Land at Claydon Road, Cropredy
Cherwell District Council

Energy & Sustainability

Prepared for:

Obsidian Strategic

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Issue Status

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DISCLAIMER

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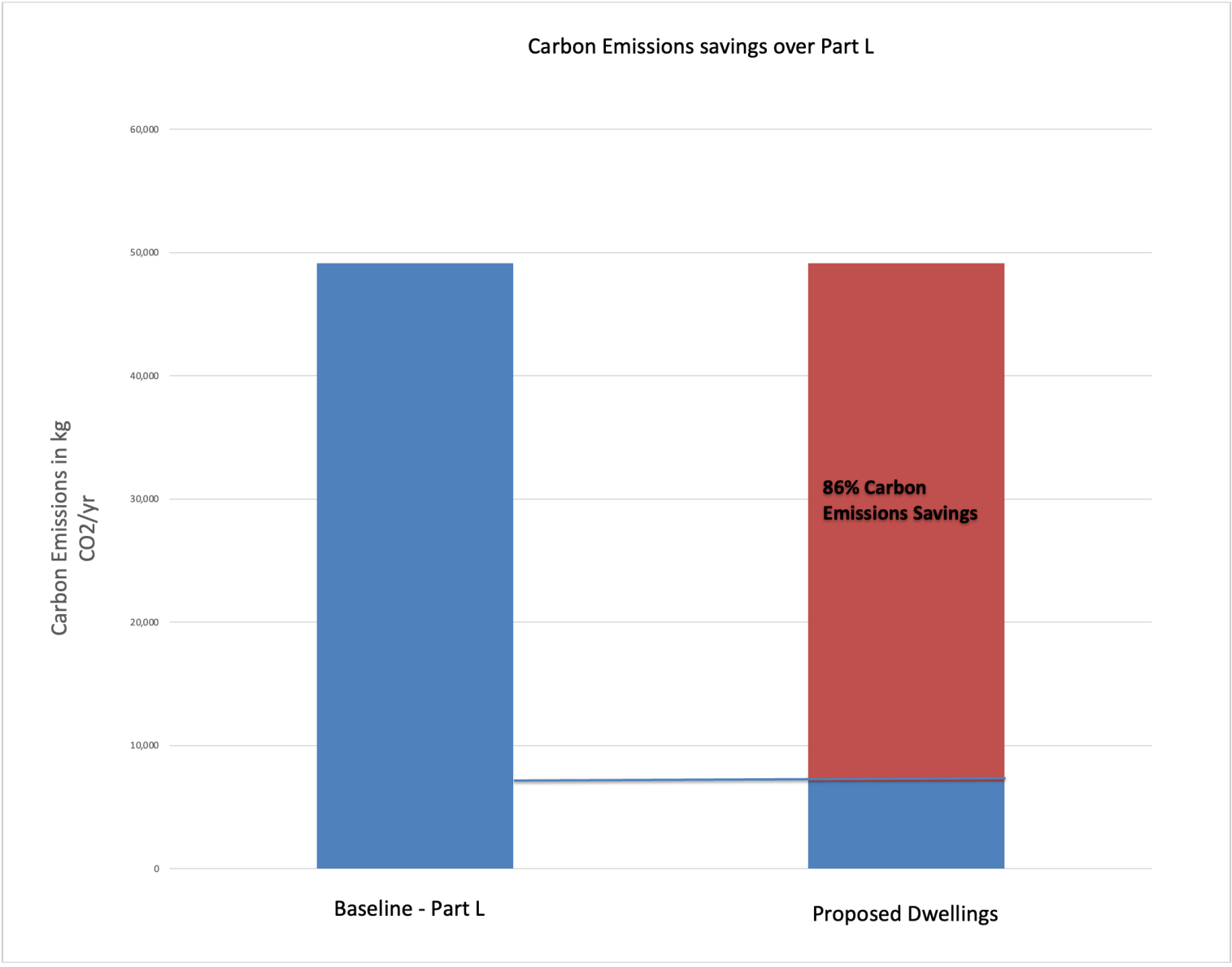
Executive Summary

INTRODUCTION	The proposed scheme on land at Claydon Road, Cherwell is required to produce an Energy and Sustainability statement in support of the outline planning application. The development of up to 60 dwellings (Use Class C3) including a community GP facility, new vehicular and pedestrian access off Claydon Road, public open space and associated infrastructure. Carbon emission reductions will be estimated in accordance with Local Policy ESD3: Sustainable Construction, using the energy hierarchy, target 110 litres water per person per day and a BREEAM 'Very Good' environmental rating for the non-residential building.
AIM OF THIS STUDY	This energy and sustainability statement should be used as a supporting document for the outline planning application to demonstrate that CO2 emissions, the overall energy and sustainability strategy of the proposed development will meet the requirements set out by Cherwell Council policy – namely in relation to Energy, BREEAM, Water usage, Materials and Waste. The aim of the energy study specifically is to assess the potential carbon emission reductions through building fabric, efficient services, renewable technologies AND aim for zero carbon dwellings on-site target. This report demonstrates how the site has followed the energy hierarchy by reducing energy demand through passive design, energy efficiency measures.
LOCAL POLICY GUIDANCE	The Cherwell Local Plan 2011-2031 (adopted 2015) has been referred to and relevant sustainability policies considered, namely: Policy ESD3: Sustainable Construction and ESD5 – Renewable Energy. The Energy Hierarchy is followed, as required in Policy ESD2.
ENERGY MODELLING	Full drawing packages are not available at this outline stage, therefore 4 representative worst-case dwellings based on potential project accommodation schedule, have been created and modelled – 1-bed (15%), 2-bed (40%), 3-bed (32.5%) and 4-bed (12.5%) units, with this housing mix distributed using the latest HENA guidelines.

ENERGY STRATEGY RECOMMENDATION	The early stage proposed energy strategy for ultra low-carbon homes is to use a highly efficient Air Source Heat Pumps as the main heating and DHW system, alongside advanced energy efficiency fabric measures, mechanical ventilation with heat recovery (MVHR) and Solar Photovoltaic panels to aim towards the zero carbon emissions reductions target. The proposal is to build traditional construction, built to advanced practice u-values and air tightness, far surpassing Part L 2021 requirements. The thermal performance targets of the dwellings are as follows: U-Values of 0.10 W/m2K for the ground floor, 0.10 W/m2K for the roof, 0.15 W/m2K for walls and high performance double-glazed standard windows of 1.2 W/m2K (average across site). A maximum air permeability of 1 m3/m2/hr at 50 pa is targeted, and to be achieved on site. Thermal bridging will also be kept to a minimum with an average Y-value of 0.045, thus going beyond accredited construction details as a minimum. Full MVHR ventilation will meet Part F requirements. 3 kWp Solar PV on houses and 2 kWp Solar PV on flats will supply clean energy to the site.
CO2 SAVINGS SUMMARY	Hypothetical baseline carbon emissions for the 60 unit residential scheme are approx. 49,132 kgCO2/yr. Following implementation of measures within this report; a total saving of 4,511 kgCO2/yr will be made, a **86% overall carbon reduction** and close to zero carbon**.** These measures include: - **Fabric** (approx. 15% savings over baseline): Energy efficiency measures to improve the building fabric and services: High performance U-Values (0.15 for walls, 0.10 for roof, 0.10 for the ground floor and 1.2 for windows in W/m2K), advanced practice air tightness (maximum of 1 m3/m2/hr at 50 Pa), best practice attention to thermal bridging at an average Y-value of 0.045. - **Renewables** (approx. 70% savings over clean case): Low carbon heating and hot water through an Air Source Heat Pump and clean energy through Solar PV.
Policy & Part L 2021	The scheme will meet ESD3: Sustainable Construction and ESD5 – Renewable Energy and will also meet building Regulations (Part L 2021) on both a carbon emission and fabric efficiency basis.

	Baseline carbon emissions (Part L building Regulations)	With Energy Efficiency Measures and Renewables
Carbon emissions in $kgCO_2/yr$	49,132	4,511
Carbon emission savings in $kgCO_2/yr$	-	42,086
Percentage reduction in carbon emissions over the site	-	86%



Building Fabric Energy Efficiency measures

ENERGY EFFICIENCY TARGETS

Energy efficiency measures for the building fabric will be incorporated to reduce the energy demand and carbon footprint of the proposed scheme.

All u-values have been pushed far beyond Part L minimum standards.

U-VALUES TARGETED ACROSS SITE

Element	Building Regulations Part L 2021 U-Value (W/m^2K)	Proposed U-Value (W/m^2K)
Roof	0.16	0.10
Floor	0.18	0.10
Walls	0.26	0.15
Window/Doors	1.6	1.2 (Average)

AIR-TIGHTNESS

In addition to excellent u-values, a very high-performance development with outstanding air tightness levels is to be achieved such that the proposed scheme does not exceed an air permeability level of 1 $m^3/hr/m^2$ at 50pa during testing.

This will be achieved through ensuring that sensitive areas are accounted for in the design and construction phases to make certain that a tightly sealed building is constructed and all punctures through the seal are airtight. In particular, attention will be paid to openings such as services and down lighters at roof level. Accredited details will be followed to ensure that the average Y-Value across site will be no greater than 0.06. Each thermal bridge will be required to be calculated and shown that an average 0.045 is met across the site.

ENERGY EFFICIENCY

Main energy systems will have weather compensator included. Heating will be delivered via efficient under floor heating and radiator mix.

In addition, 100% of internal lighting will be energy efficient.

VENTILATION

MVHR ventilation will be supplied in the dwellings and to meet the full requirements of Part F. The air test target is 1 $m^3/hr/m^2$ and dwellings should have mechanical ventilation below 3.5 air test for good air flow and occupant health.

Feasible Renewable Energy technologies

FEASIBLE LOW OR ZERO CARBON TECHNOLOGIES	A reduction in carbon emissions through the use of on-site low or zero carbon technologies can be achieved through several technologies to generate either heat or power. Local policy ESD3 notes that renewables shouldn't have adverse affects on the local area or landscape. Following the analysis of the carbon emissions related to the scheme, the objective of this section is to determine the feasible low or zero carbon technologies options that provide cost-effective and practical emissions reductions. The low or zero carbon technologies options for the proposed scheme are provided in the table below. Each technology is also assessed as either feasible or rejected based on its implications for the scheme in terms of their implementation, cost-effectiveness, site-related constraints, planning issues or others. The following sections will explore the feasible technologies in depth and explain why certain technologies have been rejected.
Technology and feasibility	**Rationale**
BIOMASS / REJECTED	Biomass would be able to provide good overall reduction in carbon emissions. However, this technology would have a significant impact on local air quality in the Borough and development access restraints preclude the possibility of biomass pellet delivery.
LIQUID BIOFUEL/ REJECTED	Although biofuel has the capability to heat the dwellings, as with solid biomass, liquid biofuel has air quality implications in addition to delivery and sourcing issues in a city/town location.
AIR SOURCE HEAT PUMP (ASHP) / FEASIBLE – ACCEPTED	An air source heat pumps can supply heating and hot water to the proposed scheme. There is space available for the condenser and cylinder required for the Air Source Heat Pump (ASHP) and for the external unit also. The high efficiency and electrical source of ASHP makes this a good choice to lower carbon emissions and meet the targets.
GROUND SOURCE HEAT PUMP / FEASIBLE – NOT ACCEPTED	A ground source heat pump would be capable of heating the developments and providing hot water; however capital cost and disruption of drilling vertical boreholes make this technology potentially undesirable on the site until further investigation.
PHOTOVOLTAIC (PV) / FEASIBLE – ACCEPTED	There are roof areas available for solar PV. Houses will accommodate 3 kWp Solar PV panel array and flats 2kWp. The panels will drive the overall carbon savings on site towards zero carbon.
SOLAR HOT WATER (SHW) / FEASIBLE – NOT ACCEPTED	As with Solar PV, Roof mounted SHW units could be located on the roof space area. If the roof space available were covered with solar collectors as appose to Solar PV, the carbon savings would be far less.
WIND TURBINE / REJECTED	Turbulence created from surrounding buildings makes this an inefficient solution and it would make a large visible impact.

Proposed Renewables

INTRODUCTION

It is proposed that in order to meet Cherwell Local Plan Policy ESD3: Sustainable Construction and ESD5 – Renewable Energy; an Air Source Heat Pump's (ASHP) and Solar PV are deemed feasible and viable solutions.

AIR SOURCE HEAT PUMPS

An air source heat pump (ASHP) absorbs heat from outside a building and release it inside using the vapor-compression refrigeration process, in the opposite direction. The heat usually goes to a buffer tank before radiators or UFH distribution. ASHP's are around 250-400% efficient (meaning 2.5-4KW of power for every 1KW put in) and are best suited to modern, well insulated properties.

SOLAR PV

Solar PV collects energy from the sun and converts to electricity. The panels can lay on the flat roof. This array will not be visible from the street. The kilowatt Hours (kWh) per year are based on a feasible 850 operating watts per 1000 peak in the UK.

POTENTIAL SPECIFICATION

A suggested specification for the Air Source Heat Pump (ASHP) is a Mitsubishi Ecodan heat pump and underfloor heating, per unit.

A suggested specification for Solar PV is 8no x 380w (1800 x 1016 mm) LG 380W Mono Solar Modules, which equates to 3 kWp system, generating approximately 2,550 kWh clean electricity per year. A 2kWp system will be specified for flats. There will be 4-8 kWp batteries storage also specified.

DISCLAIMER

Note that ASHP and PV installation requires full design and installation from the electric sub-contractor and/or a renewables installer.

Energy Strategy Summary

RECOMMENDATION	The early stage proposed energy strategy for ultra low-carbon homes is to use a highly efficient Air Source Heat Pumps as the main heating and DHW system, alongside advanced energy efficiency fabric measures, mechanical ventilation with heat recovery (MVHR) and Solar Photovoltaic panels to aim towards the zero carbon emissions reductions target. The proposal is to build traditional construction, built to advanced practice u-values and air tightness, far surpassing Part L 2021 requirements. The thermal performance targets of the dwellings are as follows: U-Values of 0.10 W/m2K for the ground floor, 0.10 W/m2K for the roof, 0.15 W/m2K for walls and high performance double-glazed standard windows of 1.2 W/m2K (average across site). A maximum air permeability of 1 m3/m2/hr at 50 pa is targeted, and to be achieved on site. Thermal bridging will also be kept to a minimum with an average Y-value of 0.045, thus going beyond accredited construction details as a minimum. Full MVHR ventilation will meet Part F requirements. 3 kWp Solar PV on houses and 2 kWp Solar PV on flats will supply clean energy to the site.
CO_2 SAVINGS SUMMARY	Hypothetical baseline carbon emissions for the 60 unit scheme are approx. 49,132 kgCO2/yr. Following implementation of measures within this report; a total saving of 4,511 kgCO2/yr will be made, a **86% overall carbon reduction** and close to zero carbon**.** These measures include: - **Fabric** (approx. 15% savings over baseline): Energy efficiency measures to improve the building fabric and services: High performance U-Values (0.15 for walls, 0.10 for roof, 0.10 for the ground floor and 1.2 for windows in W/m2K), advanced practice air tightness (maximum of 1 m3/m2/hr at 50 Pa), best practice attention to thermal bridging at an average Y-value of 0.045. - **Renewables** (approx. 70% savings over clean case): Low carbon heating and hot water through an Air Source Heat Pump and clean energy through Solar PV.
Policy & Part L 2021	The scheme will meet ESD3: Sustainable Construction and ESD5 – Renewable Energy and will also meet building Regulations (Part L 2021) on both a carbon emission and fabric efficiency basis.

BREEAM Community Building

INTRODUCTION & TARGET

The communal building onsite, will be around 1,300m^2 over two stories, with associated landscaping and approx. 44 parking spaces. Cherwell Local Plan Policy ESD3 denote that non-residential building over 500m^2 should meet BREEAM assessment score of 'Very Good'.

POTENTIAL BREEAM Rating

Below is a potential BREEAM pre-assessment score sheet, scoring a 'Very Good' rating. This assessment is based upon energy targets and assumptions made at this early stage, in line with the values and strategy for the residential units, studied in this report. The development will score well in Energy, water and pollution. Further credits can be sought at full planning and detailed design:

BREEAM Rating

	Credits available	Credits achieved	Credits targeted	% Credits achieved	Weighting	Category score
Man	21.0	11.0	11.0	52.38%	11.00%	5.76%
Hea	19.0	12.0	12.0	63.16%	14.00%	8.84%
Ene	20.0	14.0	15.0	70.00%	16.00%	11.20%
Tra	12.0	6.0	6.0	50.00%	10.00%	5.00%
Wat	8.0	6.0	6.0	75.00%	7.00%	5.25%
Mat	14.0	9.0	9.0	64.29%	15.00%	9.64%
Wst	10.0	5.0	5.0	50.00%	6.00%	3.00%
LE	13.0	8.0	8.0	61.54%	13.00%	8.00%
Pol	10.0	8.0	8.0	80.00%	8.00%	6.40%
Inn	10.0	1.0	1.0	10.00%	10.00%	1.00%
Total	137.0	80.0	81.0	58.39%	-	64.09%
Rating	-	-	-	-	-	★★★☆☆ **Very Good**

Water Requirement

INTRODUCTION

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.

Local policy ESD3 'Sustainable Construction' details that water should be preserved beyond budling regulations and target 110 litres per person per day. The water efficiency measures included in the proposed dwellings will ensure that the water use target is achieved using the measures described below. Part G will be surpassed.

RECOMMENDATION

The following water fittings will be provided for all dwellings:

- 4/2.6 litre dual flush WC 's
- Kitchen taps flow aerated taps with flow rate of 4 litres
- Flow aerated taps with flow rate of 3 litres
- Showers are average max flow rate mix of max. 6 and 9 litres/minute at supplied pressure.
- Bath 180 litres to overflow
- A/A+ rated washing machines (5kg per litre) and dishwashers (0.68 litre / place).

The above specification will equate to 104.2 litres per person per day. Alternatively, rainwater recycling may be implemented to allow higher water use figures whilst maintaining the same target.

FLOW RESTRICTORS

Simple flow restrictors will be used to ensure high spec appliances are water efficient.

Materials

INTRODUCTION	Local policy ESD3 'Sustainable Construction' advocates low impact material use. The typical UK construction material supply chain is out-dated, carbon intensive and uses many synthetic materials. Environmentally-friendly materials have lower emissions in their production and lower environmental impact.
LIFECYCLE CARBON AND MATERIALS	Materials with lower lifecycle carbon emission will be used where possible - timber frames and recycled cellulose insulation can greatly reduce carbon emissions, and furthermore sequester CO2 in its use. These systems will also use help overheating and is low pollution. Green roofs have very low lifecycle carbon emissions and encourage local wildlife to thrive and provide further insulation to the roof – these will be maximized on flat roof areas, particularly the non-residential building. Any metal (steel, aluminum, copper etc) used in the project will be sourced from recycled sources, as virgin metals have very high embodied carbon emissions.
MATERIALS CERTIFICATION	The dwellings, wherever possible, will use BRE Green Guide 'A' rated materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and manufactured. All Timber used will be FSC or PEFC certified timber. All concrete, steel and windows used in the development will be ISO14001 certified.

FSC®

ENVIRONMENTAL MANAGEMENT SYSTEM
ISO 14001

Circular Economy & Waste

INTRODUCTION

Local policy ESD3 'Sustainable Construction' and National planning policy states that all construction waste should be minimised. Furthermore 'The Circular Economy' method of pre-planning how materials will be re-used so to reduce waste and in-turn the need for virgin building materials. Therefore the site aims to practice both the Waste Hierarchy and the principles of the circular economy, within both the design and construction of the development. In addition a site waste management plan will be implemented to ensure minimal waste on site.

PREVENTION/ REDUCTION

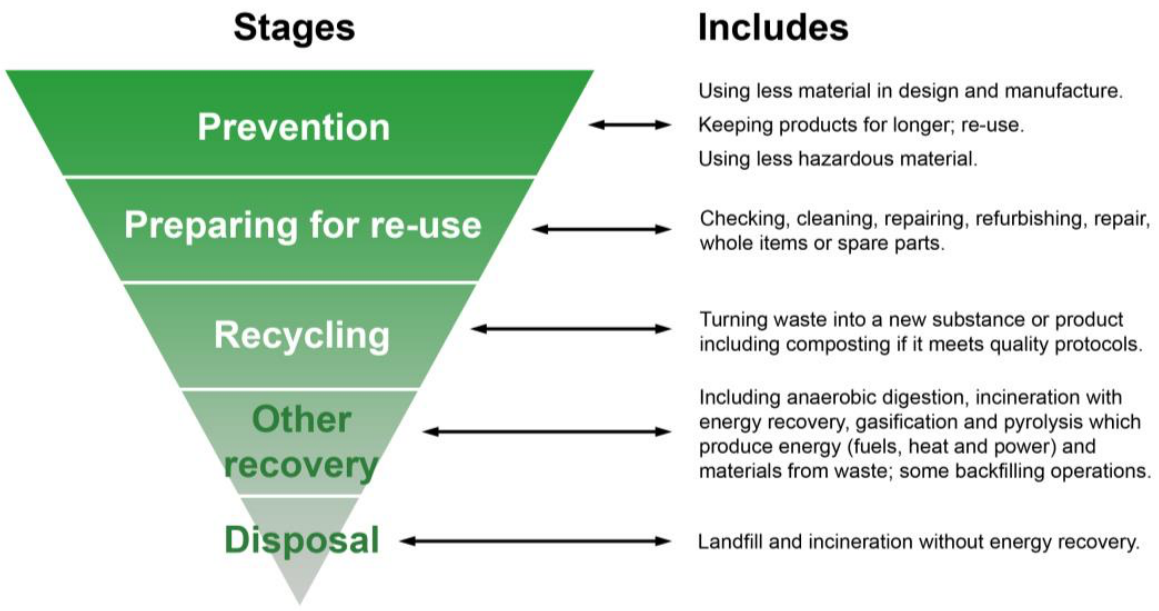
- Any metal (steel, aluminum, copper etc) used in the project will facades will be sourced from recycled sources
- The project will use standard sizes and quantities of materials, and plan ahead to reduce off cuts.
- Over-ordering will be kept to a minimum through detailed quantity surveying as part of the SWMP requirements.
- Deliveries will be arranged to match work stages, to avoid materials being stored on site longer than necessary.
- All storage areas on site will be safe, secure and weatherproof.
- A site induction will aim to brief the construction team on minimising rework from errors and poor workmanship.

REUSE OF MATERIALS

Layer	Constituent elements	Strategies
Site	The geographical setting, urban location and external works	**Retain and reuse**
Substructure	Excavations, foundations, basements and ground floors	**Longevity** – durable and resilient; readiness for alternative technologies
Superstructure	Load-bearing elements above plinth including roof supporting structure	**Adaptability** – how the current needs might change in the future
Shell/Skin	The layer keeping out water, wind, heat, cold, direct sunlight and noise	**Flexibility** – potential for reconfiguration/future refurbishment of non-structural parts
Services	Installations to ensure comfort, practicality, accessibility and safety	**Reusability** – designed to be redeployed of reused as kit of parts
Space	The layout internal walls, ceilings, floors, finishes, doors, fitted furniture	**Recoverability** – designed to be deconstructed and reused/recycled
Stuff	Anything that could fall if the building was turned upside down	Not applicable
Construction Stuff	Any temporary installations/works/ materials, packaging and equipment	**Reusability** – Use of re-usable hoardings and scaffolding **Waste minimisation, material optimisation**

RECYCLING	The site SWMP will target to recycle at least 95% of all waste not reused or identified in the circular economy plans. An off-site collection company will be employed to ensure waste is efficiently sorted for recycling and report weekly.
TARGETS	The design team and construction team will procure: • a Sustainable Procurement Plan, • a bespoke Site Waste Management Plan, • a target to divert 95% of construction waste and 95% of the demolition/excavation waste from going into the landfill. • a benchmark target for a resource efficiency of 13.3m3 (or 11.1 tonnes) of waste per 100m2 of GIA; Potentially aspiring for a target of 7.5 m3 (or 6.5 tonnes) of waste per 100m2 GIA.

WASTE HIERACHY



Climate change mitigation

INTRODUCTION	Policy ESD1 Mitigating and Adapting to Climate Change notes that applications with resilience to the anticipated effects of climate change will be preferred. The site incorporates many early stage design considerations to make the site as future-proof as possible.
ENERGY	As detailed in this report, energy use on site will be generated by Solar PV and homes heated by electric-powered ASHP, which will continue to become lower carbon, as the UK grid switches to clean energy.
CYCLES	Cycle storage will be provided on site to sufficient requirements for all units, moving away from localised use of cars. The spaces will be lockable, undercover and easily accessible.
EV CHARGING	An electrical vehicle charging hook up will be installed in the all houses and each block of flats, for clean transport energy use and lower pollution.
DESIGN	Efficient orientation, advanced u-values mechanical ventilation with heat recovery (MVHR), external shading, cross-ventilation and low glazing G values will be implemented to ensure that both energy demand and overheating are minimal.
LOCAL SOURCING	Materials and site workforce will be sought locally.
SuDS	A Sustainable urban drainage system is imperative for large sites such as this and dedicated surface water run-off swales will be provided to channel, store and drain surface water run-off from the site. Rainwater storage tanks will be implemented to ensure peak run-off rates cannot cause further flood risk.

Appendix A

Energy calculations and hypothetical SAP results on following pages

TER/DER

	TER CO2	Green CO2
1-Bed	15.46	2.20
2-bed	11.64	1.87
3-Bed	9.41	1.2
4-Bed	6.97	1.28

OVERALL EMISSION SCENARIOS

	Number	Estimated Area	Total area	TER CO2	Green CO2
1-Bed	9	51.00	459.00	7,096.14	1,009.80
2-bed	24	73	1,752.00	20,393.28	3,276.24
3-Bed	20	115	2,300.00	21,643.00	2,760.00
4-Bed	7	215	1,505.00	10,489.85	1,926.40
SUMs	**60.00**	**454.00**	**4,511.00**	**49,132.42**	**7,046.04**

Appendix B

Water Calculations

Summary for Input Data

elmhurst energy

Property Reference	Claydon 4 bed	**Issued on Date**	14/02/2023
Assessment Reference	Claydon 4 bed	**Prop Type Ref**	
Property	Chalgrove, London		

SAP Rating	94 A	**DER**	1.28	**TER**	6.97
Environmental	99 A	**% DER < TER**			81.64
CO_2 Emissions (t/year)	0.22	**DFEE**	29.16	**TFEE**	34.12
Compliance Check	See BREL	**% DFEE < TFEE**			14.52
% DPER < TPER	65.49	**DPER**	12.67	**TPER**	36.72

Assessor Details	Mr. Nicholas Bowen	**Assessor ID**	D719-0001
Client			

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

Orientation	South
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2022
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	40.00 m	108.00 m²	2.26 m
1st Storey:	40.00 m	108.00 m²	2.52 m

8.0 Living Area 35.19 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	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.15	9.00	180.00	154.88	0.00	None	25.12	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	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.00		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
GF	Dense block, dense plaster	100.00	94.50
FF	Plasterboard on timber frame	9.00	96.80

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
External Roof 2	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	108.00	0.00	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	49.53

11.0 Heat Loss Floors

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

Summary for Input Data

elmhurst energy

Ground floor	Ground Floor - Solid Lowest occupied	Slab on ground, screed over insulation	0.10	None	0.00	110.00	108.00

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	49.53

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Doors	Manufacturer	Solid Door							1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front door	Doors	External Wall 1	South	2.04	
Front elevation	Windows	External Wall 1	South	6.38	
Rear elevation	Windows	External Wall 1	North	12.01	
Side door	Doors	External Wall 1	West	1.91	
Side elevation	Windows	External Wall 1	West	2.78	

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)	Gov Approved Scheme	17.14	0.04	0.04	Yes
E3 Sill	Gov Approved Scheme	15.26	0.03	0.03	Yes
E4 Jamb	Gov Approved Scheme	32.60	0.04	0.04	Yes
E5 Ground floor (normal)	Gov Approved Scheme	40.00	0.10	0.10	No
E6 Intermediate floor within a dwelling	Gov Approved Scheme	40.00	0.00	0.00	No
E16 Corner (normal)	Gov Approved Scheme	9.56	0.05	0.05	Yes
E12 Gable (insulation at ceiling level)	Gov Approved Scheme	20.00	0.05	0.05	No
E10 Eaves (insulation at ceiling level)	Gov Approved Scheme	20.00	0.09	0.09	No

Y-value	0.02	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	1.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500321
Configuration	4
Manufacturer SFP	1.03
Duct Type	Rigid
MVHR Efficiency	85.00
Wet Rooms	4
SFP from Installer Commissioning Certificate	Yes
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

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	810.00	10	8100	18

24.0 Main Heating 1 — Database

Summary for Input Data

elmhurst energy

Description	boiler	
Percentage of Heat	100.00	%
Database Ref. No.	103154	
Fuel Type	Electricity	
In Winter	0.00	
In Summer	0.00	
Model Name	Ecodan 8.5 kW	
Manufacturer	Mitsubishi Electric Europe B.V.	
System Type	Heat Pump	
Controls SAP Code	2207	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	55.00	

25.0 Main Heating 2 — None

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

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To

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	150.00	L
Loss	2.43	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

Summary for Input Data

elmhurst energy

31.0 Thermal Store	None
32.0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	6.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
3.00	South	30°	None Or Little		No	1.00		

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

Summary for Input Data

elmhurst energy

Property Reference	Claydon 3 bed	**Issued on Date**	14/02/2023
Assessment Reference	Claydon 3 bed	**Prop Type Ref**	
Property	Chalgrove, London		

SAP Rating	96 A	**DER**	1.20	**TER**	9.41
Environmental	99 A	**% DER < TER**			87.25
CO_2 Emissions (t/year)	0.09	**DFEE**	31.42	**TFEE**	37.63
Compliance Check	See BREL	**% DFEE < TFEE**			16.50
% DPER < TPER	77.04	**DPER**	11.27	**TPER**	49.06

Assessor Details	Mr. Nicholas Bowen	**Assessor ID**	D719-0001
Client			

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

Orientation	South
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2022
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	22.80 m	65.00 m²	2.26 m
1st Storey:	20.16 m	49.53 m²	2.52 m

8.0 Living Area 35.19 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	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.15	9.00	102.30	77.18	0.00	None	25.12	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	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.00		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
GF	Dense block, dense plaster	100.00	94.50
FF	Plasterboard on timber frame	9.00	96.80

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
External Roof pitch	External Slope Roof	Plasterboard, insulated slope	0.10	9.00	13.50	2.49	None	0.00	Enter Gross Area	2.49
External Roof 2	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	49.53	0.00	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	49.53

11.0 Heat Loss Floors

Summary for Input Data

elmhurst energy

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Ground floor	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.10	None	0.00	110.00	65.00

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	49.53

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Doors	Manufacturer	Solid Door							1.00
Roof lights	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front door	Doors	External Wall 1	South	2.04	
Front elevation	Windows	External Wall 1	South	6.38	
Rear elevation	Windows	External Wall 1	North	12.01	
Rear RL	Roof lights	External Roof pitch	North	2.49	0
Side door	Doors	External Wall 1	West	1.91	
Side elevation	Windows	External Wall 1	West	2.78	

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)	Gov Approved Scheme	17.14	0.04	0.04	Yes
E3 Sill	Gov Approved Scheme	15.26	0.03	0.03	Yes
E4 Jamb	Gov Approved Scheme	32.60	0.04	0.04	Yes
E5 Ground floor (normal)	Gov Approved Scheme	22.80	0.10	0.10	Yes
E6 Intermediate floor within a dwelling	Gov Approved Scheme	20.16	0.00	0.00	Yes
E16 Corner (normal)	Gov Approved Scheme	9.56	0.05	0.05	Yes
E18 Party wall between dwellings	Gov Approved Scheme	9.56	0.03	0.03	Yes
R1 Head of roof window	Table K1 - Default	2.88	0.24	0.24	Yes
R2 Sill of roof window	Table K1 - Default	2.88	0.24	0.24	Yes
R3 Jamb of roof window	Table K1 - Default	6.92	0.24	0.24	Yes
E11 Eaves (insulation at rafter level)	Gov Approved Scheme	5.80	0.03	0.03	No
E13 Gable (insulation at rafter level)	Gov Approved Scheme	2.38	0.05	0.05	No
E12 Gable (insulation at ceiling level)	Gov Approved Scheme	14.20	0.05	0.05	No
E10 Eaves (insulation at ceiling level)	Gov Approved Scheme	5.80	0.09	0.09	No
P1 Party wall - Ground floor	Gov Approved Scheme	7.40	0.03	0.03	No
P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	7.70	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Gov Approved Scheme	7.70	0.05	0.05	No

Y-value	0.05	W/m²K

18.0 Pressure Testing	Yes	
Designed AP_{50}	1.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500321
Configuration	4
Manufacturer SFP	1.03
Duct Type	Rigid
MVHR Efficiency	85.00
Wet Rooms	4
SFP from Installer Commissioning Certificate	Yes
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

Summary for Input Data

elmhurst energy

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	810.00	10	8100	18

24.0 Main Heating 1	Database	
Description	boiler	
Percentage of Heat	100.00	%
Database Ref. No.	103154	
Fuel Type	Electricity	
In Winter	0.00	
In Summer	0.00	
Model Name	Ecodan 8.5 kW	
Manufacturer	Mitsubishi Electric Europe B.V.	
System Type	Heat Pump	
Controls SAP Code	2207	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	55.00	
25.0 Main Heating 2	None	
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

28.1 Showers

Description	**Shower Type**	**Flow Rate [l/min]**	**Rated Power [kW]**	**Connected**	**Connected To**

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes

Summary for Input Data

elmhurst energy

Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	2.43	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store None

32.0 Photovoltaic Unit One Dwelling

Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	6.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
3.00	South	30°	None Or Little		No	1.00		

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

Summary for Input Data

elmhurst energy

Property Reference	Flat	**Issued on Date**	14/02/2023
Assessment Reference	Claydon 2 bed	**Prop Type Ref**	
Property	Chalgrove, London		

SAP Rating	93 A	**DER**	1.87	**TER**	11.64
Environmental	99 A	**% DER < TER**			83.93
CO_2 Emissions (t/year)	0.11	**DFEE**	32.15	**TFEE**	35.90
Compliance Check	See BREL	**% DFEE < TFEE**			10.43
% DPER < TPER	69.05	**DPER**	18.79	**TPER**	60.72

Assessor Details	Mr. Nicholas Bowen	**Assessor ID**	D719-0001
Client			

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

Orientation	Northwest
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, End-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2022
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	26.30 m	72.57 m²	2.50 m

8.0 Living Area 27.44 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	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.15	60.00	65.75	40.00	0.00	None	25.75	Calculate Wall 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	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	27.00		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	120.50

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	72.57

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	Slab on ground, screed over insulation	0.10	None	0.00	110.00	72.57

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing	Filling	G-value	Frame	Frame	U Value

Summary for Input Data

				Gap	Type		Type	Factor	(W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Door	Manufacturer	Solid Door							1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Side elevation	Windows	External Wall	South West	16.35	
Sid eelevation	Windows	External Wall	North East	7.50	
door	Door	External Wall	North West	1.90	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	Yes	
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	10.60	0.04	0.04	LABC	No
E3 Sill	Non Gov Approved Schemes	10.60	0.03	0.03	labc	No
E4 Jamb	Non Gov Approved Schemes	24.20	0.04	0.04	labc	No
E5 Ground floor (normal)	Non Gov Approved Schemes	26.30	0.10	0.10	LABC	No
E7 Party floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	26.30	0.03	0.03	LABC	No
P1 Party wall - Ground floor	Table K1 - Default	10.80	0.32	0.32	LABC	No
E16 Corner (normal)	Non Gov Approved Schemes	7.50	0.05	0.05		No

Y-value	0.06	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	1.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500321
Configuration	2
Manufacturer SFP	0.76
Duct Type	Rigid
MVHR Efficiency	86.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

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	810.00	10	8100	8

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104638	
Fuel Type	Electricity	
In Winter	0.00	
In Summer	0.00	
Model Name	Ecodan 6.0 kW	

Summary for Input Data

elmhurst energy

Manufacturer	Mitsubishi Electric Europe B.V.
System Type	Heat Pump
Controls SAP Code	2207
PCDF Controls	0
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Enter value
Flow Temperature Value	35.00
Heating control function	TBC
Heating control ecodesign class	TBC
Heating control manufacturer	TBC
Heating control model	TBV

25.0 Main Heating 2 None

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
Hot Water Controls Manufacturer	TBC
Hot Water Controls Model	TBC

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To

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	180.00	L
Loss	0.84	kWh/day
Pipes insulation	All accessible pipework insulated	
In Airing Cupboard	No	

Summary for Input Data

elmhurst energy

31.0 Thermal Store	None
32.0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	4.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
2.00	Horizontal	Horizontal	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Summary for Input Data

elmhurst energy

Property Reference	Flat	**Issued on Date**	14/02/2023
Assessment Reference	Claydon 1 bed	**Prop Type Ref**	
Property	Chalgrove, London		

SAP Rating	93 A	**DER**	2.20	**TER**	15.46
Environmental	99 A	**% DER < TER**			85.77
CO_2 Emissions (t/year)	0.09	**DFEE**	41.75	**TFEE**	45.02
Compliance Check	See BREL	**% DFEE < TFEE**			7.26
% DPER < TPER	73.26	**DPER**	21.77	**TPER**	81.42

Assessor Details	Mr. Nicholas Bowen	**Assessor ID**	D719-0001
Client			

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

Orientation	Northwest
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, End-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2022
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	26.30 m	51.00 m²	2.50 m

8.0 Living Area 27.44 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	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.15	60.00	65.75	40.00	0.00	None	25.75	Calculate Wall 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	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	27.00		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	120.50

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	72.57

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	Slab on ground, screed over insulation	0.10	None	0.00	110.00	72.57

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing	Filling	G-value	Frame	Frame	U Value

Summary for Input Data

				Gap	Type		Type	Factor	(W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Door	Manufacturer	Solid Door							1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Side elevation	Windows	External Wall	South West	16.35	
Sid eelevation	Windows	External Wall	North East	7.50	
door	Door	External Wall	North West	1.90	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	Yes	
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	10.60	0.04	0.04	LABC	No
E3 Sill	Non Gov Approved Schemes	10.60	0.03	0.03	labc	No
E4 Jamb	Non Gov Approved Schemes	24.20	0.04	0.04	labc	No
E5 Ground floor (normal)	Non Gov Approved Schemes	26.30	0.10	0.10	LABC	No
E7 Party floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	26.30	0.03	0.03	LABC	No
P1 Party wall - Ground floor	Table K1 - Default	10.80	0.32	0.32	LABC	No
E16 Corner (normal)	Non Gov Approved Schemes	7.50	0.05	0.05		No

Y-value	0.06	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	1.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500321
Configuration	2
Manufacturer SFP	0.76
Duct Type	Rigid
MVHR Efficiency	86.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

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	810.00	10	8100	8

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104638	
Fuel Type	Electricity	
In Winter	0.00	
In Summer	0.00	
Model Name	Ecodan 6.0 kW	

Summary for Input Data

elmhurst energy

Manufacturer	Mitsubishi Electric Europe B.V.
System Type	Heat Pump
Controls SAP Code	2207
PCDF Controls	0
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Enter value
Flow Temperature Value	35.00
Heating control function	TBC
Heating control ecodesign class	TBC
Heating control manufacturer	TBC
Heating control model	TBV

25.0 Main Heating 2 None

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
Hot Water Controls Manufacturer	TBC
Hot Water Controls Model	TBC

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To

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	180.00	L
Loss	0.84	kWh/day
Pipes insulation	All accessible pipework insulated	
In Airing Cupboard	No	

Summary for Input Data

elmhurst energy

31.0 Thermal Store	None
32.0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	4.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
2.00	Horizontal	Horizontal	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Water Use Calculations

Land Claydon Road - approx. 60 units

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
WC (single flush)	Flush Volume (litres)		4.42	0.00	0
WC (dual flush)	Full flush Volume (litres)	4	1.46	0.00	5.84
	Part flush Volume (litres)	2.6	2.96	0.00	7.70
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	3.00	1.58	1.58	6.32
Bath (where shower also present)	Capacity to overflow(litres)	180.00	0.11	0.00	19.80
Shower (where bath also present)	Flow Rate(litres / minute)	9.00	4.37	0.00	39.33
Bath Only	Capacity to overflow(litres)		0.50	0.00	0
Shower Only	Flow Rate (litres/minute)		5.60	0.00	0
Kitchen/Utility room sink taps	Flow rate (litres/minute)	4.00	0.44	10.36	12.12
Washing Machine	(Litres/kg dry load)	7.00	2.1	0.00	14.70
Dishwasher	(Litres/place setting)	0.90	3.6	0.00	3.24
Waste disposal unit	(Litres/use)	☐Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	Total Calculated use (litres/person/day) =SUM(column 4)			109.05
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			99.24
	(10)	External water use			5.0
	(11)	Total water consumption (Building Regulation 17.K) =(9)+(10)(litres/person/day)			104.2

Installation Type	Make/Model (mandatory)	Litres/Person/Day
WC (dual flush)	Twyford Alcona - low water	13.54
Taps	Grohe - Flow restricted - 3 l/m	6.32
Baths (shower(s) present)	Bette - 1600x700	19.80
Showers (bath(s) present)	Grohe - Flow restricted - 9 l/m	39.33
Kitchen Taps	Grohe - Flow restricted	12.12
Washing Machines	BEKO	14.70
Dishwasher	BEKO	3.24