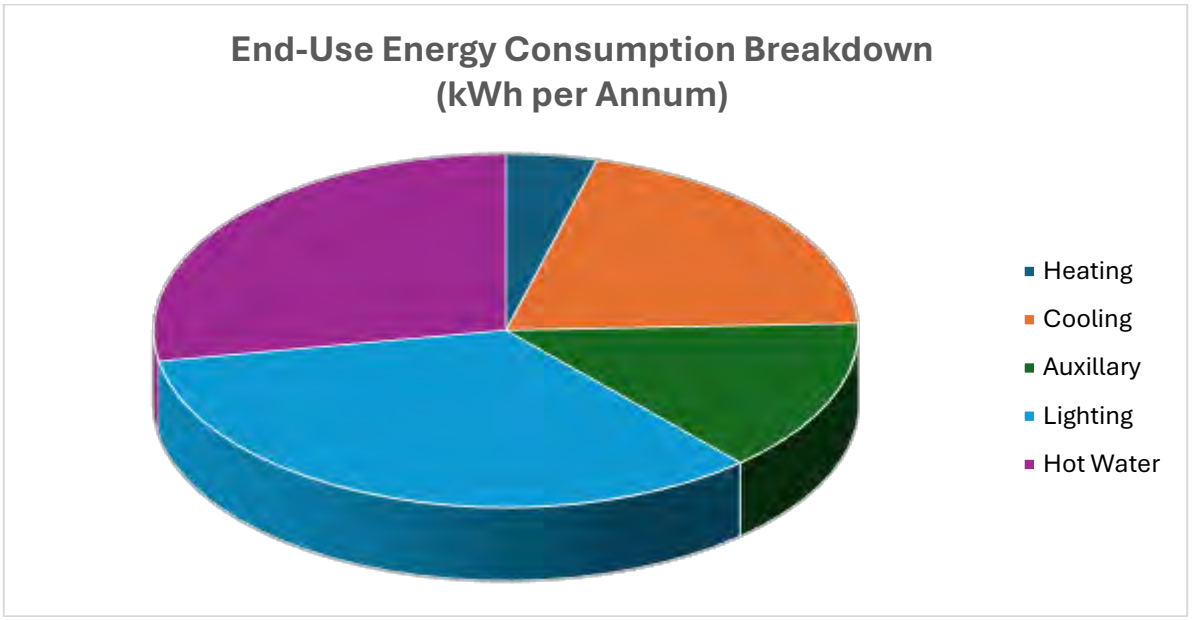


Figure 7.3 End-Use Energy Consumption Breakdown

Tables 7.4 – 7.7, highlight the carbon and energy savings that are currently anticipated for the development from a base Part L1 2021 compliant build.

Development	Predicted Energy Consumption (kWh/Annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	769,879.01	307,952
After Energy Efficient Passive + Measures	711,118.45	-
After ASHP integration	286,784.18	-

Table 7.4 Predicted Energy Consumption

Development	Regulated Energy Savings	
	kWh/Annum	%
Passive Savings	58,760.56	7.63
ASHP Savings	424,334.27	55.12
Cumulative Saving	**483,094.83**	**62.75**

Table 7.5 Regulated Energy Savings

Development	Carbon Dioxide Emissions (Tonnes/Annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	119.9	48
After Energy Efficient Passive + Measures	101.8	-
After ASHP integration	42.4	-

Table 7.6 Predicted Carbon Emissions

Development	Regulated Carbon Dioxide Emissions	
	Tonnes/Annum	%
Passive Savings	18.1	15
ASHP Savings	59.4	50
Cumulative Saving	**77.6**	**65**

Table 7.7 Regulated Carbon Emissions Savings

The development shall have an anticipated CO_2 improvement of 65% beyond Part L 2021, complying with local policy requirements. The energy and carbon calculations for the development at each stage (baseline, passive measures and PV), are displayed in full within Appendix A. Furthermore, sample SAP Calculation documents for the development are displayed in Appendix C.

Carbon Cash-in-Lieu Contribution

As a result of the zero-carbon target having not been achieved in line with The London Plan Policy SI 2, the cash in lieu contribution requirement has been calculated and displayed below in Table 7.8. Assuming a carbon off-

set price of £95 per tonne of carbon dioxide for a period of 30 years, the contribution for offsite renewable solutions is displayed below in Table 7.8.

Development	Annual Shortfall Tonnes CO_2 per Annum	Carbon Off-set Contribution (£)
Baseline: Part L 2021 of the Building Regulations Compliant Development	**42.4**	**120,728**

Table 7.8 Calculated Carbon Shortfall and Cash in Lieu Contribution

The London Plan requires all major developments to achieve a minimum on-site carbon reduction of 35% beyond Part L 2021 with a target of net-zero carbon. The overall development has an anticipated on-site CO_2 improvement of 65% beyond Part L 2021. The net-zero carbon shortfall will be met via cash-in-lieu contribution.

APPENDIX A – ENERGY AND CARBON CALCULATIONS

Baseline Energy

kWh/annum Baseline

Typical Unit	Area m²	Quantity	Total Area m²	DER	TER	Heating	Cooling	Auxillary	Lighting	Hot Water	Total Kwh/Annum	Carbon kg Co2 / Annum	Tonnes	PV
					TER Worksheet	DER Sheet (Row 207 + 0.075)	N/A	DER Sheet (Row 211+0.01)	DER Sheet Row 213	DER Sheet (Row 219 + 0.075)				
L1-SC	19.6	1	19.6	31.14	31.14	2864.84	0	111.69	57.33	1006.94	4040.794413	610.344	0.61	
L1-SM	19	1	19	28.89	28.89	2466.85	0	99.70	57.1309	1005.72	3629.401371	548.91	0.55	
L1-SSM	21	11	231	26.72	26.72	2546.05	0	105.22	61.3296	1010.22	40950.96664	6172.32	6.17	
L1-ASC	27.7	1	27.7	24.44	24.44	3238.66	0	135.48	70.6055	1033.82	4478.570825	676.988	0.68	
L1-SSC	21.8	1	21.8	30.72	30.72	3230.64	0	125.44	60.8543	1012.36	4429.301928	669.696	0.67	
L2-SC	19.6	6	117.6	25.91	25.91	2215.13	0	89.97	57.3528	1006.94	20216.3522	3047.016	3.05	
L2-SM	19	30	570	24.61	24.61	1961.79	0	82.09	59.5812	1005.72	93275.38857	14027.7	14.03	
L2-SSM	21	108	2268	22.50	22.50	1982.07	0	85.59	64.3296	1010.22	339359.1084	51030	51.03	
L2-SSC	21.8	6	130.8	25.23	25.23	2472.23	0	100.30	60.8419	1012.36	21874.39086	3300.084	3.30	
L2-PSC	26.1	12	313.2	21.12	21.12	2453.84	0	106.11	67.726	1027.05	43856.76405	6614.784	6.61	
L2-ASC	27.7	6	166.2	19.73	19.73	2410.45	0	107.27	72.2045	1033.82	21742.46049	3279.126	3.28	
L2-ASM	27	12	324	18.92	18.92	2133.77	0	98.60	84.2429	1030.77	40168.69923	6130.08	6.13	
L8-SC	19.6	1	19.6	30.70	30.70	2602.20	0	100.65	57.3528	1006.94	3767.141265	601.72	0.60	
L8-SM	19	5	95	27.48	27.48	2127.66	0	86.67	59.5812	2127.66	22007.8462	2610.6	2.61	
L8-SSM	21	16	336	25.14	25.14	9.11	0	95.37	64.3296	1010.22	18864.51682	8447.04	8.45	
L8-PSC	26.1	2	52.2	25.41	25.41	3168.72	0	125.85	70.3539	1027.05	8783.934197	1326.402	1.33	
L8-ASC	27.7	1	27.7	23.98	23.98	3162.00	0	128.01	72.2045	1033.82	4396.041278	664.246	0.66	
L8-ASM	27	2	54	23.28	23.28	2930.12	0	120.58	84.2429	1030.77	8331.437041	1257.12	1.26	
Non-Residential Area	1032.3	1	1032.3	8.62	8.62	2456.87	19892.421	11871.45	38339.62	7979.68	65705.895	8898.426	8.90	14834.151
Total	1444	223	5825.7								769,879.01	119,912.60	119.91	

Be Lean Energy

kWh/annum Baseline + Passive/Energy Efficiency Measures

Typical Unit	Area m²	Quantity	Total Area m²	DER	TER	Heating	Cooling	Auxillary	Lighting	Hot Water	Total Kwh/Annum	Carbon kg Co2 / Annum	Tonnes	PV
					TER Worksheet	DER Sheet (Row 211) + (Row 211 x 0.075)	DER Sheet Row 222	DER Sheet (Row 225)	DER Sheet Row 222	DER Sheet (Row 233) + (Row 233 x 0.075)				
L1-SC	19.6	1	19.6	27.58	31.14	2428.75	0	111.69	57.33	1006.94	3604.711892	540.568	0.54	
L1-SM	19	1	19	25.14	28.89	2015.28	0	87.24	57.1309	1009.38	3169.025419	477.66	0.48	
L1-SSM	21	11	231	23.42	26.72	2104.02	0	93.02	61.3296	1010.22	35954.49234	5410.02	5.41	
L1-ASC	27.7	1	27.7	20.71	24.44	2579.62	0	117.29	70.6055	1033.82	3801.340093	573.667	0.57	
L1-SSC	21.8	1	21.8	27.20	30.72	2742.05	0	111.96	60.8543	1012.36	3927.222162	592.96	0.59	
L2-SC	19.6	6	117.6	22.47	25.91	1785.73	0	78.11	57.3528	1006.94	17568.83298	2642.472	2.64	
L2-SM	19	30	570	21.87	24.61	1630.64	0	72.95	59.5812	1005.72	83066.76822	12465.9	12.47	
L2-SSM	21	108	2268	19.82	22.50	1623.83	0	75.71	64.3296	1010.22	299601.1936	44951.76	44.95	
L2-SSC	21.8	6	130.8	22.55	25.23	2099.91	0	90.02	60.8419	1012.36	19578.82182	2949.54	2.95	
L2-PSC	26.1	12	313.2	18.79	21.12	2067.11	0	95.44	67.726	1027.05	39087.91497	5885.028	5.89	
L2-ASC	27.7	6	166.2	17.38	19.73	1995.65	0	93.47	72.2045	1033.82	19170.87485	2888.556	2.89	
L2-ASM	27	12	324	16.60	18.92	1778.86	0	88.81	84.2429	1030.77	35792.28313	5378.4	5.38	
L8-SC	19.6	1	19.6	27.30	30.70	2389.73	0	94.79	57.3528	1006.94	3548.813923	535.08	0.54	
L8-SM	19	5	95	23.35	27.48	1810.53	0	77.92	59.5812	2127.66	20378.44665	2218.25	2.22	
L8-SSM	21	16	336	22.15	25.14	1935.95	0	84.32	64.3296	1010.22	49517.17417	7442.4	7.44	
L8-PSC	26.1	2	52.2	21.86	25.41	2579.52	0	109.58	70.3539	1027.05	7573.003096	1141.092	1.14	
L8-ASC	27.7	1	27.7	21.00	23.98	2635.94	0	113.49	72.2045	1033.82	3855.455067	581.7	0.58	
L8-ASM	27	2	54	20.29	23.28	2414.68	0	106.36	84.2429	1030.77	7272.111055	1095.66	1.10	
Non-Residential Area	1032.3	1	1032.3	7.20	8.62	2663.33	18034.281	11871.45	28935.37	7979.68	54649.962	7432.56	7.43	14834.151
Total	1444	223	5825.7								711,118.45	105,203.27	105.20	

Be Green Energy

kWh/annum Baseline + Passive/Energy Efficiency Measures + ASHP

Typical Unit	Area m²	Quantity	Total Area m²	DER	TER	Heating	Cooling	Auxillary	Lighting	Hot Water	Total Kwh/Annum	Carbon kg Co2 / Annum	Tonnes	PV (KWH)
					TER Worksheet	DER Sheet (Row 211) + (Row 211 x 0.075)	DER Sheet Row 222	DER Sheet (Row 225)	DER Sheet Row 222	DER Sheet (Row 233) + (Row 233 x 0.075)				
L1-SC	19.6	1	19.6	8.32	31.14	98.43	0.00	35.57	57.33	926.39	1,117.72	163.07	0.16	
L1-SM	19	1	19	7.90	28.89	21.95	0.00	32.28	57.13	925.26	1,036.62	150.10	0.15	
L1-SSM	21	11	231	7.28	26.72	28.97	0.00	58.94	61.33	929.40	11,865.07	1681.68	1.68	
L1-ASC	27.7	1	27.7	6.51	24.44	160.18	0.00	50.90	70.61	951.11	1,232.80	180.33	0.18	
L1-SSC	21.8	1	21.8	7.90	30.72	144.27	0.00	40.61	60.85	931.37	1,177.11	172.22	0.17	
L2-SC	19.6	6	117.6	7.58	25.91	13.47	0.00	29.23	57.35	926.39	6,158.64	891.41	0.89	
L2-SM	19	30	570	7.71	24.61	0.32	0.00	28.69	59.58	925.26	30,415.77	4394.70	4.39	
L2-SSM	21	108	2268	7.06	22.50	0.54	0.00	30.90	64.33	929.40	110,718.51	16012.08	16.01	
L2-SSC	21.8	6	130.8	7.14	25.23	46.85	0.00	33.47	60.84	931.37	6,435.17	933.91	0.93	
L2-PSC	26.1	12	313.2	6.06	21.12	35.49	0.00	58.12	67.73	944.89	13,274.66	1897.99	1.90	
L2-ASC	27.7	6	166.2	5.75	19.73	32.88	0.00	39.38	72.20	951.11	6,573.47	955.65	0.96	
L2-ASM	27	12	324	5.78	18.92	7.01	0.00	49.31	84.24	948.31	13,066.41	1872.72	1.87	
L8-SC	19.6	1	19.6	8.09	30.70	74.10	0.00	31.05	57.35	926.39	1,088.89	158.56	0.16	
L8-SM	19	5	95	7.92	27.48	24.97	0.00	28.69	59.58	925.26	5,192.53	752.40	0.75	
L8-SSM	21	16	336	7.29	25.14	30.30	0.00	31.80	64.33	929.40	16,893.20	2449.44	2.45	
L8-PSC	26.1	2	52.2	6.70	25.41	139.05	0.00	42.56	70.35	944.89	2,393.71	349.74	0.35	
L8-ASC	27.7	1	27.7	6.28	23.98	124.31	0.00	44.47	72.20	951.11	1,192.10	173.96	0.17	
L8-ASM	27	2	54	6.20	23.28	76.37	0.00	42.00	84.24	948.31	2,301.86	334.80	0.33	
Non-Residential Area	1032.3	1	1032.3	7.20	8.62	2663.33	18034.28	11871.45	28935.37	7979.68	54,649.96	7432.56	7.43	14834.151
Total	1444	223	5825.7			3,722.79	18,034.28	12,579.41	30,116.96	24,825.32	286,784.18	40,957.32	40.96	

Energy Savings

Energy Savings									
Typical Unit	Total Area	Quantity	Total Area	BaselineTotal kWh/annum	Baseline kgCO2/annum	Passive Energy Efficiency kwh /annum	Passive Energy Efficiency & PVskwh /annum	Total kwh/annum displaced	Total % kwh/annum displaced
L1-SC	19.6	1	19.6	4,041	610	3605	1118	2,923	72.34
L1-SM	19	1	19	3,629	549	3169	1037	2,593	71.44
L1-SSM	21	11	231	40,951	6,172	35954	11865	29,086	71.03
L1-ASC	27.7	1	27.7	4,479	677	3801	1233	3,246	72.47
L1-SSC	21.8	1	21.8	4,429	670	3927	1177	3,252	73.42
L2-SC	19.6	6	117.6	20,216	3,047	17569	6159	14,058	69.54
L2-SM	19	30	570	93,275	14,028	83067	30416	62,860	67.39
L2-SSM	21	108	2268	339,359	51,030	299601	110719	228,641	67.37
L2-SSC	21.8	6	130.8	21,874	3,300	19579	6435	15,439	70.58
L2-PSC	26.1	12	313.2	43,857	6,615	39088	13275	30,582	69.73
L2-ASC	27.7	6	166.2	21,742	3,279	19171	6573	15,169	69.77
L2-ASM	27	12	324	40,169	6,130	35792	13066	27,102	67.47
L8-SC	19.6	1	19.6	3,767	602	3549	1089	2,678	71.10
L8-SM	19	5	95	22,008	2,611	20378	5193	16,815	76.41
L8-SSM	21	16	336	18,865	8,447	49517	16893	1,971	10.45
L8-PSC	26.1	2	52.2	8,784	1,326	7573	2394	6,390	72.75
L8-ASC	27.7	1	27.7	4,396	664	3855	1192	3,204	72.88
L8-ASM	27	2	54	8,331	1,257	7272	2302	6,030	72.37
Non-Residential Area	1032.3	1	1032.3	65,706	8,898	54650	54650	11,056	16.83
Total	1,444	223	5,826	769,879.01	119,912.60	711,118.45	286,784.18	483,094.83	62.75

Carbon Savings

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2021 baseline	119.9		
Be lean	101.8	18.1	15%
Be clean	101.8	0.0	0%
Be green	42.4	59.4	50%
Total Savings	-	77.6	65%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**1,270.8**	-

APPENDIX B – SAMPLE BRUKL REPORT

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Clarendon Road, London - Commercial Spaces Be Lean + Green — As designed

Date: Thu Jan 29 13:02:32 2026

Administrative information

Building Details

Address: 25-27 Clarendon Road, London, N8 0DD

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.d.0

Interface to calculation engine: Energy Simulator

Interface to calculation engine version: 10.10.0.199

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

Certifier details

Name: Hasnaat Mahmood

Telephone number: 01344 628821

Address: Cudd Bentley, Ashurst Manor, Sunninghill, SL5 7DD

Foundation area [m²]: 340.43

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), kgCO_2/m²annum	8.62	
Building CO_2 emission rate (BER), kgCO_2/m²annum	7.2	
Target primary energy rate (TPER), kWh/m²annum	94.09	
Building primary energy rate (BPER), kWh/m²annum	77.9	
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	$U_{i-Limit}$	U_{i-Calc}	U_{i-Calc}	First surface with maximum value
Walls*	0.26	0.18	0.26	Partition 3
Floors	0.18	0.13	0.13	Internal Floor 1
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.12	0.12	Exposed Roof 1
Windows** and roof windows	1.6	1.4	1.4	Window 1
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{i-Limit}$ = Limiting area-weighted average U-values [W/(m²K)] U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

U_{i-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 this tool.

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	3

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Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- Commercial Spaces

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6	-	1	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					NO

* 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- Default DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
FF.KIT	-	-	0.3	-	-	-	-	-	-	-	N/A
GF.LAUND	-	-	0.3	-	-	-	-	-	-	-	N/A
GF.TEA	-	-	0.3	-	-	-	-	-	-	-	N/A
GF.WC1	-	-	0.3	-	-	-	-	-	-	-	N/A
GF.WC2	-	-	0.3	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
FF.CINEMA	140	-	-
FF.DINING	140	15	10
FF.DINING1	140	15	10
FF.GARDENR	140	-	-

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General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
GF.FITNESS	140	-	-
GF.GAMES	140	-	-
GF.GYM	140	-	-
GF.OFF	140	-	-
GF.REC	140	15	9
GF.WORKS	140	-	-
8F.COMMUNA	140	-	-
FF.KIT	140	-	-
GF.LAUND	140	-	-
GF.TEA	140	-	-
GF.WC1	140	-	-
GF.WC2	140	-	-
GF.ST	110	-	-

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?
FF.CINEMA	NO (-73,6%)	NO
FF.DINING	NO (-25,6%)	NO
FF.DINING1	NO (-35,3%)	NO
FF.GARDENR	NO (-31,6%)	NO
GF.FITNESS	NO (-7,9%)	NO
GF.GAMES	NO (-26,1%)	NO
GF.GYM	NO (-17,5%)	NO
GF.OFF	N/A	N/A
GF.REC	NO (-23,4%)	NO
GF.WORKS	NO (-41,4%)	NO
8F.COMMUNA	NO (-51,1%)	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

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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	1032.3	1032.3
External area [m²]	1815.9	1815.9
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	462.31	501.53
Average U-value [W/m²K]	0.25	0.28
Alpha value* [%]	48.15	17.95

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
100	**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	2.58	1.79
Cooling	17.47	11.07
Auxiliary	11.5	21.44
Lighting	28.03	20.62
Hot water	7.73	11.64
Equipment*	76.67	76.67
TOTAL**	**67.3**	**66.55**

* 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	14.37	2.68
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*14.37*	*2.68*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	330.33	245.07
Primary energy [kWh/m²]	77.9	94.09
Total emissions [kg/m²]	7.2	8.62

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HVAC Systems Performance

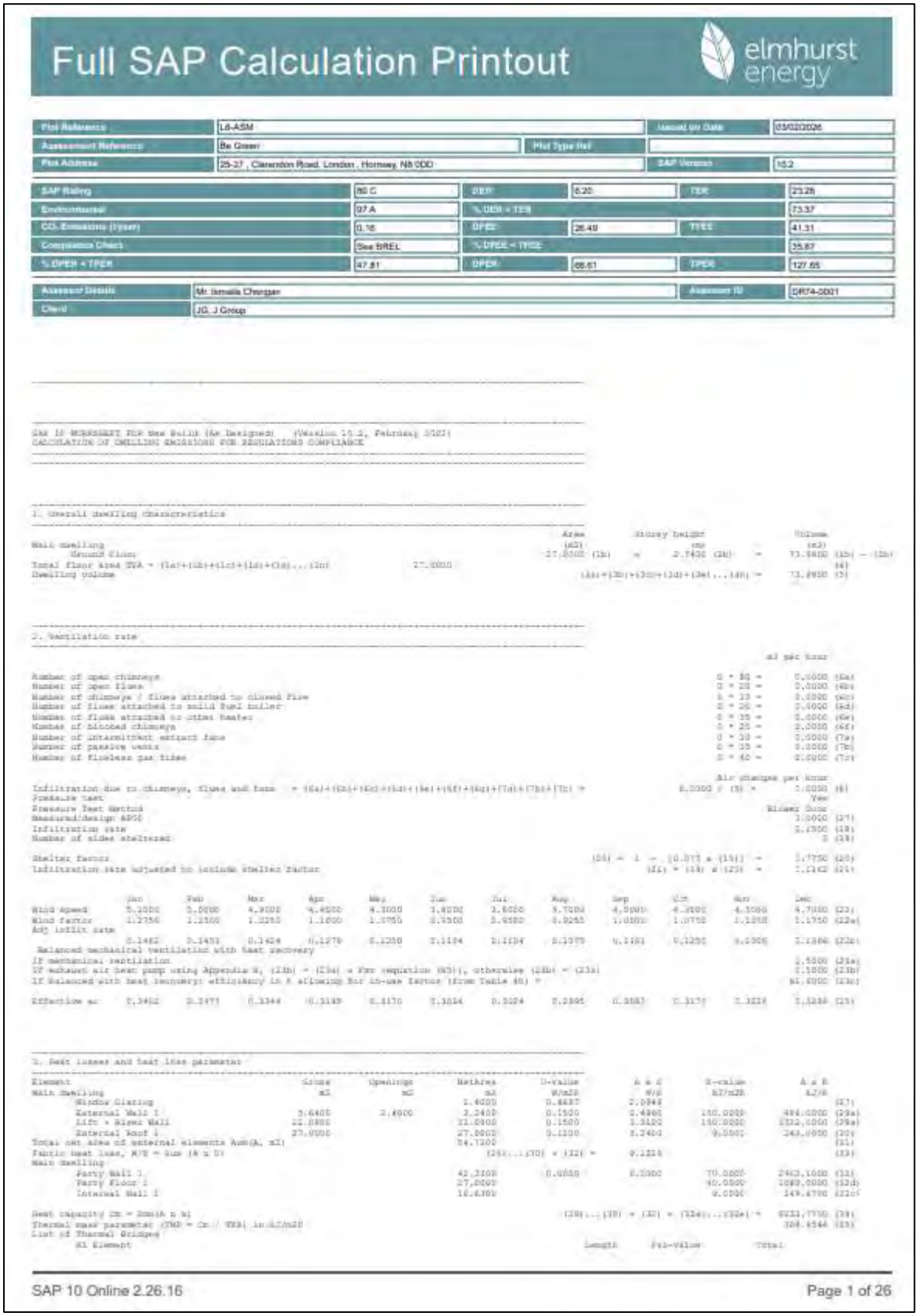
System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	37.2	269.2	2.8	19.2	11.7	3.63	3.89	4	6
	Notional	18.7	193.2	2	12.2	20.8	2.64	4.4	----	----
[ST] No Heating or Cooling										
	Actual	118.8	501.6	0	0	10.2	0	0	0	0
	Notional	101.3	526	0	0	20.5	0	0	----	----
[ST] No Heating or Cooling										
	Actual	111.6	36.7	0	0	0	0	0	0	0
	Notional	106.2	36.2	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

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APPENDIX C – SAMPLE SAP REPORT



Full SAP Calculation Printout

elmhurst energy

Plot Reference	L8-ASM	Issued on Date	03/02/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address	25-27 , Clarendon Road, London , Hornsey, N8 0DD	SAP Version	10.2

SAP Rating	80 C	DER	6.20	TER	23.26
Environmental	97 A	% DER < TER			73.37
CO2 Emissions (t/year)	0.16	DFEE	26.49	TFEE	41.31
Compliance Check	See BREL	% DFEE < TFEE			35.87
% DPER < TPER	47.81	DPER	66.61	TPER	127.65

Assessor Details	Mr Ismaila Cherqaw	Assessor ID	DR74-0021
Client	JG J Group		

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2023)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	27.0000 (1b)	x 2.7400 (2b) =	73.9800 (3b) - (3n)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	27.0000		(4)
Dwelling volume		(4a)+(4b)+(4c)+(4d)+(4e)...(4n) =	73.9800 (5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 40 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	0 * 10 =	0.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.1500 (18)
Number of sides sheltered		0 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	1.1750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1762 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.4000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.1000	1.1250	1.1750	(22a)
Adj infilt rate	0.2462	0.2451	0.2424	0.2279	0.2258	0.2104	0.2104	0.2079	0.2183	0.2350	0.2385	0.2484	(22b)
Balanced mechanical ventilation with heat recovery													
If mechanical ventilation												0.5000	(23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												91.4000	(23c)
Effective ac	0.3462	0.3477	0.3344	0.3189	0.3170	0.3054	0.3054	0.2995	0.3083	0.3179	0.3224	0.3294	(25)

3. Heat losses and heat loss parameter

Element	Gross a1	Openings a2	Nethrea a3	U-value W/m2K	A x U W/K	k-value kJ/m2K	A x k kJ/K	
Main Dwelling								
Window Glazing			1.4000	0.8437	2.0948			(27)
External Wall 1	5.6400	2.4000	3.2400	0.1500	0.4860	150.0000	486.0000	(29a)
Lift + Riser Wall	22.0800		22.0800	0.1500	3.3120	150.0000	3312.0000	(29a)
External Roof 1	27.0000		27.0000	0.1100	2.9400	9.0000	243.0000	(30)
Total net area of external elements Aum(A, m2)			54.1200					(31)
Fabric heat loss, H/T = Sum (A x U)			(26)...(30) + (32) =		9.2216			(33)
Main Dwelling								
Party Wall 1			42.3100	0.0000	0.0000	70.0000	2963.1000	(32)
Party Floor 1			27.0000			40.0000	1080.0000	(32d)
Internal Wall 1			16.6300			9.0000	149.6700	(32e)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		8231.7710	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							304.9544	(35)
List of Thermal Bridges								
E1 Element				Length	Psi-value	Total		

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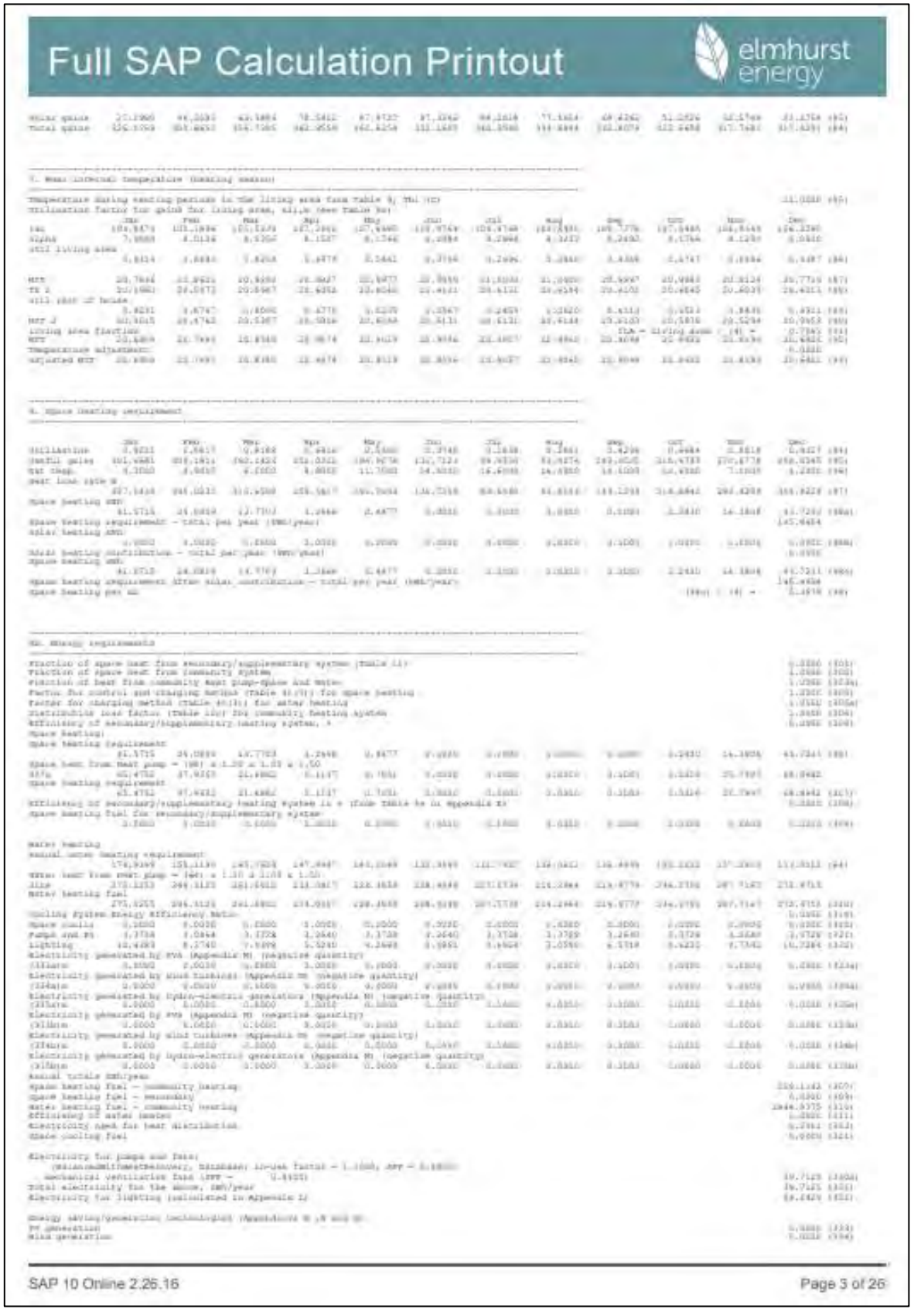
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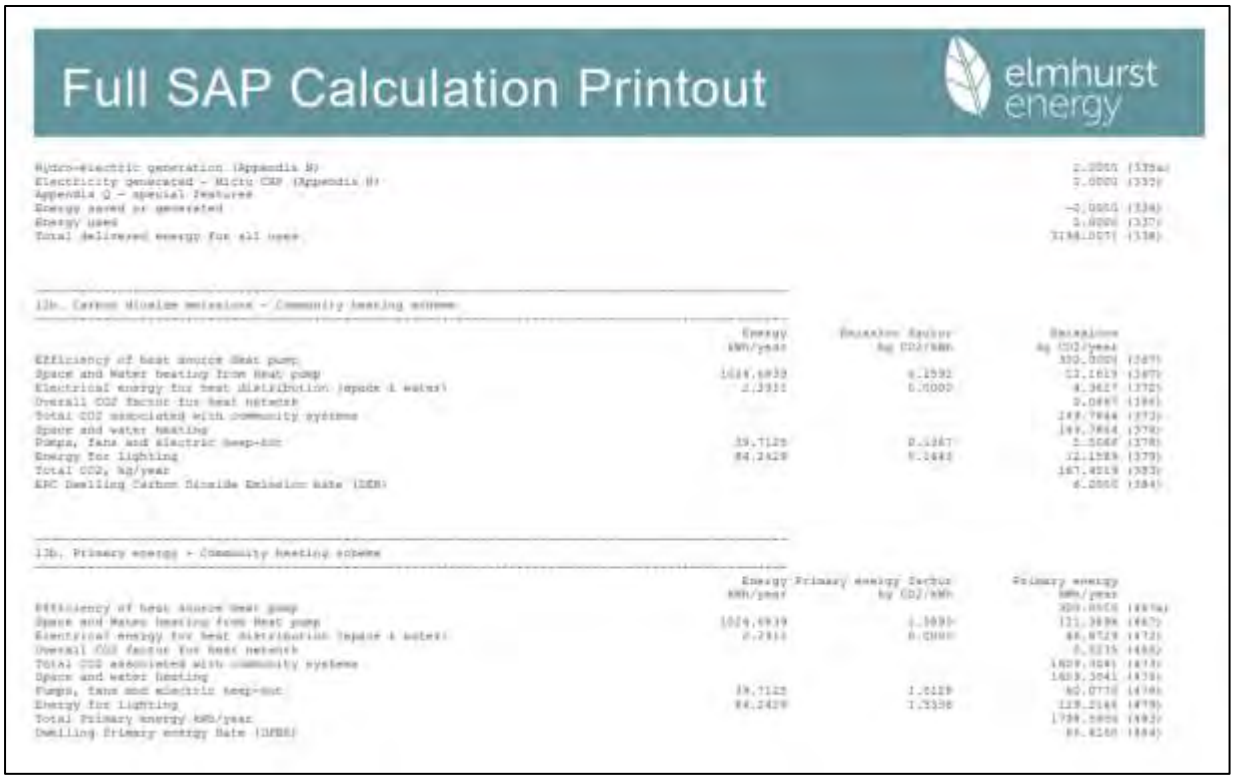
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Full SAP Calculation Printout

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Hydro-electric generation (Appendix M) 2.0000 (335a)
Electricity generated - Micro CHP (Appendix G) 0.0000 (332)
Appendix Q - special features
Energy saved or generated -0.0000 (334)
Energy used 0.0000 (337)
Total delivered energy for all uses 3148.0071 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Efficiency of heat source (heat pump)			300.0000 (367)
Space and Water heating from Heat pump	1024.6939	0.1592	53.1619 (367)
Electrical energy for heat distribution (space & water)	2.3931	0.0000	0.3627 (372)
Overall CO2 factor for heat network			0.0697 (196)
Total CO2 associated with community systems			149.7844 (373)
Space and water heating			149.7844 (376)
Pumps, fans and electric keep-hot	39.7125	0.1267	5.0068 (378)
Energy for lighting	84.2429	0.1482	12.1585 (379)
Total CO2, kg/year			167.9519 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.2000 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Efficiency of heat source (heat pump)			300.0000 (464a)
Space and Water heating from Heat pump	1024.6939	1.3693	121.3896 (467)
Electrical energy for heat distribution (space & water)	2.3931	0.0000	66.8729 (472)
Overall CO2 factor for heat network			0.0215 (466)
Total CO2 associated with community systems			1609.1041 (473)
Space and water heating			1609.1041 (476)
Pumps, fans and electric keep-hot	39.7125	1.2129	60.0770 (478)
Energy for lighting	84.2429	1.9338	119.2144 (479)
Total Primary energy kWh/year			1739.5000 (482)
Dwelling Primary energy Rate (DPER)			66.6160 (484)

APPENDIX D – MODELLING INPUTS DETAILED

Heating and Cooling		
System Type	**Heating /(S)COP**	**Cooling /(S)EER**
Residential ASHP Network (dwellings)	3	X
Communal ASHP (Commercial areas)	4	6

Hot Water System	
Type	**Fuel**
Water Heating Via ASHP	Electric

Ventilation	
Area Type	**Ventilation**
Communal Areas	Ventilation will be provided via standard MVHR units, with extract-only ventilation to WCs and kitchens.
Dwellings	Ventilation will be provided by MVHR units, designed to deliver increased airflow rates where required to sufficiently mitigate overheating.

Residential	
Building Element	**U-Value (W/m^2K)**
External Walls	0.15
Party Walls to Unheated Spaces	0.15
Exposed Floors to Level 0	0.13
Exposed Roof	0.12
Personnel Door	1.0
Glazing	Standard Triple Glazed Windows - 0.9 (g - 0.40) Opaque Panels - 0.4
Air Permeability	3 $m^3/hr/m^2$@ 50 Pa

Commercial	
Building Element	**U-Value (W/m^2K)**
External Walls	0.15
Ground & Exposed Floors	0.13

Exposed Roof	0.12
Glazing	1.4 (g= 0.4)
Air Permeability	3 m³/hr/m²@ 50 Pa

Lighting	
Lighting Type	**lumens per circuit watt**
LED	**Dwellings and storage areas:** 110 lm/W **Other commercial / non-residential areas:** 140 lm/W

Thermal Bridging Details			
Sap Ref	**Junction Detail**	**Ψ Value (W/mK)**	**Source**
E2	Other Lintels (Including other steel lintels)	0.02	Unilin Insulation UK Ltd (Government Approved Source)
E3	Sill	0.04	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E4	Jamb	0.05	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E7	Intermediate Floor between dwellings (in blocks of flats)	0.07	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E15	Roof With Parapet	0.111	Unilin Insulation UK Ltd (Government Approved Source)
E16	Corner (normal)	0.09	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E17	Corner (inverted)	0	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
E18	Party wall between dwellings	0.08	Unilin Insulation UK Ltd (Government Approved Source)
E20	Exposed Floor	0.047	Knauf Insulation (Government Approved Source)
E25	Staggered Party Wall Between Dwellings	0.12	*Individually Assessed from Old ES (Integration Consultancy Ltd)*
P3	Intermediate floor between dwellings (in blocks of flats)	0	Table K1 Default
P4	Party Wall (Roof)	0.12	No Source – Minimum target figure needed
P7	Party Exposed Floor	0.12	No Source – Minimum target figure needed

To achieve the predicted energy performance and carbon savings outlined in this Energy Statement, the development must adhere to the proposed energy strategy, including all mechanical, electrical, and fabric specifications detailed herein. Any deviation from the proposed design or systems may result in differing energy performance and carbon outcomes.

APPENDIX E - ENERGY MODELLER QUALIFICATIONS

The SAP residential modelling for the co-living development was carried out by Ismaila Changan, who also prepared the overall energy strategy and Energy Statement. His On-Construction Domestic Energy Assessor (OCDEA) certificate and Building Design Certificate are shown in Figures 8.1 and 8.2.

The SBEM energy modelling was undertaken by Hasnaat Mahmood, with his qualifications and CV provided in Figure 8.3.

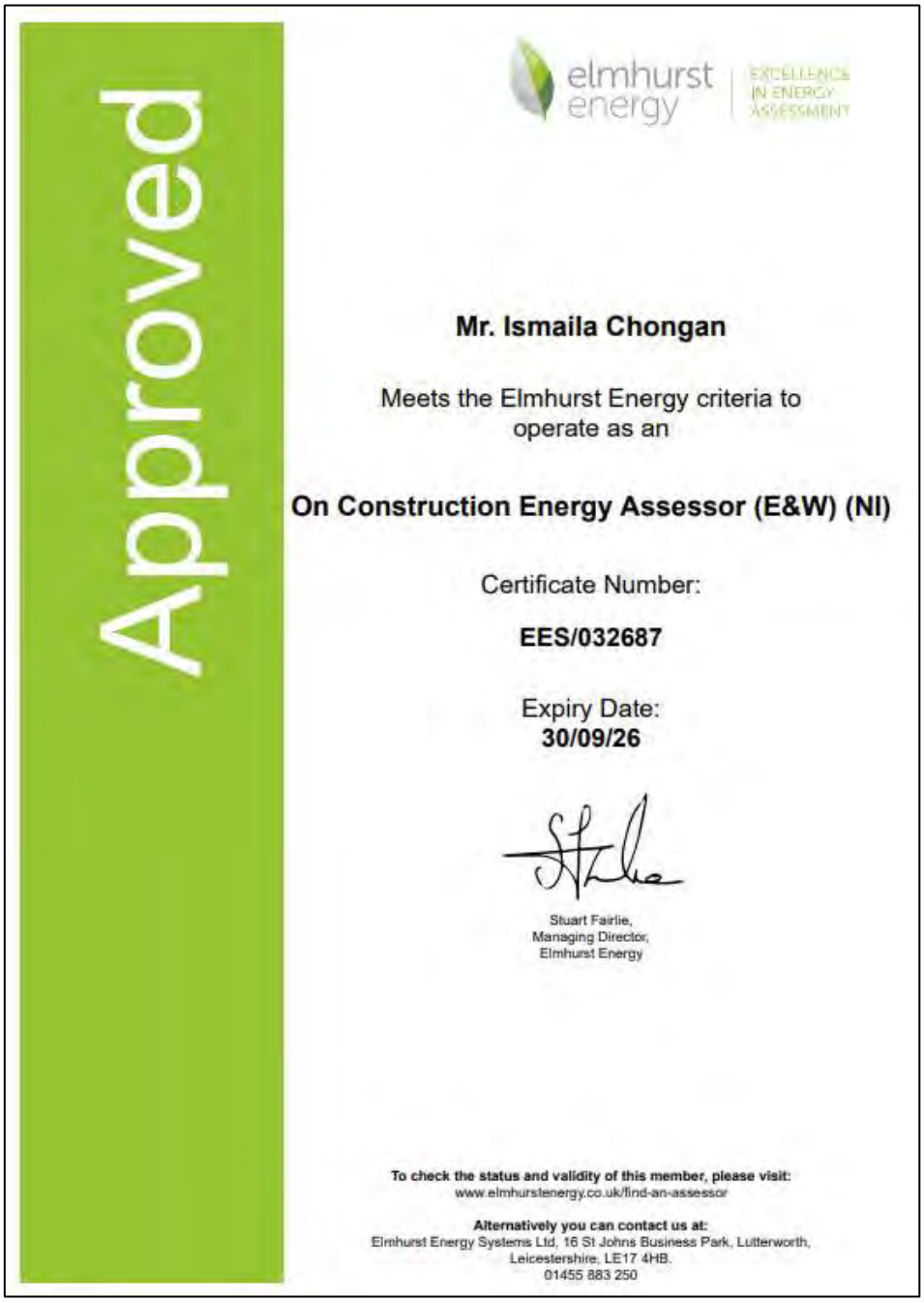


Figure 8.1 Residential Energy Modeller Qualifications



CIBSE Certification Limited

This Certificate is to certify that

Ismaila Chongan

has complied with the requirements of the following

LCC Building Design

to comply with the Building Regulations and the EPBR
in England, Wales & Northern Ireland

and is authorised to use the CIBSE Certification Mark

Date of Issue: 15/01/2026

Certification number: LCC 206839

Date of Expiry: 31/08/2026

Date of First Issue: 15/01/2026

This certificate is valid only with a current ID card and online register entry. You can check the current validity of this certificate at https://www.cibsecertification.co.uk

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Signed on behalf of CIBSE Certification Ltd

Authourised Signatory

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CCF 310 Rev 8

Figure 8.2 Energy Strategist Qualifications



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(0.56) Miles

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Email: hasnaat.mahmood@cuddbentley.co.uk
Tel: 01344628821

LCC: **LCC Building Design; LCC Simulation;**

LCEA: **LCEA EPC Level 3 and 4 EW&NI;**

Figure 8.3 Non-Residential Energy Modeller Qualifications



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