Energy Report for:

WILDES COTTAGE, EWELL ROAD, CHEAM, SM3 8AS

Carried out by:

Richmond Thermal Solutions

Introduction

This is a Sustainability Assessment, it is a consultation provided by Richmond Thermal Solutions for New Dwelling, Wildes Cottage, Cheam, SM3 8AS.

The proposal is to construct newly efficiently designed house which would exceed the current building regulations to Future Home standard and will be airtight and thermally efficient.

For this report we have based the outputs on SAP10 software which is covered by SAP 10.2 conventions.

Summary of Information (DER/TER DFEE/TFEE) – (DES10)

SAP Calculations have been produced from the planning drawings and proposed specification. Through the inclusion of passive measures, fabric improvements, and carbon reducing technologies and systems we can reduce the carbon emissions the planning requirement advises – the development :

achieves at least a 35% reduction in CO 2 emissions compared to Part L 2021 compliant dwelling based on updated carbon factors in SAP 10.2 (it is recommended that emissions reductions after each stage of the hierarchy are presented using the approach in the Mayor's Energy Assessment Guidance 2022 and the Mayor's carbon emissions reporting spreadsheet), and demonstrate at least a 10% reduction in total CO 2 emissions (regulated and unregulated) through on-site renewable energy generation (details of the proposed renewable technology should be provided in terms of layout, orientation, generating capacity, maintenance requirements and carbon savings).

The TER and DER figures in the SAP calculations are measures in kg of CO2 emissions per year divided by the dwelling floor area.

With the inclusion of passive measures fabric improvements and carbon reducing technologies and systems, the baseline TER (Target Emission Rate) for the dwelling are shown on table 1 below.

Dwelling	Reference	Postcode	DER	TER	% Improvement	Air perm	PV Energy Generated	Total CO2
Wildes Cottage, Ewell Road	Cheam	SM3 8AS	4.45	13.63	67.35%	5	-945.19	0.30t/yr

Baseline	13.63
Actual	4.45
Reduction in CO2	67.35%

This development is currently achieving 67.35% reduction based on the installation of 2kwp of Solar Photovoltaic along with high fabric efficiency with low carbon air source heating along with high insulation levels to the floor, walls and roof, windows and doors which in turn with an airtight envelope will ensure the dwelling perform well with the minimum amount of heating use.

Estimated EPC

Overview Report

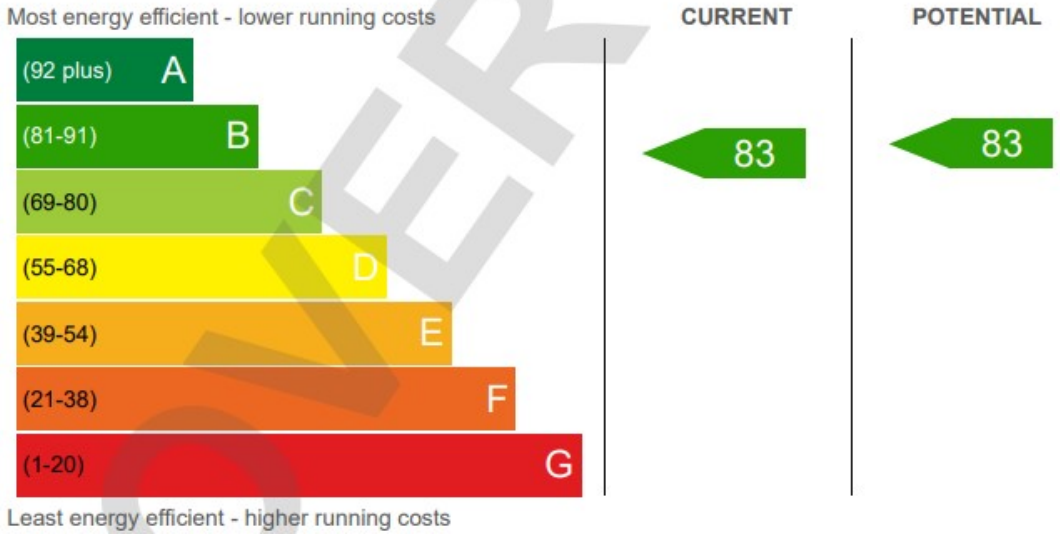
elmhurst energy

Dwelling Address	Ewell Road, Wildes Cottage, SM3 8AS
Report Date	18/12/2023
Property Type	House, Semi-Detached
Floor Area [m^2]	89

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.



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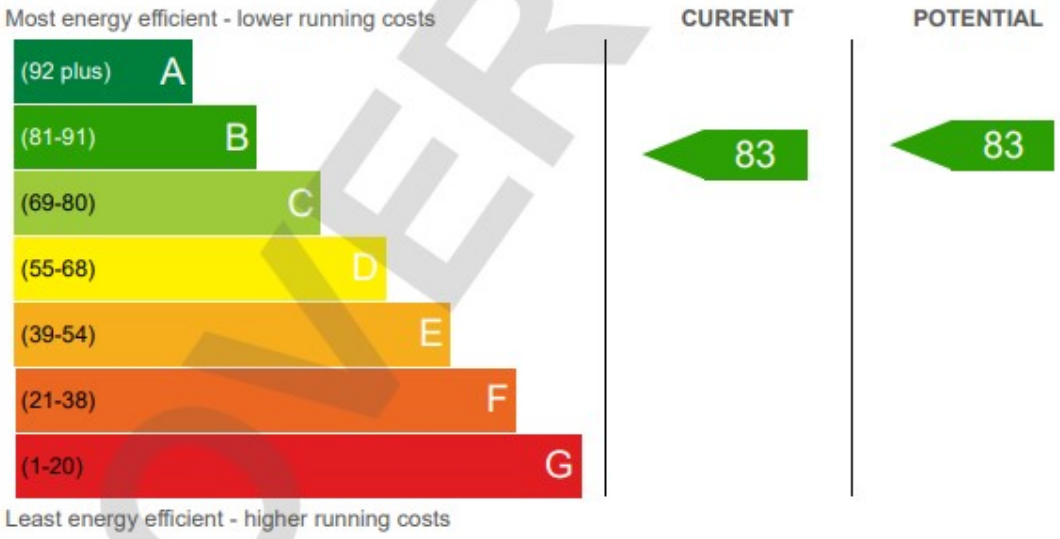

Passive design features – Fabric

The proportion of glazing on each elevation allows solar, gains through all orientations of the proposed dwelling. Consideration has been given to the orientation and layout of the buildings to help maximize energy efficiency as part of the development as this approach is in consideration of a fabric first approach.

Passive design features

The proportion of glazing on each elevation allows solar gains through all orientations of the proposed dwelling. Consideration has been given to the orientation and layout of the buildings to help.

There has been a great consideration to be sympathetic to the landscaping of the scheme to ensure there is not any unnecessary loss whilst keeping safe measures to ensure natural and localized infiltration.

Water Efficiency Usage

Water usage will be within the permitted usage of 105 litres of water per person per day.

Building Materials

These will be locally sourced where possible, and to be sympathetic to the area.

Electric car charging Point

With a third of the UK's carbon emissions generated by transport, reducing CO2 from cars is at the heart of the government's ambitious net zero targets. And electric cars are poised to keep Britain moving while reducing emissions.

In the UK there is a high level of ultra-low emission vehicles on the roads, which is consistent with consumers wanting a cleaner and greener transport, and the convenience of being able to charge your car overnight is a benefit and cost savings EV v's Petrol/Diesel is approximately 50%.

In addition to the introduction of domestic charge points, the government has also been consulting on the incorporation of 'smart' charging which would allow electric vehicle owners to charge their cars at different points in the day in response to signals such as tariff information to encourage off-peak charging and thus keep costs down.

Costs for installing a EV point start from £449 upwards depending on the type of car and charging type to be installed, however there is currently a grant available for up to 75% of the cost under the EVHS scheme per household, that is if customer fits the criteria set out under this scheme – this may mean if this scheme is to be used that the applicant will need to liase with the prospective buyer to ensure these criteria's are met. It may be that communal EV bays are more feasible dependant on site restrictions.

EV must be considered to be installed as part of the build.

High Speed Internet

As a requirement high speed internet is to be fitted in to the dwelling.

Healthy Enviroment

Consideration has been taken into account for natural daylight where possible, the houses are to be laid out internally to provide as much natural light as is possible. Along with the use of 100% low energy bulbs.

Space has been allocated for private parking and adequate drying space, along with allotted recycle area.

Any white goods installed will be A+/A rated.

This property achieves well below the target U-values as in approved Document L1A, please see below :

Base Case (Notional U-values) v's Actual Compliant Case using a low fabric first approach (DES10)

The Development (Standard case minimum specification)

ELEMENT	NOTIONAL U-VALUE	ACTUAL U-VALUE
Floor	0.18	0.11
Wall	0.18	0.18
Roof – Rafter	0.15	0.13
Roof – Insulated Ceiling	0.15	0.10
Door	1.40	1.20
Window	1.40	1.20
Heating – Gas/Air source	88%	170%
Controls	Prog, Roomstat & TRV	Zoned
Air Permeability	8	5.00

Information for the feasibility study has been provided by standard case SAP calculations and entered onto the spreadsheet using the following information:

The "Standard" case includes the minimum space and water heating services as set out in the Domestic Heating Compliance Guide and are as follows:

- Primary heating fuel (space and water) – Mains gas
- Boiler SEDBUK 88 per cent room sealed fanned flue
- Secondary space heating Electric heater assumed
- Heat loss of cylinder 2.62
- Cylinder Volume 150 litres
- Primary pipe work : Insulated

- Space heating control Programmer, Room Thermostat and TRV's
- Hot water Control Boiler interlock, cylinder thermostat separate water control

From these initial SAP calculations a base line emission rate has been used.

Environmental Standards

This assessment has been carried out by an OCDEA using Stroma Technology software as approved by the BRE.

Planning

To demonstrate 35% reduction in carbon emissions and 10% reduction with renewable technology.

Reason

To ensure that the development incorporates necessary mitigation and adaptation measures with regard to climate change. It is considered necessary for this to be a Pre-commencement condition as these details relate to the construction of the development and thus go to the heart of the planning permission.

Renewables or Low Carbon Technology (DES10)

There is to have 2kwp of Solar Photovoltaic, and air source heat pump installed into the dwelling this will help reduce energy bills, they have low maintenance costs also being a renewable energy source.

Solar Photovoltaic

Solar photovoltaics (PV) offer several benefits, here are some key benefits of solar PV:

1. Renewable and Clean Energy: Solar PV systems generate electricity from sunlight, which is an abundant and renewable energy source. Solar power is a clean and environmentally friendly energy option that does not produce greenhouse gas emissions or air pollutants during operation.
2. Energy Independence: Solar PV systems allow individuals and businesses to generate their own electricity, reducing reliance on external energy sources. This can provide greater energy independence and security, especially in remote areas or during power outages.
3. Cost Savings: Investing in solar PV can result in long-term cost savings. Once installed, solar panels can generate electricity for decades, reducing or even eliminating monthly electricity bills. The financial benefits are particularly significant in areas with high electricity rates and favorable solar conditions.
4. Environmental Benefits: Solar PV helps mitigate climate change by reducing reliance on fossil fuels and lowering carbon dioxide emissions. By generating electricity without combustion, solar PV contributes to improved air quality and reduces environmental pollution.
5. Scalability and Modularity: Solar PV systems can be designed to meet various energy needs, from small residential installations to large-scale solar farms. The modular

nature of solar PV allows for flexibility in system size and expansion, enabling customization based on energy requirements and available space.

It's important to consider site-specific factors, such as solar resource availability, upfront costs, and local policies, when evaluating the benefits and feasibility of solar photovoltaics for a particular location.

In this scheme each house is to have solar PV installed, these also gives a 10% carbon reduction on each dwelling.

Air Source Heat Pump

Air source heat pumps are considered good for the environment due to several reasons:

1. Renewable Energy Source: Air source heat pumps utilize the freely available and abundant heat energy present in the air. This renewable energy source reduces the reliance on fossil fuels for heating and cooling purposes, which helps in lowering greenhouse gas emissions.
2. Energy Efficiency: Air source heat pumps are highly energy-efficient compared to traditional heating systems. They operate by transferring heat from the outdoor air to the indoors, using electricity to power the pump. The ratio of heat output to energy input, known as the Coefficient of Performance (COP), is typically high for heat pumps. This means that for each unit of electricity consumed, they can provide several units of heat energy, resulting in lower energy consumption and reduced carbon emissions.
3. Reduced Carbon Footprint: By using air source heat pumps, which primarily rely on electricity, the carbon footprint associated with heating and cooling is significantly reduced. Generating electricity from renewable energy sources, such as solar or wind power, can further enhance the environmental benefits of air source heat pumps.
4. No Direct Emissions: Air source heat pumps do not burn fuel to generate heat, unlike fossil fuel-based systems such as gas or oil boilers. As a result, they do not release pollutants or greenhouse gases directly into the atmosphere. This helps in improving air quality and mitigating the impacts of climate change.
5. Versatility and Longevity: Air source heat pumps can be used for both heating and cooling purposes, making them versatile throughout the year. They are also durable and can have a long lifespan if properly maintained, reducing the need for frequent replacements and associated environmental impacts.

It's important to note that the overall environmental impact of air source heat pumps also depends on factors such as the energy source used to generate electricity and the proper installation and maintenance of the system. However, when compared to traditional heating and cooling methods, air source heat pumps offer significant environmental benefits.

In this scheme each house is to have an approved Air Source Heat Pump installed which will be from the PCDF database, therefore have been tested by the BRE for their efficiency.

SAP 10 Results

(Be lean, Be Clean, Be Green)

GLA Spreadsheet attached.

SAP Rating:	83 B	CO2 Emission:	0.3 t/yr	DER:	4.45 kgCO2/yr/m2	TER:	13.63 kgCO2/yr/m2
% DER<TER:	67.35%	Compliance:	See BREL	DPER:	45.71 kWh/m2/yr	TPER:	71.47 kWh/m2/yr
DPER<TPER:	36.04 %	DFEE:	48.57 kWh/m2/yr	TFEE:	49.53 kWh/m2/yr	DFEE<TFEE:	1.93 %

Energy Hierarchy – Energy Strategy (DES10)

The building fabric performance determines the outcome for the carbon emissions from the energy usage the dwelling in conjunction with (NPPF) National Planning Policy Framework. We propose to increase the energy and thermal performance to reduce the energy consumption and the CO2 emissions through enhancing the building fabric specifications over L1A 2013 Building Regulations.

The table below is demonstrating the above strategy:

Renewable Technology	**Evaluation**
Wind Turbine	There is not enough land for the turbines to be installed for the scheme.
	Due to the trees and surroundings the turbines would not be as efficient and lifetime of the components would reduce.
	There are property's close to the site which would be affected by the turbine noise, light and shadows created – and wouldn't be aesthetically pleasing.
	Roof mounted turbine are not a proven technology with its own technical issues which need to be resolved – it's not a viable option for this site.
Photovoltaics	Whilst PV does have a place on schemes it can affect the visual appearance of a development along with the RHI scheme being discontinued. However these are to be installed an amount of 2kwp however a survey would need to be undertaken but there is showing sufficient space for these to be installed, the survey would check to confirm suitable, regarding overshading from trees, and other structures and that the required KWP to be installed would be possible, this may determine that Solar PV is not suitable,.
Solar Thermal	Whilst there would be sufficient space to install the solar water panels (a survey would be required), the amount installed would not be a significant improvement in the reduction in CO2 emissions.
ASHP (Air Source Heatpump)	This technology is to be installed on this scheme. We have specified a 8.5kw heatpump which is on the PCDF database, however a specialist needs to confirm the suitable model to be installed using heat loss's on a room by room calculation. To be considered : a) Make sure the noise will not be an annoyance for the residents and local surrounding residents b) There is suitable space inside to house the water
GSHP (Ground Source Heat Pump)	This technology was considered but found to not have enough space this was after the following factors from a survey would need to be checked to see if suitable:
	a) Make sure the noise will not be an annoyance for the residents and local surrounding residents b) There is suitable space inside to house the water cylinder, of if a combi chosen would this be suitable c) Are the outside temperatures going to let the heat pump run efficiently

Biomass Boiler	There is not enough land to house the provision of biomass boiler – for the storage of the fuel, and associated equipment.
CHP	Due to the size the management of the system wouldn't be viable as the infrastructure is not in place. CHP is usually installed in buildings with high electricity and heating demand for most of the year. Residential heating such as hotels, hospitals and flats for example bring a lot of small intermittent loads which gives a suitable heat demand for CHP.

Post Occupancy Evaluation (DES10)

A Post Occupancy Evaluation will be carried out. As part of post construction monitoring smart meters will be installed to measure all electricity used. In addition, the Solar Photovoltaic panels will all be designed, tested, and commissioned to current approved standards.

As solar panels have no moving parts, very little service and maintenance is required. The solar panels are to have annual service to ensure your system is kept in full working order and any fault or drop in generation is flagged immediately and resolved.