

ENERGY STRATEGY

PROJECT: Independence House, Richmond

PROJECT NUMBER: **P2738**

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1.0 EXECUTIVE SUMMARY

QuinnRoss Energy was commissioned to develop an energy statement for the proposed development at *Independence House, 84 Lower Mortlake Rd, Richmond* that will outline how it intends to provide heating and power and meet the energy and carbon emission targets set by national and local policy. The development comprises 21 residential units with refuse, gym, cycle store and carpark spaces.

This strategy was prepared directly in line with the *London Borough of Richmond Upon Thames Local Plan* guidance on energy statements.

This development will be subject to the following requirements:

Requirement	Description / Summary
National Planning Policy Framework (2021)	The National Planning Policy Framework (NPPF) introduced a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. The framework states that the purpose of planning is to help achieve sustainable development.
Building Regulations Part ADL1 2021	You are expected to improve building's energy efficiency, however there are no specific targets.
London Plan 2021	The London Plan 2021 outlines all major developments must have zero CO_2 emissions. A CO_2 reduction of at least 35% is expected. The remaining CO_2 to zero must be off-set with a cash in lieu contribution.
Richmond Upon Thames Local Plan 2018	The Richmond Upon Thames Local Plan 2018 Policy LP 22 All new major residential developments (10 units or more) should aim to reduce their carbon dioxide emissions in accordance with the levels set out in the London Plan.
Energy Assessment Guidance (June 2022)	Section 6.15 to 6.25 outlines the approach for refurbished buildings.

Table 01: Summary of energy and sustainability targets



To achieve the above targets, the following energy reduction methods will be required, using the London Plan's Energy Hierarchy:

Method	Description / Summary
Be Lean	
High performing building thermal envelope	Construction U-values performing substantially above the current building regulations, including triple glazing.
Low infiltration	Air tightness no higher than 3.0 m³/m²h.
Natural ventilation	Natural ventilation to be used with opening windows.
Highly efficient lighting with controls	LED lighting installed throughout.
Highly efficient HVAC systems	High efficiency heat pump for heating and hot water will be installed. No gas installations on site.
Insulated pipe work	All Internal heating pipework will be insulated to a standard beyond building regulation requirements.
Unregulated Energy Use	Efforts will be made to reduce the unregulated emissions by providing "best in class" ("A" rated or equivalent) white goods.
Be Clean	
District Heating	No existing DH networks are near the site and no future network is planned.
Combined Heat and Power (CHP)	The CO_2 savings from the proposed heat pump system will be significantly improved over an equivalent CHP system, therefore CHP is not considered.
Be Green	
Heat pumps	High efficiency exhaust air heat pump system for heating, ventilation and hot water will be installed. This is an internal unit with no external condensers required.
Solar panels	A 105m ² photovoltaic (PV) array will be installed on roof space. This will be around 20.4 kWp.

Table 02: Summary of energy hierarchy Lean, Clean & Green methods



Thermal and Energy Modelling Results

The whole development has been analysed for its energy use using current 2021 Building Regulations in *Elmhurst SAP 10* and *IES VE Compliance* approved energy modelling software. The predicted CO_2 emissions, saved CO_2 emissions and cash-in-lieu sum is shown below:

		Ра	rt L 2021 Results			
	major refurbishments assessed		New build residential (includes major refurbishments assessed under Part L1A)		Overall area weighted reductions	
	Total tCO ₂	% Reduction at each stage	Total tCO ₂	% Reduction at each stage	Total tCO ₂	% Reduction at each stage
Baseline	-	-	11	N/A	11	N/A
Be Lean	-	-	31	-197%	31	-197%
Be Clean	-	-	31	0%	31	0%
Be Green	-	-	6	238%	6	238%
TOTAL	-	-	4	41%	4	41%

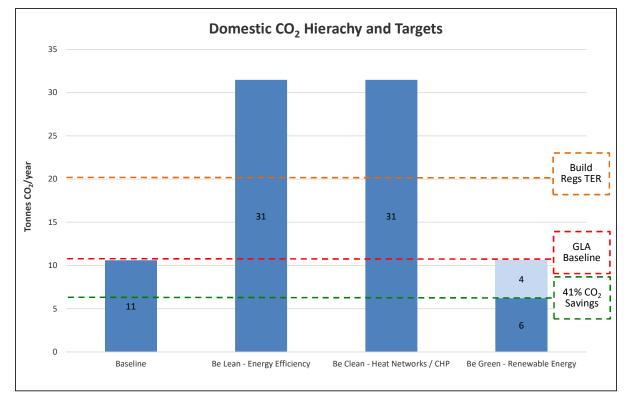


Table 03: Summary carbon reductions calculations using current Build Regs

Figure 01: Carbon reductions comparison between current and future Build Regs

Please note the \pounds in lieu payment is based on $\pounds 95$ per tonne over 30 years as per GLA's Carbon Offset Funds: Monitoring Report 2020. All inputs, SAP outputs can be found in the appendices.



2.0 INTRODUCTION

QuinnRoss Energy was commissioned to develop an energy statement for the proposed development at *Independence House, 84 Lower Mortlake Rd, Richmond* that will outline how it intends to provide heating and power and meet the energy and carbon emission targets set by national and local policy. The development comprises 21 residential units with refuse, gym, cycle store and carpark spaces.

The site is located on London, in the borough of Richmond Upon Thames. See image below:



Figure 02: Google Map image of site

3.0 PLANNING POLICY AND LEGISLATION

This section describes the planning policies and regulations that will affect the proposed development. These are outlined below:

- National Planning Policy Framework (2021).
- Building Regulations Part ADL1, dwellings.
- London Plan 2021.
- Richmond Upon Thames Local Plan 2018
- Energy Assessment Guidance (June 2022)



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Figure 03: Document front cover images of applicable policies

3.01 National Planning Policy Framework (NPPF) 2021

The NPPF sets out government planning policy for England. It was first published by the Department for Communities and Local Government (now the Ministry of Housing, Communities and Local Government (MHCLG)) on 27 March 2012.

The NPPF followed a commitment made in the 2010 Coalition Agreement to 'publish and present to Parliament a simple and consolidated national planning framework covering all forms of development and setting out national economic, environmental and social priorities'.

The NPPF introduces a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. The framework states that the purpose of planning is to help achieve sustainable development.

Please note the NPPF does not state any specific energy or CO_2 targets, it outlines that local councils should produce their own (as outlined below).

3.02 Building Regulations Part ADL1 2021

The residential areas will be subject to the Building Regulations Conservation of Fuel and Power in new & existing dwellings. This policy does require refurbishment works to improve the building's energy efficiency. There are no specific targets or requirements that are mandatory to achieve other than to improve energy efficiency over the existing building.

3.03 London Plan 2021

The London Plan 2021 outlines a number of policies to underpin London's response to climate change. These policies cover adaptation, waste, aggregates, contaminated land, hazardous substances and most applicable to this development climate change mitigation. The key policies within the London Plan relating to energy consumption and CO_2 emissions include the following policies:

• SI2 Minimising greenhouse gas emissions.

3.03.01 Policy SI2 Minimising Greenhouse Gas Emissions

Policy SI2 above will have the most significant impact on this development as it outlines specific carbon emissions targets:



- All major development must have <u>zero CO₂ emissions</u>.
- CO₂ emissions must be at a minimum 40% lower than the Building Regulations Part L2A 2010 TER (which is 35% better than the current 2013 Building Regulations) then further short fall off-set through a cash in lieu payment.

3.04 Richmond Upon Thames Local Plan 2018

The Richmond Upon Thames Local Plan 2018 Policy LP22 All new major residential developments (10 units or more) should aim to reduce their carbon dioxide emissions in accordance with the levels set out in the London Plan.

It must be noted however the above policy does not contain any specific energy and CO₂ targets and Richmond Council themselves refer to the London Plan 2021 as their current guidance (outlined above).

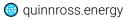
3.05 Energy Assessment Guidance (June 2022).

The GLA's Energy Assessment Guidance (June 2022) outlines the approach for refurbished buildings and is outlined in the section below.

4.0 APPROACH FOR REFURBISHED BUILDINGS

This development is not a new-build, it's a refurbishment and change-of-use development. The approach for refurbishment is outlined in the GLA's *Energy Assessment Guidance (June 2022)* section 6.15 to 6.25. It clearly states that a "Baseline" building must be produced using the inputs outlined in Appendix C: Notional specification for existing buildings. The refurbishment works will be assessed against the performance of this Baseline building.

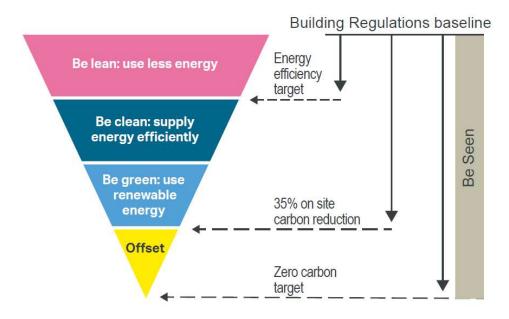
Although not a new-build development, it has been requested to also include the Part L 2021 Target Emissions Rate (TER) for information purposes.





5.0 ENERGY HIERACHY

As part of our aims to provide a sustainable development we will be following the energy hierarchy outlined in the London Plan policy. The hierarchy shown below guides our approach to minimising the energy use within the building and to create a comfortable internal environment. This consists of three best practice criteria: Be Lean, Be Clean and Be Green to achieve Low energy and carbon design.





The design team has taken the above criteria and applied the most feasible measures to the building.

5.01 Be Lean

5.01.01 Building Envelope Thermal Performance

The most effective way of keeping heating energy consumption to a minimum is to ensure the building uses high performing fabric properties. It is proposed the building is well insulated and uses high performing constructions above the current minimum requirement of the building regulations. As a result, the following construction U-values (W/m².K) are proposed:

Envelope Element	U-Value W/m².K
	Residential
Wall	0.15
Roof	0.10
Floor	0.10
Glazing	1.20

Table 04: Proposed U-values



The above figures will be achieved by adding substantial high performing insulation into the constructions and only using manufacturer's that have well insulated glazing products with deep air gaps between frames.

5.01.02 Air Infiltration

Uncontrolled air infiltration in a building can contribute to a sizeable proportion of heat losses particularly in well insulated modern buildings. An air permeability of no greater than 3.0 m³/m²h is proposed. This is done by ensuring all bridges, corners and air gaps in the façade or glazing are sealed as far as feasibly possible.

5.01.03 Energy efficient services

A number of energy efficient HVAC and lighting strategies are proposed for the development:

- Lighting LED lighting will be installed throughout and be chosen to minimise over-illumination.
- Energy meters energy meters will be installed for all major energy uses including water.
- User controls Efficient and user-friendly controls will be specified throughout all buildings.
- Heating & hot water The building will be highly insulated for low space heating requirements. Residential heating and hot water will be provided by a high efficiency exhaust air heat pump system.
- Natural ventilation The dwellings are mainly naturally ventilated with exhaust ventilation for maximum comfort.

5.01.04 Insulated pipework

All Internal heating pipework, particularly those located in internal corridors, will be insulated to a standard beyond building regulation requirements. This will minimise issues of internal heat gain and avoid the need for any additional ventilation or cooling.

5.01.05 Unregulated energy use

In addition, efforts are being made to reduce the unregulated emissions by providing "best in class" ("A" rated or equivalent) white goods in each room to encourage energy consumption reduction.

Please note the benefits of high efficiency appliances cannot be included in any results shown in this report. These measures interact to some degree (e.g., more low energy lighting reduces the ancillary heat gains from lighting, so increases the space heating demand) so comparisons of individual results can produce apparent anomalies and are not provided as a result.



5.02 Be Clean

5.02.01 District Heating (DH) Networks

The next stage of the London Plan hierarchy is to look at the availability of decentralised heat networks within the vicinity of the development. Consideration should be given to connecting to these networks should there be one close to the development, or if a network is proposed for the local area. The image below shows the location of the site on the current London Heat Map (https://maps.london.gov.uk/webmaps/heatmap/):

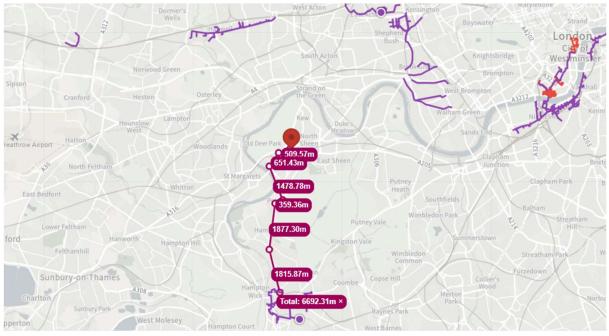


Figure 05: London heat map image showing site and proposed (Purple) and existing (red) networks

The site is not in a district heating priority area.

The site is 6km from the proposed heating network and 12km from existing heating network. There are no existing networks or proposed network within a reasonable distance. Therefore, district heating is not considered.

5.02.02 Combined Heat and Power (CHP)

The recent change (June 2022) in Building Regulations now favours electrical systems over gas fuelled ones, such as CHP, in line with the government policy to move away from natural resource consumption such as gas. Therefore, the CO_2 savings from the proposed heat pump system will be significantly improved over an equivalent CHP system, therefore CHP is not considered.



5.03 Be Green

The final part of the hierarchy is to minimise carbon dioxide emissions using renewable / Low or Zero Carbon (LZC) technologies. An initial LZC technology feasibility study has been carried out, shown in appendix A, and the most appropriate products available is heat pumps and solar panels.

5.03.01 Heat pumps

A high efficiency exhaust air heat pump system for space heating, ventilation and hot water will be used. This is an internal unit with no external condensers required.

5.03.02 Solar panels

A 105m² solar panel array will be installed at residential roof. This will be around 20.4 kWp.

5.04 Be Seen

Extensive monitoring and metering for all major plant and equipment will be installed. Individual equipment and services will be capable of being monitored individually and their energy consumption tabulated for review. All metering will also have pulsed outputs and be capable of warning of "out of range" values.

6.0 THERMAL & ENERGY MODELLING RESULTS

6.01 Part ADL1 Software Used

All residential apartments will be calculated using the Standard Assessment Procedure (SAP). The software used will be *Elmhurst Energy*'s (formerly NHER) *Design SAP 10* which is widely used for building energy calculations throughout the On-Construction industry. All versions of *Elmhurst's Design SAP* software are fully BRE tested, and Government approved; they calculate the necessary building regulations/standards for England (Part L), Wales (Part L), Northern Ireland (Part F) and Scotland (Section 6).

http://www.elmhurstenergy.co.uk/

An approved Elmhurst Energy On-Construction Domestic Energy Assessor (OCDEA) also conducted the calculations.

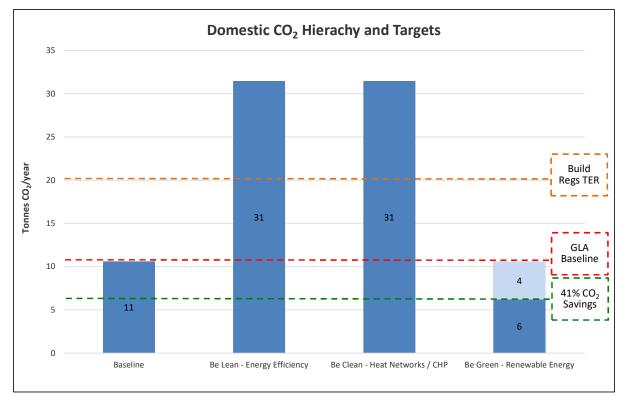
6.02 Baseline Building

Unlike with new-build developments, the target emission rate (TER) for existing building is not created automatically from notional building standards. A Baseline building must be created in line with the energy strategy guidance as outlined in Section 4.0 above.

See appendices for the inputs for the Baseline building.



6.03 Results



The Part ADL1 results under current Building Regulations 2021 are shown below:

Using the input data outlined in this report the residential areas will improve the GLA baseline building by 56%.

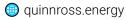


Figure 06: Part L1A results



7.0 SUMMARY & CONCLUSION

The proposed development will achieve the following energy & sustainability targets:

Requirement	Description / Summary
National Planning Policy Framework (2021)	By conforming to the legal requirements of Part L 2021 and the local requirements of Hounslow Borough Council, as outlined below, the development can be considered compliant with the NPPF.
Building Regulations Part ADL1 2021	Using the inputs outlined in this report all residential spaces will be compliant with Part ADL1 2021.
London Plan 2021	Using the inputs outlined in this report the building will have CO_2 emissions 36% better than the GLA baseline building, exceeding the London Plan minimum requirements.
Richmond Upon Thames Local Plan 2018	Compliance with the London Plan 2021 (as outlined above) is achieved.

Table 05: Summary of energy and sustainability targets

To achieve the above emissions, the following energy reduction methods will be required, using the London Plan's Energy Hierarchy:

Be Lean

• High performing building thermal envelope – Construction U-values performing above the current building regulations. The following construction U-values will be used

Envelope Element	U-Value W/m².K		
Livelope Liement	Residential		
Wall	0.15		
Roof	0.10		
Floor	0.10		
Glazing	1.20		

Table 06: Proposed U-values

- Low Infiltration Air tightness no higher than 3.0 m³/m²h.
- Highly efficient lighting with controls LED lighting installed throughout.
- Highly efficient HVAC systems Only specifying a high efficiency exhaust air heat pump system.
- **Highly efficient hot water generator -** The hot water demand will be provided by the same heat pump used for space heating with built in hot water tank.



- Insulated pipe work All Internal heating pipework will be insulated to a standard beyond building regulation requirements.
- Unregulated Energy Use In addition, efforts are being made to reduce the unregulated emissions by providing "best in class" ("A" rated or equivalent) white goods in apartments.

Be Clean

- District Heating (DH) There are no existing networks or proposed networks within a reasonable distance.
- Combined Heat and Power (CHP) Although CHP is feasible, it would offer far inferior CO₂ savings over the proposed heat pumps and is not considered as a result.

Be Green

- Heat Pumps Highly efficient exhaust air heat pump system for space heating, ventilation and hot water will be installed. This is an internal unit with no external condensers required.
- Solar panels A 105 m² solar panel array will be installed at residential roof. This will be around 20.4 kWp.

Energy Modelling Results

The whole development has been analysed for its energy use using approved energy modelling software. The predicted tonnes of CO_2 are shown below:

		Ра	rt L 2021 Results			
	major refurbishments assessed		New build residential (includes major refurbishments assessed under Part L1A)		Overall area weighted reductions	
	Total tCO ₂	% Reduction at each stage	Total tCO ₂	% Reduction at each stage	Total tCO₂	% Reduction at each stage
Baseline	-	-	11	N/A	11	N/A
Be Lean	-	-	31	-197%	31	-197%
Be Clean	-	-	31	0%	31	0%
Be Green	-	-	6	238%	6	238%
TOTAL	-	-	4	41%	4	41%

Table 07: Summary of CO₂ emissions and savings

As the results above show, when including all available technologies and methods, the building will achieve a 36% improvement over the GLA baseline.



8.0 APPENDICES

8.01 Appendix A – LZC Technology Feasibility Analysis

	Technology	Feasibility	
Photovoltaic (PV) Panels		PV's use semiconductor technology to convert incident solar radiation into electrical power. The building is well suited for solar collection with a large flat roofs located several storeys above ground level. Any electricity that is generated and used on site is preferable as every kWh used is one that the development doesn't have to purchase. Any surplus electricity generated can be exported to the national grid, receiving a further export tariff in addition to the generation tariff. This development has lots of open roof ideal for solar panel placement.	High
Solar Thermal Panels		Solar thermal panels are a method of harvesting the sun's energy, commonly to provide a source of preheated water. As mentioned above, the building has a large area of roof providing an ideal location for solar thermal collection. The optimum size of a solar thermal array is to provide approximately a third of the daily stored demand, which would benefit the residential areas however it would be at the cost of PV panel area. Electricity demand reduction, from PV's, has a greater impact on CO_2 savings than hot water consumption making this tech feasible but less effective than other options.	Medium
Ground Source Heat Pump (GSHP)		A GSHP takes low-grade heat from the ground and uses electricity to convert it to useful heat (at approximately 40°C) that can be used to heat a building. The ground can also be used as a heat sink to provide cooling. The bore holes and length of pipework into the ground required for this tech make this option difficult to justify considering the developments suburban location.	Low
Air Source Heat Pump (ASHP)		Similar to the GSHP, ASHP utilises the external environment as a heat source. A heat pump uses electricity or gas to run a refrigerant cycle, extracting heat from external air to convert it to useful heat for space heating. ASHPs offer high efficiencies and are suited to institutional and commercial properties. Although these systems are typically not silent-running, must be located externally and require an area of flat roof, their high efficiencies are too beneficial to rule out.	High
Wind Turbines		Wind energy can be converted to electricity by using wind turbines. This renewable technology is suited to exposed areas free from obstructions where the average wind speeds are high. On the site there are plenty of obstructions which would lead to the wind having a turbulent nature resulting in poor output for turbines, plus they have significant visual and noise impacts on neighbouring areas. Hence they are unsuitable for this development.	Low
Biomass		Biomass fuel is usually wood chips or wood pellets, and as it comes from plants it is considered a low- carbon source of high-grade heat that can be used for space heating, domestic hot water and, with absorption chillers, cooling (this last option is very rarely implemented due to high capital cost). A biomass boiler needs to operate under a reasonably constant load being a solid fuel boiler, it is unable to respond to load fluctuations as quickly as a gas or oil boiler. This limits the boilers to being suitable to operate for the provision of the base load. This could still be suitable for this development for its likely large base load however biomass also has the potential to have a significantly detrimental effect on air quality in the local vicinity, frequent fuel deliveries are required which could be disruptive to residents and there are significant maintenance costs. Unless a free source of wood can be found, such as waste from a factory or forestry management operation, the biomass fuel is often the same price or more expensive than gas. This means that the additional capital outlay on top of the increased fuel, maintenance costs, air quality, running costs and maintenance issues make biomass less viable than other tech available.	Low
Combined Heat and Power		CHP is the simultaneous generation of usable heat and power (usually electricity) in a single process, the heat being distributed in surrounding buildings instead of being wasted. CHP is best suited to buildings with large heating and DHW demands making it feasible for this development. Although CHP is feasible, it would not offer significantly better savings over the proposed heat pumps. It must also be noted that future Building Regs are widely predicted to be moving away from CHP and natural resource consumption, therefore CHP is not considered.	Medium
District Heating		DH tends to be large CHP units run by commercial energy firms supplying energy to local buildings through underground pipework. Though they offer the same benefits as an on site CHP, without maintenance costs (provided by the supplier), the limitations are the proposed site needs to be within reasonable distance of a network. The nearest proposed network is around 6km from the site. There are no existing DH networks within feasible distance of the site. Therefore DH is not considered.	Low



8.02 Appendix B – Input data used for BASELINE Calculations

Construction

Construction U-values W/m².K		
Floor	0.25	
External wall	0.55	
Roof	0.16	
Front door	2.20	

Glazing Parameters	
Overall U-value, including frame	1.60
g-value	0.63

Internal / Party Constructions	
Party wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity
Internal partitions	Internal partition plaster on dabs
Internal ceiling	Plasterboard ceiling, carpeted chipboards floor
Internal floor	Plasterboard ceiling, carpeted chipboards floor

Thermal Mass Parameter (TMP)	
TMP Varies between apartments	
Thermal Bridging	
Calculating source type	Calculated per apartment

Default

Air Permeability

Pressure Test	
Pressure Test AP50	5.0

Ventilation

All bridges

Natural Ventilation	
Туре	Centralised mechanical extract ventilation
Duct type	Rigid
SFP W/I/s	0.65

Cooling

None	
-	-



Lighting

Lighting	
% of Low Energy Lighting (L.E.L.) fittings	100%
Efficacy	75 lm/W
Tariff	Standard

Heating System

Heat Source 1	
Heat source	Exhaust air heat pump
Heating use	Heating and hot water
Efficiency	358.0%
Code	Time and temperature zone control by arrangement

Domestic Hot Water

Water Heating	
Water heating	From main heating system
Heater type	-
Fuel type	-
Туре	-

Hot Water Cylinder	
Volume	150.0
Storage losses kwh/day	1.68
Pipework	Fully insulated
Pipework	Fully insulated

Renewables

None	
-	-



8.03 Appendix C –Input data used for LEAN calculations

Construction

Construction U-values W/m².K	
Floor	0.10
External wall	0.15
Roof	0.10
Front door	1.40

Glazing Parameters	
Overall U-value, including frame	1.20
g-value	0.60

Internal / Party Constructions	
Party wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity
Internal partitions	Internal partition plaster on dabs
Internal ceiling	Plasterboard ceiling, carpeted chipboards floor
Internal floor	Plasterboard ceiling, carpeted chipboards floor

Thermal Mass Parameter (TMP)		
TMP Varies between apartments		
Thermal Bridging		

i nermai Bridging	
Calculating source type	Calculated per apartment
All bridges	Default

Air Permeability

Pressure Test	
Pressure Test AP50	3.0

Ventilation

Natural Ventilation	
-	-

Cooling

None		
-	-	



Lighting

Lighting	
% of Low Energy Lighting (L.E.L.) fittings	100%
Efficacy	100 lm/W
Tariff	Standard

Heating System

Heat Source 1	
Heat source	Gas boiler combi
Heating use	Heating and hot water
Efficiency	78%
Code	Programmer, room thermostat and TRVs

Domestic Hot Water

Water Heating	
Water heating	From main heating system
Heater type	-
Fuel type	-
Туре	-

Hot Water Cylinder

Renewables

-

None		



8.04 Appendix D – Input data used for GREEN calculations

Construction

Construction U-values W/m².K	
Floor	0.10
External wall	0.15
Roof	0.10
Front door	1.40

Glazing Parameters	
Overall U-value, including frame	1.20
g-value	0.60

Internal / Party Constructions	
Party wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity
Internal partitions	Internal partition plaster on dabs
Internal ceiling	Plasterboard ceiling, carpeted chipboards floor
Internal floor	Plasterboard ceiling, carpeted chipboards floor

Thermal Mass Parameter (TMP)	
TMP	Varies between apartments
Thermal Bridging	

internal Bridging	
Calculating source type	Calculated per apartment
All bridges	Default

Air Permeability

Pressure Test	
Pressure Test AP50	3.0

Ventilation

Mechanical Ventilation	
Туре	Centralised mechanical extract ventilation
Duct type	Rigid
SFP W/I/s	0.65

Cooling

None	
-	-



Lighting

Lighting	
% of Low Energy Lighting (L.E.L.) fittings	100%
Efficacy	100 lm/W
Tariff	Standard

Heating System

Heat Source 1	
Heat source	Exhaust air heat pump
Heating use	Heating and hot water
Efficiency	358%
Code	Time and temperature zone control by arrangement

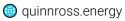
Domestic Hot Water

Water Heating	
Water heating	From main heating system
Heater type	-
Fuel type	-
Туре	-

Hot Water Cylinder	
Volume	170.0
Storage losses kwh/day	1.56
Pipework	Fully insulated

Renewables

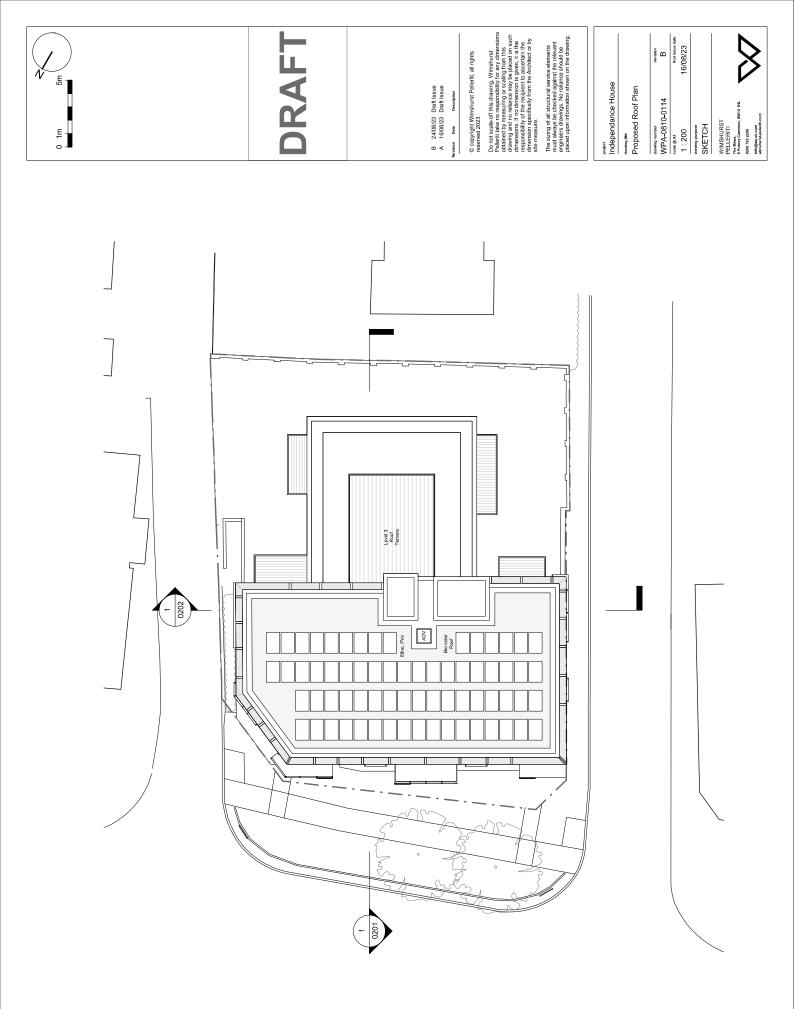
Photovoltaics (PV) Solar Panels	
No. of panels for whole site	68 no.
Orientation	Horizontal
Overshading	None or little
Connect to dwelling	Yes



Energy Strategy



8.05 Appendix E – PV Layout



Energy Strategy



8.06 Appendix F – BASELINE SAP Outputs



Property Reference	3rd_unit03				Issued on Date	17/10/2023
Assessment Reference	3rd_unit03_BASELINE		Ргор Тур	e Ref		
Property						
SAP Rating		69 C	DER		TER	
Environmental		93 A	% DER < TER			N/A
CO ₂ Emissions (t/year)		0.54	DFEE		TFEE	
Compliance Check		See BREL % DFEE < TFEE				
% DPER < TPER			DPER		TPER	
Assessor Details Mr.	. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT DA	TA FOR: Conversion	(As Designed)				
rientation		Northeast				
roperty Tenture		ND				
ransaction Type		6				
errain Type		Suburban				
		Cabalball				
.0 Property Type		Flat, End-Terrace				
0 Property Type Position of Flat						
		Flat, End-Terrace				
Position of Flat Which Floor		Flat, End-Terrace Top-floor flat				
Position of Flat Which Floor .0 Number of Storeys		Flat, End-Terrace Top-floor flat 3				
		Flat, End-Terrace Top-floor flat 3 1				
Position of Flat Which Floor .0 Number of Storeys .0 Date Built		Flat, End-Terrace Top-floor flat 3 1	1			
Position of Flat Which Floor O Number of Storeys O Date Built O Sheltered Sides O Sunlight/Shade		Flat, End-Terrace Top-floor flat 3 1 1989 1	1			
Position of Flat Which Floor .0 Number of Storeys .0 Date Built .0 Sheltered Sides		Flat, End-Terrace Top-floor flat 3 1 1989 1 Average or unknown	1			
Position of Flat Which Floor O Number of Storeys O Date Built O Sheltered Sides O Sunlight/Shade		Flat, End-Terrace Top-floor flat 3 1 1989 1 Average or unknown Precise calculation	1			

		Ground floor:	32.88 m	77.	13 m²	3	3.26 m
8.0 Living Area		32.70			m²		
9.0 External Walls							
Description	Туре		U-Value Kappa Gross (W/m²K) (kJ/m²K) Area(m²	Nett Area Shelter) (m²) Res	- Shelte	r Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.55 60.00 86.06	74.24 0.00	None	11.82	Enter Gross Area
Unheated Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.55 60.00 21.12	19.00 0.00	None	2.12	Enter Gross Area
9.1 Party Walls							
Description	Туре	Construction		U-Value Kap (W/m²K) (kJ/m		Shelter Res	Shelter
Party Wall 1	Solid Wall	Plasterboard on dabs mounted on sides, AAC blocks, cavity	e cement render on both			NC3	None
9.2 Internal Walls							
Description		Construction				Kapp (kJ/m [:]	
Internal Wall 1		Dense block, plasterboard on dabs				75.0	
10.0 External Roofs							
Description	Туре	Construction	U-Value Kappa (W/m²K)(kJ/m²K)			Shelter Calcul Factor Typ	lationOpenings pe
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16 9.00	77.13 77.13	8 None	0.00 Enter 0 Are	
11.1 Party Floors							
Description		Storey Construction Index				Kap (kJ/n	opa Area (m²) n²K)



Party Floor 1		Lowest occupied		cast concrete plank floor	r (screed laid or	n insulation)	, carpeted			30.00	77.13
12.0 Opening Types		1									
Description	Data Source	Туре		Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K
	Manufacturer Manufacturer	Door to C Window	orrido	or Double glazed		Gap	Type	0.63	Type	0.70	2.20 1.60
I3.0 Openings											
Name Opening Opening Opening Opening	Opening Ty Door Window Window Window	ре		Location Unheated Wall External Wall 1 External Wall 1 External Wall 1		Orienta North South South North	East West East	Area 2.1 1.7 1.6 8.4	2 6 0	Pi	tch
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 E23 Balcony within or betw support penetrates wall ins		balcony		rce Type e K1 - Default	Length 5.49	Psi 1.00	Adjusted 1.00	Reference	:		Imported No
E16 Corner (normal) E17 Corner (inverted – inte external area)		er than		e K1 - Default e K1 - Default	9.78 3.26	0.18 0.00	0.18 0.00				No No
E2 Other lintels (including o E3 Sill E4 Jamb E7 Party floor between dwe E14 Flat roof	ellings (in block	,	Tab Tab Tab Tab	e K1 - Default e K1 - Default e K1 - Default e K1 - Default e K1 - Default K1 - Default	6.98 5.97 18.80 32.88 32.88	1.00 0.10 0.28 0.16	1.00 0.10 0.10 0.28 0.16				Yes Yes Yes Yes Yes
E18 Party wall between dw	ellings		Tab	e K1 - Default	6.52	0.24	0.24				Yes
Y-value				0.00				W/m²K			
18.0 Pressure Testing				Yes							
Designed AP ₅₀				5.00				m³/(h.m	²) @ 50 Pa		
Property Tested?				Yes							
Test Method				Blower Door							
19.0 Mechanical Ventilation Mechanical Ventilation											
Mechanical Ventilatio	n System Prese	ent		Yes				7			
Approved Installation				No				i i			
Mechanical Ventilatio				Database				i i			
Туре				Mechanical extract ven	tilation - centra	lised		i i			
MV Reference Numb	er			500258				Ξ́			
Configuration				1				=			
Manufacturer SFP				0.65							
Duct Type				Rigid				4			
Wet Rooms	Flues			1							
				No							
21.0 Fixed Cooling System				טאון							
22.0 Lighting No Fixed Lighting				No				7			
NO FIXEd Lighting				Name Lighting 1	Efficacy 75.00		wer 5	Capa 37			ount 20
24.0 Main Heating 1				Database							
Percentage of Heat				100.00				%			
Database Ref. No.				100393				ī			
Fuel Type				Electricity				Ξ			



In Summer	0.00	1
Model Name	Fighter 470	1
Manufacturer	NIBE Energy Systems Ltd	1
System Type	Heat Pump	1
Controls SAP Code	2207	1
Is MHS Pumped	Pump in unheated space	1
' Heating Pump Age	2013 or later	1
Heat Emitter	Underfloor	1
Underfloor Heating	Yes - Pipes in thin screed	1
Flow Temperature	Enter value	1
Flow Temperature Value	35.00	j
25.0 Main Heating 2	None]
26.0 Heat Networks	None	
Heat Source 1 Heat source 1 Heat source 2 Heat source 3 Heat source 4 Heat source 5	Jse Efficiency Percentage Of Heat Heat Ele Heat Power Ratio	ctrical Fuel Factor Efficiency type
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	No]
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	170.00] L
Loss	1.56	kWh/day
In Airing Cupboard	No]
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 SAP r 0 0 0	0
	0	



Property Reference	1st_unit01				Issued on Date	17/10/2023
Assessment Reference	1st_unit01_BASELINE		Prop Ty	pe Ref		
Property						
SAP Rating		76 C	DER		TER	
Environmental		95 A	% DER < TER			N/A
CO ₂ Emissions (t/year)		0.38	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details	r. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT DA	TA FOR: Conversion	(As Designed)				
Drientation		Southeast				
Property Tenture		ND				
ransaction Type		6				
errain Type		Suburban				
		Suburban Flat, End-Terrace				
.0 Property Type		Flat, End-Terrace				
		Flat, End-Terrace				
.0 Property Type Position of Flat Which Floor .0 Number of Storeys		Flat, End-Terrace Mid-floor flat				
.0 Property Type Position of Flat Which Floor		Flat, End-Terrace Mid-floor flat 1				
.0 Property Type Position of Flat Which Floor .0 Number of Storeys .0 Date Built .0 Sheltered Sides		Flat, End-Terrace Mid-floor flat 1 1989	1			
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built		Flat, End-Terrace Mid-floor flat 1 1 1989 2	n			
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 3.0 Sheltered Sides 3.0 Sunlight/Shade 3.0 Thermal Mass Parameter		Flat, End-Terrace Mid-floor flat 1 1 1989 2 Average or unknow	n			
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 3.0 Sheltered Sides 3.0 Sunlight/Shade		Flat, End-Terrace Mid-floor flat 1 1 1989 2 Average or unknow Precise calculation	n			

			Ground floor		Loss P 17.71		er In	ternal Floo 64.38 n		•	orey Height 7 m
8.0 Living Area			25.80					m	2		
9.0 External Walls											
Description	Туре	Construction		U-Value			Nett Area		Shelter	Openings A	rea Calculation
External Wall 1	Cavity Wall	Cavity wall : plast filled cavity, any o	erboard on dabs, AAC block,	(W/M²K) 0.55	(kJ/m²K) 60.00	59.67) (m²) 46.56	Res 0.00	None	13.11 E	Type Inter Gross Area
Unheated Wall	Cavity Wall		erboard on dabs, AAC block,	0.55	60.00	5.32	3.20	0.00	None	2.12 E	inter Gross Area
9.1 Party Walls											
Description	Туре	Const	ruction					Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall		rboard on dabs mounted o AAC blocks, cavity	n cemer	nt render	on both		45.00	68.23		None
9.2 Internal Walls											
Description		Constru	uction							Kappa (kJ/m²ł	· · ·
Internal Wall 1		Dense b	olock, plasterboard on dab	6						75.00	162.14
10.1 Party Ceilings											
Description		Constru	uction							Kappa (kJ/m²h	
Party Ceiling 1		Precast	concrete plank floor (scree	ed laid o	n insulati	ion), car	rpeted			30.00	64.38
11.1 Party Floors											
Description		Storey Index	Construction							Kapp (kJ/m²	· · ·
Party Floor 1			Precast concrete plank floo	or (scree	ed laid on	i insulat	ion), carp	eted		30.0	



Description	Data Source	Туре		Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K
Door Window	Manufacturer Manufacturer	Door to C Window	Corridor	Double glazed			.,,,,,	0.63	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.70	2.20 1.60
3.0 Openings				-							
Name Opening Opening Opening Opening	Opening Ty Door Window Window Window	pe	Un Ext Ext	cation heated Wall ernal Wall 1 ernal Wall 1 ernal Wall 1		Orient South North North Sou	East West East	Area 2.1 7.0 1.6 4.4	2 5 5	Pi	tch
4.0 Conservatory			No	ne							
5.0 Draught Proofing			100)				%			
6.0 Draught Lobby			No								
7.0 Thermal Bridging			Cal	culate Bridges							
7.1 List of Bridges											
Bridge Type E23 Balcony within or b support penetrates wall	etween dwellings, insulation	balcony	Source Table K	Type 1 - Default	Length 3.65	Psi 1.00	Adjusted 1.00	Reference	:		Importe No
E16 Corner (normal) E17 Corner (inverted – external area)		er than		1 - Default 1 - Default	11.01 3.67	0.18 0.00	0.18 0.00				No No
E2 Other lintels (includi	ng other steel linte	ls)		1 - Default	7.50	1.00	1.00				Yes
E3 Sill E4 Jamb			Table K	1 - Default 1 - Default	6.49 15.80	0.10 0.10	0.10 0.10				Yes Yes
E7 Party floor between E18 Party wall between		s of flats)		1 - Default 1 - Default	17.71 7.34	0.28 0.24	0.28 0.24				Yes Yes
Y-value			0.0	0				W/m²K			
8.0 Pressure Testing			Yes	3							
Designed AP50			5.0	0				m³/(h.m	²) @ 50 Pa	I	
Property Tested?			Yes	3							
Test Method			Blo	wer Door							
19.0 Mechanical Ventilation	on										
Mechanical Ventilation											
	ation System Pres	ent	Yes	3							
Approved Installa			No								
Mechanical Ventil	ation data Type			abase							
Туре				chanical extract vent	illation - central	ised					
MV Reference Nu	Imber)258							
Configuration			1								
Manufacturer SFF	5		0.6								
Duct Type			Rig	id							
Wet Rooms			1								
20.0 Fans, Open Fireplace											
21.0 Fixed Cooling System	n		No								
2.0 Lighting No Fixed Lighting			No					_			
				Name ghting 1	Efficacy 75.00		wer 5	 Capa 37			ount 20
4.0 Main Heating 1			Dat	abase							
Percentage of Heat			100).00				%			
Database Ref. No.			100)393							
Fuel Type				ctricity							
In Winter			0.0	0							
In Summer			0.0	0				7			
								=			



								_		
Manufacturer			NIBE E	Energy Systems	Ltd					
System Type			Heat P	ʻump						
Controls SAP Code			2207							
Is MHS Pumped			Pump	in unheated spa	ice					
Heating Pump Age			2013 o	or later						
Heat Emitter			Underf	loor						
Underfloor Heating			Yes - F	Pipes in thin scre	eed					
Flow Temperature			Enter v	/alue						
Flow Temperature Value	;		35.00							
25.0 Main Heating 2			None							
26.0 Heat Networks			None							
Heat source 1 Heat source 2 Heat source 3 Heat source 4	Source F	Fuel Type Heating	g Use E	fficiency Perc	entage Of Heat	Heat	Heat E Power Ratio	ectrical	Fuel Factor	Efficiency type
Heat source 5										
28.0 Water Heating			Main	leating 1				7		
Water Heating SAP Code			901							
Flue Gas Heat Recover	v Svetom		No							
Waste Water Heat Reco		tangous System 1	No							
Waste Water Heat Reco	-	-								
Waste Water Heat Reco	-	-	No							
Solar Panel	wery Storag	je System	No							
Water use <= 125 litres/	(person/day		No							
Cold Water Source	person/day		From r	maine						
Bath Count			1							
Immersion Only Heating	n Hot Water		No							
28.3 Waste Water Heat Re	-									
	covery Sys	lem						_		
29.0 Hot Water Cylinder				al Store				-		
Insulation Type				red Loss						
Cylinder Volume			170.00							
Loss			1.56					kWh/c	lay	
In Airing Cupboard			No							
34.0 Small-scale Hydro			None							
Jan Feb	Ма	r Apr	Мау	Jun	Jul	Aug	Sep	0	ct Nov	Dec
Recommendations Lower cost measures None Further measures to a	chieve eve	n higher standarc	ls Typical C	Cost Ty∣	pical savings	s per year		Ratings rating 0 0 0	after improven Enviror	nent Imental Impact 0 0 0



Property Reference	Grd_unit02				Issued on Date	17/10/2023
Assessment Reference	Grd_unit02_BEASELINE	E	Prop	Type Ref		
Property						
SAP Rating		59 D	DER		TER	
Environmental		91 B	% DER < TER			N/A
CO ₂ Emissions (t/year)		0.51	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details Mr	. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT DA	TA FOR: Conversion	(As Designed)				
Orientation		Southwest				
Property Tenture		ND				
Transaction Type		6				
Terrain Type		Suburban				
1.0 Property Type		Flat, End-Terrace				
Position of Flat		Ground-floor flat				
Which Floor		0				
		0				
2.0 Number of Storeys 3.0 Date Built		-				
2.0 Number of Storeys		1				
2.0 Number of Storeys 3.0 Date Built		1 1989	1			
2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides		1 1989 2	1			
2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides 5.0 Sunlight/Shade 6.0 Thermal Mass Parameter		1 1989 2 Average or unknown	1			
2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides 5.0 Sunlight/Shade		1 1989 2 Average or unknown Precise calculation	1			

7 0	Mea		om	onte	
1.0	iviea	asui	em	ents	j –

		Heat Loss PerimeterGround floor:19.24 m			r In	ternal Floo 41.50 r	•	e y Height n				
8.0 Living Area			35.50					m	2			
9.0 External Walls												
Description	Туре	Construction		U-Value	Kappa		Nett Area		Shelter	Openings	Area	Calculation
External Wall 1	Cavity Wall	Cavity wall : plasterbo filled cavity, any outsion	pard on dabs, AAC block,	(W/m²K) 0.55	(kJ/m ² K) 60.00	38.68	(m²) 26.48	Res 0.00	None	12.20	Ente	Type r Gross Area
Unheated Wall	Cavity Wall		pard on dabs, AAC block,	0.55	60.00	31.93	29.81	0.00	None	2.12	Ente	r Gross Area
9.1 Party Walls												
Description	Туре	Construc	tion					Kappa	Area	Shelter	S	nelter
Party Wall 1	Solid Wall		ard on dabs mounted o C blocks, cavity	n cemen	t render	on both		(kJ/m²K) 45.00	(m²) 32.70	Res	١	lone
9.2 Internal Walls												
Description		Constructi	on							Kap (kJ/m		Area (m²)
Internal Wall 1		Dense bloc	k, plasterboard on dabs	6						75.0		62.76
10.1 Party Ceilings												
Description		Constructi	on							Kap (kJ/m		Area (m²)
Party Ceiling 1		Precast cor	ncrete plank floor (scree	ed laid or	n insulati	on), car	peted			30.0		41.50
11.0 Heat Loss Floors												
Description	Туре	Storey Index	Construction				-Value	Shelter	Code	Shelter		a Area (m²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other				V/m²K) 0.25	Nor	ne	Factor 0.00	(kJ/m² 0.00	

. . .



Description	Data Source Manufacturer	Type Door to (Corrido	Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Valu (W/m²K 2.20
Window	Manufacturer	Window	Sonna	Double glazed				0.63		0.70	1.60
3.0 Openings											
Name Opening	Opening Ty Door	pe		Location Unheated Wall		Orient South		Area (2.12		Pi	tch
Opening Opening	Window Window			External Wall 1 External Wall 1		North South		5.28 6.92			
	WINDOW					South	East	0.9.	2		
4.0 Conservatory				None							
5.0 Draught Proofing				100				%			
6.0 Draught Lobby				No							
7.0 Thermal Bridging				Calculate Bridges							
7.1 List of Bridges			_								
Bridge Type E17 Corner (inverted – inte	ernal area great	er than		rce Type e K1 - Default	Length 3.67	Psi 0.00	Adjusted 0.00	Reference:			Importe No
external area) E2 Other lintels (including			Tab	e K1 - Default	7.96	1.00	1.00				Yes
E3 Sill		0)	Tab	e K1 - Default	6.95	0.10	0.10				Yes
E4 Jamb E5 Ground floor (normal)				e K1 - Default e K1 - Default	21.90 19.24	0.10 0.32	0.10 0.32				Yes Yes
E16 Corner (normal)			Tab	e K1 - Default	3.67	0.18	0.18				No
E18 Party wall between dw E23 Balcony within or betw		balconv		e K1 - Default e K1 - Default	7.34 2.72	0.24 1.00	0.24 1.00				Yes No
support penetrates wall ins		Juicony									
Y-value				0.00				W/m²K			
8.0 Pressure Testing				Yes							
Designed AP ₅₀				5.00				m³/(h.m	²) @ 50 Pa		
Property Tested?				Yes							
Test Method				Blower Door							
9.0 Mechanical Ventilation											
Mechanical Ventilation											
Mechanical Ventilation	n System Pres	ent		Yes							
Approved Installation				No							
Mechanical Ventilation	n data Type			Database							
Туре				Mechanical extract ver	ntilation - central	ised					
MV Reference Numb	er			500258							
Configuration				1							
Manufacturer SFP				0.65							
Duct Type				Rigid							
Wet Rooms				1							
0.0 Fans, Open Fireplaces,	Flues										
21.0 Fixed Cooling System				No							
2.0 Lighting											
No Fixed Lighting				No							
				Name Lighting 1	Efficacy 75.00	Po	5	Capa 37			20
4.0 Main Heating 1				Database							
Percentage of Heat				100.00				%			
Database Ref. No.				100393							
Fuel Type				Electricity							
In Winter				0.00							
In Summer				0.00				ī			
Model Name				Fighter 470				i i			
				<u> </u>							



26.0 Heat Networks	None	
25.0 Main Heating 2	None	
Flow Temperature Value	35.00	
Flow Temperature	Enter value	
Underfloor Heating	Yes - Pipes in thin screed	
Heat Emitter	Underfloor	
Heating Pump Age	2013 or later	
Is MHS Pumped	Pump in unheated space	
Controls SAP Code	2207	
System Type	Heat Pump	

neat source in der type neating o	Se Enciency	Heat	neat	Power Ratio	Liectrical	i dei i actor	Enciency type
Heat source 1 Heat source 2 Heat source 3 Heat source 4 Heat source 5				nutio			
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	No						
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	Internal Store						
In	sulation Type				Measure	ed Loss]		
Cy	ylinder Volum	е			170.00] L		
Lc	oss				1.56					kWh/day		
In	Airing Cupbo	ard			No]		
34.0 S	Small-scale H	lydro			None]		
	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations Lower cost measures None Further measures to achieve even higher standards

Typical Cost	Typical cavinga par year	Ratings af	ter improvement
	Typical savings per year	SAP rating	Environmental Impact
		0	0
		0	0
		0	0

Energy Strategy



8.07 Appendix G – LEAN SAP Outputs



Property Reference	Grd_unit02				Issued on Date	17/10/2023	
Assessment Reference	Grd_unit02_LEAN		Prop T	ype Ref			
Property							
SAP Rating		78 C	DER		TER		
Environmental		80 C	% DER < TER			N/A	
CO ₂ Emissions (t/year)	1.18	DFEE					
Compliance Check		See BREL					
% DPER < TPER			DPER		TPER		
Assessor Details M	r. Christopher Armstrong				Assessor ID	P763-0001	
Client							
SUMMARY FOR INPUT DA	TA FOR: Conversion	(As Designed)					
Drientation		Southwest					
Property Tenture		ND					
Fransaction Type		6					
Transaction Type Terrain Type		6 Suburban					
errain Type		-					
Ferrain Type		Suburban					
Terrain Type I.0 Property Type		Suburban Flat, End-Terrace					
Terrain Type I. 0 Property Type Position of Flat Which Floor		Suburban Flat, End-Terrace Ground-floor flat					
Terrain Type I.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys		Suburban Flat, End-Terrace Ground-floor flat 0					
Ferrain Type I.0 Property Type Position of Flat		Suburban Flat, End-Terrace Ground-floor flat 0 1					
Terrain Type 1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 1.0 Sheltered Sides		Suburban Flat, End-Terrace Ground-floor flat 0 1 1989	n				
Terrain Type 1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built		Suburban Flat, End-Terrace Ground-floor flat 0 1 1989 2	n				
Ferrain Type 1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides 5.0 Sunlight/Shade 5.0 Thermal Mass Parameter		Suburban Flat, End-Terrace Ground-floor flat 0 1 1989 2 Average or unknow	1				
Terrain Type 1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides 5.0 Sunlight/Shade		Suburban Flat, End-Terrace Ground-floor flat 0 1 1989 2 Average or unknow Precise calculation	n				

7.0 Measurements			Heat Loss Perimeter Ground floor: 19.24 m						Average Storey Height 3.67 m			
		35.50					m²	2				
Туре	Construction							Shelter	Openings		Calculation Type	
Cavity Wall			0.15	60.00	38.68	26.48	0.00	None	12.20		Gross Area	
Cavity Wall	Cavity wall : plasterbo	ard on dabs, AAC block,	0.15	60.00	31.93	29.81	0.00	None	2.12	Enter	Gross Area	
Туре	Construc	tion						Area	Shelter	Sh	elter	
Solid Wall			on cemen	t render	on both		45.00	32.70	Re5	No	one	
	Constructi	on									Area (m²)	
	Dense bloc	k, plasterboard on dab	s								62.76	
	Constructi	on									Area (m²)	
	Precast cor	crete plank floor (scre	ed laid or	n insulati	on), car	peted			` 30.0	0	41.50	
Туре	Storey Index	Construction					Shelter	Code				
Exposed Floor - Solid	Lowest occupied	Other					Nor	e	0.00	0.00	41.50	
	Cavity Wall Cavity Wall Type Solid Wall	Cavity Wall Cavity wall : plasterbo filled cavity, any outsi Cavity Wall Cavity wall : plasterbo filled cavity, any outsi Cavity Wall Cavity wall : plasterbo filled cavity, any outsi Cavity wall : plasterbo filled cavity, any outsi Cavity wall : plasterbo filled cavity, any outsi Cavity wall : plasterbo sides, AAC Constructi Dense bloc Constructi Precast cor Type Storey Index Exposed Floor - Lowest occupied	35.50 Type Construction Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure Type Construction Solid Wall Plasterboard on dabs mounted or sides, AAC block, cavity Solid Wall Plasterboard on dabs mounted or sides, AAC block, plasterboard on dabs mounted or sides, AAC block, cavity Construction Dense block, plasterboard on dab Dense block, plasterboard on dab Construction Precast concrete plank floor (screet plank floor (screet plank floor (screet plank floor - Lowest occupied Othert	Ground floor: 35.50 Type Construction U-Value (W/m'K) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 Type Construction 0.15 Solid Wall Plasterboard on dabs mounted on cemen sides, AAC block, cavity 0.15 Solid Wall Plasterboard on dabs mounted on cemen sides, AAC block, plasterboard on dabs 0.15 Construction Dense block, plasterboard on dabs 0.15 Type Construction Dense block, plasterboard on dabs Type Storey Index Construction Type Storey Index Construction Exposed Floor - Lowest occupied Other	Ground floor: 19.24 r 35.50 35.50 Type Construction U-Value (W/m*K) (kJ/m*K) Kappa (W/m*K) (kJ/m*K) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 Type Construction 0.15 60.00 Solid Wall Plasterboard on dabs mounted on cement render sides, AAC blocks, cavity Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Type Construction Dense block, plasterboard on dabs Construction Dense block plasterboard on dabs Construction Dense block plasterboard on dabs	Ground floor: 19.24 m 35.50 Type Construction Cavity Wall Cavity wall: plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 Cavity Wall Cavity wall: plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 Type Construction 0.15 60.00 31.93 Solid Wall Plasterboard on dabs mounted on cement render on both sides, AAC block, cavity 0.15 60.00 Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Precast concrete plank floor (screed laid on insulation), car Type Storey Index Construction <t< td=""><td>Ground floor: 19.24 m 35.50 Type Construction U-Value (Kappa Gross Nett Area (W/m*K) (k.l/m*K) Area(m*) (m*) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 Type Construction U-Value (W/m*K) Construction (W/m*K) U-Value (W/m*K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 0.00 31.93 29.81 Construction U-Value (W/m*K) Construction U-Value (W/m*K) U-Value (W/m*K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 0.00 sides, AAC block, cavity 0.00 Construction Dense block, plasterboard on dabs U-Value (W/m*K) U-Value (W/m*K) U-Value (W/m*K) Type Storey Index Construction U-Value (W/m*K) U-Value (W/m*K) Exposed Floor - Lowest occupied Other 0.10 U-Value (W/m*K)</td><td>Ground floor: 19.24 m 41.50 m 35.50 m* Type Construction U-Value Kappa Gross Nett Area Shelter Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 0.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 0.00 Type Construction U-Value Kappa (W/m²K) (kJ/m²K) U-Value Kappa (W/m²K) (kJ/m²K) Solid Wall Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity 0.00 45.00 Construction Dense block, plasterboard on dabs Construction U-Value Kappa (W/m²K) (kJ/m²K) Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Shetter Type Storey Index Construction U-Value (W/m²K) Shetter Type Storey Index Construction U-Value (W/m²K) Shetter Exposed Floor - Lowest occupied Other 0.10 Nor</td><td>Ground floor: 19.24 m 41.50 m² 35.50 m² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Cavity Wall Cavity any outside structure 0.15 60.00 35.68 26.48 0.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, Cavity wall 0.15 60.00 31.93 29.81 0.00 None Type Construction U-Value Kappa (W/m²K) Kappa (W/m²K) Area (M²/m²K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Solid Wall Plasterboard on dabs Construction U-Value Kappa (M/m²K) Area (M²/m²K) Construction Dense block, plasterboard on dabs 0.00 45.00 32.70 Dense block, plasterboard on dabs Construction U-Value Kappa Area (M²/m²K) Dense block, plasterboard on dabs Construction U-Value Shelter Code Type Storey Index Construction U-Value Shelter Code Type Storey Index Construction U-Value Shelter Code Exposed Floor- Lowest occupied Other 0.10</td><td>Ground floor: 19.24 m 41.50 m² 3 35.50 m² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Cavity wall: plasterboard on dabs, AAC block, filled cavity, any outside structure U-Value Kappa Gross Nett Area Shelter Openings Cavity wall: plasterboard on dabs, AAC block, filled cavity, any outside structure U-Value Kappa Gross Nett Area Shelter Openings Type Construction U-Value Kappa Area Shelter Shelter Type Construction U-Value Kappa Area (W/m²K) (kJ/m²K) (kJ/m²K) Kappa Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Kappa Construction Kappa Construction Construction Kappa Construction Value Value</td><td>Ground floor: 19.24 m 41.50 m² 3.67 m 35.50 m² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Area 0 Cavity Wall : plasterboard on dabs, AAC block, 0.15 0.15 60.00 31.93 29.81 0.00 None 12.20 Enter Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Area 0 Type Construction 0.15 60.00 31.93 29.81 0.00 None 2.12 Enter Type Construction U-Value Kappa (W/m²K) (KJ/m²K) (M/m²K) Mrm² Shelter Shelter Shelter Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Shelter No Construction U-Value Kappa Area (KJ/m²K) (KJ/m²K) 75.00 No No Construction Kappa (KJ/m²K) Construction Kappa (KJ/m²K) Shelter Code (KJ/m²K) Shelter Kappa (KJ/m²K) 30.00 Type Stor</td></t<>	Ground floor: 19.24 m 35.50 Type Construction U-Value (Kappa Gross Nett Area (W/m*K) (k.l/m*K) Area(m*) (m*) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 Type Construction U-Value (W/m*K) Construction (W/m*K) U-Value (W/m*K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 0.00 31.93 29.81 Construction U-Value (W/m*K) Construction U-Value (W/m*K) U-Value (W/m*K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 0.00 sides, AAC block, cavity 0.00 Construction Dense block, plasterboard on dabs U-Value (W/m*K) U-Value (W/m*K) U-Value (W/m*K) Type Storey Index Construction U-Value (W/m*K) U-Value (W/m*K) Exposed Floor - Lowest occupied Other 0.10 U-Value (W/m*K)	Ground floor: 19.24 m 41.50 m 35.50 m* Type Construction U-Value Kappa Gross Nett Area Shelter Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 0.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 0.00 Type Construction U-Value Kappa (W/m²K) (kJ/m²K) U-Value Kappa (W/m²K) (kJ/m²K) Solid Wall Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity 0.00 45.00 Construction Dense block, plasterboard on dabs Construction U-Value Kappa (W/m²K) (kJ/m²K) Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Shetter Type Storey Index Construction U-Value (W/m²K) Shetter Type Storey Index Construction U-Value (W/m²K) Shetter Exposed Floor - Lowest occupied Other 0.10 Nor	Ground floor: 19.24 m 41.50 m ² 35.50 m ² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Cavity Wall Cavity any outside structure 0.15 60.00 35.68 26.48 0.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, Cavity wall 0.15 60.00 31.93 29.81 0.00 None Type Construction U-Value Kappa (W/m ² K) Kappa (W/m ² K) Area (M ² /m ² K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Solid Wall Plasterboard on dabs Construction U-Value Kappa (M/m ² K) Area (M ² /m ² K) Construction Dense block, plasterboard on dabs 0.00 45.00 32.70 Dense block, plasterboard on dabs Construction U-Value Kappa Area (M ² /m ² K) Dense block, plasterboard on dabs Construction U-Value Shelter Code Type Storey Index Construction U-Value Shelter Code Type Storey Index Construction U-Value Shelter Code Exposed Floor- Lowest occupied Other 0.10	Ground floor: 19.24 m 41.50 m² 3 35.50 m² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Cavity wall: plasterboard on dabs, AAC block, filled cavity, any outside structure U-Value Kappa Gross Nett Area Shelter Openings Cavity wall: plasterboard on dabs, AAC block, filled cavity, any outside structure U-Value Kappa Gross Nett Area Shelter Openings Type Construction U-Value Kappa Area Shelter Shelter Type Construction U-Value Kappa Area (W/m²K) (kJ/m²K) (kJ/m²K) Kappa Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Kappa Construction Kappa Construction Construction Kappa Construction Value Value	Ground floor: 19.24 m 41.50 m ² 3.67 m 35.50 m ² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Area 0 Cavity Wall : plasterboard on dabs, AAC block, 0.15 0.15 60.00 31.93 29.81 0.00 None 12.20 Enter Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Area 0 Type Construction 0.15 60.00 31.93 29.81 0.00 None 2.12 Enter Type Construction U-Value Kappa (W/m ² K) (KJ/m ² K) (M/m ² K) Mrm ² Shelter Shelter Shelter Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Shelter No Construction U-Value Kappa Area (KJ/m ² K) (KJ/m ² K) 75.00 No No Construction Kappa (KJ/m ² K) Construction Kappa (KJ/m ² K) Shelter Code (KJ/m ² K) Shelter Kappa (KJ/m ² K) 30.00 Type Stor	

12.0 Opening Types



Description Door	Data Source Manufacturer	Type Door to (Corrido	Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K) 1.40
Window	Manufacturer	Window		Double glazed				0.60		0.70	1.20
3.0 Openings											
Name Opening	Opening Ty Door	pe		Location Unheated Wall		Orient South		Area (2.12		Pit	ch
Opening Opening	Window Window			External Wall 1 External Wall 1		North South		5.28 6.92			
	Window					00000	Last		<u>-</u>		
4.0 Conservatory				None							
5.0 Draught Proofing				100				%			
6.0 Draught Lobby				No							
17.0 Thermal Bridging				Calculate Bridges							
7.1 List of Bridges			~	_		_ .					
Bridge Type E17 Corner (inverted – i	nternal area greate	er than		i rce Type le K1 - Default	Length 3.67	Psi 0.00	0.00	Reference:			Importe No
external area) E2 Other lintels (includin	ng other steel lintel	s)	Tabl	e K1 - Default	7.96	1.00	1.00				Yes
E3 Sill E4 Jamb	5	,	Tabl	e K1 - Default e K1 - Default	6.95 21.90	0.10 0.10	0.10 0.10				Yes Yes
E5 Ground floor (normal)		Tabl	e K1 - Default	19.24	0.32	0.32				Yes
E16 Corner (normal) E18 Party wall between	dwellings			e K1 - Default e K1 - Default	3.67 7.34	0.18 0.24	0.18 0.24				No Yes
E23 Balcony within or be support penetrates wall	etween dwellings, l	balcony		e K1 - Default	2.72	1.00	1.00				No
				r							
Y-value				0.00				W/m²K			
8.0 Pressure Testing				Yes							
Designed AP ₅₀				3.00				m³/(h.m ⁻	²) @ 50 Pa		
Property Tested?				Yes							
Test Method 9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventila	I	ent		Blower Door							
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventila	ation System Prese	ent									
19.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace	ation System Prese s, Flues	ent									
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting 	ation System Prese s, Flues	ent		No							
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 	ation System Prese s, Flues	ent		No	Efficacy						
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting	ation System Prese s, Flues	ent		No	Efficacy 100.00	Pc	ower 5				unt 20
 9.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 0.0 Fans, Open Fireplace 1.0 Fixed Cooling System 2.0 Lighting No Fixed Lighting 	ation System Prese s, Flues	ent		No No No Name		Pc					
 9.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 0.0 Fans, Open Fireplace 1.0 Fixed Cooling System 2.0 Lighting No Fixed Lighting 	ation System Prese s, Flues	ent		No No No Lighting 1		Pc					
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 	ation System Prese s, Flues	ent		No No No Lighting 1 SAP table		Pc		50			
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat 	ation System Prese s, Flues	ent		No No Name Lighting 1 SAP table 100.00		Pc		50			
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type 	ation System Prese s, Flues	ent		No No No Lighting 1 SAP table 100.00 Mains gas		Pc		50			
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code 	ation System Prese s, Flues	ent		No No No Name Lighting 1 SAP table 100.00 Mains gas 104		Pc		50			
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter 	ation System Prese s, Flues	ent		No No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00		Pc		50			
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer	ation System Prese s, Flues	ent		No No No Name Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00		Pc		50			
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat	ation System Prese s, Flues	ent		No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106		Pc		50			
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code	ation System Prese s, Flues	ent		No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106 No		Pc		50			
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type Fan Assisted Flue	ation System Prese s, Flues	ent		No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106 No None or Unknown No		Pc		50			
9.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type Fan Assisted Flue Is MHS Pumped	ation System Prese s, Flues	ent		No No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106 No None or Unknown No Pump in unheated spa		Pc		50			
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 22.0 Lighting 22.0 Lighting 23.0 Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type Fan Assisted Flue Is MHS Pumped Heating Pump Age 	ation System Prese s, Flues	ent		No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106 No None or Unknown No None or Unknown No Pump in unheated spa 2013 or later		Pc		50			
19.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type Fan Assisted Flue Is MHS Pumped Heating Pump Age Heat Emitter	ation System Prese s, Flues	ent		No No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106 No None or Unknown No None or Unknown No Pump in unheated spa 2013 or later Radiators		Pc		50			
 19.0 Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation Mechanical Ventilation 20.0 Fans, Open Fireplace 21.0 Fixed Cooling System 22.0 Lighting No Fixed Lighting 22.0 Lighting 22.0 Lighting 24.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type Fan Assisted Flue Is MHS Pumped Heating Pump Age 	n s, Flues n	ent		No No No Lighting 1 SAP table 100.00 Mains gas 104 84.00 75.00 2106 No None or Unknown No None or Unknown No Pump in unheated spa 2013 or later		Pc		50			



Combi boiler ty	ре			Sta	ndard Con	nbi							
Combi keep ho	t type			Gas	s/Oil, time	clock							
25.0 Main Heating	2			Nor	ie								
26.0 Heat Network	(S			Nor	ie								
	Heat Source	Fuel 1	ype Heating	Use	Efficien	су Р	ercentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency f	type
Heat source 1 Heat source 2 Heat source 3 Heat source 4 Heat source 5									Kallo				
28.0 Water Heating	g												
Water Heating				Mai	n Heating	1							
SAP Code				901									
Flue Gas Heat	Recovery Syste	m		No									
Waste Water H	eat Recovery In	stantaneo	us System 1	No									
Waste Water H	eat Recovery In	stantaneo	us System 2	No									
Waste Water H	eat Recovery S	torage Sys	stem	No									
Solar Panel				No									
Water use <= 1	25 litres/person	/day		No									
Cold Water Sou	ırce			Fro	m mains								
Bath Count				1									
28.3 Waste Water	Heat Recovery	System											
29.0 Hot Water Cy	linder			Nor	ie								
In Airing Cupbo	ard			No									
34.0 Small-scale H	lydro			Nor	ie								
Jan	Feb	Mar	Apr	Мау	/	Jun	Jul	Aug	Se	p (Oct No	v Dec	;
Recommendation Lower cost me None Further measu	easures	even hig	her standards		al Cost		Typical saving	is per year	S	AP rating	s after improve Enviro	onmental Impa	act
										0 0 0		0 0 0	



Property Reference	1st_unit01				Issued on Date	17/10/2023
Assessment Reference	1st_unit01_LEAN		Ргор Туј	pe Ref		
Property						
SAP Rating		81 B	DER		TER	
Environmental		83 B	% DER < TER			N/A
CO ₂ Emissions (t/year)		1.26	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details	Ir. Christopher Armstrong				Assessor ID	P763-0001
Client						
UMMARY FOR INPUT D	ATA FOR: Conversior	n (As Designed)				
rientation		Southeast				
roperty Tenture		ND				
ransaction Type		6				
errain Type		Suburban				
0 Property Type		Flat, End-Terrace				
Position of Flat		Mid-floor flat				
Which Floor		1				
0 Number of Storeys		1				
		1989				
0 Date Built		1909				
.0 Date Built .0 Sheltered Sides		2				
			n			
0 Sheltered Sides		2	n			
0 Sheltered Sides 0 Sunlight/Shade		2 Average or unknow	n			
0 Sheltered Sides 0 Sunlight/Shade 0 Thermal Mass Parameter		2 Average or unknow Precise calculation	n			

			Ground floor:		Loss P 17.71		r In	ternal Floo 64.38 n			67 m
8.0 Living Area			25.80					m	2		
9.0 External Walls											
Description	Туре	Construction		U-Value	Kappa		Nett Area		Shelter	Openings	Area Calculation
External Wall 1	Cavity Wall	Cavity wall : plaster filled cavity, any out	rboard on dabs, AAC block,	0.15	(kJ/m ² K) 60.00	59.67	(m²) 46.56	Res 0.00	None	13.11	Type Enter Gross Area
Unheated Wall	Cavity Wall		rboard on dabs, AAC block,	0.15	60.00	5.32	3.20	0.00	None	2.12	Enter Gross Area
9.1 Party Walls											
Description	Туре	Constru	uction					Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall		oard on dabs mounted or AC blocks, cavity	n cemen	t render	on both		45.00	68.23		None
9.2 Internal Walls											
Description		Construc	ction							Kapp (kJ/m²	
Internal Wall 1		Dense blo	ock, plasterboard on dabs							75.00	
10.1 Party Ceilings											
Description		Construc	tion							Kapp	
Party Ceiling 1		Precast c	oncrete plank floor (scree	d laid oi	n insulati	ion), car	peted			(kJ/m² 30.00	
11.1 Party Floors											
Description			onstruction							Kap	
Party Floor 1		Index Lowest Pl occupied	recast concrete plank floo	r (scree	d laid on	i insulati	ion), carp	eted		(kJ/m 30.0	



12.0 Opening Types Description	Data Source	Туре		Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Door Window	Manufacturer Manufacturer	Door to C Window	Corridor	Double glazed		Gap	Туре	0.60	Туре	Factor 0.70	(W/m²K 1.40 1.20
3.0 Openings				5							
Name Opening Opening Opening Opening	Opening Ty Door Window Window Window	vpe	Un Ex Ex	cation heated Wall ternal Wall 1 ternal Wall 1 ternal Wall 1		Orient South North North Sou	East West East	Area 2.1 7.0 1.6 4.4	2 95 95	Pi	tch
14.0 Conservatory			No	ne							
15.0 Draught Proofing			10					%			
16.0 Draught Lobby			No								
17.0 Thermal Bridging			Ca	Iculate Bridges							
17.1 List of Bridges Bridge Type E23 Balcony within or b	etween dwellings	balcony	Source	Type 1 - Default	Length 3.65	Psi 1.00	Adjusted	Reference	:		Importe No
support penetrates wall E16 Corner (normal) E17 Corner (inverted –	insulation	-	Table K	1 - Default 1 - Default 1 - Default	11.01 3.67	0.18	0.18 0.00				No No
external area) E2 Other lintels (includi	-			1 - Default	7.50	1.00	1.00				Yes
E3 Sill		13)	Table K	1 - Default	6.49	0.10	0.10				Yes
E4 Jamb E7 Party floor between		s of flats)	Table K	1 - Default 1 - Default 1 - Default	15.80 17.71	0.10 0.28	0.10				Yes Yes
E18 Party wall between Y-value	aweilings		1able K	1 - Default	7.34	0.24	0.24	W/m²K			Yes
18.0 Pressure Testing			Ye:						2) @ 50 Pa		
Designed AP₅₀ Property Tested?			Ye:						1²) @ 50 Pa	1	
Test Method				ower Door				=			
19.0 Mechanical Ventilatio	on										
Mechanical Ventilation											
Mechanical Ventil	ation System Pres	ent	No								
20.0 Fans, Open Fireplace	es, Flues										
21.0 Fixed Cooling System	m		No								
22.0 Lighting											
No Fixed Lighting			No			_				-	
			L	Name ighting 1	Efficacy 100.00		5		acity D0		20
24.0 Main Heating 1			SA	P table							
Percentage of Heat			10	0.00				%			
Fuel Type			Ma	iins gas							
SAP Code			10	4							
In Winter			84	.00							
In Summer			75	.00							
Controls SAP Code			21	06							
Delayed Start Stat			No								
Flue Type			No	ne or Unknown							
Fan Assisted Flue			No								
Is MHS Pumped			Pu	mp in unheated spa	ice						
Heating Pump Age			20	13 or later							
riouning r unip rigo											
Heat Emitter			Ra	diators							
				diators ter value							



Boiler Interlock	No]				
Combi boiler type	Standard Combi]				
Combi keep hot type	Gas/Oil, time clock	Gas/Oil, time clock					
25.0 Main Heating 2	None]				
26.0 Heat Networks	None]				
Heat Source Fuel Type Heatin	g Use Efficiency Percentage Of Heat Heat	Power	ctrical Fuel F	actor Effi	ciency type		
Heat source 1 Heat source 2 Heat source 3 Heat source 4 Heat source 5		Ratio					
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		1				
Waste Water Heat Recovery Storage System	No		1				
Solar Panel	No		1				
Water use <= 125 litres/person/day	No		1				
Cold Water Source	From mains		1				
Bath Count	1		1				
28.3 Waste Water Heat Recovery System							
29.0 Hot Water Cylinder	None]				
In Airing Cupboard	No		j				
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 standard							
	Typical Cost Typical savings per year	SAP ra		Ènvironmen 0	tal Impact		
		0 0		0 0			



Property Reference	3rd_unit03				Issued on Date	17/10/2023
Assessment Reference	3rd_unit03_LEAN		Prop T	ype Ref		
Property						
SAP Rating		79 C	DER		TER	
Environmental		80 C	% DER < TER			N/A
CO ₂ Emissions (t/year)		1.65	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details	Ir. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT DA	ATA FOR: Conversion	(As Designed)				
Drientation		Northeast				
Property Tenture		ND				
Fransaction Type		6				
Terrain Type		Suburban				
I.0 Property Type		Flat, End-Terrace				
Position of Flat		Top-floor flat				
Which Floor		3				
2.0 Number of Storeys		1				
3.0 Date Built		1989				
4.0 Sheltered Sides		1				
5.0 Sunlight/Shade		Average or unknown	ו			
6.0 Thermal Mass Parameter		Precise calculation				
7.0 Electricity Tariff		Standard				
Smart electricity meter fitted		No				
Smart gas meter fitted		No				
7.0 Measurements		Ground floo	Heat Loss Perir	neter Int	ternal Floor Area 77.13 m²	Average Storey Hei 3.26 m

		Ground floo	or: 32	.88 m		//.13	m-		3.26 m
8.0 Living Area		32.70					m²		
9.0 External Walls									
Description	Туре	Construction	U-Value Kap (W/m²K) (kJ/r		Nett Area) (m²)	Shelter Res	Shelte	er Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.15 60.		74.24	0.00	None	11.82	Enter Gross Area
Unheated Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.15 60.	00 21.12	19.00	0.00	None	2.12	Enter Gross Area
9.1 Party Walls									
Description	Туре	Construction				Kappa (kJ/m²K		Shelter Res	Shelter
Party Wall 1	Solid Wall	Plasterboard on dabs mounted sides, AAC blocks, cavity	on cement ren	der on both	n`0.00´	` 45.00	20.28		None
9.2 Internal Walls									
Description		Construction						Kap (kJ/m	
Internal Wall 1		Dense block, plasterboard on da	ıbs					75.0	
10.0 External Roofs									
Description	Туре	Construction		ie Kappa K)(kJ/m²K)	Gross Area(m²)				lationOpenings pe
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	77.13	(m) 77.13	None		Gross 0.00 ea
11.1 Party Floors									
Description		Storey Construction Index							ppa Area (m²) m²K)



Party Floor 1		Lowest occupied	Precas	t concrete plank floo	or (screed laid on	insulation), carpeted			30.00	77.13
2.0 Opening Types											
Description	Data Source	Туре		Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K
Door Window	Manufacturer Manufacturer	Door to C Window	orridor	Double glazed				0.60		0.70	1.40 1.20
3.0 Openings				0							
Name	Opening Typ	be		ocation		Orient		Area		Pi	tch
Opening Opening	Door Window			nheated Wall kternal Wall 1		North South		2.1 1.7			
Opening	Window Window			kternal Wall 1 kternal Wall 1		South North		1.6 8.4			
Opening	VIIIdOW					NOTUT	vesi	0.4	0		
4.0 Conservatory				one				_			
5.0 Draught Proofing			10					%			
6.0 Draught Lobby			No)							
7.0 Thermal Bridging			Ca	alculate Bridges							
7.1 List of Bridges											
Bridge Type E23 Balcony within or betw	ween dwellinas. I	balconv	Source Table k	e Type (1 - Default	Length 5.49	Psi 1.00	Adjusted 1.00	Reference	:		Importe No
support penetrates wall ins E16 Corner (normal)		,	Table k	(1 - Default	9.78	0.18	0.18				No
E17 Corner (inverted – inte	ernal area greate	er than		(1 - Default	3.26	0.00	0.00				No
external area) E2 Other lintels (including	other steel lintel	s)		(1 - Default	6.98	1.00	1.00				Yes
E3 Sill E4 Jamb				<1 - Default <1 - Default	5.97 18.80	0.10 0.10	0.10 0.10				Yes Yes
E7 Party floor between dw	vellings (in blocks	s of flats)	Table k	(1 - Default (1 - Default	32.88	0.28	0.28				Yes
E14 Flat roof E18 Party wall between dv	wellings			(1 - Default	32.88 6.52	0.16 0.24	0.16 0.24				Yes Yes
Y-value			0.0	00				W/m²K			
8.0 Pressure Testing			Ye	95				7			
Designed AP ₅₀			3.0					 	²) @ 50 Pa	a	
Property Tested?			Ye						1)@0010	4	
Test Method				ower Door				\exists			
9.0 Mechanical Ventilation Mechanical Ventilation											
Mechanical Ventilation	on System Prese	ent	No)				7			
0.0 Fans, Open Fireplaces,	-										
1.0 Fixed Cooling System			No)							
2.0 Lighting											
N La Ellis a del Carla Con a			No								
No Fixed Lighting				Name	Efficacy		wer 5	Capa 50	acity 00		20
No Fixed Lighting			L	ighting 1	100.00						
					100.00						
			SA	AP table	100.00			%			
4.0 Main Heating 1			S/ 10	AP table	100.00			%			
4.0 Main Heating 1 Percentage of Heat			S/ 10	AP table 10.00 ains gas	100.00			%			
4.0 Main Heating 1 Percentage of Heat Fuel Type			S/ 10 Mi 10	AP table 10.00 ains gas	100.00			% %			
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code			S/ 10 Mi 10 84	AP table 0.00 ains gas 4 .00	100.00			% 			
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer			5/ 10 Mi 10 84 75	AP table 10.00 ains gas 14 .00 5.00	100.00			% 			
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code			5/ 10 Mi 10 84 75 21	AP table 0.00 ains gas 4 .00 .00 06	100.00			% 			
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat			S/ 10 Mi 10 84 75 21 Nc	AP table 10.00 ains gas 14 .00 6.00 06 00				% 			
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type			5/ 10 Mi 10 84 75 21 21 No	AP table 0.00 ains gas 4 .00 .00 06 				% 			
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type Fan Assisted Flue			5/ 10 Ma 10 84 75 21 No No No	AP table 00.00 ains gas 4 0.00 6.00 06 00 00 00 00 00 00 00 00 00 00 00 00							
4.0 Main Heating 1 Percentage of Heat Fuel Type SAP Code In Winter In Summer Controls SAP Code Delayed Start Stat Flue Type			S/ 10 Mi 10 84 75 21 No No No No Pu	AP table 0.00 ains gas 4 .00 .00 06 							



Flow Temperature	Enter value	
Flow Temperature Value	35.00	
Boiler Interlock	No	
Combi boiler type	Standard Combi	
Combi keep hot type	Gas/Oil, time clock	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
Heat Source Fuel Type Heating Us	Efficiency Percentage Of Heat Heat Elec Heat Power Ratio	trical Fuel Factor Efficiency type
Heat source 1 Heat source 2 Heat source 3 Heat source 4 Heat source 5	Railo	
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	No	
Cold Water Source	From mains	
Bath Count	1	
28.3 Waste Water Heat Recovery System		
29.0 Hot Water Cylinder	None	
In Airing Cupboard	No	
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 SAP rating 0
		0

	Ratings	after improvement
AΡ	rating	Environmental Impact
	0	0
	0	0
	0	0

Energy Strategy



8.08 Appendix H – GREEN SAP Outputs



	1st_unit01				Issued on Date	17/10/2023
Assessment Reference	1st_unit01_GREEN		Prop Ty	pe Ref		
Property						
SAP Rating		85 B	DER		TER	
Environmental		97 A	% DER < TER			N/A
CO ₂ Emissions (t/year)		0.24	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details	Mr. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT D	DATA FOR: Conversion	n (As Designed)				
Drientation		Southeast				
Property Tenture		ND				
ransaction Type		6				
errain Type		Suburban				
on and type		Suburban				
		Flat, End-Terrace				
.0 Property Type		Flat, End-Terrace				
.0 Property Type Position of Flat Which Floor		Flat, End-Terrace Mid-floor flat				
.0 Property Type Position of Flat Which Floor .0 Number of Storeys		Flat, End-Terrace Mid-floor flat				
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built		Flat, End-Terrace Mid-floor flat 1				
.0 Property Type Position of Flat		Flat, End-Terrace Mid-floor flat 1 2024	n			
.0 Property Type Position of Flat Which Floor .0 Number of Storeys .0 Date Built .0 Sheltered Sides		Flat, End-Terrace Mid-floor flat 1 2024 2	n			
.0 Property Type Position of Flat Which Floor .0 Number of Storeys .0 Date Built .0 Sheltered Sides .0 Sunlight/Shade .0 Thermal Mass Parameter		Flat, End-Terrace Mid-floor flat 1 2024 2 Average or unknow	n			
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 3.0 Sheltered Sides 3.0 Sunlight/Shade	1	Flat, End-Terrace Mid-floor flat 1 1 2024 2 Average or unknow Precise calculation	n			

			Ground floo		Heat Loss Perimeter Inte 17.71 m				or Area n²		torey Height 67 m
8.0 Living Area			25.80					m	2		
9.0 External Walls											
Description	Туре	Construction		U-Value	Kappa (kJ/m²K)		Nett Area (m ²)	Shelter Res	Shelter	Openings /	Area Calculation Type
External Wall 1	Cavity Wall		erboard on dabs, AAC block,	(w/m²k) 0.15	(KJ/M-K) 60.00	59.67	46.56	0.00	None	13.11	Enter Gross Area
Unheated Wall	Cavity Wall	filled cavity, any c Cavity wall : plast filled cavity, any c	erboard on dabs, AAC block,	0.15	60.00	5.32	3.20	0.00	None	2.12	Enter Gross Area
9.1 Party Walls											
Description	Туре	Const	ruction					Kappa	Area	Shelter	Shelter
Party Wall 1	Solid Wall		board on dabs mounted c AAC blocks, cavity	on cemer	t render	on both		(kJ/m²K) 45.00	(m²) 68.23	Res	None
9.2 Internal Walls											
Description		Constru	uction							Kapp	
Internal Wall 1		Dense b	lock, plasterboard on dab	s						(kJ/m²) 75.00	
10.1 Party Ceilings											
Description		Constru	uction							Kapp	
Party Ceiling 1		Precast	concrete plank floor (scre	ed laid o	n insulati	ion), car	peted			(kJ/m²) 30.00	
11.1 Party Floors											
Description			Construction							Кар	
Party Floor 1		Index Lowest occupied	Precast concrete plank flo	or (scree	d laid on	i insulat	ion), carp	eted		(kJ/m 30.0	



12.0 Opening Types Description	Data Source	Туре		Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Door Window	Manufacturer Manufacturer	Door to C Window	Corridor	Double glazed		Gap	Туре	0.60	Туре	Factor 0.70	(W/m²K) 1.40 1.20
3.0 Openings											
Name Opening Opening Opening Opening	Opening Ty Door Window Window Window	pe	Un Ex Ex	cation heated Wall ternal Wall 1 ternal Wall 1 ternal Wall 1		Orient South North North Sou	East West East	Area 2.1 7.0 1.6 4.4	2 5 5	Pi	tch
4.0 Conservatory			No	ne							
5.0 Draught Proofing			10	0				%			
6.0 Draught Lobby			No								
7.0 Thermal Bridging			Ca	Iculate Bridges							
7.1 List of Bridges				3							
Bridge Type E23 Balcony within or b support penetrates wall		balcony	Source Table K	Type 1 - Default	Length 3.65	Psi 1.00	Adjusted 1.00	Reference	:		Imported No
E16 Corner (normal) E17 Corner (inverted – external area)		er than		1 - Default 1 - Default	11.01 3.67	0.18 0.00	0.18 0.00				No No
E2 Other lintels (includir E3 Sill	ng other steel linte	ls)		1 - Default 1 - Default	7.50 6.49	1.00 0.10	1.00 0.10				Yes Yes
E4 Jamb			Table K	1 - Default	15.80	0.10	0.10				Yes
E7 Party floor between E18 Party wall between		s of flats)		1 - Default 1 - Default	17.71 7.34	0.28 0.24	0.28 0.24				Yes Yes
Y-value			0.0	0				W/m²K			
8.0 Pressure Testing			Ye	6							
Designed AP50			3.0	0				m³/(h.m	²) @ 50 Pa		
Property Tested?			Ye	5							
Test Method			Blo	ower Door							
9.0 Mechanical Ventilatio	on										
Mechanical Ventilation											
Mechanical Ventila		ent	Ye					_			
Approved Installat	ion		No								
Mechanical Ventila	ation data Type			tabase							
Туре				chanical extract vent	lation - central	ised					
MV Reference Nu	mber		50	0258							
Configuration			1								
Manufacturer SFF			0.6								
Duct Type			Riç	jid							
Wet Rooms			1								
20.0 Fans, Open Fireplace											
21.0 Fixed Cooling System	11		No								
22.0 Lighting No Fixed Lighting			No								
No Fixed Eighting					Efficacy 100.00	Po	ower 5	Capa 50			20
4.0 Main Heating 1			Da	tabase							
Percentage of Heat			10	0.00				%			
Database Ref. No.			10	0393							
Fuel Type			Ele	ectricity							
In Winter			0.0	0							
In Summer			0.0	0							
Model Name			Fie	hter 470				Ξ			



Manufacturer			NIBE	Energy Syste	ems Ltd						
System Type			Heat	Pump							
Controls SAP Code			2207								
Is MHS Pumped			Pump	in unheated	space						
Heating Pump Age			2013	or later							
Heat Emitter			Unde	rfloor							
Underfloor Heating			Yes -	Pipes in thin	screed						
Flow Temperature			Enter	value							
Flow Temperature Value			35.00								
25.0 Main Heating 2			None								
26.0 Heat Networks			None								
Heat Sour	rce Fuel Type	Heating Us	e	Efficiency F	Percentage Of Heat	Heat	Heat Power Ratio	Elec	ctrical	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 Sy	vstem		No								
Waste Water Heat Recovery	y Instantaneous S	ystem 1	No								
Waste Water Heat Recovery	y Instantaneous S	ystem 2	No								
Waste Water Heat Recovery	y Storage System		No								
Solar Panel			No								
Water use <= 125 litres/pers	son/day		No								
Cold Water Source			From	mains							
Bath Count			1								
Immersion Only Heating Ho	t Water		No								
28.3 Waste Water Heat Recov	ery System										
29.0 Hot Water Cylinder			Interr	al Store							
Insulation Type			Meas	ured Loss							
Cylinder Volume			170.0	0					L		
Loss			1.56						kWh/da	ау	
In Airing Cupboard			No								
32.0 Photovoltaic Unit			One I	Dwelling							
Export Capable Meter?			No								
Connected To Dwelling			Yes								
Diverter			No								
Battery Capacity [kWh]			0.00								
PV Cells kWp	Orientation	Elevation	C	vershading	FGHRS	MCS Certif	icate	Over: Facto	shading or	MCS Certificate Reference	Panel Manufacturer
1.03	Horizontal	Horizontal	١	lone Or Little		No		1.00		iverenence	
34.0 Small-scale Hydro			None								

Jan Feb

Recommendations Lower cost measures

None Further measures to achieve even higher standards

Mar

Мау

Apr

Jun

Jul

Aug

Sep

Oct

Nov

Dec



Typical Cost

Typical savings per year

Ratings after improvementSAP ratingEnvironmental Impact00000000



Property Reference	Grd_unit02				Issued on Date	17/10/2023
Assessment Reference	Grd_unit02_GREEN		Prop T	ype Ref		
Property						
SAP Rating		72 C	DER		TER	
Environmental		94 A	% DER < TER			N/A
CO ₂ Emissions (t/year)		0.35	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details Mi	r. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT DA	TA FOR: Conversion	(As Designed)				
Drientation		Southwest				
Property Tenture		ND				
Fransaction Type		6				
		U				
Terrain Type		Suburban				
		-				
		Suburban				
.0 Property Type		Suburban Flat, End-Terrace				
I .0 Property Type Position of Flat Which Floor		Suburban Flat, End-Terrace Ground-floor flat				
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys		Suburban Flat, End-Terrace Ground-floor flat 0				
1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built		Suburban Flat, End-Terrace Ground-floor flat 0 1				
		Suburban Flat, End-Terrace Ground-floor flat 0 1 2024				
1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides		Suburban Flat, End-Terrace Ground-floor flat 0 1 2024 2	n			
.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 3.0 Sheltered Sides 3.0 Sunlight/Shade 3.0 Thermal Mass Parameter		Suburban Flat, End-Terrace Ground-floor flat 0 1 2024 2 Average or unknow	n			
 1.0 Property Type Position of Flat Which Floor 2.0 Number of Storeys 3.0 Date Built 4.0 Sheltered Sides 5.0 Sunlight/Shade 		Suburban Flat, End-Terrace Ground-floor flat 0 1 2024 2 Average or unknow Precise calculation	n			

.u measurements		Heat Loss PerimeterGround floor:19.24 m				r In			•		
		35.50					m²	2			
Туре	Construction							Shelter	Openings		Calculation Type
Cavity Wall			0.15	60.00	38.68	26.48	0.00	None	12.20		Gross Area
Cavity Wall	Cavity wall : plasterbo	ard on dabs, AAC block,	0.15	60.00	31.93	29.81	0.00	None	2.12	Enter	Gross Area
Туре	Construc	tion						Area	Shelter	Sh	elter
Solid Wall			on cemen	t render	on both		45.00	32.70	Re5	No	one
	Constructi	on									Area (m²)
	Dense bloc	k, plasterboard on dab	s								62.76
	Constructi	on									Area (m²)
	Precast cor	crete plank floor (scre	ed laid or	n insulati	on), car	peted			` 30.0	0	41.50
Туре	Storey Index	Construction					Shelter	Code		Kappa	
Exposed Floor - Solid	Lowest occupied	Other					Nor	e	0.00	0.00	41.50
	Cavity Wall Cavity Wall Type Solid Wall	Cavity Wall Cavity wall : plasterbo filled cavity, any outsic Cavity Wall Cavity Wall Cavity wall : plasterbo filled cavity, any outsic Type Construct Solid Wall Solid Wall Plasterbo sides, AAC Constructi Dense bloc Dense bloc Constructi Precast cor Precast cor Type Storey Index Exposed Floor - Lowest occupied	35.50 Type Construction Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure Type Construction Solid Wall Plasterboard on dabs mounted or sides, AAC block, cavity Solid Wall Plasterboard on dabs mounted or sides, AAC block, cavity Construction Dense block, plasterboard on dabs Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Plasterboard on dabs Construction Dense block, plasterboard on dabs Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dab Construction Dense block, plasterboard on dabs Construction	Ground floor: 35.50 Type Construction U-Value (W/m'K) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 Type Construction 0.15 Solid Wall Plasterboard on dabs mounted on cemen sides, AAC block, cavity 0.15 Solid Wall Plasterboard on dabs mounted on cemen sides, AAC block, plasterboard on dabs 0.15 Construction Dense block, plasterboard on dabs 0.15 Type Construction Dense block, plasterboard on dabs Type Storey Index Construction Type Storey Index Construction Exposed Floor - Lowest occupied Other	Ground floor: 19.24 35.50 Type Construction U-Value (Kappa (W/m*K)) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 Type Construction 0.15 60.00 Solid Wall Plasterboard on dabs mounted on cement render sides, AAC blocks, cavity Onstruction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Figure 1000000000000000000000000000000000000	Ground floor: 19.24 m 35.50 Type Construction Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 Type Construction 0.15 60.00 31.93 Solid Wall Plasterboard on dabs mounted on cement render on both sides, AAC block, cavity 0.15 Construction Dense block, plasterboard on dabs Construction Construction Dense block, plasterboard on dabs Construction on dabs Vertical and on insulation), car Type Storey Index Construction Type Storey Index Construction Curvest occupied Other	Ground floor: 19.24 m 35.50 Type Construction U-Value (Kappa Gross Nett Area (W/m*K) (k.J/m*K) Area(m²) (m²) Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 Type Construction U-Value (W/m²K) Construction U-Value (W/m²K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 0.00 sides, AAC block, cavity 0.00 Construction Dense block, plasterboard on dabs U-Value (W/m²K) U-Value (W/m²K) U-Value (W/m²K) Type Construction Dense block, plasterboard on dabs U-Value (W/m²K) U-Value (W/m²K) Construction Dense block, plasterboard on dabs U-Value (W/m²K) U-Value (W/m²K) U-Value (W/m²K) Type Storey Index Construction U-Value (W/m²K) U-Value	Ground floor: 19.24 m 41.50 m 35.50 m* Type Construction U-Value Kappa Gross Nett Area Shelter Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 0.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 0.00 Type Construction U-Value Kappa (W/m²K) (kJ/m²K) U-Value Kappa (W/m²K) (kJ/m²K) Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 Solid Wall Plasterboard on dabs Construction U-Value Kappa (W/m²K) (kJ/m²K) Dense block, plasterboard on dabs Construction Dense block, plasterboard on dabs Dense block, plasterboard on dabs Construction U-Value Shetter Type Storey Index Construction U-Value Shetter Type Storey Index Construction U-Value Shetter Exposed Floor - Lowest occupied Other 0.10 Nor	Ground floor: 19.24 m 41.50 m² 35.50 m² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Cavity Wall Cavity any outside structure 0.15 60.00 35.88 26.48 0.00 Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 31.93 29.81 0.00 None Type Construction U-Value Kappa (W/m²K) (kJ/m²K) (kJ/m²K) Area (M²m²K) (kJ/m²K) (kJ/m²K) (m²) None Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 Solid Wall Plasterboard on dabs Construction U-Value Kappa (M²m²K) (kJ/m²K) (m²) Dense block, plasterboard on dabs Construction 32.70 Dense block, plasterboard on dabs Construction 32.70 Dense block, plasterboard on dabs Construction Set to the construction Dense block, plasterboard on dabs Dense block, plasterboard on dabs Set to the construction Type Storey Index Construction U-Value (W/m²K) (W/m²K) (W/m²K) (W/m²K) (W/m²K) Exposed Floor- Lowest occupied Other 0.10 None	Ground floor: 19.24 m 41.50 m² 3 33.50 m² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Cavity Wall Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure 0.15 60.00 38.68 26.48 0.00 None 12.20 Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Type Construction 0.15 60.00 31.93 29.81 0.00 None 2.12 Type Construction U-Value Kappa Kappa Gross Kappa Gross Solid Wall Plasterboard on dabs mounted on cement render on both 0.00 45.00 32.70 32.70 Construction U-Value Kappa Kappa Kappa Kappa Kappa Construction U-Value Kappa (m²) 32.70 32.70 32.70 Construction U-Value Kappa Kappa Kappa Kappa Construction Kappa Kappa 75.0 30.0 Precast concrete plank floor (screed laid on insulation), carpeted 30.0 30.0 T	Ground floor: 19.24 m 41.50 m ² 3.67 m 35.50 m ² Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Area 0 Cavity Wall : plasterboard on dabs, AAC block, 0.15 0.15 0.00 None 12.20 Enter Type Construction U-Value Kappa Gross Nett Area Shelter Shelter Openings Area 0 Cavity Wall : plasterboard on dabs, AAC block, 0.15 0.15 60.00 31.93 29.81 0.00 None 2.12 Enter Type Construction U-Value Kappa Area Shelter Shelter Shelter Construction U-Value Kappa Area Shelter Shelter Shelter Construction U-Value Kappa Area Shelter Shelter Shelter Construction U-Value Kappa Area Shelter (KJ/m ² K) Construction Kappa // Construction Kappa // Cons

12.0 Opening Types



Description	Data Source	Type	Corride	Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K
Door Window	Manufacturer Manufacturer	Door to Window	Corridor	Double glazed				0.60		0.70	1.40 1.20
3.0 Openings	Ononing Tu			ocation		Orient	ation	A	(m ²)	Di	tch
Name Opening	Opening Ty Door	pe	U	nheated Wall		South	West	Area (2.12	2	PI	icn
Opening Opening	Window Window			kternal Wall 1 kternal Wall 1		North South		5.28 6.92			
4.0 Conservatory			N	one							
5.0 Draught Proofing			10	00				%			
6.0 Draught Lobby			N)							
7.0 Thermal Bridging			C	alculate Bridges							
7.1 List of Bridges											
Bridge Type E17 Corner (inverted – inte	ernal area great	er than	Source Table k	e Type (1 - Default	Length 3.67	Psi 0.00	Adjusted 0.00	Reference:			Importe No
external area) E2 Other lintels (including	other steel linte	ls)		(1 - Default	7.96	1.00	1.00				Yes
E3 Sill E4 Jamb				<1 - Default <1 - Default	6.95 21.90	0.10 0.10	0.10 0.10				Yes Yes
E5 Ground floor (normal)			Table k	<1 - Default	19.24	0.32	0.32				Yes
E16 Corner (normal) E18 Party wall between dv				<1 - Default <1 - Default	3.67 7.34	0.18 0.24	0.18 0.24				No Yes
E23 Balcony within or betw support penetrates wall ins		balcony	Table k	<1 - Default	2.72	1.00	1.00				No
Y-value			0.	00				W/m²K			
8.0 Pressure Testing			Ye	S							
Designed AP50			3.	00				m³/(h.m	²) @ 50 Pa	ı	
Property Tested?			Ye	es							
Test Method			BI	ower Door							
9.0 Mechanical Ventilation											
Mechanical Ventilation			_					_			
Mechanical Ventilation	on System Pres	ent	Ye	es							
Approved Installation			No	0							
Mechanical Ventilation	on data Type		Da	atabase							
Туре			M	echanical extract ve	entilation - central	ised					
MV Reference Numb	er		50	0258							
Configuration			1								
Manufacturer SFP			0.	65							
Duct Type			Ri	gid							
Wet Rooms			1								
0.0 Fans, Open Fireplaces,	Flues										
1.0 Fixed Cooling System			No)							
22.0 Lighting											
No Fixed Lighting			No		F #					-	
			L	Name Lighting 1	Efficacy 100.00	Po	5	Capa 50	o 0		20
4.0 Main Heating 1			Da	atabase							
Percentage of Heat			10	00.00				%			
Database Ref. No.			10	0393							
Fuel Type			EI	ectricity							
In Winter			0.	00							
In Summer			0.	00				Ī			
Model Name				ghter 470				Ξ			
				~ -				=			



System Type	Heat Pump	
Controls SAP Code	2207	
Is MHS Pumped	Pump in unheated space	
Heating Pump Age	2013 or later	
Heat Emitter	Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
Heat Source Fuel Type Heating Us	e Efficiency Percentage Of Heat Heat Ele Heat Power Ratio	ctrical 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	No
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 C	ylinder			Internal	Store						
Insulation Type	e			Measure	d Loss						
Cylinder Volur	ne			170.00					L		
Loss				1.56					kWh/da	у	
In Airing Cupb	oard			No							
32.0 Photovoltaid	c Unit			One Dwe	elling						
Export Capabl	le Meter?			No							
Connected To	Dwelling			Yes							
Diverter				No							
Battery Capac	ity [kWh]			0.00							
PV Cells	s kWp	Orientation	Elevation	Ove	rshading	FGHRS	MCS Certificate	Overs Facto	or Ö	MCS Certificate	Panel Manufacturer
0.66		Horizontal	Horizontal	Non	e Or Little		No	1.00		Reference	
34.0 Small-scale	Hydro			None							
Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recommendation Lower cost m											

Further measures to achieve even higher standards

Typical Cost

Typical savings per year

Ratings after improvement SAP rating Environmental Impact

elmhurst energy

0 0 0 0 0 0



Property Reference	3rd_unit03				Issued on Date	17/10/2023
Assessment Reference	3rd_unit03_GREEN		Prop Ty	vpe Ref		
Property						
SAP Rating		82 B	DER		TER	
Environmental		96 A	% DER < TER			N/A
CO ₂ Emissions (t/year)		0.31	DFEE		TFEE	
Compliance Check		See BREL	% DFEE < TFEE			
% DPER < TPER			DPER		TPER	
Assessor Details	Mr. Christopher Armstrong				Assessor ID	P763-0001
Client						
SUMMARY FOR INPUT D	ATA FOR: Conversior	ı (As Designed)				
Drientation		Northeast				
Property Tenture		ND				
Fransaction Type		6				
Ferrain Type		Suburban				
I.0 Property Type		Flat, End-Terrace				
Position of Flat		Top-floor flat				
Which Floor		3				
2.0 Number of Storeys		1				
3.0 Date Built		2024				
1.0 Sheltered Sides		1				
5.0 Sunlight/Shade		Average or unknown	1			
6.0 Thermal Mass Parameter		Precise calculation				
7.0 Electricity Tariff		Standard				
Smart electricity meter fitted		No				
Smart gas meter fitted		No				
7.0 Measurements						
		Ground floo	Heat Loss Perin 32.88 m	neter Int	ternal Floor Area / 77.13 m ²	Average Storey Hei 3.26 m

				02.00			77.10			0.2	0 111	
8.0 Living Area		32.70						m²				
9.0 External Walls												
Description	Туре	Construction		Kappa		Nett Area	Shelter Res	Shelt	er Op	enings A	rea Calcula	tion
External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	(W/m²K) 0.15	(KJ/M-K) 60.00	86.06	(m²) 74.24	0.00	Non	e ć	11.82 E	Type nter Gross A	\rea
Unheated Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.15	60.00	21.12	19.00	0.00	Non	e	2.12 E	nter Gross A	\rea
9.1 Party Walls												
Description	Туре	Construction				U-Value (W/m²K)					Shelter	
Party Wall 1	Solid Wall	Plasterboard on dabs mounted on sides, AAC blocks, cavity	on cement	render			45.00	20.28			None	
9.2 Internal Walls												
Description		Construction								Kappa (kJ/m²K	Area (m²)
Internal Wall 1		Dense block, plasterboard on dab	os							75.00	, 151.2	26
10.0 External Roofs												
Description	Туре	Construction			Kappa (J/m²K)/	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter (Factor	Calculat Type	ionOpeni	ings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	C).10	9.00	77.13	(m) 77.13	None	0.00 l	Enter Gr Area	oss 0.0	0
11.1 Party Floors												
Description		Storey Construction Index								Kappa (kJ/m²		(m²)



Party Floor 1		Lowest occupied		cast concrete plank floor	(screed laid or	insulation)	, carpeted			30.00	77.13
2.0 Opening Types Description	Data Source	Туре		Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K
Door Window	Manufacturer Manufacturer	Door to C Window	orrido	or Double glazed		P	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.60	.,,,,	0.70	1.40 1.20
3.0 Openings											
Name Opening Opening Opening Opening	Opening Ty Door Window Window Window	pe		Location Unheated Wall External Wall 1 External Wall 1 External Wall 1		Orienta North South South North	East West East	Area 2.1 1.7 1.6 8.4	2 6 0	Pi	tch
14.0 Conservatory				None							
15.0 Draught Proofing				100				%			
16.0 Draught Lobby				No							
17.0 Thermal Bridging				Calculate Bridges							
E23 Balcony within or between dwellings, balcony				rce Type e K1 - Default	Length 5.49	Psi 1.00	Adjusted 1.00	Reference	:		Importe No
support penetrates wall E16 Corner (normal) E17 Corner (inverted – i		er than		e K1 - Default e K1 - Default	9.78 3.26	0.18 0.00	0.18 0.00				No No
external area) E2 Other lintels (includir E3 Sill E4 Jamb E7 Party floor between o E14 Flat roof E18 Party wall between	dwellings (in block	,	Tabl Tabl Tabl Tabl	e K1 - Default e K1 - Default	6.98 5.97 18.80 32.88 32.88 6.52	1.00 0.10 0.28 0.16 0.24	1.00 0.10 0.28 0.16 0.24				Yes Yes Yes Yes Yes Yes
Y-value				0.00				W/m²K			
18.0 Pressure Testing				Yes				7			
Designed AP ₅₀				3.00				 	²) @ 50 Pa		
Property Tested?				Yes],(, e		
Test Method			Blower Door								
19.0 Mechanical Ventilatio Mechanical Ventilation Mechanical Ventila	ı	ont		Yes							
Approved Installati	-	CIII		No							
Mechanical Ventila				Database							
Туре				Mechanical extract ven	tilation - central	lised		=			
MV Reference Nu	mher			500258				=			
Configuration				1				4			
Manufacturer SFP	,			0.65				i i			
Duct Type				Rigid				i i			
Wet Rooms				1				i i			
20.0 Fans, Open Fireplace	s, Flues										
21.0 Fixed Cooling Systen	n			No							
22.0 Lighting								_			
No Fixed Lighting				No Name Lighting 1	Efficacy 100.00		wer 5	Capa 50			ount 20
24.0 Main Heating 1				Database							
Percentage of Heat				100.00				%			
Database Ref. No.				100393							
Fuel Type				Electricity							
In Winter				0.00				_			



Immersion Only Heating Hot Water			No						
			1						
			From mains						
	n/day								
-	Storage System								
			No						
Waste Water Heat Recovery	Instantaneous S	ystem 1	No						
Flue Gas Heat Recovery Sys	tem		No						
SAP Code			901						
Water Heating			Main Heating 1						
-			Main Heating 1						
28.0 Water Heating									
28.0 Water Heating									
Heat source 5									
Heat source 4									
Heat source 4									
Heat source 3									
Heat source 2 Heat source 3									
Heat source 4									
Heat source 5									
28.0 Water Heating									
-			Main Heating 1						
Water Heating			Main Heating 1						
-									
SAP Code			901						
	A								
Flue Gas Heat Recovery Sys	tem		No						
Flue Gas Heat Recovery Sys	tem		No						
Flue Gas Heat Recovery Sys	tem		No						
Flue Gas Heat Recovery Sys	tem		No						
Flue Gas Heat Recovery Sys	tem		No						
Flue Gas Heat Recovery Sys	lem		INO						
		votom 1	No						
Waste Water Heat Beesvery	Instantanoous S	votom 1	No						
Waste Water Heat Recovery	Instantaneous S	vetem 1	No						
Waste Water Heat Recovery	Instantaneous S	vstem 1	No						
Waste Water Heat Recovery	Instantaneous S	ystem 1	No						
-		-							
Waste Water Heat Recovery	Instantaneous S	vetem 2	No						
Waste Water Heat Recovery	Instantaneous S	ystem 2	No						
Waste Water Heat Recovery	Instantaneous S	ystem 2	No						
Waste Water Heat Recovery	Storage System		No						
Waste Water Heat Necovery	Storage System								
Solar Panel			No						
Solar Panel			No						
Water use <= 125 litres/perso	on/dav		No						
water use <= 125 litres/perso	in/day		NO						
Cold Water Source			From mains						
Cold Water Source			From mains						
Bath Count			1						
Bain Count			I						
Immersion Only Heating Hot Water			No						
Immersion Only Heating Hot	valer	l	NO						
, ,									
	v System								
28.3 Waste Water Heat Recover	ry System								
28.3 Waste Water Heat Recove	ry System		laste me el Oteme						
	ry System		Internal Store						
28.3 Waste Water Heat Recove 29.0 Hot Water Cylinder	ry System								
28.3 Waste Water Heat Recove	ry System		Internal Store Measured Loss						
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type	ry System								
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type	ry System						L		
28.3 Waste Water Heat Recove 29.0 Hot Water Cylinder	ry System		Measured Loss				L		
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume	ry System		Measured Loss 170.00					٩V	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type	ry System		Measured Loss				L kWh/da	ау	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss	ry System		Measured Loss 170.00 1.56					ау	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume	ry System		Measured Loss 170.00					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss	ry System		Measured Loss 170.00 1.56					ау	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard	ry System		Measured Loss 170.00 1.56 No					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss	ry System		Measured Loss 170.00 1.56					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit	ry System		Measured Loss 170.00 1.56 No One Dwelling					ау	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard	ry System		Measured Loss 170.00 1.56 No					ay 	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter?	ry System		Measured Loss 170.00 1.56 No One Dwelling					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit	ry System		Measured Loss 170.00 1.56 No One Dwelling					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling	ry System		Measured Loss 170.00 1.56 No One Dwelling No Yes					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter?	ry System		Measured Loss 170.00 1.56 No One Dwelling No					ay 	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling	ry System		Measured Loss 170.00 1.56 No One Dwelling No Yes					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter	ry System		Measured Loss 170.00 1.56 No One Dwelling No Yes					ay	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh]	ry System		Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00				kWh/da	ay 	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh]	ry System Orientation		Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00	FGHRS	MCS Certificate		kWh/da	ay 	Panel
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter			Measured Loss 170.00 1.56 No One Dwelling No Yes No	FGHRS	MCS Certificate		kWh/da	MCS	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh]			Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00	FGHRS	MCS Certificate	Overs Factor	kWh/da	MCS Certificate	Panel Manufacturer
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh] PV Cells kWp	Orientation	Elevation	Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00 Overshading	FGHRS		Facto	kWh/da	MCS	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh]			Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00	FGHRS	MCS Certificate No		kWh/da	MCS Certificate	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh] PV Cells kWp 1.23	Orientation	Elevation Horizontal	Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00 Overshading None Or Little	FGHRS		Facto	kWh/da	MCS Certificate	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh] PV Cells kWp	Orientation	Elevation Horizontal	Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00 Overshading	FGHRS		Facto	kWh/da	MCS Certificate	
28.3 Waste Water Heat Recover 29.0 Hot Water Cylinder Insulation Type Cylinder Volume Loss In Airing Cupboard 32.0 Photovoltaic Unit Export Capable Meter? Connected To Dwelling Diverter Battery Capacity [kWh] PV Cells kWp 1.23	Orientation Horizontal	Elevation Horizontal	Measured Loss 170.00 1.56 No One Dwelling No Yes No 0.00 Overshading None Or Little	FGHRS	No	Facto	kWh/da	MCS Certificate Reference	



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				