Energy Statement

83 Station Road,

Hampton,

TW12 2BJ

Report details

Client	FORM Design Group
Report title	Energy Statement
Site Address	83 Station Road, Hampton, TW12 2BJ
Project Number	001141

Document control

Issue	Issue Date	Purpose of report	Author	Authorized
Version 1.0	07/06/2024	Issue	JP	TH

Sustain Quality Ltd | Maple Works | 73 Maple Road | Surbiton | KT6 4AG | Tel: 01372 438 039

info@sustainquality.co.uk | www.sustainquality.co.uk |

Contents

Executive Summary

Policy Target: The proposal of 83 Station Road is change of use of shop/showroom into two separate flats as well as the change and addition of fenestrations.
The identified target, as set out in the London Plan policy SI2 and the London Borough of Richmond upon Thames' Local Plan Policy LP 22, is that all new residential buildings should achieve 35% minimum reductions in carbon dioxide emissions.

The energy Hierarchy: In line with best practice, the Energy Hierarchy (as set out in the London Plan and the London Borough of Richmond upon Thames' Local Plan) has been adopted throughout the proposed design and the resulting CO_2 savings are set out in this report.

Be Lean: Energy efficiency measures were first assessed to reduce energy demand. The efficiency measures incorporated in the proposed design were the use of high-performance insulating materials to improve the U-values of fabric elements, thermally efficient glazing and lighting, and heating controls. These upgrades are predicted to provide a **36.77% CO_2 reduction site-wide compared to the Part L 2021 Baseline**.

Be Clean: The feasibility of connecting to an existing or planned heat network was considered as part of this energy strategy. No existing or planned heat networks were identified within a reasonable distance of the site and the small scale of the site is not sufficient to support the inclusion of a CHP system.

Be Green: The feasibility of various Low and Zero Carbon (LZC) technologies were considered as part of the design process for this proposed development, with the resulting recommendations being no renewable technologies to be incorporated due to the small scale of the project.

Results: The adopted energy strategy is predicted to deliver the planning policy target. The proposed development total cumulative CO_2 emissions savings is **36.77% site-wide compared to the Part L 2021 Baseline.**

1. Introduction

Sustain Quality Limited was instructed by **FORM Design Group** to provide an energy statement to support the proposed development at **83 Station Road, Hampton, TW12 2BJ**. This proposed development incorporates the energy efficiency measures detailed within the following energy strategy.

This document sets out the CO_2 emissions savings predicted to be achieved because of applying these measures, in accordance with both local and national planning policy. It also outlines aspects of sustainable development that this project will strive towards.

The proposal of 83 Station Road is change of use of shop/showroom into two separate flats as well as the change and addition of fenestrations.

The subject site is in the London Borough of Richmond upon Thames, specifically in Hampton. The proposal is relevant to ground floor of a property with two existing flats located on the first floor. The property is semi-detached with the entrances to the two flats located along the eastern walls of the property alongside bin storage. Amenity spaces for both flats are located towards the south-end of the property.

The existing gross internal floor area of each flat is 47.4 m^2 and 46.5 m2.

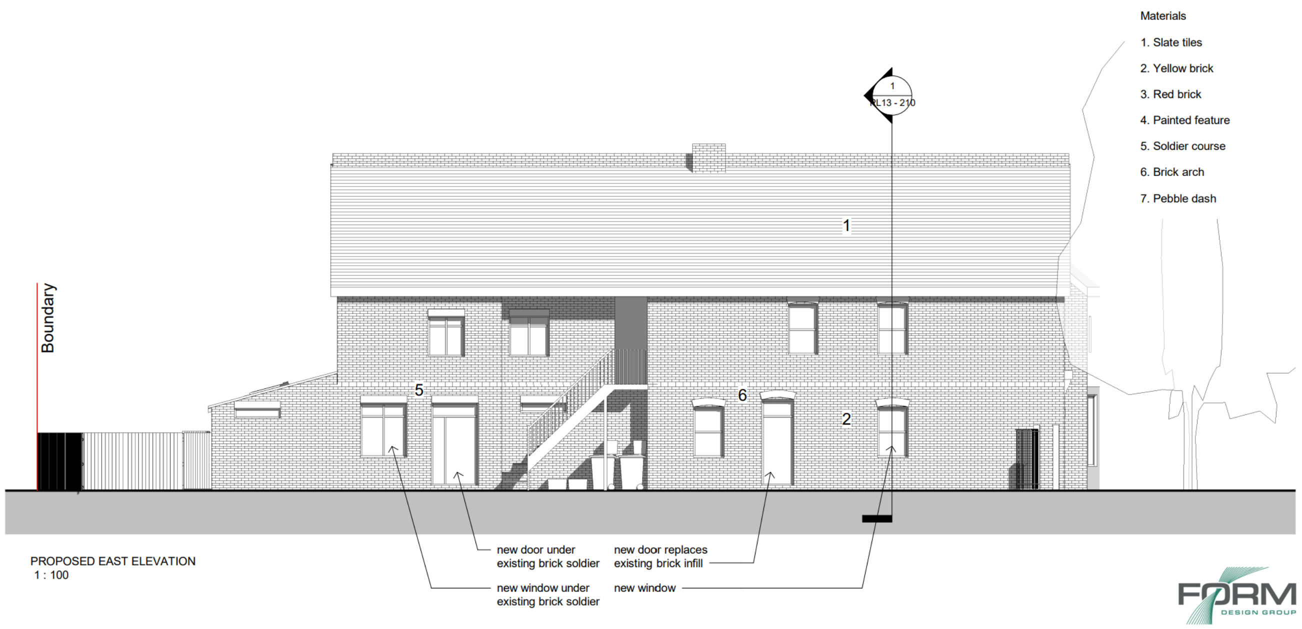

Figure 1: Proposed East Elevation of 83 Station Road.

Figure 2: Proposed North Elevation of 83 Station Road.

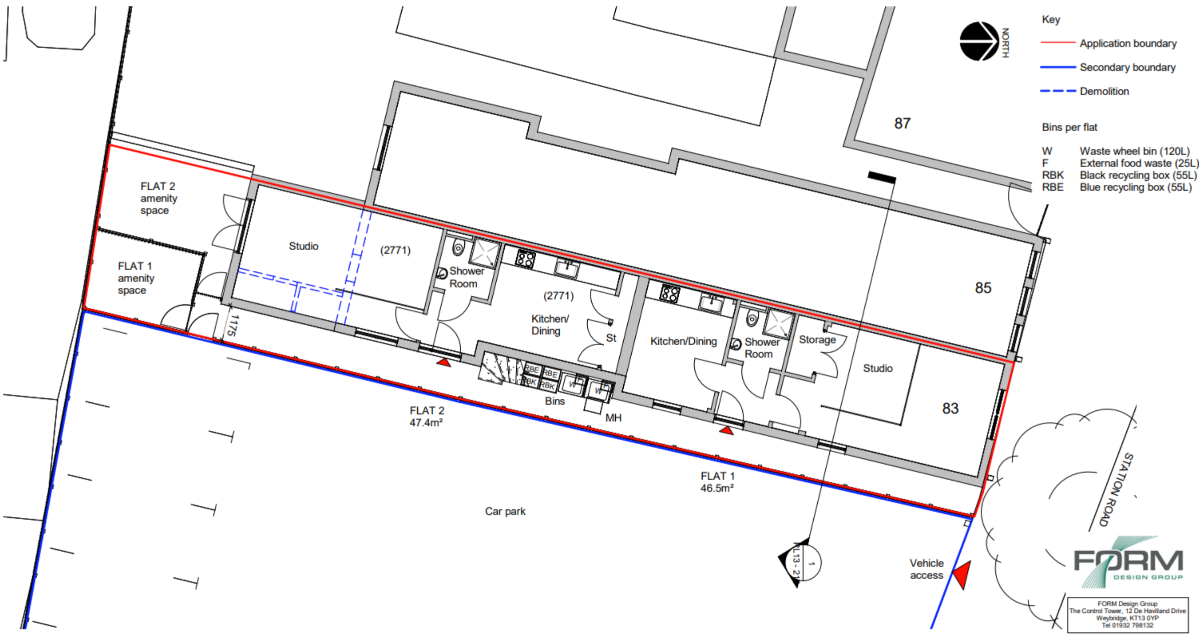

Figure 3: Proposed Ground Floor Plan for 83 Station Road.

2. Planning Policy Review

The following policies and requirements are related to the proposed development, both from a national and local perspective.

The identified target, as set out in Policy LP 22 – Sustainable Design and Construction in the London Borough of Richmond upon Thames' Local Plan Policy LP 22 and the London Plan policy SI2, minimising greenhouse gas emissions, is that residential developments should achieve a 35% reduction in carbon emissions from a baseline building.

This section summarises planning policy requirements relevant to the Proposed Development with regards to energy and environmental sustainability. The relevant documents setting out the current planning policy on energy and environmental sustainability strategies are listed below:

1. National Planning Policy Framework

2. Part L of the Building Regulations

3. London Borough of Richmond upon Thames Local Policy
    - Policy LP 22 – Sustainable Design and Construction

4. The London Plan 2021 Policies
    - Policy SI2 – Minimising greenhouse gas emissions

The site policy context is as follows:

National Planning Policy Framework

The National Planning Policy Framework (NPPF) was adopted in March 2012 and updated in July 2021. The framework sets out a structure for delivering sustainable developments with relevance for energy and carbon issues.

The NPPF sets out 12 core planning principles, of which the following are directly related to sustainability:

A. Proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs;
B. Support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy);
C. Contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser environmental value, where consistent with other policies in this Framework (the NPPF).

Part L of the Building Regulations

The notional DER (Dwelling Emission Rate kgCO_2/m_2/year) as calculated by the SAP software. The DER is the calculated emission rate based on the regulated energy usage of the dwelling. The target emission rate is calculated by producing a notional model of the property with the same geometric properties, orientation, and façades, but with the limiting standards for building fabrics, controlled fittings and controlled services, as set out in Approved Document L, Conservation of fuel and power, Volume 1: Dwellings and in the Domestic Building Services Compliance Guide.

London Borough of Richmond upon Thames Local Policy – Policy LP 22 Sustainable Design and Construction

Developers are required to incorporate measures to improve energy conservation and efficiency as well as contributions to renewable and low carbon energy generation. Proposed developments are required to meet the following minimum reductions in carbon dioxide emissions:

1. All new major residential developments (10 units or more) should achieve zero carbon standards in line with London Plan policy.
2. All other new residential buildings should achieve a 35% reduction.
3. All non-residential buildings over 100sqm should achieve a 35% reduction. From 2019 all major non-residential buildings should achieve zero carbon standards in line with London Plan policy.

Targets are expressed as a percentage improvement over the target emission rate (TER) based on Part L of the 2013 Building Regulations.

This should be achieved by following the Energy Hierarchy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

High standards of energy and water efficiency in existing developments will be supported wherever possible through retrofitting. Householder extensions and other development proposals that do not meet the thresholds set out in this policy are encouraged to complete and submit the Sustainable Construction Checklist SPD as far as possible, and opportunities for micro-generation of renewable energy will be supported in line with other policies in this Plan.

The London Plan – Policy SI 2 Minimising greenhouse gas emissions

A. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
   1. be lean: use less energy and manage demand during operation;
   2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly;
   3. be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site;
   4. be seen: monitor, verify and report on energy performance.

B. Residential development should achieve 10 per cent on-site reduction beyond Building Regulations, and non-residential development should achieve 15 per cent through energy efficiency measures.

3. Energy Statement

The following sections detail the proposed energy strategy in accordance with the Energy Hierarchy set out in The London Plan. This hierarchy dictates a 'best practice' approach to reducing carbon emissions through the implementation of energy demand reductions ('Be Lean'), use of clean energy ('Be Clean') and the use of Low and Zero Carbon technologies ('Be Green').

3.1. Energy Demand: Part L Baseline

To assess the proposed development against the relevant planning criteria, the first stage in this energy assessment is to ascertain baseline energy consumption and related emissions.

The baseline has been calculated by modelling the proposed building using Part L 2021 notional values for the fabric elements, controlled fittings, and controlled services. This modelling has been carried out using DesignSAP10 software to determine Part L 2021 compliance. Models have been created for each stage of the energy hierarchy, with the results from each stage input into the Greater London Authority's (GLA) Carbon Reporting spreadsheet to confirm the percentage reduction in CO_2 emissions at each stage.

The results of the baseline model are summarised in Table 1.

Table 1: Baseline predicted CO_2 emissions for flat 1 of the proposed development.

	Regulated Emissions ($tCO_2e/year$)	Unregulated Emissions ($tCO_2e/year$)
Baseline: Part L 2021	2.12	0.81

Table 2: Baseline predicted CO_2 emissions for flat 2 of the proposed development.

	Regulated Emissions ($tCO_2e/year$)	Unregulated Emissions ($tCO_2e/year$)
Baseline: Part L 2021	2.04	0.81

3.2. Be Lean: Use Less Energy

Use less energy: Optimise the building fabric, glazing and structure to minimise energy consumption in the first instance by using low U-values and good air tightness and make sure active systems run as energy efficiently as possible.

Before any renewable technologies are appraised it is considered good practice to reduce the overall energy demand of the building by using low energy design techniques. This is commonly referred to as a 'fabric first' approach.

Several efficiency measures have been incorporated into the design of this new building, summarised as follows:

- High performance insulating materials
- Thermally efficient glazing
- 100% low energy LED lighting
- Energy efficient ventilation extracts
- Efficient and appropriate lighting controls
- Efficient space and water heating controls

High performance insulating materials

Using materials with low thermal conductivity and specifying thermally efficient glazing, the proposed development seeks to achieve improved fabric U-values for external heat-loss elements. These improved U-values can be found in Table 3, below. They are subject to further refinement of strategy.

Table 3: Proposed U-values for both residential units.

Building Element	Baseline Value (W/m^2K)	Specified Value (W/m^2K)
External Cavity Walls	0.60	0.18
Floors	1.20	0.18
Pitched Roof	0.40	0.16
Windows, roof windows, and glazed doors	2.00	1.60
Air Permeability	8.00 m^3/hm^2	8.00 m^3/hm^2

100% low energy LED lighting

Energy efficient lighting helps to lower electricity demand and carbon dioxide emissions. The current Building Regulations require a minimum efficiency for lighting of 75 lumens per circuit Watt. This building design seeks to improve upon this by specifying a minimum efficacy for fixed lighting of 110 km/W.

Efficient space and water heating controls

To ensure that energy demand relating to space and water heating is reduced, the proposed design will incorporate time and temperature zone control. It is also proposed that the hot water pipework is fully insulated to reduce heat losses in delivery.

The CO_2 reduction following the implementation of these measures is summarised in Tables 4 and 5:

Table 4: Predicted CO_2 emissions after applying energy efficiency measures for flat 1 of the proposed development.

	Regulated Emissions (tCO_2e/year)	Unregulated Emissions (tCO_2e/year)
Baseline: Part L 2021	2.12	0.81
Be Lean	1.33	0.81
% Reduction	37.26%	-

Table 5: Predicted CO_2 emissions after applying energy efficiency measures for flat 2 of the proposed development.

	Regulated Emissions (tCO_2e/year)	Unregulated Emissions (tCO_2e/year)
Baseline: Part L 2021	2.04	0.81
Be Lean	1.30	0.81
% Reduction	36.27%	-

The implementation of 'Be Lean' measures ('fabric first') aims to enable the development to achieve the carbon emissions reduction target beyond those required by the current Building Regulations.

A careful attention to the two key areas below is recommended to achieve the design standards:

- Structural leakage
- Services leakage

Structural leakage occurs at joints in the building fabric and around window and door surrounds, and access openings. There will also be some diffusion through materials such as cracks in masonry walls typically caused by poor perpends in blockwork inner leaves.
Services leakage occurs at penetrations from pipes and cables entering the building. These can be sewerage pipes, water pipes and heating pipes. As well as electricity cables there may also be telecommunication cables. Attention, therefore, needs to be paid to sealing all penetrations during construction.

Although not a requirement under Part L1B of the Building Regulations, focus on the air permeability of the building has been identified as a cost-effective method to reduce carbon emissions and therefore should be quantified through on-site testing post-construction.

This also demonstrates that due care and attention has been paid to Part L1B section 5.5: "Continuity of insulation and airtightness". The picture below shows an example of continuity of insulation.

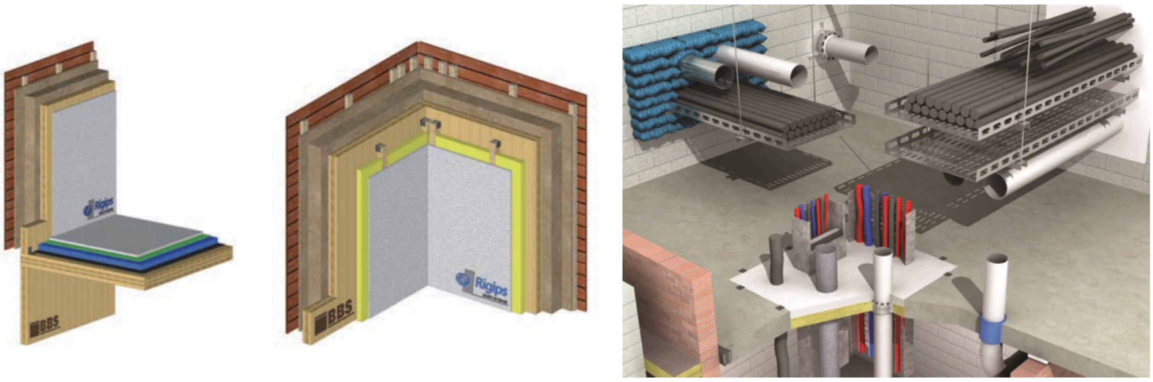

Figure 4: Example of a continuity insulation in CLT and airtightness considerations.

3.3. Be Clean: Supply Energy Efficiently

Supply energy efficiently: Further reduce carbon emissions through the use of decentralised energy where feasible, such as combined heat and power (CHP), combined cooling and heating power (CCHP) and district heating.

Following the application of energy efficiency measures (Be Lean) the next step is to consider the feasibility of Combined Heat and Power (CHP) systems and/or decentralised heating or cooling networks. The recommended hierarchy is:

- Connection to existing heating or cooling networks
- Site wide CHP network
- Communal heating and cooling

In addition to this, where an opportunity to join a proposed network in the future is identified, proposals should be designed to connect to these networks.

3.3.1. Existing Heat Networks

For any new development it is expected, where possible, that connections to existing heat networks should be prioritised and, where no existing networks are available within a reasonable distance, any opportunities for connection to proposed networks should be explored.

There are currently no existing or proposed heat networks within a reasonable distance of the proposed site.

3.3.2. Site Wide CHP Network

In accordance with the recommended hierarchy, where connection to an area wide heat network will not be available in the foreseeable future (i.e. within 5 years following completion), the applicant should evaluate the feasibility of on-site CHP.

CHP systems are best utilised where there is a consistent and high demand for heat. Because of the small electricity supplies and demand of this site, a CHP installed to meet base heat load would typically require the export of electricity to the grid.

The administrative burden of managing CHP electricity sales at a small scale without an active energy service company (ESCOs) is prohibitive for smaller operators of developments.
The heat demand profile of this site is not suitable to CHP.

3.3.3. Communal Heating and Cooling

Whilst a communal heating scheme is feasible for this site, the small size of the development lends itself towards more efficient use of low and zero carbon technologies, such as individual air source heat pump systems. This is explained further in the 'Be Green' section of this report.

Tables 6 and 7 show that there are no changes in the CO_2 emissions going from 'Be Lean' to 'Be Clean' because the development is not to be connected to a heating network.

Table 6: Predicted CO_2 emissions after applying decentralised energy measures for flat 1 of the proposed development.

	Regulated Emissions ($tCO_2e/year$)	Unregulated Emissions (tCO2e/year)
Be Lean	1.33	0.81
Be Clean	1.33	0.81
% Reduction	0%	-

Table 7: Predicted CO_2 emissions after applying decentralised energy measures for flat 2 of the proposed development.

	Regulated Emissions ($tCO_2e/year$)	Unregulated Emissions (tCO2e/year)
Be Lean	1.30	0.81
Be Clean	1.30	0.81
% Reduction	0%	-

3.4. Managing Heat Risk

Cooling Assessment

With climate change already meaning that London is experiencing higher than average temperatures and more severe hot weather events it is imperative that developments are designed to minimise overheating.

Where design measures and the use of natural and/or mechanical ventilation are not enough to guarantee the occupants comfort, the developments cooling strategy must include details of the active cooling plant being proposed, including efficiencies, and the ability to take advantage of free cooling and/or renewable cooling sources.

This study is carried out prior to the calculation of the 'Be Green' stage of the energy hierarchy so that any additional energy demand generated by mechanical ventilation or active cooling systems can be considered when assessing the feasibility of renewable technologies. For clarity of reporting, this strategy is presented in line with the cooling hierarchy as set out in The London Plan:

1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure;
2. Minimise internal heat generation through energy efficient design;
3. Manage the heat within the building through exposed internal thermal mass and high ceilings;
4. Provide passive ventilation;
5. Provide mechanical ventilation;
6. Provide active cooling systems.

The proposed buildings will benefit from the following measures to reduce overheating and the need for cooling:

- Minimise internal heat generation through energy efficient design.
- Direct solar gains are limited through the use of light-coloured internal shading to fenestrations. This shading has also been optimised to avoid substantially reducing daylighting or increasing the requirement for electric lighting.
- Insulation has been maximised and the resulting U-values are lower than required by Building Regulations. The build-ups therefore prevent the penetration of heat as much as practicably possible. Please see the 'Be Lean' section of this report for target U-values.
- Reduce the amount of heat entering the building in summer (e.g. shading and fenestration)

- Internal heat gains will be minimised using energy efficient appliances, lighting and pipework insulation. LED lighting has been specified that achieves an efficiency of 125 lumens per circuit watt and pipework will be fully insulated.

Heat transfer and infiltration of the building envelope has been controlled in the following ways:

- Insulation levels have been maximised as much as possible with the limitations of a façade retention scheme, and all the resulting U-values are lower than required by Building Regulations for the first floor and upwards. The resulting U-values that are higher than required by Building Regulations are the glazed features on the ground floor which are the features with limitations. The build-ups therefore prevent the penetration of heat as much as practically possible. See the 'Be Lean' section of this report for target U-values.
- A reduced air permeability rate of 5.00 m3/(hr.m2) @ 50 pa has been targeted for the development to minimise uncontrolled air infiltration. This will require attention to detailing and sealing. See the 'Be Lean' section of this report for details on how this will be achieved.
- Manage the heat within the building through thermal mass.

3.5. Be Green: Renewable Energy

Use renewable energy: When the Be Lean and Be Clean design elements have been reasonably exhausted, supply energy through renewable sources, where practical.

In line with London Plan Policy SI2, the feasibility of renewable energy technologies has been considered.

Each technology has been considered under broader categories. There are key criteria for each category on which the technology is evaluated. The key criteria have been given a weighting based on a tick-system, a graphical representation of this is shown below:

The renewable technologies listed below have been assessed for their applicability to this development and are listed in the table below. The table below presents the summary of the preliminary assessment for suitable renewable technologies for the proposed development.

Table 8: Renewable Technology Preliminary Assessment

System	Description	Feasible
Photovoltaics	Appropriately oriented roof space available (Flat roof) but with limited space.	No
Solar thermal	Appropriately oriented roof space available. For this development they need to be combined with other systems to achieve minimum CO_2 reduction.	No
Solar warmed air	Appropriately oriented roof space available. For this development they need to be combined with other systems to achieve minimum CO_2 reduction.	No
Wind power	NOABL wind map indicates that a wind speed of 5.5m/s is likely at 10 meters above ground level. However, given that the proposed development is in a town, wind access and the ability to build a turbine is limited and potential local community resistance and disturbance.	No
Electric Heat Pumps	Space available for installation of electric heat pumps and suitable heating/hot water requirement. These systems may be suitable for 1 bed units. Further investigation and consultation with M&E consultant are recommended.	No
Air Source Heat Pumps	Space available for installation of air source heat pumps and suitable heating/hot water requirement.	No
Ground Source Heat Pumps	Space available for installation of ground source heat pumps and suitable heating/hot water requirement. Associated carbon emissions from ground source heat pumps tend to be lower than air source heat pumps.	No
Anaerobic digestion	It is unlikely that organic waste streams will be generated on site in the quantities required for this form of heat generation plant.	No
Biomass & Biofuel	The site is likely to be unsuitable for biomass boilers due to site constraints such as storage of the biomass fuel, plant area requirements and potential high level of noise and turbulence.	No

None of the renewable technologies above were selected to be implemented in the design of this conversion development; this is the result of the small scope and scale of the project.

Tables 9 and 10 outline the predicted emissions in the 'Be Green' scenario.

Table 9: Predicted CO_2 emissions after applying decentralised energy measures for flat 1 of the proposed development.

	Regulated Emissions (tCO_2e/year)	Unregulated Emissions (tCO_2e/year)
Be Clean	1.33	0.81
Be Green	1.33	0.81
% Reduction	0%	-

Table 10: Predicted CO_2 emissions after applying decentralised energy measures for flat 2 of the proposed development.

	Regulated Emissions (tCO_2e/year)	Unregulated Emissions (tCO_2e/year)
Be Clean	1.34	0.81
Be Green	1.34	0.81
% Reduction	0%	-

3.6. Be Seen: Monitor, Verify and report on Energy Performance

To truly achieve net zero-carbon buildings, we need to have a better understanding of their actual operational energy performance and work towards bridging the 'performance gap' between design theory and actual energy use.

Latest government guidance on energy efficiency identifies a gap in many developments between proposed design and the finished article, commonly referred to as the 'performance gap'.

To facilitate the measurement of in-use energy performance, 'Be Seen' was added to The London Plan energy hierarchy. This encompasses the monitoring and reporting of actual energy data to measure and compare this with the proposed results.

It is therefore suggested that residential smart meters are installed to assist occupants with the monitoring and enhanced control of the energy usage within the dwellings. With this monitoring in place, it allows occupants to take a proactive approach to energy saving measures.

It is also a requirement that these energy figures are reported periodically through the 'Be Seen' webform, accessible from the following link:
https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance/be-seen-energy-monitoring-guidance/be-seen-planning-stage-webform

A preliminary spreadsheet has been produced by the GLA to assist with completion of the relevant stage webform.

3.7. Energy Assessment Results

The adopted energy strategy is predicted to deliver the planning policy target saving of 10% minimum reduction in CO_2 emissions for the residential development and 15% across the commercial development.

The proposed development total cumulative CO_2 emissions savings is 36.77% overall, site-wide, with a cumulative on-site savings of 37.26% in flat 1 of the proposed development and 36.27% in flat 2 of the proposed development.

These results are summarised in the following tables.

Table 11: Summary of predicted regulated CO_2 emissions for flat 1 of the proposed development.

	Regulated Emissions (tCO_2e/year)	% Reduction
Baseline: Part L 2021	2.12	-
After energy demand reduction	1.33	37.26%
After heat network	1.33	0.00%
After renewable energy	1.33	0.00%
Total cumulative savings	**0.79**	**37.26%**

Table 12: Summary of predicted regulated CO_2 emissions for flat 2 of the proposed development.

	Regulated Emissions (tCO_2e/year)	% Reduction
Baseline: Part L 2021	2.04	-
After energy demand reduction	1.30	36.27%
After heat network	1.30	0.00%
After renewable energy	1.30	0.00%
Total cumulative savings	**0.74**	**36.27%**

The tables below present the predicted CO_2 emissions after applying decentralised energy measures.

Table 13: Predicted CO_2 emissions after applying decentralised energy measures for flat 1 of the proposed development.

	Regulated Emissions Savings	
	(tCO_2e/year)	(%)
Savings from energy demand reduction (Be Lean)	0.79	37.26
Savings from heat network (Be Clean)	0.00	0.00
Savings from renewable energy (Be Green)	0.00	0.00
Total Cumulative Saving	0.79	37.26
Cumulative Savings for Offset Payment	39.90	-
Cash-on-Lieu Contribution (London Plan £95)	£3,790.50	-

Table 14: Predicted CO_2 emissions after applying decentralised energy measures for flat 2 of the proposed development.

	Regulated Emissions Savings	
	(tCO_2e/year)	(%)
Savings from energy demand reduction (Be Lean)	0.74	36.27
Savings from heat network (Be Clean)	0.00	0.00
Savings from renewable energy (Be Green)	0.00	0.00
Total Cumulative Saving	0.74	36.27
Cumulative Savings for Offset Payment	39.00	-
Cash-on-Lieu Contribution (London Plan £95)	£3,705.00	-

In summary, the design specifications for 83 Station Road are outlined below.

Table 15: Proposed design specifications for both flat 1 and flat 2 of the proposed development.

Parameters	Baseline U-values (W/m^2K)	Development's U-Value (W/m^2K)
Walls	0.60	0.18
Floor	0.18	0.18
Pitched Roof	0.40	0.16
Windows, roof windows, and glazed doors	2.00	1.80
Air Permeability Rate	8.00 m^3/hm^2	
Ventilation	Mechanical exhaust fans are present in both the kitchen and bathroom with a SFP of 0.28 ($W/m^3/hr$).	
Heating System	A generic gas boiler will be used for radiators with room thermostat controls only.	
Hot Water	Same as the Heating System	

The table below presents the carbon summary for both flat 1 and flat 2 of the proposed development. This confirm the total emissions for all units proposed for this development.

Table 16: Summary of predicted regulated CO_2 emissions for flat 1 and flat 2 of the proposed development.

	Regulated Emissions (tCO_2e/year)	% Reduction
Baseline: Part L 2021	4.16	-
After energy demand reduction	2.63	36.78%
After heat network	2.63	0.00 %
After renewable energy	2.63	0.00 %
Total cumulative savings	**1.53**	**36.78%**

Table 17: Predicted CO_2 emissions after applying decentralised energy measures for both flat 1 and flat 2 of the proposed development.

	Regulated Emissions Savings	
	(tCO_2e/year)	(%)
Savings from energy demand reduction (Be Lean)	1.53	36.78%
Savings from heat network (Be Clean)	0.00	0.00 %
Savings from renewable energy (Be Green)	0.00	0.00 %
Total Cumulative Saving	**1.53**	**36.78%**
Cumulative Savings for Offset Payment	78.90	-
Cash-on-Lieu Contribution (London Plan £95)	7,495.5	-

4. Sustainable Development

This project is committed to sustainable development (Appendix B – United Nations Sustainable Development Goals) and future sustainability requirements and will adhere closely to the requirements set out by the client.

Sustainability is often described as having three pillars of equal importance: economic, environmental, and social. These can also be replaced by People, Planet and Profit. This means that for a development to be sustainable it must not detrimentally impact the environment, provide economic benefits and be beneficial to society, i.e. the people using it or living near it.

International and national bodies have set out broad principles of sustainable development. Resolution 42/187 of the United Nations General Assembly define sustainable development as ‘meeting the needs of the present without compromising the ability of future generations to meet their own needs’.

The UK Sustainable Development Strategy ‘Securing the Future’ set out five ‘guiding principles’ of sustainable development:

- living within the planet’s environmental limits;
- ensuring a strong, healthy and just society;
- achieving a sustainable economy; promoting good governance;
- and using sound science responsibly.

The strategies below highlight how the Proposed Development achieves environmental sustainability:

Energy Strategy

The proposed form of heating to the residential units is a generic gas boiler with radiators and room thermostat controls only.

The proposals achieve an 36.78% reduction in total emissions across the site compared to the baseline, thereby exceeding the requirements of London Plan Policy SI2 and the London Borough of Richmond upon Thames Policy LP 22.

Site Management

To reduce ensure effective management during the design, construction, and handover the contractor will be required to register the development under the Considerate Constructors Scheme.

Transport

The accessibility index of the development has an access level (PTAL) of 2. The development is located on Station Road and is within the London Borough of Richmond upon Thames, specifically in the town of Hampton.

The site has good access to public transport. It has bus stops within 15 metres and Hampton Train Station within 500 metres.

Water Efficiency Strategy

Careful selection of low flow sanitary and appliances will be combined with a water leak detection monitoring and automatic shut-off/water flow control to communal WC areas.

In accordance with London Plan policy new dwellings should be designed so that mains water consumption would meet a target of 105 litres of water or less per person per day (excluding allowance of up to five litres for external water consumption). This is also in line with the Optional Requirement of the Building Regulations (residential development) in terms of minimising the use of mains water.

Please refer to the Part G, Water Calculations to show compliance with this policy.

Materials

The materials used in the construction of the proposed building will optimise the use of responsibly sourced (ISO, BES, CSC, FSC, and reused in-Situ whenever possible. The design team will optimise the use of materials with Environment Product Declaration (EPD) whenever possible.

Sustainable Development Goals

Superseding the Millennium Development Goals, the Sustainable Development Goals (SDGs) are a set of interlinked objectives designed to drive ongoing efforts to eliminate poverty, discrimination, inequality, and environmental degradation.

The 17 SDGs can be applied to the proposed development to ensure it is maximising sustainability in all fields. This proposed development supports the SDGs (Appendix B – United Nations Sustainable Development Goals).

Climate Change Mitigation and Adaptation

Climate change has been one of the key factors in focusing the minds of the general populous onto the sustainable agenda. More commonly known as Global Warming, Climate Change is the long-term change in weather patterns.
This is no longer just related to an increase in temperature, but a change in the frequency and intensity of extreme weather events as seen in recent times with extreme flooding and heatwaves across Europe.

Mitigation

Reducing carbon dioxide is the most important mitigation measure to combat the impacts of climate change, which can be achieved in various ways including:

- Reducing energy demand of new buildings;
- Increase the use of low or zero carbon technologies for heating, cooling; and
- Reduce the use of private cars by encouraging, public transport, walking and cycling and electric car use.

Proposed Development

The following mitigation measures are included within the current design:

- 36.78% reduction compared to the baseline building in regulated CO_2 emissions through high performance fabric; and
- The location of the development provides good access to public transport links with Hampton Train Station within 500 metres of the site as well as being less than 15 metres from bus stops.

5. Conclusion

The recommended strategy for achieving the Local Plan targets for the proposed development is a combination of ‘Be Lean’ and ‘Be Green’ measures.

A range of efficiency measures have been detailed that are predicted to deliver an 36.78% savings in CO_2 emissions from the baseline across both flats with 37.26% and 36.27% savings in CO_2 emissions from flat 1 and flat 2, respectively.

With no existing or planned heat networks in the reasonable vicinity and the demand of the development being too small scale to consider CHP or DHN, no further measures have been adopted from these options.

Furthermore, no renewable energy measures are planned to be integrated into the design of these two flats because of the small scale and scope of the project.

The total reduction in predicted regulated emissions is 36.78%.

Appendix A - Limitations

The recommendations contained in this Report represent Sustain Quality's professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Sustain Quality does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Sustain Quality obtained, reviewed, and evaluated information in preparing this Report from the Client and others. Sustain Quality's conclusions, opinions, and recommendations have been determined using this information. Sustain Quality does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Sustain Quality has expressed, or conclusions that it has reached in reliance upon the information that is subsequently proven to be inaccurate.

This Report was prepared by Sustain Quality for the sole and exclusive use of the Client and for the specific purpose for which Sustain Quality was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client. Sustain Quality and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party.

Sustain Quality does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by its use to indemnify and hold harmless Sustain Quality from and against all claims, losses, and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B – United Nations Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations (UN) member states in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future.

At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries – developed and developing – in a global partnership. They recognise that ending poverty and other deprivations must go together with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

Today, the Division for Sustainable Development Goals (DSDG) in the United Nations Department of Economic and Social Affairs (UNDESA) provides substantive support and capacity-building for the SDGs and their related thematic issues.

It includes water, energy, climate, oceans, urbanization, transport, science and technology, the Global Sustainable Development Report (GSDR), partnerships, and Small Island Developing States.

DSDG plays a key role in the evaluation of the UN systemwide implementation of the 2030 Agenda and advocacy and outreach activities relating to the SDGs. To make the 2030 Agenda a reality, broad ownership of the SDGs must translate into a strong commitment by all stakeholders to implement the global goals. DSDG aims to help facilitate this engagement.

Source: https://sustainabledevelopment.un.org

Appendix C – SAP Summary Reports

Summary for Input Data

Property Reference	Flat 1_83 Station Road	**Issued on Date**	03/06/2024
Assessment Reference	Be Green_Flat 1	**Prop Type Ref**	
Property	83, Station Road, Hampton, United Kingdom, TW12 2BJ		

SAP Rating	72 C	**DER**		**TER**	
Environmental	77 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.33	**DFEE**		**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**		**TPER**	

Assessor Details	Mr. Thiago Haberli	**Assessor ID**	Z723-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest
Property Tenture	ND
Transaction Type	5
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2024
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
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

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	31.85 m	46.50 m²	2.79 m

8.0 Living Area 26.74 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
North Wall (Studio)	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	12.35	10.29	0.00	None	2.06	Enter Gross Area
East Wall (Entrance)	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	36.54	31.34	0.00	None	5.20	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Neighbour Party Wall (West)	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	36.39		None
Flat 2 Party Wall (South)	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	12.15		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Studio Internal	Plasterboard on timber frame	9.00	10.49
Kitchen Internal	Plasterboard on timber frame	9.00	10.49
Shower Internal	Plasterboard on timber frame	9.00	5.35

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	46.50

11.0 Heat Loss Floors

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

Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.18	None	0.00	110.00	46.50

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1			0.76			1.60
Glazed Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1			0.76			1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Windows	Window	East Wall (Entrance)	East	2.76	
Glazed Doors	Glazed Door	East Wall (Entrance)	East	2.44	
Windows (North)	Window	North Wall (Studio)	North	2.06	

14.0 Conservatory None

15.0 Draught Proofing 100 %

16.0 Draught Lobby No

17.0 Thermal Bridging Default

Y-value 0.20 W/m²K

18.0 Pressure Testing No

Test Method Blower Door

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Mechanical Ventilation data Type Defaults

Type Mechanical extract ventilation - decentralised

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.28	In Room Fan Kitchen	1
0.28	In Room Fan Other Wet Room	1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System No

22.0 Lighting

No Fixed Lighting No

Name	Efficacy	Power	Capacity	Count
Lighting 1	110.00	10	1100	20

24.0 Main Heating 1 SAP table

Percentage of Heat 100.00 %

Fuel Type Mains gas

SAP Code 113

In Winter 79.00

In Summer 75.00

Controls SAP Code 2103

Delayed Start Stat No

Flue Type None or Unknown

Fan Assisted Flue No

Is MHS Pumped No pump

Heat Emitter Radiators

Flow Temperature Unknown

Boiler Interlock No

Combi boiler type Standard Combi

Combi keep hot type Gas/Oil, no clock

Summary for Input Data

25.0 Main Heating 2	None
26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Cold Water Source	From mains
Bath Count	0

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None
In Airing Cupboard	No

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

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

Summary for Input Data

elmhurst energy

Property Reference	Flat 2_83 Station Road	**Issued on Date**	03/06/2024
Assessment Reference	Be Green_Flat 2	**Prop Type Ref**	
Property	83, Station Road, Hampton, United Kingdom, TW12 2BJ		

SAP Rating	73 C	**DER**		**TER**	
Environmental	78 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.3	**DFEE**		**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**		**TPER**	

Assessor Details	Mr. Thiago Haberli	**Assessor ID**	Z723-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest
Property Tenture	ND
Transaction Type	5
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2024
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
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

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	33.58 m	47.40 m²	2.79 m

8.0 Living Area 23.92 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
South External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.18	17.00	12.41	8.77	0.30	None	3.64	Enter Gross Area
West External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.18	17.00	10.32	10.32	0.00	None	0.00	Enter Gross Area
East External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.18	17.00	25.67	19.96	0.00	None	5.71	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Bin Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	13.11		None
85 Party Wall	Solid Wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	26.76		None
Flat 1 Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	10.32		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Studio Internal	Plasterboard on timber frame	9.00	10.49
Kitchen Internal	Plasterboard on timber frame	9.00	10.49
Shower Internal	Plasterboard on timber frame	9.00	5.35

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings

External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	6.81	6.81	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	40.59

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.18	None	0.00	110.00	47.40

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window/Glazed Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1			0.76			1.60
Rooflight	BFRC, BSI or CERTASS data	Roof Light	Double Low-E Soft 0.1			0.76			1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Windows East Wall	Window/Glazed Door	East External Wall	East	2.57	
Door East Wall	Window/Glazed Door	East External Wall	East	3.14	
Window South Wall	Window/Glazed Door	South External Wall	South	3.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
18.0 Pressure Testing	No	
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Mechanical Ventilation data Type	Defaults
Type	Mechanical extract ventilation - decentralised

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.28	In Room Fan Other Wet Room	1
0.28	In Room Fan Kitchen	1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	110.00	10	1100	20

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	113	
In Winter	79.00	
In Summer	75.00	
Controls SAP Code	2103	
Delayed Start Stat	No	
Flue Type	None or Unknown	
Fan Assisted Flue	No	

Is MHS Pumped	No pump
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Combi boiler type	Standard Combi
Combi keep hot type	Gas/Oil, no clock

25.0 Main Heating 2	None

26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Cold Water Source	From mains
Bath Count	0

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None
In Airing Cupboard	No

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

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