

Sustainability & Energy Statement

Land at Former 'Charters' Garage, Oxford Road, Reading

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Executive Summary

This Sustainability and Energy Statement has been prepared in support of a detailed planning application for the construction of 32, 1, 2 and 3-bedroom apartments with associated infrastructure and landscaping on land at the former 'Charters' garage, Oxford Road, Tilehurst, Reading.

This Statement includes an energy strategy showing how selected energy efficiency, low carbon and renewable energy measures have been considered and those, which have been incorporated into the proposals.

SAP calculations have been prepared for representative units based on Part L 2021. These have used the construction specification set out in the Statement and the detailed planning drawings.

The fabric insulation standards and the construction specification of the apartments will exceed the minimum required by the Building Regulations.

Whilst various technologies are considered appropriate it is proposed to install exhaust air heat pumps into each apartment.

In addition, the crown roof of each of the four blocks includes the installation of photovoltaic panels. It is proposed to install 20 panels on each of Blocks 1 and 2, 14 panels on Block 3 and 18 panels on Block 4. The benefit of the panels is attributable to the apartments within the block in question based on their floor area.

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

	Emissions	% Reduction
	kg CO ₂ per year	
Baseline Emissions (TER)	27,191	
Be Green Emissions (DER) – after energy efficiency & renewables	7,128	73.79%

The residual emissions from the site are 7.128 tonnes of CO₂.

The water efficiency standards for the apartments will be less than 110 litres per person per day (including 5 litres for external water use).

The proposals are in compliance with the planning policy.

1.0 Introduction

This report has been commissioned by Maxika Homes and provides a Sustainability and Energy Statement in support of a detailed planning application for the construction of 32, 1, 2 and 3-bedroom apartments with associated infrastructure and landscaping on land at the former 'Charters' garage, Oxford Road, Tilehurst, Reading.

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

The apartments have been designed and will be constructed to reduce energy demand and carbon dioxide emissions.

The objective is to reduce the energy demand to an economic minimum by making investments in the parts of the buildings 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 cost-effective structures have been designed, low-carbon and renewable technologies have been considered to provide further emissions reductions.

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 policies are set out in the **Reading Borough Local Plan**, which was adopted in November 2019. Of particular relevance to the subject area of this Statement are the following policies;

CC2: Sustainable Design and Construction

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- *All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;*
- *All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;*
- *All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.*

CC3: Adaptation to Climate Change

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- *Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;*
- *Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;*
- *Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and*
- *All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.*

CC4: Decentralised Energy

- *In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.*
- *Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.*
- *Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.*

CC5: Waste Minimisation and Storage

Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting.

In addition to the Local Plan the Council have published further guidance within the **Sustainable Design and Construction Supplementary Planning Document**, which was adopted in December 2019.

The SPD sets out the Councils requirement that all residential developments of 10 units or more should achieve 'zero carbon' with a preference for the reduction to be achieved on site but if it is not feasible then at least 35% should be achieved on site with the balance offset using a carbon offset payment system.

3.0 Assessment Methodology

The carbon dioxide emissions from the apartments have been established using agreed building specifications and the detailed drawings for the development.

SAP calculations have been prepared for representative units, the results from which have been aggregated across similar unit types in order to estimate the total emissions from the site.

Emission Factors

The CO₂ emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L - 2021.

	kg CO ₂ /kWh
Grid supplied and displaced electricity	0.136
Mains gas	0.210

4.0 Proposal

The accommodation schedule can be expressed as:

Unit Type	Number	Area	Total Area
		m ²	m ²
1-Bedroom Lower-floor apartments	6	52.0	312.0
1-Bedroom Lower-floor apartments (M4(3))	2	59.0	118.0
2-Bedroom Lower-floor apartments	8	70.0	560.0
2-Bedroom Upper-floor apartments	8	78.0	624.0
2-Bedroom Upper-floor apartments	3	95.0	285.0
2-Bedroom Upper-floor apartment (M4(3))	1	106.0	106.0
3-Bedroom Upper-floor apartments	3	110.0	330.0
3-Bedroom Upper-floor apartment (M4(3))	1	121.0	121.0
Totals	32		2,456.0

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 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 Proposed Site Plan shows all apartments are orientated with both a southwest (front) and northeast aspect. This maximises the access to sunlight with all apartments benefitting from direct morning and evening sunlight.

In addition, all apartments are at least dual aspects, which provides cross ventilation and limits summer overheating.

Natural Daylighting

The orientation and the size of the windows have been 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 L (2021) standards and further improvements to U-values will reduce the home's heating requirements.

Exposed floors will be insulated with 150mm PIR insulation or similar.

The modelling has been based upon the use of traditional load-bearing construction over a reinforced concrete basement structure.

External walls are assumed to be built with 102mm facing brickwork, 150mm fully filled cavities using Dritherm 32 insulation (or similar) and 100mm medium density blockwork internally. Vertical tile hanging is assumed to be fixed to a medium density concrete block external skin

Roofs will be insulated with 150mm of PIR insulation comprising 100mm between joists and 50mm underneath.

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:

Element	Part L Limiting U-values	Proposed U-values	Proposed Improvement
	W/m ² K	W/m ² K	
Exposed Floors	0.18	0.13	28%
External Walls	0.26	0.18	31%
Party Walls	0.20	0.00	100%
Roofs	0.16	0.13	19%
Windows	1.60	1.30	19%
External Doors	1.60	1.00	38%
'G' factor for Glazing		0.55	

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 m³ of air per hour per m² of envelope area, at 50Pa. The homes will target a 44% improvement over Building Regulations and will seek to achieve a permeability of 4.5 m³/hr/m² or better.

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 CO₂ reduction targets set out in this strategy.

The thermal details for the buildings 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 buildings to achieve the higher energy efficiency requirements of the Building Regulations.

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

Reference	Location	PSI Value
		W/mK
E2	Other Lintels (including other steel lintels)	0.028
E3	Sill	0.024
E4	Jamb	0.019
E5	Exposed Floor	0.046
E6	Intermediate Floor in a Dwelling	0.000
E7	Party Floor	0.036
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 ventilation to Cloakrooms, En-Suites and Bathrooms will be comprised of continuous extract ventilation as per System 3 criteria. This reduces the number of external penetrations required to the building envelope.

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 fittings to have lamps with a minimum luminous efficacy of 80 light source lumens per circuit-watt. The specification for the light fittings will exceed this.

Space Heating and Hot Water

The SAP modelling has been based upon the use of a NIBE exhaust air heat pump 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 as follows. This section determines the appropriateness of each renewable technology.

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 Oxford Road to be 4.3 m/s at 10m above ground level and 5.1 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. In addition the use of wind turbines will 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 gas fuelled and generate electricity with heat being a by-product. The heat is usually used to meet the hot water load, which is fairly consistent throughout the year.

Historically CO₂ 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 not proposed.

The planning policy requires community heating to be considered, which has been. The site consists of four blocks of apartments totalling 32 apartments. It is proposed to use heat pumps to provide space heating and hot water and whilst communal heat pump systems are becoming more available, they are intended for developments of greater number than those proposed.

A community heating system is not appropriate.

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.

The installation of ground source heat pumps to apartments is not appropriate.

Ground source heat pumps are not proposed.

Solar

(i) Solar Water Heating

Solar hot water panels use the sun's 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 assumed solar panels could reduce the energy demand of the hot water requirements by 50%.

However, the installation of solar hot water heating panels would not enable the apartments to meet the requirements of the Building Regulations without other technologies.

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. The panels typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.

The Roof Plans for each apartment building propose the installation of photovoltaic panels on the crown roof portion of the roof. It is proposed to install 20 panels on the each of Blocks 1 and 2, 14 panels on Block 3 and 18 panels on Block 4.

The location of the panels does not detrimentally impact on the aesthetics of the proposals.

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.

It is proposed to install exhaust air heat pumps to all apartments. The modelling has been based on the use of NIBE exhaust air heat pumps but other manufacturers make similar units.

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

There are five unit types (albeit there are three variations for M4(3)) and SAP calculations have been prepared for each type.

These are based on the installation of exhaust air heat pumps to each apartment and the benefit of the photovoltaic arrays apportioned as follows;

- 1-Bedroom Lower-floor Apartment (52.0 m²) Block 3 = 0.541 kW
- 1-Bedroom Lower-floor Apartment (52.0 m²) Block 4 = 0.632 kW
- 2-Bedroom Lower-floor Apartment (70.0 m²) = 1.064 kW
- 2-Bedroom Upper-floor Apartment (78.0 m²) = 1.186 kW
- 2-Bedroom Upper-floor Apartment (95.0 m²) = 0.988 kW
- 3-Bedroom Upper-floor Apartment (110.0 m²) = 1.338 kW

The Summary SAP Reports are attached as Appendix 1 but the emissions can be summarised as follows:

Unit Type	CO ₂ TER	CO ₂ DER
	kg/m ² /yr	kg/m ² /yr
1-Bedroom Lower-floor Apartment Block 3 (52.0 m ²)	13.88	3.85
1-Bedroom Lower-floor Apartment Block 4 (52.0 m ²)	13.88	3.70
2-Bedroom Lower-floor Apartment (70.0 m ²)	11.77	2.92
2-Bedroom Upper-floor Apartment (78.0 m ²)	10.73	2.63
2-Bedroom Upper-floor Apartment (95.0 m ²)	9.81	2.85
3-Bedroom Upper-floor Apartment (110.0 m ²)	9.09	2.47

Using the above results, the total site CO₂ emissions from the site can be calculated as follows;

	Area	CO ₂ TER	CO ₂ DER
	m ²	kg/yr	kg/yr
1-Bed Lower-floor Apartment Block 3 (52.0 & 59.0 m ²)	215.0	2,984	828
1-Bed Lower-floor Apartment Block 4 (52.0 & 59.0 m ²)	215.0	2,984	796
2-Bed Lower-floor Apartment (70.0 m ²)	560.0	6,591	1,635
2-Bed Upper-floor Apartment (78.0 m ²)	624.0	6,696	1,641
2-Bed Upper-floor Apartment (95.0 & 106.0 m ²)	391.0	3,836	1,114
3-Bed Upper-floor Apartment (110.0 & 121.0 m ²)	451.0	4,100	1,114
Total	2,456.0	27,191	7,128

The total site emissions are reduced by 20,063 kg CO₂ per year, which equates to a reduction of 73.79%.

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 exhaust air heat pumps into each apartment. In addition, it is proposed to install photovoltaic panels onto the crown roof of all four blocks. The location of the panels is shown on the submission drawings. The benefit of the panels is apportioned to the apartments based on their floor area.

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

The total site (TER) CO₂ emissions are calculated as **27,191 kg CO₂ per year (TER)** and the emissions following the energy efficiency measures, low-carbon and renewable technologies are **7,128 kg CO₂ per year (DER)**.

This equates to a reduction of **20,063 kg CO₂ per year** or **73.79%** of the total TER emissions.

Summary

The total reduction in emissions from energy efficiency, low-carbon and renewable technologies are calculated as; 20,063 kg CO₂ per year, which equates to a reduction of 73.79% (% of TER).

The proposals are in compliance with the planning policy.

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

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 (included five litres per person per day allowance for external water use).

Water efficient devices will be fully evaluated, and installed, wherever possible. 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 homes:

- 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 year target (including five litres per person per day allowance for external water use). This is the equivalent of the 105 litres per person per day.

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

Property Reference	Charters 1BF EXP 52 Block 3		Issued on Date	23/10/2024
Assessment Reference	Charters 1BF EXP 52 Block 3	Prop Type Ref	Charters 1BF EXP 52 Block 3	
Property	Former Charters Garage, Oxford Road, Reading, Berkshire, RG31 6TQ			

SAP Rating	87 B	DER	3.85	TER	13.88
Environmental	97 A	% DER < TER			72.26
CO ₂ Emissions (t/year)	0.17	DFEE	30.77	TFEE	33.01
Compliance Check	See BREL	% DFEE < TFEE			6.77
% DPER < TPER	42.93	DPER	41.87	TPER	73.37

Assessor Details	Mr. Ivan Ball	Assessor ID	DE88-0001
Client			

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

Orientation	Southwest		
Property Tenure	1		
Transaction Type	6		
Terrain Type	Urban		
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	2024		
4.0 Sheltered Sides	2		
5.0 Sunlight/Shade	Average or unknown		
6.0 Thermal Mass Parameter	Enter TMP value		
Thermal Mass	250.00		kJ/m ² K
7.0 Electricity Tariff	Standard		
Smart electricity meter fitted	No		
Smart gas meter fitted	No		

7.0 Measurements	Ground floor:	Heat Loss Perimeter 19.49 m	Internal Floor Area 52.00 m ²	Average Storey Height 2.40 m
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8.0 Living Area	27.80	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		46.78	37.01	0.00	None	9.77	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		33.10		None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling	Timber I-joists, carpeted	20.00	52.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Exposed Floor	Exposed Floor - Solid	Lowest occupied	Other	0.13	None	0.00	75.00	52.00

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Windows & Glazed Doors	Manufacturer	Window	Double Low-E Soft 0.05			0.55		0.70	1.30

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
Lounge	Windows & Glazed Doors	External Wall	North East	3.78	
Kitchen	Windows & Glazed Doors	External Wall	North East	3.78	
Bathroom	Windows & Glazed Doors	External Wall	North West	0.32	
Bed 1	Windows & Glazed Doors	External Wall	South West	1.89	

14.0 Conservatory

15.0 Draught Proofing %

16.0 Draught Lobby

17.0 Thermal Bridging

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	6.20	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	2.60	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	11.30	0.02	0.02	No
E5 Ground floor (normal)	Non Gov Approved Schemes	19.49	0.05	0.05	No
E18 Party wall between dwellings	Non Gov Approved Schemes	4.80	0.04	0.04	No
E16 Corner (normal)	Non Gov Approved Schemes	4.80	0.04	0.04	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	20

24.0 Main Heating 1

Percentage of Heat %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Is MHS Pumped

Heating Pump Age

Heat Emitter

Summary for Input Data

Flow Temperature

Flow Temperature Value

25.0 Main Heating 2

26.0 Heat Networks

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

In Airing Cupboard

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Battery Capacity [kWh]

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.54	South West	30°	Modest		No	0.80		

34.0 Small-scale Hydro

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

Lower cost measures

None

Further measures to achieve even higher standards

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

Summary for Input Data

Property Reference	Charters 1BF EXP 52 Block 4		Issued on Date	23/10/2024
Assessment Reference	Charters 1BF EXP 52 Block 4	Prop Type Ref	Charters 1BF EXP 52 Block 4	
Property	Former Charters Garage, Oxford Road, Reading, Berkshire, RG31 6TQ			

SAP Rating	87 B	DER	3.70	TER	13.88
Environmental	97 A	% DER < TER			73.34
CO ₂ Emissions (t/year)	0.16	DFEE	30.77	TFEE	33.01
Compliance Check	See BREL	% DFEE < TFEE			6.77
% DPER < TPER	44.54	DPER	40.69	TPER	73.37

Assessor Details	Mr. Ivan Ball	Assessor ID	DE88-0001
Client			

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

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
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	2024	
4.0 Sheltered Sides	2	
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	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter 19.49 m	Internal Floor Area 52.00 m ²	Average Storey Height 2.40 m
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8.0 Living Area	27.80	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		46.78	37.01	0.00	None	9.77	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		33.10		None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling	Timber I-joists, carpeted	20.00	52.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Exposed Floor	Exposed Floor - Solid	Lowest occupied	Other	0.13	None	0.00	75.00	52.00

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Windows & Glazed Doors	Manufacturer	Window	Double Low-E Soft 0.05			0.55		0.70	1.30

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Lounge	Windows & Glazed Doors	External Wall	North East	3.78	
Kitchen	Windows & Glazed Doors	External Wall	North East	3.78	
Bathroom	Windows & Glazed Doors	External Wall	North West	0.32	
Bed 1	Windows & Glazed Doors	External Wall	South West	1.89	

14.0 Conservatory

15.0 Draught Proofing %

16.0 Draught Lobby

17.0 Thermal Bridging

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	6.20	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	2.60	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	11.30	0.02	0.02	No
E5 Ground floor (normal)	Non Gov Approved Schemes	19.49	0.05	0.05	No
E18 Party wall between dwellings	Non Gov Approved Schemes	4.80	0.04	0.04	No
E16 Corner (normal)	Non Gov Approved Schemes	4.80	0.04	0.04	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	20

24.0 Main Heating 1

Percentage of Heat %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Is MHS Pumped

Heating Pump Age

Heat Emitter

Summary for Input Data

Flow Temperature

Flow Temperature Value

25.0 Main Heating 2

26.0 Heat Networks

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

In Airing Cupboard

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Battery Capacity [kWh]

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.63	South West	30°	Modest		No	0.80		

34.0 Small-scale Hydro

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

Lower cost measures

None

Further measures to achieve even higher standards

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

Summary for Input Data

Property Reference	Charters 2BF EXP 70		Issued on Date	23/10/2024
Assessment Reference	Charters 2BF EXP 70	Prop Type Ref	Charters 2BF EXP 70	
Property	Former Charters Garage, Oxford Road, Reading, Berkshire, RG31 6TQ			

SAP Rating	88 B	DER	2.92	TER	11.77
Environmental	98 A	% DER < TER			75.19
CO ₂ Emissions (t/year)	0.17	DFEE	28.67	TFEE	30.35
Compliance Check	See BREL	% DFEE < TFEE			5.54
% DPER < TPER	46.20	DPER	33.25	TPER	61.80

Assessor Details	Mr. Ivan Ball	Assessor ID	DE88-0001
Client			

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

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	2	
3.0 Date Built	2024	
4.0 Sheltered Sides	2	
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	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	18.06 m	46.00 m ²	2.40 m
	1st Storey:	9.94 m	24.00 m ²	2.40 m

8.0 Living Area	22.00	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		67.20	54.60	0.00	None	12.61	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		33.10		None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling	Timber I-joists, carpeted	20.00	22.00
Party Ceiling 2	Timber I-joists, carpeted	20.00	24.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Exposed Floor	Exposed Floor - Solid	Lowest occupied	Other	0.13	None	0.00	75.00	46.00

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Windows & Glazed Doors	Manufacturer	Window	Double Low-E Soft 0.05			0.55		0.70	1.30

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Bed 1	Windows & Glazed Doors	External Wall	North East	3.78	
Bed 1	Windows & Glazed Doors	External Wall	North East	0.95	
Bathroom	Windows & Glazed Doors	External Wall	North West	0.32	
Bed 2	Windows & Glazed Doors	External Wall	South West	1.89	
Lounge	Windows & Glazed Doors	External Wall	North East	3.78	
Lounge	Windows & Glazed Doors	External Wall	North East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

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	8.00	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	6.20	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	17.60	0.02	0.02	No
E5 Ground floor (normal)	Non Gov Approved Schemes	18.06	0.05	0.05	No
E18 Party wall between dwellings	Non Gov Approved Schemes	9.60	0.04	0.04	No
E16 Corner (normal)	Non Gov Approved Schemes	7.20	0.04	0.04	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	9.94	0.00	0.00	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m²/(h.m²) @ 50 Pa

Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	28

24.0 Main Heating 1

Percentage of Heat %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Is MHS Pumped

Summary for Input Data

Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Enter value
Flow Temperature Value	45.00

25.0 Main Heating 2

26.0 Heat Networks

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

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

	Internal Store
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.68 kWh/day
In Airing Cupboard	No

32.0 Photovoltaic Unit

	One Dwelling
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
1.06	South West	30°	Modest		No	0.80		

34.0 Small-scale Hydro

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

Lower cost measures

None

Further measures to achieve even higher standards

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

Summary for Input Data



Property Reference	Charters 2BF UPPER 78		Issued on Date	23/10/2024
Assessment Reference	Charters 2BF UPPER 78	Prop Type Ref	Charters 2BF UPPER 78	
Property	Former Charters Garage, Oxford Road, Reading, Berkshire, RG31 6TQ			

SAP Rating	89 B	DER	2.63	TER	10.73
Environmental	98 A	% DER < TER			75.49
CO ₂ Emissions (t/year)	0.17	DFEE	27.16	TFEE	28.00
Compliance Check	See BREL	% DFEE < TFEE			3.02
% DPER < TPER	46.36	DPER	30.15	TPER	56.22

Assessor Details	Mr. Ivan Ball	Assessor ID	DE88-0001
Client			

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

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	3	
3.0 Date Built	2024	
4.0 Sheltered Sides	2	
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	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	1.05 m	3.20 m ²	2.40 m
	2nd Storey:	11.03 m	28.74 m ²	2.40 m
		21.11 m	47.72 m ²	2.40 m

8.0 Living Area	22.00	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		79.66	68.11	0.00	None	11.56	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		65.64		None

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Flat & Mansard	External Flat Roof	Plasterboard, insulated flat roof	0.13	9.00	47.72	47.72	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Exposed Floor	Exposed Floor - Solid	Lowest occupied	Other	0.13	None	0.00	75.00	3.20

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	+1	Timber I-joists, carpeted	20.00	25.54
Party Floor	+2	Timber I-joists, carpeted	20.00	18.98

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows & Glazed Doors	Manufacturer	Window	Double Low-E Soft 0.05			0.55		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Hall	Windows & Glazed Doors	External Wall	South West	0.84	
Bathroom	Windows & Glazed Doors	External Wall	North West	0.32	
Bed 1	Windows & Glazed Doors	External Wall	South West	3.78	
Bed 2	Windows & Glazed Doors	External Wall	South West	0.95	
Dining	Windows & Glazed Doors	External Wall	North East	3.78	
Lounge	Windows & Glazed Doors	External Wall	North East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

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	8.95	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	8.95	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	17.30	0.02	0.02	No
E5 Ground floor (normal)	Non Gov Approved Schemes	1.05	0.05	0.05	No
E18 Party wall between dwellings	Non Gov Approved Schemes	14.40	0.04	0.04	No
E16 Corner (normal)	Non Gov Approved Schemes	12.00	0.04	0.04	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	12.08	0.00	0.00	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	20.06	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	4.80	-0.08	-0.08	No
E14 Flat roof	Non Gov Approved Schemes	21.11	0.04	0.04	No
P4 Party wall - Roof (insulation at ceiling level)	Non Gov Approved Schemes	8.59	0.02	0.02	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	40

24.0 Main Heating 1

Percentage of Heat %

Summary for Input Data



Database Ref. No.	100092
Fuel Type	Electricity
In Winter	260.04
In Summer	186.58
Model Name	F205P
Manufacturer	NIBE Energy Systems 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
Flow Temperature	Enter value
Flow Temperature Value	45.00

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

27.0 Secondary Heating	None
------------------------	------

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Internal Store	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.68	kWh/day
In Airing Cupboard	No	

32.0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
1.19	South West	30°	Modest		No	0.80		

Summary for Input Data



34.0 Small-scale Hydro

None

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

Typical Cost

Typical savings per year

Ratings after improvement
SAP rating Environmental Impact
0 0
0 0
0 0

Summary for Input Data

Property Reference	Charters 2BF UPPER 95		Issued on Date	23/10/2024
Assessment Reference	Charters 2BF UPPER 95	Prop Type Ref	Charters 2BF UPPER 95	
Property	Former Charters Garage, Oxford Road, Reading, Berkshire, RG31 6TQ			

SAP Rating	87 B	DER	2.85	TER	9.81
Environmental	97 A	% DER < TER			70.95
CO ₂ Emissions (t/year)	0.25	DFEE	29.59	TFEE	29.97
Compliance Check	See BREL	% DFEE < TFEE			1.26
% DPER < TPER	39.17	DPER	31.13	TPER	51.18

Assessor Details	Mr. Ivan Ball	Assessor ID	DE88-0001
Client			

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

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	3	
3.0 Date Built	2024	
4.0 Sheltered Sides	2	
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	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	1.05 m	4.43 m ²	2.40 m
	1st Storey:	20.57 m	51.21 m ²	2.40 m
	2nd Storey:	20.47 m	47.78 m ²	2.40 m

8.0 Living Area	17.60	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		101.02	82.38	0.00	None	18.64	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		66.98		None

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Flat & Mansard Roof	External Flat Roof	Plasterboard, insulated flat roof	0.13	9.00	51.21	51.21	None	0.00	Enter Gross Area	0.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Exposed Floor	Exposed Floor - Solid	Lowest occupied	Other	0.13	None	0.00	75.00	4.43

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	+1	Timber I-joists, carpeted	20.00	46.78

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows & Glazed Doors	Manufacturer	Window	Double Low-E Soft 0.05			0.55		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Hall	Windows & Glazed Doors	External Wall	South West	0.84	
Storage/ Utility	Windows & Glazed Doors	External Wall	North West	0.32	
Kitchen/ Dining	Windows & Glazed Doors	External Wall	North East	7.56	
Lounge	Windows & Glazed Doors	External Wall	South West	3.78	
Bed 1	Windows & Glazed Doors	External Wall	North East	3.78	
En Suite	Windows & Glazed Doors	External Wall	North East	0.64	
Bed 2	Windows & Glazed Doors	External Wall	South West	1.08	
Bed 2	Windows & Glazed Doors	External Wall	South West	0.64	

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	13.65	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	13.65	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	25.00	0.02	0.02	No
E5 Ground floor (normal)	Non Gov Approved Schemes	1.05	0.05	0.05	No
E18 Party wall between dwellings	Non Gov Approved Schemes	14.40	0.04	0.04	No
E16 Corner (normal)	Non Gov Approved Schemes	12.00	0.04	0.04	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	21.52	0.00	0.00	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	19.52	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	4.80	-0.08	-0.08	No
E14 Flat roof	Non Gov Approved Schemes	20.47	0.04	0.04	No
P4 Party wall - Roof (insulation at ceiling level)	Non Gov Approved Schemes	8.59	0.02	0.02	No

Y-value

0.02

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

0

Number of open flues

0

Number of chimneys/flues attached to closed fire

0

Number of flues attached to solid fuel boiler

0

Number of flues attached to other heater

0

Number of blocked chimneys

0

Number of intermittent extract fans

3

Number of passive vents

0

Number of flueless gas fires

0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

4.50

 m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	52

24.0 Main Heating 1

Database

Percentage of Heat

100.00

 %

Summary for Input Data



Database Ref. No.	100092
Fuel Type	Electricity
In Winter	263.01
In Summer	186.58
Model Name	F205P
Manufacturer	NIBE Energy Systems 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
Flow Temperature	Enter value
Flow Temperature Value	45.00

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

27.0 Secondary Heating	None
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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	Internal Store	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.68	kWh/day
In Airing Cupboard	No	

32.0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.99	South West	30°	Modest		No	0.80		

Summary for Input Data



34.0 Small-scale Hydro

None

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

Typical Cost

Typical savings per year

Ratings after improvement
SAP rating Environmental Impact
0 0
0 0
0 0

Summary for Input Data



Property Reference	Charters 3BF UPPER 110		Issued on Date	23/10/2024
Assessment Reference	Charters 3BF UPPER 110	Prop Type Ref	Charters 3BF UPPER 110	
Property	Former Charters Garage, Oxford Road, Reading, Berkshire, RG31 6TQ			

SAP Rating	88 B	DER	2.47	TER	9.09
Environmental	98 A	% DER < TER			72.83
CO ₂ Emissions (t/year)	0.23	DFEE	28.20	TFEE	28.48
Compliance Check	See BREL	% DFEE < TFEE			0.96
% DPER < TPER	41.62	DPER	27.65	TPER	47.37

Assessor Details	Mr. Ivan Ball	Assessor ID	DE88-0001
Client			

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

Orientation	Southwest
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, End-Terrace
Position of Flat	Ground-floor flat
Which Floor	1
2.0 Number of Storeys	3
3.0 Date Built	2024
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	1.05 m	4.39 m ²	2.40 m
	2nd Storey:	22.54 m	62.29 m ²	2.40 m
		21.15 m	48.10 m ²	2.40 m

8.0 Living Area	19.30	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		107.38	90.76	0.00	None	16.62	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		73.46		None

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Flat & Mansard	External Flat Roof	Plasterboard, insulated flat roof	0.13	9.00	62.29	62.29	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Exposed Floor	Exposed Floor - Solid	Lowest occupied	Other	0.13	None	0.00	75.00	4.39

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	+1	Timber I-joists, carpeted	20.00	57.90

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows & Glazed Doors	Manufacturer	Window	Double Low-E Soft 0.05			0.55		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Hall	Windows & Glazed Doors	External Wall	South West	0.84	
Bathroom	Windows & Glazed Doors	External Wall	North West	0.32	
Kitchen/ Dining	Windows & Glazed Doors	External Wall	North East	7.56	
Lounge	Windows & Glazed Doors	External Wall	South West	3.78	
Bed 1	Windows & Glazed Doors	External Wall	South West	1.26	
Bed 2	Windows & Glazed Doors	External Wall	North East	1.04	
Bed 3	Windows & Glazed Doors	External Wall	South West	0.54	
Bed 2	Windows & Glazed Doors	External Wall	South West	0.64	
Shower Room	Windows & Glazed Doors	External Wall	South West	0.64	

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	12.88	0.03	0.03	No
E3 Sill	Non Gov Approved Schemes	12.88	0.02	0.02	No
E4 Jamb	Non Gov Approved Schemes	22.40	0.02	0.02	No
E5 Ground floor (normal)	Non Gov Approved Schemes	1.05	0.05	0.05	No
E18 Party wall between dwellings	Non Gov Approved Schemes	14.40	0.04	0.04	No
E16 Corner (normal)	Non Gov Approved Schemes	12.00	0.04	0.04	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	22.20	0.00	0.00	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	21.49	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	4.80	-0.08	-0.08	No
E14 Flat roof	Non Gov Approved Schemes	22.54	0.04	0.04	No
P4 Party wall - Roof (insulation at ceiling level)	Non Gov Approved Schemes	8.59	0.02	0.02	No

Y-value

0.02 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

0

Number of open flues

0

Number of chimneys/flues attached to closed fire

0

Number of flues attached to solid fuel boiler

0

Number of flues attached to other heater

0

Number of blocked chimneys

0

Number of intermittent extract fans

3

Number of passive vents

0

Number of flueless gas fires

0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

4.50 m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	52

24.0 Main Heating 1

Database

Summary for Input Data



Percentage of Heat	100.00	%
Database Ref. No.	100092	
Fuel Type	Electricity	
In Winter	263.42	
In Summer	186.58	
Model Name	F205P	
Manufacturer	NIBE Energy Systems 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	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	

25.0 Main Heating 2

26.0 Heat Networks

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

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

	Internal Store	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.68	kWh/day
In Airing Cupboard	No	

32.0 Photovoltaic Unit

	One Dwelling
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate	Panel Manufacturer
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Summary for Input Data



1.34		South West	30°	Modest		No		0.80	Reference		
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