

SPRING LANE, MUSWELL HILL

1916 - Energy Statement Report

A report prepared for and on behalf of:
Springdene Nursing and Care Home Ltd



HARNISS

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Energy Statement

1.0 EXECUTIVE SUMMARY

- 1.1

This document details the intended energy and sustainability strategy for the proposed care scheme at Spring Lane, Muswell Hill, London. The development comprises of six apartments and a care home on the site and the associated works including car parking, access, landscaping, and associated engineering. This report has been prepared by Harniss Consulting on behalf of Springdene Nursing and Care Homes Ltd.
- 1.2

The ethos for the design of the proposed development follows the recognised energy hierarchy to “Be Lean, Be Clean, Be Green”, i.e. to minimise the building’s energy usage before applying low carbon technologies/renewables to the design.
- 1.3

By following the energy hierarchy, the building wasn't found to be compliant with Building Regulations Approved Document Part L 2021 without additional renewable or low carbon technology. However, with the inclusion of, electric panel heating, electric shower, Mechanical Ventilation with Heat Recovery (MVHR) and Photovoltaic (PV) panels the development is compliant against Part L 2021. The improvement beyond building regulations is illustrated below, resulting in an overall saving of 2.3 tonnes of carbon dioxide per year, as calculated by the SAP 10.
- 1.4

In-line the GLA London Plan 2021 and local Planning policy the development successfully demonstrates compliance with Building Regulations 2021 and surpassing this threshold by 35% (10% improvement from energy efficient measures) and needs to offset the residual carbon associated with the scheme through further on-site savings and/or offset payments. In-line with the GLA guidance this is based upon the 1.6tCO2e/yr for 30 years at £95/tCO2, therefore the cash in lieu contribution will be £4,483.00.

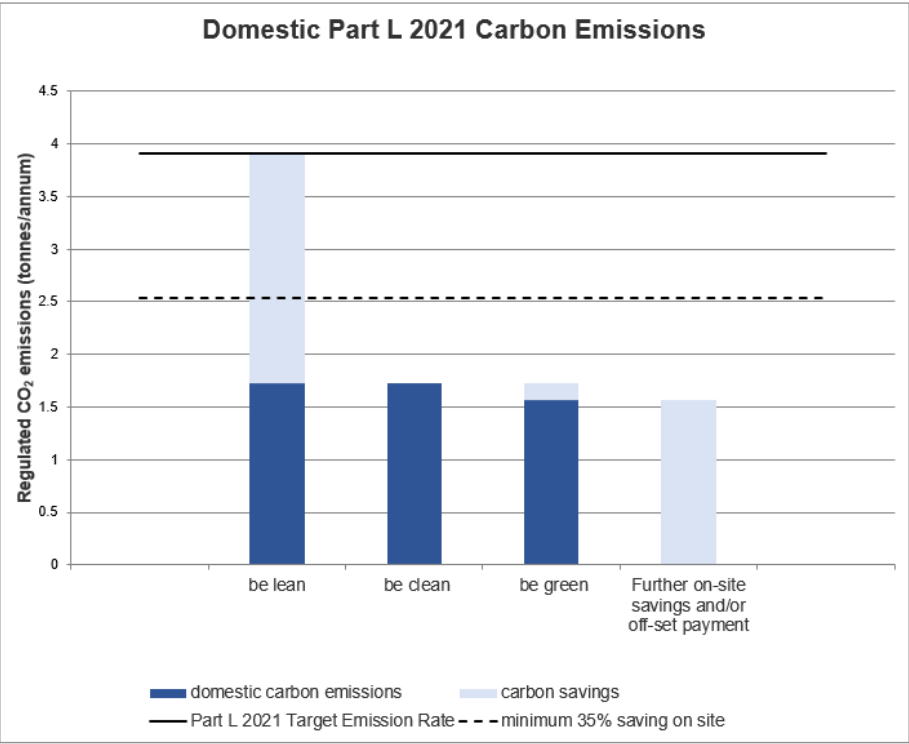


Figure 1: Part 2021 Carbon Emissions

Summary

The following summarises the key drivers of the energy strategy for the development:

- Enhanced building fabric performance has been targeted through improved thermal performance and reduced air permeability.
- Energy efficient heating, domestic hot water, ventilation, and lighting throughout.
- Energy efficient controls for HVAC and lighting to minimise building in-use energy.
- An initial desk top study was undertaken to assess the most viable low zero carbon technologies for proposed implementation to achieve compliance with the local planning policy.
- Electric panel heaters, Mira Advance Electric shower (9.8kWh), Nuaire MVHR unit and an array PV panels was found to be the most feasible source of low carbon technology for the six care apartments on this project based on the findings of Section 6, spatial considerations and the impact to the local population / building aesthetics.

The conclusion of the conceptual design stage energy strategy is to provide electric panel heaters to all care apartments with programmer and room thermostat for the controls. In addition to the electric panel heaters, a fabric first approach, MVHR and Photovoltaic panels, situated on the roof.

The Strategy outlined in this report would result in the same impact as the following (99 tonnes of CO2 saved over 20 years):



784 Trees
Grown for 10 years



80 Flights
From London to New York
(per passenger)



4,276 Train journeys
From London to Paris (per
passenger)

2.0 INTRODUCTION

- 2.1 The report has been prepared in accordance with Part L 2021 of the building regulations with the assessment showing compliance with all applicable criteria.
- 2.2 The strategy for the development takes into account the recognised energy hierarchy to “Be Lean, Be Clean, Be Green”, i.e. to minimise the energy usage within each building before applying renewable technologies to the design.

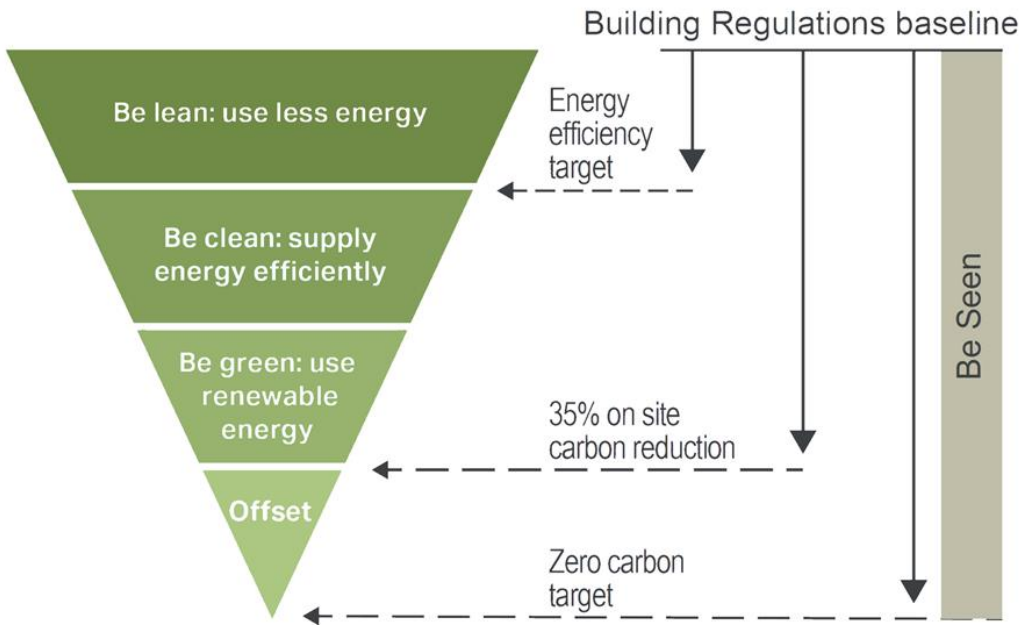


Figure 2: GLA Energy Hierarchy

- 2.3 Further work will be required at later stages in the detailed design process to ensure that the requirement to comply with the above targets and that all statutory guidelines or local planning enforcement requirements are met.

3.0 STANDARD ASSESSMENT PROCUDRE (SAP)

- 3.1 Under SAP (Standard Assessment Procedure) all six care apartments have been assessed using Elmhurst’s SAP 10 software which is an industry leading software which looks at the anticipated energy usage and compares it against the notional benchmarks TER (Target Emissions Rate) set out in Part L of the Building Regulations. The software was initially used to determine a baseline carbon emission using fabric performance values as discussed with the development team (as detailed in the body of the report) without contribution from additional renewable technologies. Thereafter, renewable technology was introduced to the ‘Be Green’ stage of the process.

4.0 LOCAL PLANNING POLICIES

- 4.1 Haringey has a New Local Plan which is intended to run from 2024 – 2039. The New Local Plan looks at Changes and Opportunities, the Vision, Regeneration, Opportunity Areas, Housing, Reducing Climate Change, Transport, Design, Green Infrastructure and the Natural Environment among other areas.
- 4.2 The New London Plan stipulates that The New Local Plan will have a minimum housing target to achieve per year. Haringey will need to build 1,592 homes per year and 260 homes will need to come from small sites (within 0.25 hectares).
- 4.3 Their vision looks at the following elements:
- Provide more space on streets to allow for cycles, public transport and essential vehicles.
 - New developments to connect to pedestrian and cycle networks to Haringey and Green Grid.
 - Planning for new and improved waling, cycling and public transport networks in new growth areas.
 - Developments to contribute to cycle infrastructure.
 - Creating new links for walkways to the town centre, public transport infrastructure, healthcare facilities, school and green spaces.
- 4.4 Within the Haringey’s Local Plan it stipulates they will be rising the cost of offsetting emissions, increasing the 35% minimum threshold for carbon reductions and increasing the amount of renewable technology to be used on or near the development.
- 4.5 If a development has tried to reduce their emissions as much as possible, there will be an offsetting payment to pay. Haringey’s charge for offsetting carbon per tonne is currently £95/tonne/year over a 30 year period.

5.0 DESCRIPTION OF DEVELOPMENT

5.1 The proposed development consists of six self-contained care suites located in Spring Lane, Muswell Hill, London, which comprising of:

- Six one bed care suites
- All care apartments have dedicated ensuites
- Lounge area within the care suites
- Communal lobby / stairs
- Lift access to care suites
- Plantroom located in the basement

5.2 The assessment has been based on the following architectural AutoCAD drawings, produced by RDT Architects:

- 1326F – RDT – 01 – XX – DR – A - 1100 – Proposed Site Plan
- 1326F – RDT – 01 – 00 – DR – A – 2100 – Proposed Ground Floor
- 1326F – RDT – 01 – 01 – DR – A – 2200 – Proposed First Floor
- 1326F – RDT – 01 – 02 – DR – A – 2300 – Proposed Second Floor
- 1326F – RDT – 01 – 03 – DR – A – 2400 – Proposed Roof Plan
- 1326F – RDT – 01 – ZZ – DR – A 3000 Proposed Elevations Sheet 1
- 1326F – RDT – 01 – ZZ – DR – A 3001 Proposed Elevations Sheet 2
- 1326F – RDT – 01 – ZZ – DR – A 3002 Proposed Elevations Sheet 3
- 1326F – RDT – 01 – ZZ – DR – A 3003 Proposed Elevations Sheet 4

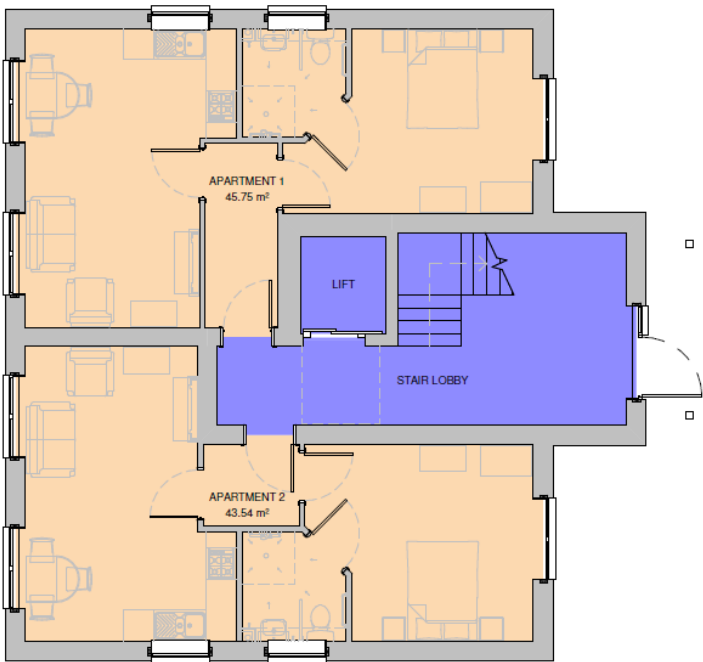


Figure 3: Proposed Ground Floor Plan



Figure 4: Proposed Site Plan

6.0 USE LESS ENERGY (BE LEAN)

- 6.1 The proposed development and the energy strategy detailed herein has low energy use at its core, with significant passive and energy efficient measure having been specified, these include:
- A significant improvement over limiting U-values within the Building Regulations. The thermal performance of the building envelope has been maximised to its fullest within the constraints of a traditional build with 100mm cavity.
 - Air permeability improved over the limiting value. The target will be to improve yet further on the air permeability during the construction phase but given the relatively small percentage of total energy that the heating system contributes to, any further gain will result in minimal actual reduction against the Target Emission Rate calculated under Approved Document Part L.
 - Improved lighting specified which reduces primary energy usage.
 - Automatic lighting controls used throughout, where appropriate for care i.e. proximity infrared used throughout in en-suites, bathrooms, stair lobby etc. timeclocks utilised for corridor night-time setback.
- 6.2 To this end, the proposed design promotes reducing the CO₂ emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. With these measures incorporated, then the addition of low carbon technologies and renewable energy system will have a greater impact – renewable energy sources should not be used as an alternative to a well-designed building.
- 6.3 A preliminary Standard Assessment Procedure (SAP) Assessment has been completed using SAP 10. The software was used to determine a baseline performance utilising the employer’s requirements including the project specifications, room data sheets and good industry custom and practice.
- 6.4 The SAP Assessments were produced using constructions advised by the project architect which were:

Building Fabric Parameter	Value
Air permeability (m3/(m2.h) @ 50Pa)	4.0
External Wall U-value (W/m2.K)	0.14
Wall to Corridor	0.14
Roof U-value (W/m2.K)	0.13
Ground Floor U-value (W/m2.K)	0.13
Glazing U-value (W/m2.K)	1.20

Table 1: Building Fabric U-Values

- 6.5 In line with the first stage of the recognised energy hierarchy of intervention to “Be Lean, Be Clean, Be Green”, it is essential to ensure that an efficient building and building services systems have been designed and proposed, prior to the consideration of application of LZC technologies.

7.0 HEATING INFRASTRUCTURE (BE CLEAN)

7.1 The second stage of the recognised energy hierarchy of ‘Be Lean, Be Clean, Be Green’ is to exploit local energy resources such as secondary heat to reduce the developments carbon emissions. From reviewing online heat maps from the Department for Business, Energy, & Industrial Strategy there are no available heat networks to readily connect to in the local vicinity of the proposed development. Due to there being no local heat network that can be capitalised upon there are no associated carbon emission savings at this stage. However, this does not preclude a future heat network connection, should one become operational locally.

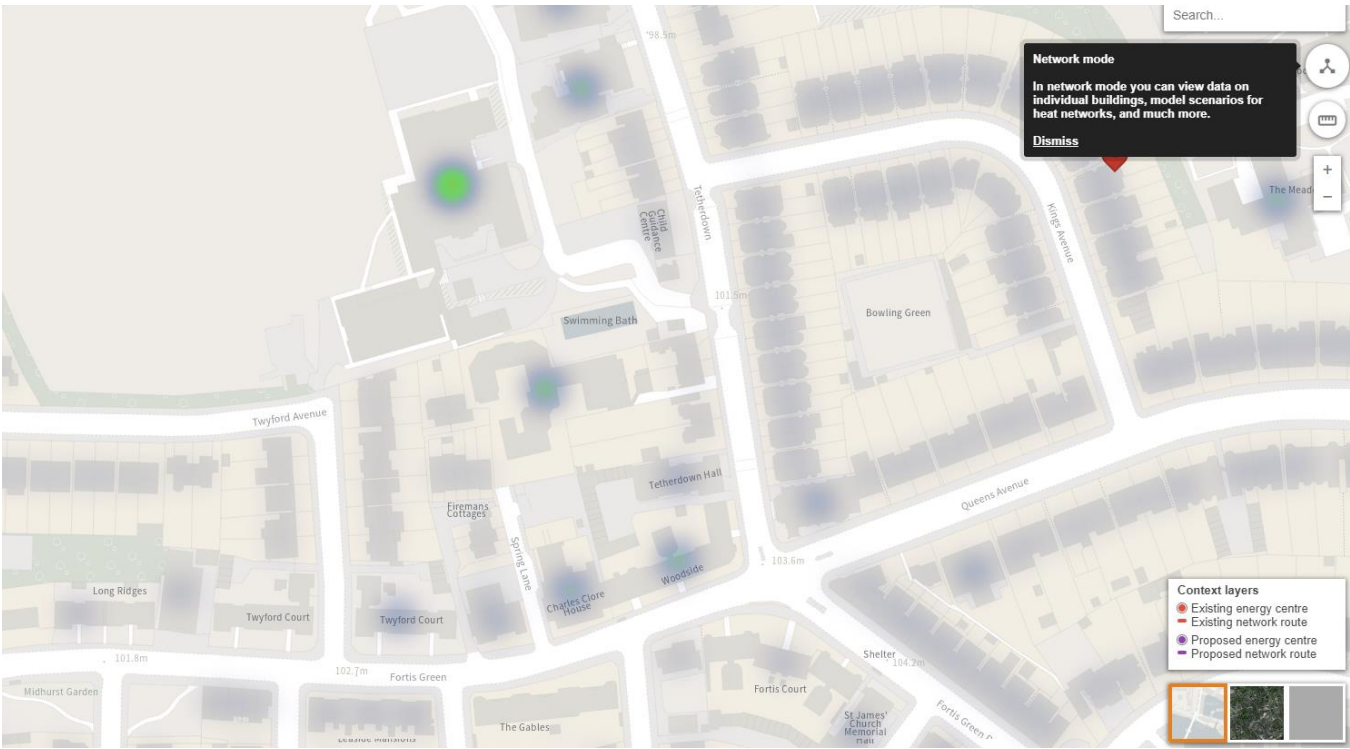


Figure 5: Heat Network

8.0 LOW CARBON AND RENEWABLE TECHNOLOGY

8.1 This section provides a brief overview of available renewable and Low/Zero Carbon (LZC) technologies. The technical feasibility of installing each LZC technology at the proposed care home has been assessed in order to discount any unsuitable options at an early stage. A summary of the feasibility process is presented in the following table and discusses the advantages and disadvantages that are specific to the project:

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Solar Photovoltaic	Photovoltaic panels convert solar radiation into electrical energy	Low maintenance. No moving parts. Easily integrated into building design.	Any overshadowing affects panel performance. Large area required for installation. Panels ideally inclined and facing southerly direction.	Yes
Solar Thermal	Solar thermal energy can contribute towards space heating and hot water requirements.	Low maintenance.	Must be sized for the building base load hot water requirements. Panels ideally inclined at around 30 degrees and facing southerly direction	Yes
Wind Turbine	Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.	Low maintenance On-going cost. Excess electricity can be exported to the grid.	Planning issues. Aesthetic impact. Background noise Space limitations on site. Minimum wind speed requirements. Wind survey to be undertaken to verify ‘local’ viability.	No
Biomass	Modern wood-fuel boilers are highly efficient, clean and almost carbon	Stable long-term running costs. Potential good CO ₂ saving.	Large area needed for fuel delivery and storage. Reliable fuel supply chain required. Regular maintenance required Significant plant space required. Air pollution / Clean Air Act limits use.	No
Ground Source Heat Pump (GSHP)	GSHP systems tap into the earth’s considerable energy store to provide both heating and cooling to buildings.	Minimal maintenance. Unobtrusive technology. Flexible installation options to meet available site footprint.	Large area required for horizontal pipes Full ground survey required to determine geology. More beneficial to the development if cooling is required. Integration with piled foundations must be done at an early stage. The lack of space to locate the underground pipework loops and the associated plant around the site.	No

Table 2:Low Carbon and Renewable Technologies

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Air Source Heat Pump	Electric air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).	Efficient use of fuel. Relatively low capital costs.	Specialist maintenance. Some additional plant space required. External proximity to boundary and noise generation with units cycling. Impact of the required external plant and associated noise within the domestic setting can be a nuisance to residents.	No
Combined Heat and Power	A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and thermal heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.	Potential high CO ₂ saving available. Efficient use of fuel. Excess electricity can be exported to the grid	Maintenance intensive. Sufficient base thermal and electrical demand required. Additional plant space required. Noise and air quality constraints.	No
Earth Ducts	Passive pre-treatment of fresh air	Low cost Free energy	Requires significant air loads and riser space	No
Onsite Battery Storage	PV Battery Storage able to charge the battery during periods of low electrical load & discharging battery power at times of low/no solar radiation	Battery discharges power during periods of low solar radiation. Reduce electrical energy supply costs.	Specialist Maintenance Additional Plant space required Low Electrical Baseload, battery storage not economically viable	No

Table 3: Low Carbon and Renewable Technologies Cont.

8.2 Building Regulations isn’t achieved without any additional renewable technology. The energy strategy of this development has utilised a full electric heating and hot water in the form of electric panel heaters and electric showers to each care apartment. Also, there will be PV panels which will serve the care apartments.

9.0 PHOTOVOLTAIC SYSTEM (PV)

- 9.1 A PV system uses layers of semi-conductor material to produce electricity generated directly from sunlight. Several types of PV are available with varying costs and performance.
- 9.2 The efficiency ranges around 20% for high performance panels, based on peak output under ideal conditions. For the panels to function effectively, they must be installed in an unshaded location, and correctly orientated based on the site latitude.
- 9.3 PV panels are mounted on a metal racking system which are typically angled at between 5 and 30 degrees to improve the energy capture, for maintenance the system requires access paths, provided with man safe system where required. Visual impact has to be taken in consideration, PV solar system installation will be prevented on a sloping roof and therefore will be visible. The intermittency and unpredictability of solar energy due to weather is an element which can dictate that the system is not used at full potential. A further consideration is the additional structural provisions to support the photovoltaic panels and metal racking system which for a system of this size is considerable.



Figure 6: Roof Mounted PV Panels



Figure 7: Frame Mounted PV Panels

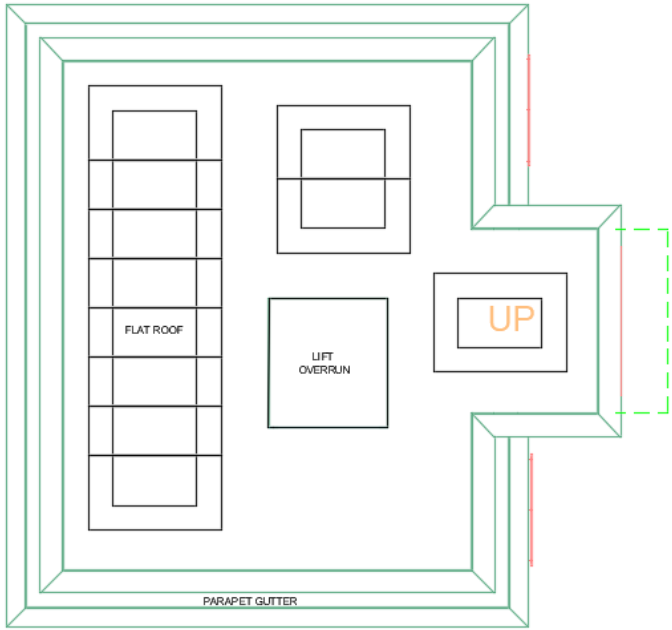


Figure 8: Proposed PV Layout

10.0 RESULTS WITH LOW CARBON TECHNOLOGY (BE GREEN)

10.1 With the inclusion of electric panel heaters, MVHR and PV panels each care apartment achieves the following results:

	DER kgCO ₂ /m ² .annum	TER kgCO ₂ /m ² .annum	DPER kWh/m ² .annum	TPER kWh/m ² .annum
Care Home 1	5.58	14.88	57.83	79.45
Care Home 2	6.44	14.65	66.51	78.16
Care Home 3	6.10	14.85	63.03	79.34
Care Home 4	6.40	14.42	66.15	76.94
Care Home 5	7.79	21.32	80.45	114.71
Care Home 6	7.66	20.26	79.08	108.88

Table 4: Overall Apartment Compliance

Table 4 shows the improvement from the Target Emission Rate (TER) over the Dwelling Emission Rate (DER). As well as these aspects, in SAP Assessment there is the addition of the Dwelling Primary Energy Rate (DPER) and the Target Primary Energy Rate (TPER). The DPER looks at the annual primary energy use for the dwelling based on the floor area. It also accounts for space and water heating, ventilation and lighting. There is an aspect for renewables primary energy generation for the dwelling.

In all cases, the DER and DPER has to show an improvement over the TER and TPER. Table 4 demonstrates the DER is showing a vast improvement over the TER with a minimum of 55% improvement. The DPER is showing a minimum of 14% improvement over the TPER.

11.0 M AND E SPECIFICATION

11.1 Lighting Strategy

This energy Demand will be limited by the application of LED lighting throughout.

11.2 Ventilation strategy

Within each care apartment, there will be Mechanical Ventilation with Heat Recovery (MVHR). The ventilation aspect of an MVHR systems bring in fresh outdoor air into the dwelling and remove indoor stale air. This helps to maintain good indoor air quality by limiting pollutants, odours and moisture buildup. The heat recovery element of an MVHR unit has the ability to recover heat from outgoing stale air. There is a transfer process which occurs, allowing heat from the warm indoor air being expelled to preheat the incoming outdoor air. By having a MVHR unit installed helps to improve energy efficiency of the dwelling, reducing heating costs and carbon emissions.

The unit which has been specified within the SAP Assessment is a Nuaire MRXBOX-ECO-LP2 Low Profile MVHR Unit.

11.3 The following strategy has been proposed

Ventilation Zone	System	Heat Recovery (eff)
Bedroom Ensuite / WC	MVHR Unit	79%
Communal Areas	N/A	N/A
Stores	N/A	N/A
Kitchen	MVHR Unit	79%

Table 5: Ventilation Strategy

11.4 Space and Water Heating

After reviewing available technologies and the general need to move away from conventional gas heating and hot water systems, full electric panel heaters, electric hot water and PV will be installed to the development.

11.5 PV Array

The proposed PV will be mounted on the flat roof as previously illustrated in Figure 7.

The building design will provide service riser accommodation to allow the roof mounted inverter(s) to be wired back to a distribution board and G99 intake meter arrangement. Included in the table below is a breakdown of a proposed PV array:

Served Area	PV Area	PV peak Power (kWp)	PV energy generation (kWh.yr)
Roof of Care Apartments	19.20m ²	5.10	5,100

This energy assessment has identified a roof mounted PV array of 5.10kWp. This will generate 5,100kWh of renewable electricity per annum and will result in a reduction of 693kg CO2 per Annum (calculated using SAP 10 emission factors). This is based upon 12 PV panels at 425 watts.

The combination of measures would ensure that the development meets with current Part L 2021 Target emissions rates and would lead to an annual carbon footprint of regulated energy uses of 1.60 tonnes of CO₂ per annum.

12.0 CARBON OFFSET

12.1 In-line with the GLA London Plan 2021 and local Planning policy the development now successfully demonstrating compliance with Building Regulations 2021 and surpassing this threshold with 56% improvement from energy efficient measures and needs to offset the residual carbon associated with the scheme through further on-site savings and/or offset payments. In-line with the GLA guidance this is based upon the 1.6tCO₂e/yr for 30 years at £95/tCO₂, therefore the cash in lieu contribution will be £4,483.00. See table 6, below.

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	2.2	56%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.1	4%
Cumulative on site savings	2.3	60%
Annual savings from off-set payment	1.6	-
	(Tonnes CO₂)	
Cumulative savings for off-set payment	47	-
Cash in-lieu contribution (£)	4,483	

Table 6: Regulated Carbon Saving

APPENDIX A – COMPLIANCE DOCUMENTATION

The following pages detail the Predicted Energy Assessment (PEA) output and Part L compliance information for the proposed care apartments, based on the solution as described elsewhere in this report.

This analysis demonstrates feasibility only. The contractor shall be responsible for developing a holistic solution in conjunction with the detailing architect to achieve compliance.

Predicted Energy Assessment



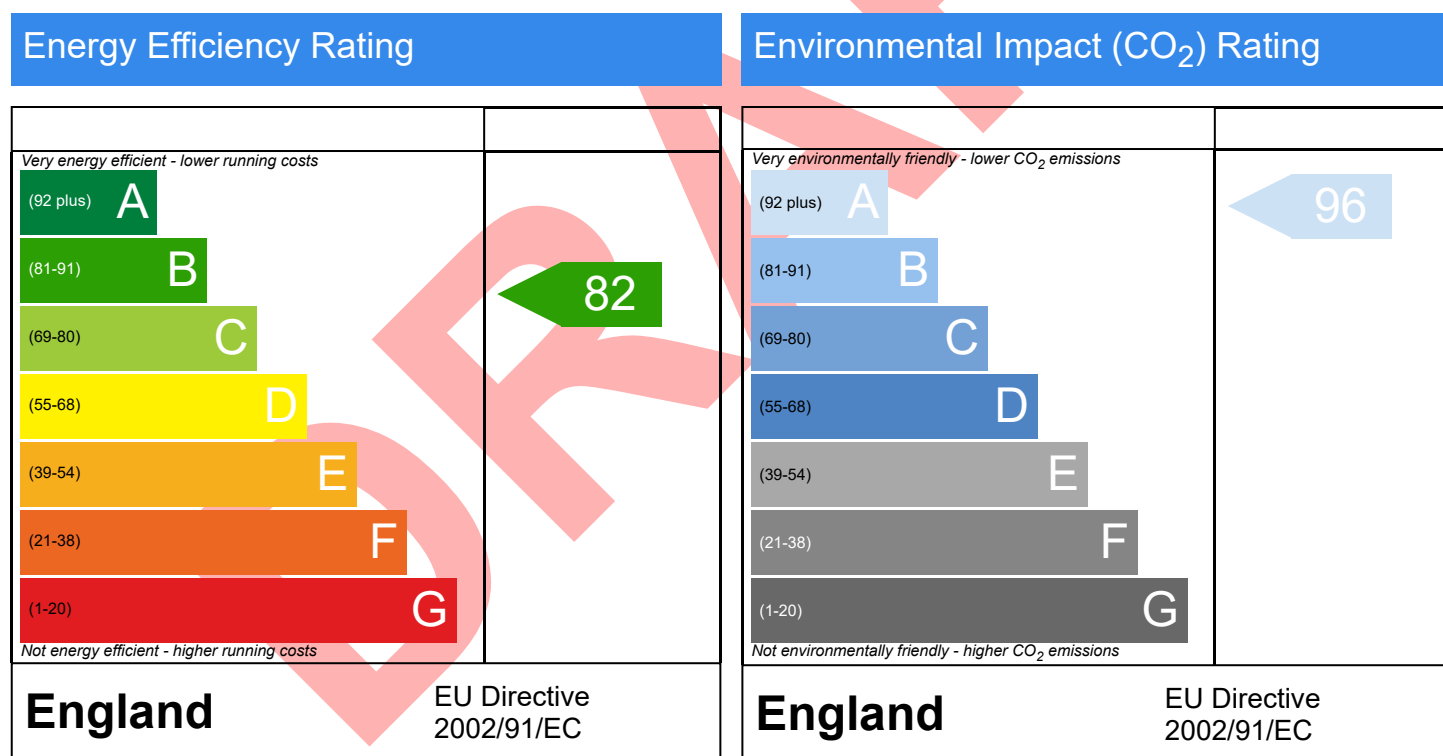
Apartment 1, Spring Lane, Fortis Green, Muswell Hill,
N10 3PA

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
12/10/2023
Adam Alexander
43.23 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Predicted Energy Assessment



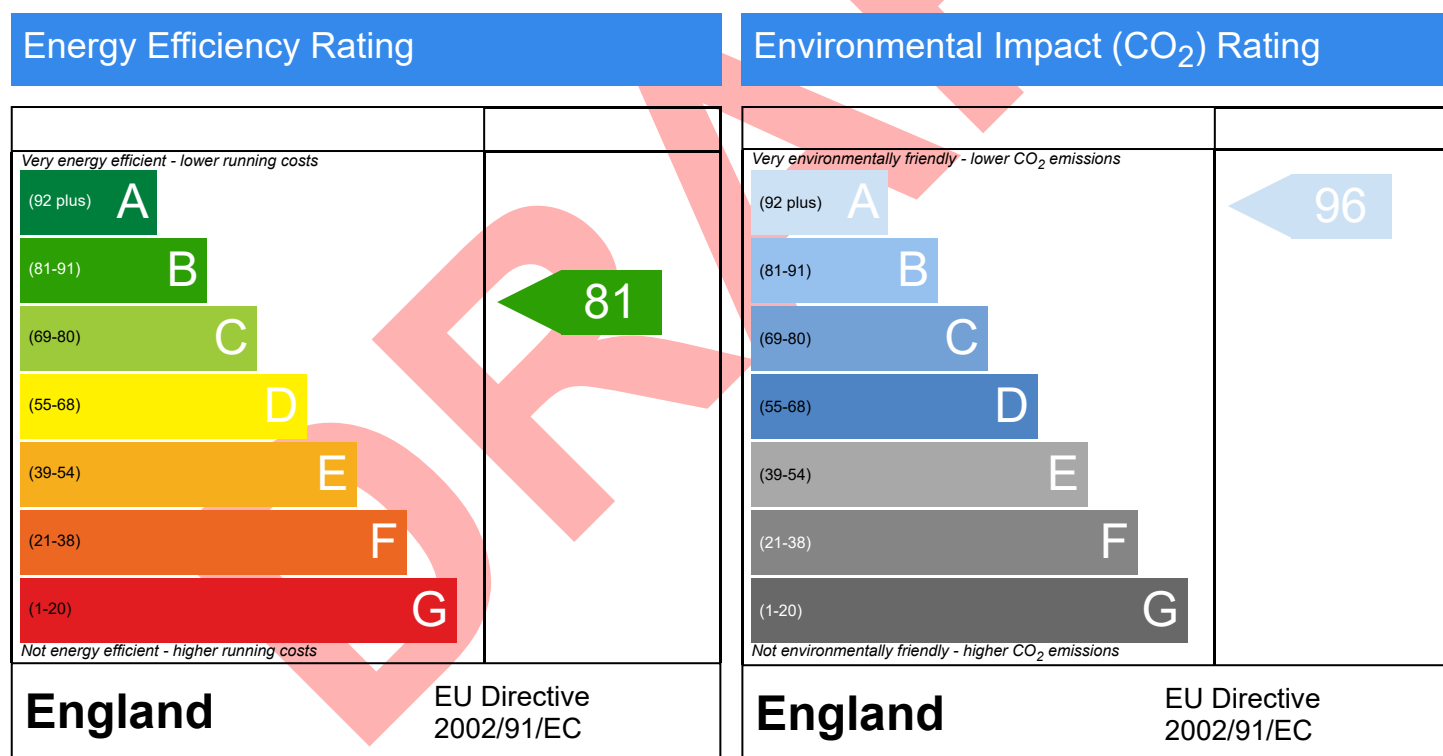
Apartment 2, Spring Lane, Fortis Green, Muswell Hill,
N10 3PA

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
12/10/2023
Adam Alexander
45.77 m²

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Predicted Energy Assessment



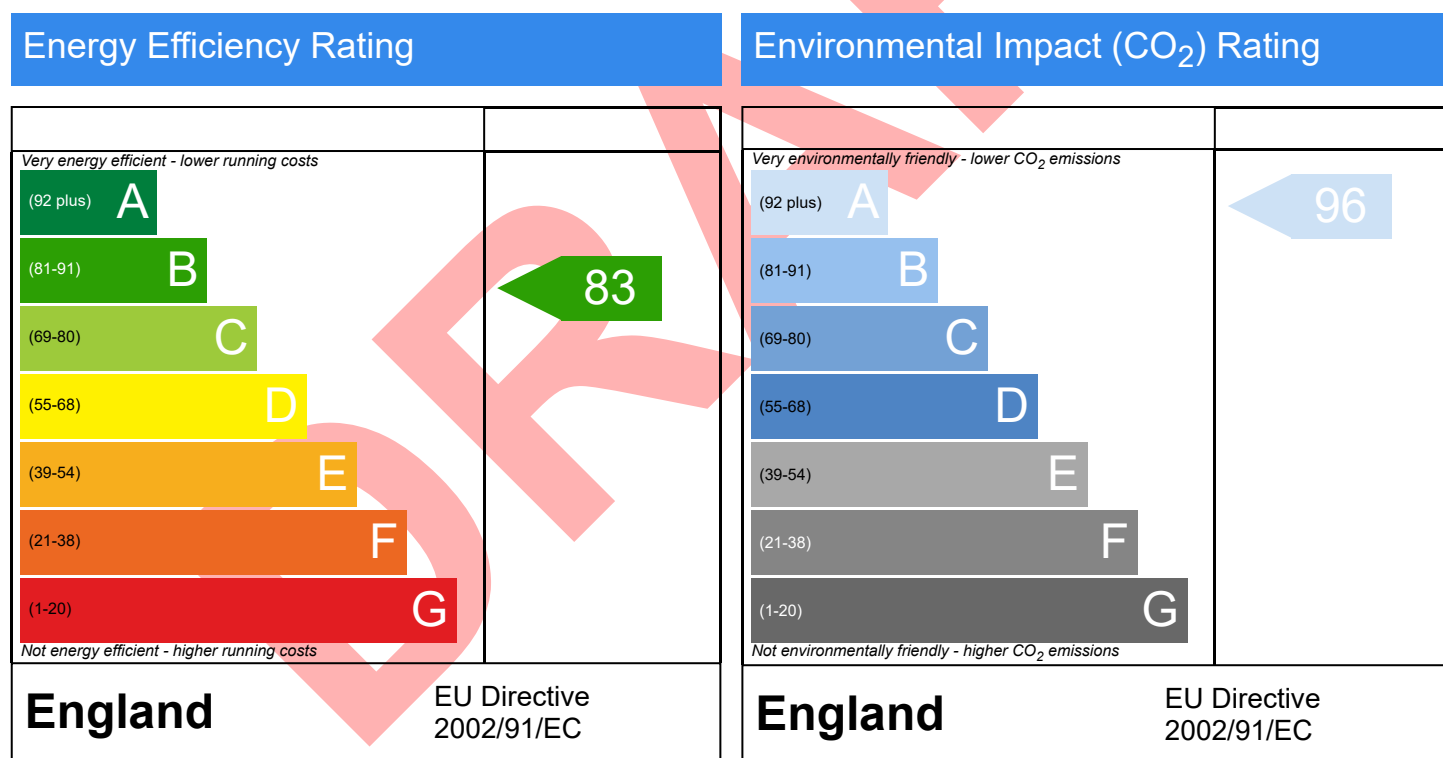
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N10 3PA

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
12/10/2023
Adam Alexander
43.23 m²

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Predicted Energy Assessment



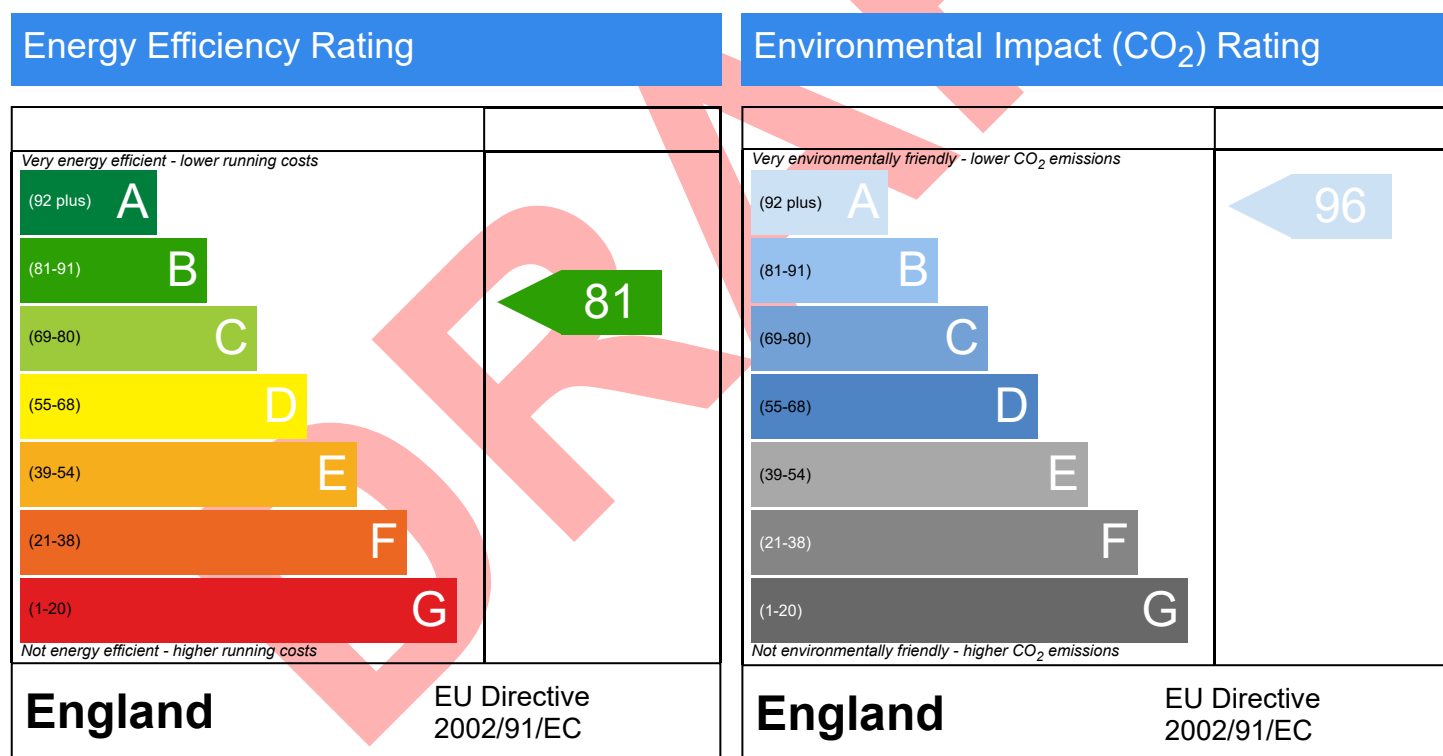
Apartment 4, Spring Lane, Fortis Green, Muswell Hill,
N10 3PA

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
12/10/2023
Adam Alexander
45.77 m²

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The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Predicted Energy Assessment



Apartment 5, Spring Lane, Fortis Green, Muswell Hill,
N10 3PA

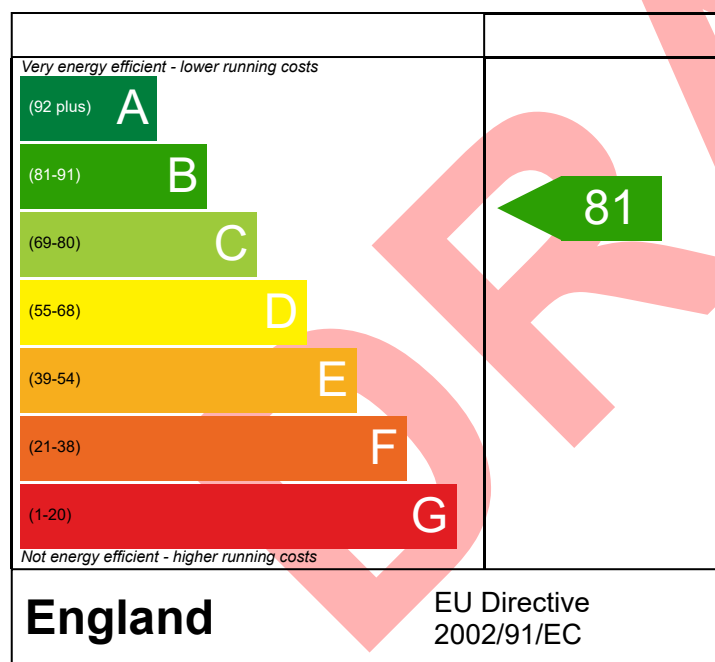
Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
12/10/2023
Adam Alexander
29.99 m²

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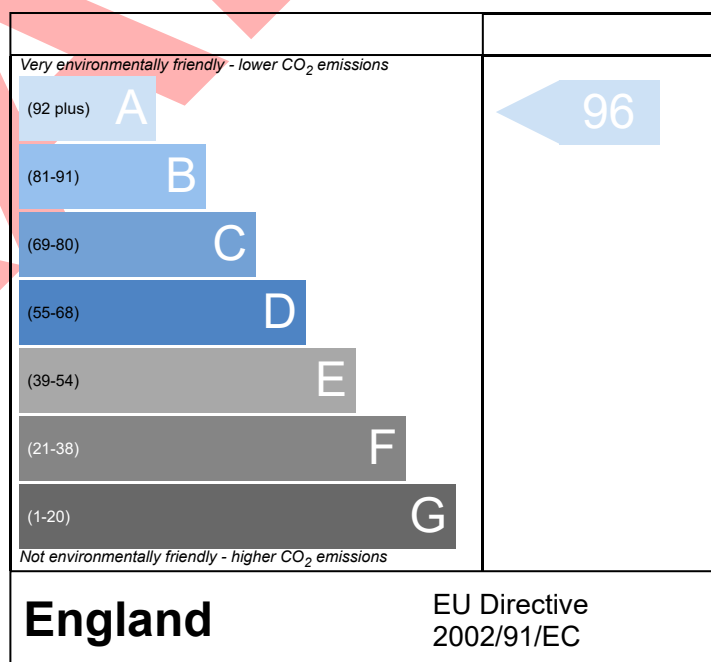
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Predicted Energy Assessment



Apartment 6, Spring Lane, Fortis Green, Muswell Hill,
N10 3PA

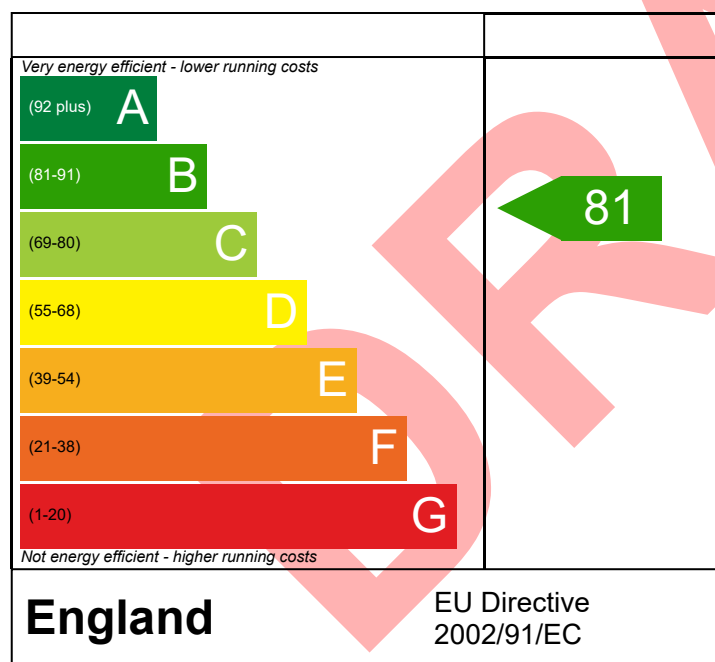
Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
12/10/2023
Adam Alexander
32.33 m²

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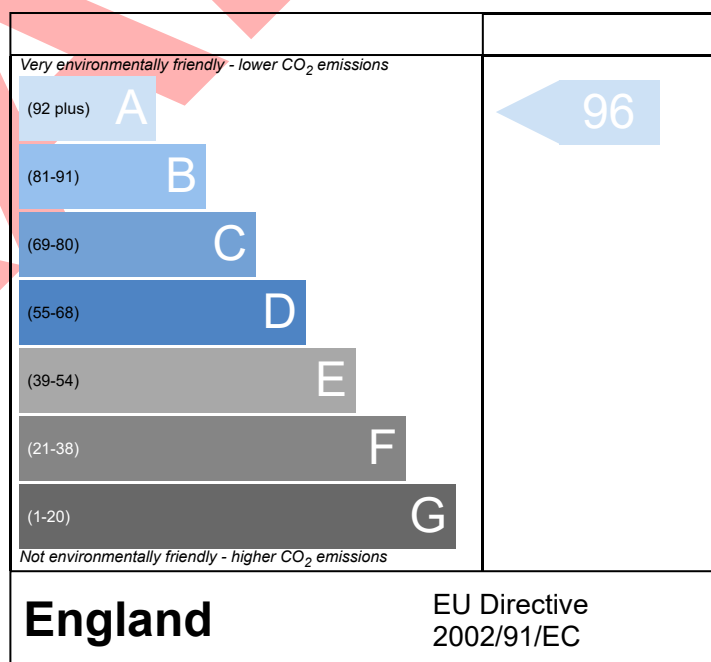
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.