Sustainability and Energy Statement

3 Lavant Road, Chichester

Prepared by Ivan Ball

Bluesky Unlimited
39 Marsh Baldon
Oxfordshire
OX44 9LP

ivan@blueskyunlimited.co.uk

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Executive Summary

This Sustainability and Energy Statement has been prepared in support of a planning application for the construction of six, 2 and 3-bedroom apartments on land at 3 Lavant Road, Chichester.

This Statement shows how selected energy efficiency, low carbon and renewable energy measures have been considered and those, which will be incorporated into the detailed design.

SAP calculations have been prepared for representative units based on the construction specification set out in the Statement and the detailed planning drawings.

The SAP Summary Reports are attached as Appendix 1.

The fabric insulation standards of the apartments exceed the minimum required by the Building Regulations.

It is proposed to install an air source heat pump into each apartment.

The total site emissions and reductions can be summarised as follows;

	Emissions	% Reduction
	kg CO_2 per year	
Baseline Emissions (TER)	5,995	
Be Green Emissions (DER) – using ASHPs	2,316	**61.37%**

1.0 Introduction

This report has been commissioned by Hestia Homes and provides a Sustainability and Energy Statement in support of a planning application for the construction of six, 2 and 3-bedroom apartments on land at 3 Lavant Road, Chichester.

This Statement describes the methodology used in assessing the development and the initiatives proposed.

The applicant is committed to a sustainable development and the apartments have been designed and will be built to minimise carbon emissions.

The objective has been to reduce the energy demand to an economic minimum by making investments in the parts of the building that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric.

Once a cost-effective structure has been designed, low carbon and renewable technologies have been considered to provide heat and/or electricity.

The following hierarchy has been followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources

The report has been prepared by Ivan Ball of Bluesky Unlimited who are sustainability consultants.

2.0 Planning Policy Context

National Policy

The UK Government published its sustainable development strategy in 1999 entitled "A better quality of life: A strategy for sustainable development in the UK". This sets out four main objectives for sustainable development in the UK:

- Social progress that recognises the needs of everyone.
- Effective protection of the environment.
- Prudent use of natural resources.
- Maintenance of high stable levels of economic growth and employment.

Sustainable Communities: Building for the Future, known colloquially as the Communities Plan was published in 2003. The Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in parts of the country, low demand in other parts and the quality of our public spaces. The Communities Plan describes sustainable communities as: Active, inclusive and safe, well run, environmentally sensitive, well designed and built, well connected, thriving, well served and fair for everyone.

The most relevant national planning policy guidance on sustainability is set out in:

- National Planning Policy Framework - 2023

Paragraph 157 states;

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

Local Policy

The local planning policy framework is provided by the **Chichester Local Plan: Key Policies 2014-2029**. The following policies are of particular relevance to this Statement.

Chichester Local Plan

Policy 1

Presumption in Favour of Sustainable Development

When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

Planning applications that accord with the policies in this Local Plan (and, where relevant, with policies in neighbourhood plans) will be approved, unless material considerations indicate otherwise.

Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise – taking into account whether:

1. *Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or*
2. *Specific policies in that Framework indicate that development should be restricted*

Policy 40

Sustainable Design and Construction

For all new dwellings or for new non-domestic buildings, evidence will be required by the developer to demonstrate that all of the following criteria have been considered (proportionate to the scale of development):

1. *How the proposal aims to protect and enhance the environment, both built and natural. Where this is not possible, how any harm will be mitigated;*
2. *The proposal achieves a minimum of 110 litres per person per day including external water use;*
3. *New development complies with Building for Life Standards or equivalent replacement national minimum standards, whichever are higher by ensuring it is accessible to all, flexible towards future adaptation in response to changing life needs, easily accessible to facilities and services; and takes into account the need for on-site waste reduction and recycling;*

4. *Where appropriate, the proposals apply sound sustainable design, good environmental practices, sustainable building techniques and technology, including the use of materials that reduce the embodied carbon of construction and the use of re-used or recycled materials;*
5. *Energy consumption will be minimised and the amount of energy supplied from renewable resources will be maximised to meet the remaining requirement, including the use of energy efficient passive solar design principles where possible;*
6. *The proposals include measures to adapt to climate change, such as the provision of green infrastructure, sustainable urban drainage systems, suitable shading of pedestrian routes and open spaces and drought resistant planting/landscaping;*
7. *The historic and built environment, open space, and landscape character will be protected and enhanced;*
8. *The natural environment and biodiversity will be protected and/or where appropriate provision will be made for improvements to biodiversity areas and green infrastructure;*
9. *The development is appropriate and sympathetic in terms of scale, height, appearance, form, siting and layout and is sensitively designed to maintain the tranquillity and local character and identity of the area; and*
10. *The reduction of the impacts associated with traffic or pollution (including air, water, noise and light pollution) will be achieved, including but not limited to the promotion of car clubs and facilities for charging electric vehicles.*

The Council are also working on their new local plan and this Statement is in compliance with the **Chichester Local Plan 2021 – 2039: Proposed Submission**.

3.0 Assessment Methodology

The baseline carbon dioxide emissions from the apartments have been established by preparing SAP calculations for representative units. The two ground-floor apartments are similar to one another and SAP calculations have been prepared for one of them, which are presented as representative of both. Similarly for the mid-floor and top-floor units.

The calculations have been based on the methodology set out in Part L – 2021 and have been based upon certain assumptions as to the building specification and these are clarified below.

Emission Factors

The CO_2 emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L (2021).

	kg CO_2/kWh
Mains gas	0.210
Grid supplied and displaced electricity	0.136

4.0 Proposal

The accommodation schedule for the proposal is as follows:

Unit Type	Number	Area	Total Area
		m^2	m^2
2-Bedroom Top-floor apartments	2	91.7	183.4
2-Bedroom Mid-floor apartments	2	112.8	225.6
3-Bedroom Ground-floor apartments	2	130.1	260.2
Total	**6**		**669.2**

5.0 Energy Efficiency

5.1 Demand Reduction (Be Lean and Be Clean)

Design

The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical.

Passive Design Measures

The passive design measures proposed include;

Passive Solar Gain

Passive measures include allowing for natural ventilation and exposed thermal mass coupled with high levels of insulation, air tightness and the control of solar gain.

The apartments have been designed with multiple aspects but they predominantly benefit from aspect towards the east (rear) and west (front). The homes will have access to direct sunlight throughout the day.

Natural Daylighting

The orientation and the size of the windows will be optimised to maximise the amount of natural daylight and therefore reduce the demand for artificial lighting.

Efficient Building Fabric

Building Envelope

U-values of the building envelope must meet Building Regulations Part L1 but further improvements to U-values will reduce the heating requirements.

There is a commitment to exceed the minimum U-values required by the Building Regulations.

The apartments are suited to traditional masonry load bearing construction with concrete beam and block ground floors and timber joist first and second floors. It is assumed the ground floors are insulated with 150mm or PIR insulation.

The external walls will be built in 300mm cavity wall construction with 100mm facing brick, 100mm fully filled cavities and 100mm medium density blocks internally.

Sloping ceilings and flat roofs will be insulated with at least 150mm of PIR insulation. The low level walls within the top-floor accommodation and dormer cheeks will be insulated with 150mm PIR insulation.

Windows are proposed as double glazed with Low 'e' soft coat and argon filled.

It is proposed to set maximum limits for the elemental U-values as follows:

Elements	Part L Limiting U-values	Proposed U-values	Proposed Improvement
	W/m²K	W/m²K	
Ground Floors	**0.18**	**0.13**	**39%**
External Walls	**0.26**	**0.18**	**44%**
Sloping Ceilings & Flat Roofs	**0.16**	**0.15**	**6%**
Windows and Glazed Doors	**1.60**	**1.20**	**25%**
External Doors	**-**	**1.20**	**-**

'g' Value of Glazing	**0.54**

Air Leakage

Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration or air permeability) often through poor sealing of joints and openings in the building.

The Building Regulations set a minimum standard for air permeability of 8 m^3 of air per hour per m^2 of envelope area, at 50Pa and it is proposed to target a 50% improvement over Building Regulations and achieve a permeability of 4.0 $m^3/hr/m^2$.

Thermal Bridging

The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO_2 reduction targets set out in this strategy.

The thermal details for the building will be modelled at the detailed working drawing stage but for the purposes of this assessment the thermal details formulated by the Recognised Construction Details have been used. Any details not available on the RCD website will be modelled. These will enable the building to achieve the higher energy efficiency requirements of the Building Regulations.

The following table provides the values currently used within the modelled SAP calculation.

Reference	Location	PSI Values
		W/mK
E2	Other Lintels (including other steel lintels)	0.028
E3	Sill	0.024
E4	Jamb	0.019
E5	Ground Floor	0.046
E7	Party Floor	0.036
E10	Eaves (Ceiling)	0.051
E14	Flat Roof	0.041
E16	Corner (normal)	0.037
E17	Corner (inverted)	-0.079
E18	Party Wall	0.041

Ventilation

As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2021 to address the possibility of overheating and poor air quality. The assessment has been based on mechanical extract ventilation to all units.

Active Design Measures will include;

Efficient Lighting and Controls

Throughout the scheme natural lighting will be optimised.

Part L of the Building Regulations requires all light fitting to have lamps with a minimum luminous efficacy of 80 light source lumens per circuit-watt.

Space Heating and Hot Water

The fabric specification has been set out above but the M+E installation will include the installation of air source heat pumps to provide space heating and hot water to each apartment.

5.2 Low Carbon and Renewable Technologies (Be Clean and Be Green)

The carbon dioxide emissions established above have been used to test the viability of various renewable and low carbon technologies and considers the ability of each technology to comply with the planning requirements.

The Government's Renewable Obligation defines renewable energy in the UK. The identified technologies are;

- Small hydro-electric
- Landfill and sewage gas
- Onshore and offshore wind
- Biomass
- Tidal and wave power
- Geothermal power
- Solar

The use of landfill or sewage gas, offshore wind or any form of hydroelectric power is not suitable for the site due to its location. The remaining technologies are considered below;

Wind

Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.

The Government wind speed database predicts local wind speeds at Lavant Road to be 5.0 m/s at 10m above ground level and 5.8 m/s at 25m above ground level. This is below the level generally required for commercial investment in large wind turbines. In addition, the land take, potential for noise and signal interference make a large wind turbine unsuitable for this development.

Roof mounted turbines could be used at the development to generate small but valuable amounts of renewable electricity but the small output and contribution to total emissions means any investment would be small and purely tokenism. The use of wind turbines will also have a detrimental aesthetic impact on the appearance of the development.

Combined Heat and Power and Community Heating

Combined heat and power (CHP) also called co-generation is a de-centralised method of producing electricity from a fuel and 'capturing' the heat generated for use in buildings. The plant is essentially a small-scale electrical power station. The production and transportation of electricity via the National Grid is very inefficient with over 65% of the energy produced at the power station being lost to the atmosphere and through transportation.

CHP units are generally fuelled by gas and generate electricity with heat being a by-product of the generation process. The heat is usually used to meet the hot water load, which is fairly consistent throughout the year.

Historically CO_2 savings have been achieved because gas has been used to generate electricity and gas has had a lower emissions factor than electricity. However, with the de-carbonisation of the electricity grid the benefit of CHP is negated.

CHP is no longer an appropriate technology.

Ground Source Heat Pumps

Sub soil temperatures are reasonably constant and predictable in the UK, providing a store of the sun's energy throughout the year. Below London the groundwater in the lower London aquifer is at a fairly constant temperature of 12° C. Ground source heat pumps (GSHP) extract this low-grade heat and convert it to usable heat for space heating.

GSHP operates on a similar principle to refrigerators, transferring heat from a cool place to a warmer place. They operate most efficiently when providing space heating at a low temperature, typically via under floor heating or with low temperature radiators.

GSHPs are not appropriate for apartment applications.

Solar

(i) Solar Water Heating

Solar hot water panels use the suns energy to directly heat water circulating through panels or pipes. The technology is simple and easily understood by purchasers.

Solar hot water heating panels are based generally around two types, which are available being 'flat plate collectors' and 'evacuated tubes'. Flat plate collectors can achieve an output of up to 1,124 kWh/annum (Schuco) and evacuated tubes can achieve outputs up to 1,365 kWh/annum (Riomay).

It is likely that the use of solar hot water heating panels would only show a marginal increase in the reduction in emissions.

In addition, the installation of air source heat pumps already reduces emissions significantly, further negating the benefit of solar hot water heating panels.

Solar hot water heating panels are not proposed.

(ii) Photovoltaics

Photovoltaic panels (PV) provide clean silent electricity. They generate electricity during most daylight conditions although they are most efficient when exposed to direct sunlight or are orientated to face plus or minus 30 degrees of due south.

PV panels can be integrated into many different aspects of a development including roofs, walls, shading devices or architectural panels and typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.

Photovoltaic panels are not proposed.

Air Source Heat Pumps (ASHP)

Air sourced heat pumps operate using the same reverse refrigeration cycle as ground source heat pumps; however, the initial heat energy is extracted from the external air rather than the ground. These heat pumps can be reversed to provide cooling to an area although this reduces the coefficient of performance of the pumps.

ASHP tend to have a lower coefficient of performance (CoP) than GSHP but are considerably less costly to install. They work well where there is a large low temperature demand but the efficiency can be impacted on, for example where there is a high hot water demand.

The proposal is appropriate for the installation of air source heat pumps and the SAP calculations have been based on the use of this technology.

5.3 Establishing Carbon Dioxide Emissions (Be Lean, Be Clean & Be Green)

The two ground-floor apartments are similar in scale and design, the two mid-floor apartments are similar in scale and design and the two top-floor apartments are similar in scale and design. Therefore, SAP calculations have been prepared for one of the ground-floor units, for one of the mid-floor units and for one of the top-floor units, which are presented as representative of all unit types.

The specification includes the installation of an air source heat pump to provide space heating and hot water to each unit.

The Summary SAP Reports for the modelled units are attached as Appendix 1 but the emissions can be summarised as follows;

Unit Type	Carbon Emissions TER	Carbon Emissions DER
	Kg $CO_2/m^2/yr$	Kg $CO_2/m^2/yr$
3-Bedroom Ground-floor apartment – 130.1 m^2	9.07	3.38
2-Bedroom Mid-floor apartment – 112.8 m^2	7.95	3.19
2-Bedroom Top-floor apartment – 91.7 m^2	10.04	3.91

Total Site Carbon Dioxide Emissions

The above results have been used to populate the following table, which provides the total TER and DER emissions from the site.

Unit Type	Area	TER Emissions	DER Emissions
		kg CO_2/yr	kg CO_2/yr
Ground-floor apartments	260.2	2,360	879
Mid-floor apartments	225.6	1,794	720
Top-floor apartments	183.4	1,841	717
Totals		**5,995**	**2,316**

Summary

The total emissions allowable through the Building Regulations (TER) are calculated as:

- **5,995 kg CO_2 per year**

With total actual site emissions (DER) assessed as:

- **2,316 kg CO_2 per year**

The carbon dioxide emissions are reduced by 3,679 kg CO_2 per year as a result of the energy efficiency measures and air source heat pumps.

This equates to a reduction of 61.37%.

5.4 Summary of Calculations and Proposals for Low-Carbon and Renewable Technologies

Be Lean, Be Clean and Be Green

SAP calculations have been prepared for a representative range of the apartments based on the 2021 Building Regulations.

It is proposed to install an air source heat pump into each apartment.

The Summary SAP Reports for the modelled units are attached as Appendix 1.

The total site (TER) CO_2 emissions are calculated as **5,995 kg CO_2 per year** (TER) and the emissions following the energy efficiency measures and air source heat pumps are **2,316 kg CO_2 per year** (DER)**.**

This equates to a reduction of **3,679 kg CO_2 per year** or **61.37%** of the total TER emissions.

Summary

The total reduction in emissions from energy efficiency, low-carbon and renewable technologies are calculated as; 3,679 kg CO_2 per year, which equates to a reduction of 61.37% (% of TER).

6.0 Climate change adaption and Water resources

Sustainable Drainage Systems (SUDS)

The site lies within Flood Zone 1 and is classified as being of low risk.

Surface Water Management

The Site Plan shows the apartments will benefit from a communal rear garden area and discretely located rainwater butts could be provided to store rainwater for use with landscaping maintenance.

Consideration has been given to the use of grey water recycling. However, customer's resistance to the appearance of the recycled water and the cost of the systems does not currently make them a viable option. They have therefore not been included in the proposals.

Water efficiency measures

In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.

The water efficiency measures included will ensure that the water use target of 110 litres per person per day is achieved.

Water efficient devices have been evaluated and will be installed. The specification of such devices will be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

The following devices will be incorporated within the apartments:

- water efficient taps;
- water efficient toilets;
- low output showers;
- flow restrictors to manage water pressures to achieve optimum levels and
- water meters.

Below is a typical specification, which would achieve the 110 Litres per person per day target (including five litres per person per day allowance for external water use).

Schedule of Appliance Water Consumption		
Appliance	Flow rate or capacity	Total Litres
WC	6/3 litres dual flush	17.64
Basin	2.0 litres/min.	4.74
Shower	9.0 litres/min	39.33
Bath	175 litres	19.25
Sink	5.0 litres/min	12.56
Washing Machine	6.75 litres/kg	14.18
Dishwasher	1.25 litres/places	4.50
		112.20
	Normalisation Factor	0.91
	Total Internal Water Consumption	102.10
	External Water Use	5.00
	Total Water Consumption	107.10

7.0 Materials and Waste

The BRE Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The construction specification will prioritise materials within ratings A+, A or B.

Preference will be given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers will be undertaken at the next stage of design.

In addition, timber would be sourced, where practical, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process would be recycled.

All insulation materials to will have a zero-ozone depleting potential

Construction waste

Targets will be set to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.

The overarching principle of waste management is that waste should be treated or disposed of within the region where it is produced.

Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes can be reduced through appropriate selection of the construction method, good site management practices and spotting opportunities to avoid creating unnecessary waste.

The Construction Strategy will explore these issues, some of which are set out below:

- Proper handling and storage of all materials to avoid damage.
- Efficient purchasing arrangements to minimise over ordering.
- Segregation of construction waste to maximise potential for reuse/recycling.
- Suppliers who collect and reuse/recycle packaging materials.

Appendix 1 – Summary SAP Reports for the Modelled Units

Summary for Input Data

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Property Reference	Lavant 3BF GND 130	**Issued on Date**	20/03/2024
Assessment Reference	Lavant 3BF GND 130	**Prop Type Ref**	3BF GND 130
Property	3, Lavant Road, Chichester, West Sussex, PO19 5QY		

SAP Rating	83 B	**DER**	3.38	**TER**	9.07
Environmental	97 A	**% DER < TER**			62.73
CO_2 Emissions (t/year)	0.38	**DFEE**	27.51	**TFEE**	30.91
Compliance Check	See BREL	**% DFEE < TFEE**			11.01
% DPER < TPER	25.51	**DPER**	35.18	**TPER**	47.22

Assessor Details	Mr. Ivan Ball	**Assessor ID**	X001-7283
Client			

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

Orientation	East	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	35.96 m	130.10 m²	2.40 m

8.0 Living Area	54.39	m²

9.0 External Walls

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 1	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		86.30	62.99	0.00	None	23.31	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00		45.84		None

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	130.10

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.11	None	0.00	75.00	130.10

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1	Manufacturer	Window	Double Low-E Soft 0.05			0.54		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Bed 1	Opening Type 1	External Wall 1	North	0.81	
Bed 1	Opening Type 1	External Wall 1	East	3.24	
Bed 1	Opening Type 1	External Wall 1	South	0.81	
Dining, Kitchen & Bed 3	Opening Type 1	External Wall 1	South	4.32	
Dining & Lounge	Opening Type 1	External Wall 1	West	11.97	
Kitchen	Opening Type 1	External Wall 1	West	0.72	
Bed 2	Opening Type 1	External Wall 1	East	1.44	

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
E5 Ground floor (normal)	Non Gov Approved Schemes	35.96	0.05	0.05	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	14.70	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	9.00	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	23.10	0.02	0.02	No
E16 Corner (normal)	Non Gov Approved Schemes	16.80	0.04	0.04	No
E18 Party wall between dwellings	Non Gov Approved Schemes	4.80	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	9.60	-0.08	-0.08	No

Y-value	0.01	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
21.0 Fixed Cooling System	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	5	400	46

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	102607	
Fuel Type	Electricity	
In Winter	261.04	
In Summer	163.68	
Model Name	aroTHERM 5kW	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2208	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in Concrete	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Summary for Input Data

elmhurst energy

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

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	
Immersion Only Heating Hot Water	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store	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

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
			0	0
			0	0
			0	0

Summary for Input Data

elmhurst energy

Property Reference	Lavant 2BF MID 113	**Issued on Date**	20/03/2024
Assessment Reference	Lavant 2BF MID 113	**Prop Type Ref**	2BF MID 113
Property	3, Lavant Road, Chichester, West Sussex, PO19 5QY		

SAP Rating	85 B	**DER**	3.19	**TER**	7.95
Environmental	97 A	**% DER < TER**			59.87
CO_2 Emissions (t/year)	0.32	**DFEE**	21.79	**TFEE**	23.22
Compliance Check	See BREL	**% DFEE < TFEE**			6.17
% DPER < TPER	18.75	**DPER**	33.45	**TPER**	41.17

Assessor Details	Mr. Ivan Ball	**Assessor ID**	X001-7283
Client			

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

Orientation	East	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	34.69 m	112.80 m²	2.40 m

8.0 Living Area	45.83	m²

9.0 External Walls

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 1	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		83.26	62.47	0.00	None	20.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00		39.84		None

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	112.80

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	112.80

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1	Manufacturer	Window	Double Low-E Soft 0.05			0.54		0.70	1.20

Summary for Input Data

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13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Bed 1	Opening Type 1	External Wall 1	North	0.81	
Bed 1	Opening Type 1	External Wall 1	East	3.24	
Bed 1	Opening Type 1	External Wall 1	South	0.81	
Kitchen	Opening Type 1	External Wall 1	South	1.26	
Dining & Lounge	Opening Type 1	External Wall 1	West	11.97	
Kitchen	Opening Type 1	External Wall 1	West	0.63	
Bed 2	Opening Type 1	External Wall 1	East	1.44	
Utility	Opening Type 1	External Wall 1	South	0.63	

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)	Non Gov Approved Schemes	12.90	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	7.20	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	19.80	0.02	0.02	No
E16 Corner (normal)	Non Gov Approved Schemes	16.80	0.04	0.04	No
E18 Party wall between dwellings	Non Gov Approved Schemes	4.80	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	9.60	-0.08	-0.08	No
E7 Party floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	34.69	0.04	0.04	No

Y-value	0.03	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
21.0 Fixed Cooling System	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	5	400	42

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	102607	
Fuel Type	Electricity	
In Winter	264.62	
In Summer	163.62	
Model Name	aroTHERM 5kW	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2208	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in Concrete	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
25.0 Main Heating 2	None	

Summary for Input Data

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26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

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	
Immersion Only Heating Hot Water	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store	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

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
			0	0
			0	0
			0	0

Summary for Input Data

elmhurst energy

Property Reference	Lavant 2BF TOP 92	**Issued on Date**	20/03/2024
Assessment Reference	Lavant 2BF TOP 92	**Prop Type Ref**	2BF TOP 92
Property	3, Lavant Road, Chichester, West Sussex, PO19 5QY		

SAP Rating	82 B	**DER**	3.91	**TER**	10.04
Environmental	97 A	**% DER < TER**			61.06
CO_2 Emissions (t/year)	0.32	**DFEE**	26.46	**TFEE**	27.17
Compliance Check	See BREL	**% DFEE < TFEE**			2.63
% DPER < TPER	21.83	**DPER**	41.07	**TPER**	52.54

Assessor Details	Mr. Ivan Ball	**Assessor ID**	X001-7283
Client			

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

Orientation	East	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Top-floor flat	
Which Floor	3	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	30.95 m	91.70 m²	2.38 m

8.0 Living Area 42.07 m²

9.0 External Walls

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 1	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		6.46	3.94	0.00	None	2.52	Enter Gross Area
Low Level Walls & Dormers	Timber Frame	Timber framed wall (one layer of plasterboard)	0.15		52.57	44.02	0.00	None	8.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00		39.84		None

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.15	9.00	74.45	74.45	None	0.00	Enter Gross Area	0.00
Sloping Ceiling	External Slope Roof	Plasterboard, insulated slope	0.15	9.00	30.81	30.81	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	91.70

12.0 Opening Types

Summary for Input Data

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1	Manufacturer	Window	Double Low-E Soft 0.05			0.54		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Bed 1	Opening Type 1	External Wall 1	East	2.52	
Bed 2	Opening Type 1	Low Level Walls & Dormers	East	1.08	
Bathroom	Opening Type 1	Low Level Walls & Dormers	South	1.08	
Lounge	Opening Type 1	Low Level Walls & Dormers	West	3.24	
Dining	Opening Type 1	Low Level Walls & Dormers	West	3.15	

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)	Non Gov Approved Schemes	7.20	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	4.50	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	15.60	0.02	0.02	No
E16 Corner (normal)	Non Gov Approved Schemes	20.70	0.04	0.04	No
E18 Party wall between dwellings	Non Gov Approved Schemes	3.00	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.50	-0.08	-0.08	No
E7 Party floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	30.95	0.04	0.04	No
E14 Flat roof	Non Gov Approved Schemes	31.30	0.04	0.04	No

Y-value	0.02	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
21.0 Fixed Cooling System	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	5	400	42

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	102607	
Fuel Type	Electricity	
In Winter	265.21	
In Summer	163.62	
Model Name	aroTHERM 5kW	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2208	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in Concrete	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
25.0 Main Heating 2	None	

Summary for Input Data

elmhurst energy

26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

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	
Immersion Only Heating Hot Water	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store	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

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
			0	0
			0	0
			0	0