NRG CONSULTING

HIGH STREET HORNSEY

ENERGY STATEMENT

MAY 2023

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DOCUMENT CONTROL SHEET

Report Reference	**S2059/HSH/ES/202304-NR**
Revision	**-**
Issue Purpose	**Initial Issue**
Report Prepared for:	**Chapman Developments Ltd**
Author	**Neil Rothon**
Approved By	**Ryan Thrower**
Date of Issue	**16th May 2023**

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1. EXECUTIVE SUMMARY

1.1 NRG Consulting have been appointed to undertake an Energy Statement on a proposed development at 23-23A High Street, Hornsey in the London Borough of Haringey.

1.2 Planning Ref: HGY/2020/0590

Demolition of existing building and construction of a mixed-use scheme at part two and part three storeys in height (with accommodation in the roof space) providing retail floorspace (Class A1) at ground floor level, together with 7 residential flats (Class C3) and 2 residential houses (Class C3), with associated cycle parking, landscaping and ancillary works.

1.3 This document is written to satisfy Planning Condition 19 which states:

Prior to the commencement of construction works on site, a further energy statement demonstrating that carbon savings have been maximised, taking into account the limitations of the building, in line with policy 5.4 of the London Plan shall be submitted to and approved in writing by the Local Planning Authority. The development hereby permitted shall be built in accordance with the approved energy statement and the energy provisions shall thereafter be permanently retained unless otherwise agreed in writing with the Local Planning Authority.

1.4 This document illustrates a reduction in excess of 68% in CO_2 emissions over that of the baseline of Part L2021 achieved via:

Energy Efficient Measures (*Be Lean*) – *Residential*

- High levels of thermal insulation to achieve U-Values lower than the Part L 2021 notional building specification.
- LED Lighting with high luminous efficacy (85lm/W)
- Air Permeability target of 3 m3/(hm2) @50Pa

Energy Efficient Measures (*Be Lean*) – *Commercial*

- High levels of thermal insulation to achieve U-Values lower than the Part L 2021 notional building specification.
- LED Lighting with high luminous efficacy (105lm/W)
- Air Permeability target of 3 m3/(hm2) @50Pa

Decentralised Energy *(Be Clean)*

Due to the small size and heat demand of the scheme and the distance from the scheme to any proposed district heating networks, no connection to nor provision for a future connection has been allowed for. The residential units are also already being powered by ASHPs, and a VRF system is being used for the commercial units.

Renewable Technologies *(Be Green)* – *Residential*

The following is proposed the residential units:

- Individual Air Source Heat Pumps

Renewable Technologies *(Be Green)* – *Commercial*

The following is proposed for the commercial units:

- A VRF System to each unit

1.5 Following the energy hierarchy for the scheme, the final CO_2 emissions are summarised below:

	CO_2 Emissions (Tonnes per Annum)		
	Domestic	Non-Domestic	Site
Baseline: Part L 2021 of the Building Regulations (TER)	8.3	0.38	8.68
Be Lean: Energy Demand Reduction	10.9	0.35	11.25
Be Clean: Supply Energy Efficiently	10.9	0.35	11.25
Be Green: Renewable Energy (DER)	2.6	0.30	2.9
Regulated CO_2 Savings at 'Be Green' over Part L 2021	68.93 %	21 %	66.80 %

Table: Carbon Emissions Table

1.6 The Be Lean savings currently show a shortfall in the target. However, this is due to the Part L 2021 Notional Dwelling Specification includes PV as part of the specification.

Every effort has been made for the Be Lean to meet the target, prior to PV being added.

2. POLICY FRAMEWORK

2.1 The proposed development falls within the Government's **"minor"** category of planning applications.

NATIONAL POLICY – NPPF (2021)

The delivery of sustainable development is at the foundation of the NPPF, which defines it as "meeting the needs of the present without compromising the ability of future generations to meet their own needs.

REGIONAL POLICY

The London Plan - March 2021	
The London Plan sets out high-end goals for the whole of London based on the Energy Hierarchy. It also states that its overarching goal is for London to become a zero-carbon city. This will require reduction of all greenhouse gases, of which carbon dioxide is the most prominent. Local Boroughs should ensure that all developments maximise opportunities for on-site electricity and heat production and reduce carbon emissions in-line with the stages of the Energy Hierarchy. In-line with the Zero Carbon Policy, all CO_2 emissions should be offset via a mixture of on-site and off-site measures.	
Policy SI2	Minimising greenhouse gas emissions
Policy SI3	Energy Infrastructure
Policy SI 4	Managing heat risk
Energy Assessment Guidance: Greater London Authority Guidance on preparing energy assessments as part of planning applications (June 2022)	

GLA – Energy Assessment Guidance (June 2022);

On 15th June 2022, with the implementation of Part L of the Building Regulations (2021) and SAP 10.2 a new GLA guidance note was released to supersede the April 2020 guidance.

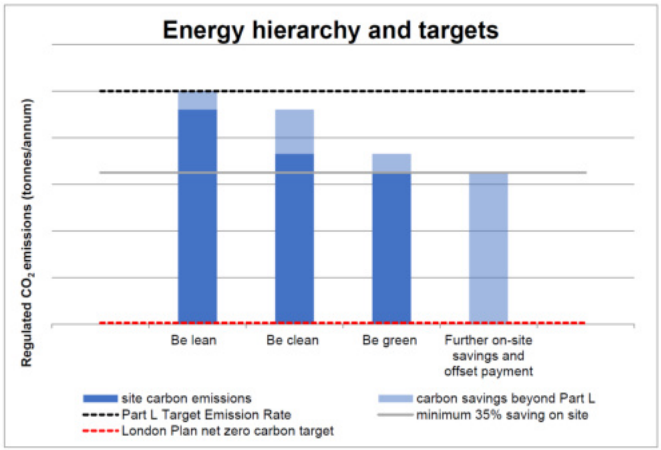
The main clarification of the June 2022 guidance was to confirm that the minimum expected carbon reduction on-site was to remain at 35% better than Part L 2021; the same target as the previous Building Regulation version. A new benchmark target of 50% better than Part L 2021 has been introduced for residential developments also. The cover note for the new version states:

Background

On 15 June 2022, national building regulations were updated to enhance energy performance standards for new buildings through Part L 2021. A new Part O 2021 was also introduced, updating requirements to tackle overheating.

The Mayor's Energy Assessment Guidance has been updated to explain how London Plan policy should be applied now that these regulations have taken effect. This note summarises the key updates.

Part L 2021 is a stepping-stone towards the Future Homes Standard and Future Buildings Standard which the Government is expected to consult on in 2023 and introduce in 2025.



LOCAL POLICIES

2.2 The following Planning Policies from the local authority are relevant to this report:

London Borough of Haringey

- Local Policy SP4 – Working towards a low carbon Haringey
- Local Policy DM21 – Sustainable Design, Layout and Construction.
- Local Policy DM22 – Decentralised Energy

Policy SP4 – Working towards a low carbon Haringey

Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing
Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:

a. From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO2 emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and

b. From 2011 onwards all new non-residential development shall be built to at least BREEAM "very good" standard and should aim to achieve BREEAM "excellent" or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.

The Council will promote low-carbon energy through the following measures:
a. Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;
d. All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.

Policy DM21 – Sustainable Design, Layout and Construction

Proposals should:

a Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements;

b Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems;

c Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls

d Wherever possible, use building materials with high environmental performance ratings; and

e Seek opportunities for locally sourced labour.

Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.

Policy DM22 – Decentralised Energy

Subject to other policy requirements, proposals that contribute to the provision and use of Decentralised Energy network infrastructure will be supported.

Communal energy systems

All development that incorporates site-wide communal energy systems should examine opportunities for extending such systems, irrespective of whether it is connected to a DE network.

All development that incorporates site-wide communal energy systems should optimise opportunities for extending such systems beyond the site boundary to supply energy to neighbouring existing and planned future developments.

Existing and planned future DE networks

All development proposals should prioritise connection to existing or planned future DE networks.All major development located within 500 metres of an existing DE Network, and minor new-build development located within 25 metres, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.

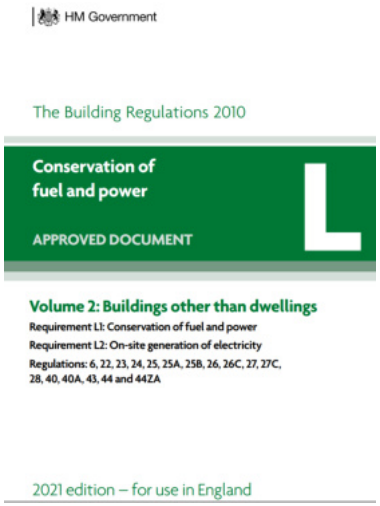
BUILDING REGULATIONS (PART L 2021 & FUTURE HOMES STANDARD)

2.3 On 24th July 2018 the Department for Business Energy & Industrial Strategy (BEIS) published their update to SAP 9.92 (Part L 2013), called SAP 10.

In October 2019, the Ministry of Housing, Communities and Local Government (MHCLG) then issued consultation on changes to Part L of the Building Regulations. Dubbed *The Future Homes Standard*, it is an aspiration to ensure all new homes will have low carbon heating and "world-leading levels of energy efficiency" by 2025 and is intended to be the primary driver in achieving the Governments desire to reduce carbon emissions in the creation of new-build housing stock.

On the June 15th 2022, Part L 2021 of the Building Regulations came into force. As per the requirements, all new homes must produce 31% less CO_2 emissions than that of Part L 2013 in-order to achieve Building Regulation compliance.

2.4 The major change in the regulations is the change in carbon factor of electricity to represent the decarbonisation of the National Grid and the push towards net-zero


HM Government

The Building Regulations 2010

Conservation of fuel and power

APPROVED DOCUMENT

L

Volume 2: Buildings other than dwellings

Requirement L1: Conservation of fuel and power

Requirement L2: On-site generation of electricity

Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26C, 27, 27C, 28, 40, 40A, 43, 44 and 44ZA

2021 edition – for use in England

Fuel	SAP 2012 CO_2 ($kgCO_2/kWh$)	SAP 10 CO_2 ($kgCO_2/kWh$)	Part L 2021 CO_2 ($kgCO_2/kWh$)	Percentage Reduction
Main Gas	0.216	0.210	0.210	2.75%
Electricity	0.519	0.233	0.136	73.8%

***Table**: Change in Carbon Factors from Part L 2013 to Part L 2021*

3. ENERGY CALCULATIONS - "*Be Lean*"

3.1 In order to estimate the CO_2 emissions for the residential element of the site, SAP Calculations have been carried out by a licensed and accredited OCDEA Domestic Energy Assessor using Design SAP 10's online platform and a NDEA (SBEM) Assessor for the Commercial unit.

3.2 The baseline CO_2 emissions covered by Part L 2021 of the Building Regulations will be expressed as the Target Emissions Rate (TER). This covers regulated carbon emissions from:

- Heating
- Cooling
- Hot Water
- Lighting
- Auxiliary (Pumps and Fans)

3.3 Passive Design

Passive design measures utilised by the architect in the concept and development of the schemes design include:

- High levels of insulation have been proposed in excess of the Part L 2021 notional values.
- Through good design and careful construction, air infiltration will be minimised and thus a low Air Permeability target has been sort..
- Maximising thermal mass where possible to reduce internal temperature variation.
- Thermal Bridging will be considered to minimise junction heat loss

ELEMENT	PART L2a LIMITING FABRIC PARAMETERS	PROPOSED U-VALUES (W/m²K)
Walls		
External Wall -	*0.26 W/m²K*	**0.14 W/m²K**
Floors		
Ground Floor	*0.18 W/m²K*	**0.10 W/m²K**
Roof		
Roof	*0.16 W/m²K*	**0.10 W/m²K**
Openings		
Doors	*1.6 W/m²K*	**1.4 W/m²K**
Windows	*1.6 W/m²K*	**1.4 W/m²K**
Air Permeability		
3 m³/(hm²) @50Pa		

***Table**: Proposed Fabric Specification*

4. DECENTRALISED ENERGY – *Be Clean*

4.1 There are no local heat networks to currently connect up to. Due to the small size and nature of the development and distance from the proposed future network no potential connection is being allowed for as it is not economically viable.

4.2 The LETI Climate Emergency Decision Tree[1] has also been followed.

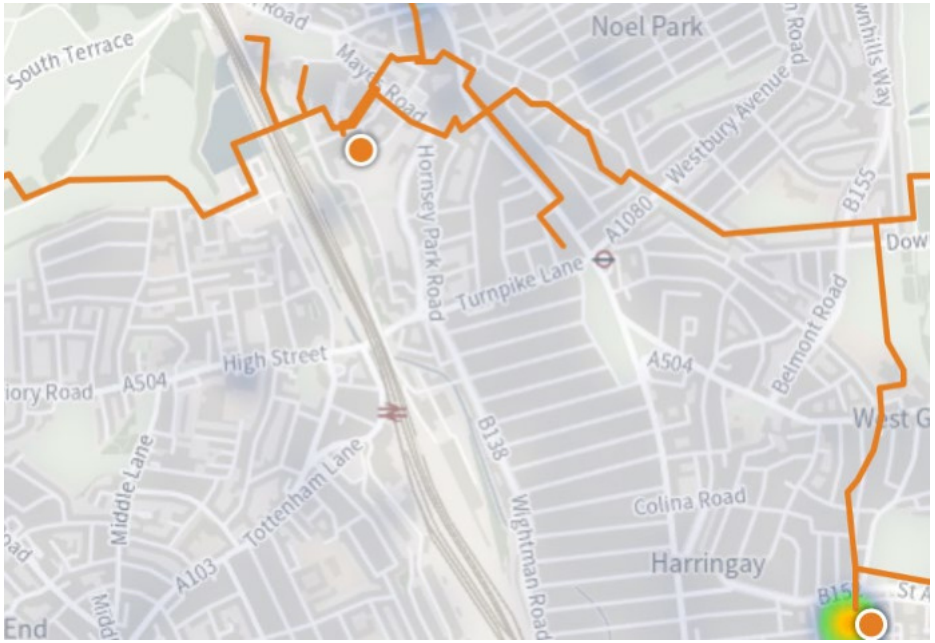


Figure: Mayor of London Heat Map

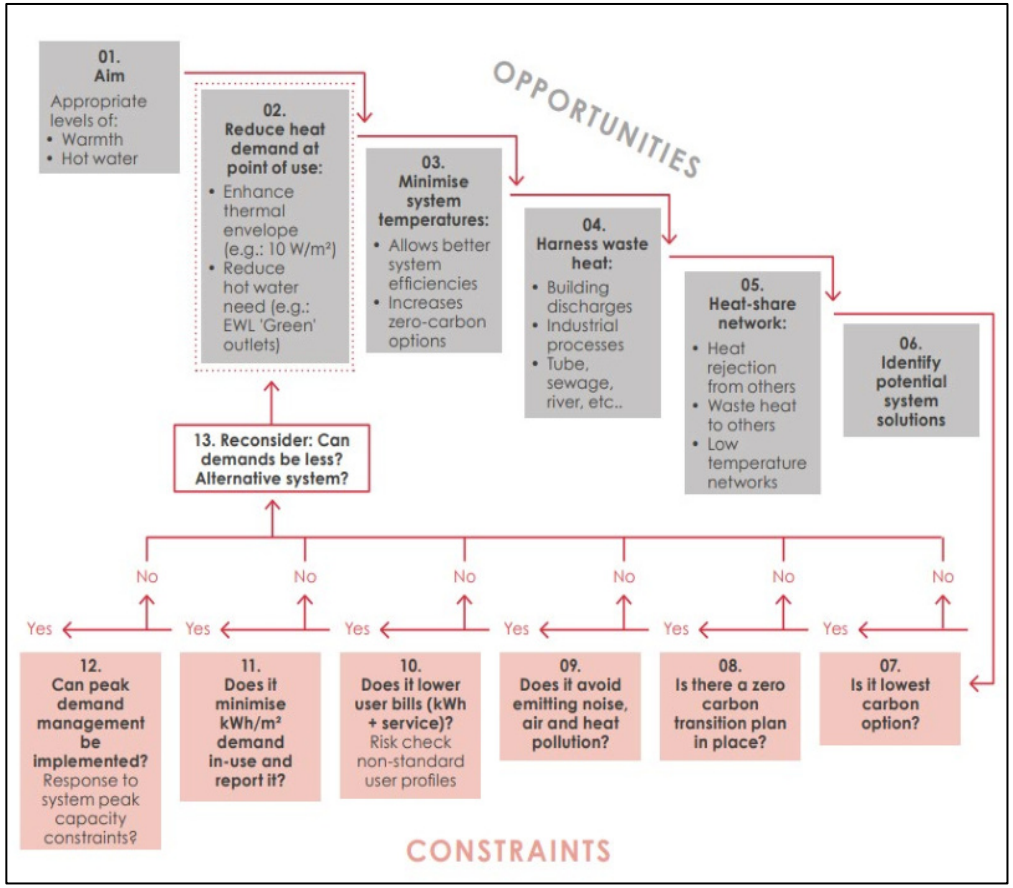


Figure: LETI Decision Tree

1 https://www.levittbernstein.co.uk/site/assets/files/3494/leti-climate-emergency-design-guide.pdf

5. RENEWABLE ENERGY – *Be Green*

5.1 Renewable energy sources are defined as:

"Energy derived from a source that is continually replenished, such as wind, wave, solar, hydroelectric and energy from plant material, but not fossil fuels or nuclear energy. Although not strictly renewable, geothermal energy is generally included."

The high-target goal is to maximise all possible avenues for renewable energy on site.

5.2 Based on recent legislation such as the Clean Air Act as well as the location of the proposed development, the following technologies have been discounted:

- Wind Turbines
- Biomass
- Hydropower / Wave Technology
- Biogas / Biofuel

5.3 The feasibility of remaining renewable and low carbon technologies is highlighted in the table opposite.

5.4 Following a review of the available technologies, the following have been chosen to be integrated into the scheme:

- Air Source Heat Pumps (Residential
- VRF (Commercial)

FEASIBILITY

Technology	Considerations					Overall Feasibility
	Cost	Noise	Land Use	Tariffs	CO_2 Offset	
Photovoltaic Panels (PV)	The increased cost of PV installation due to supply-chain issues and shipping costs, the rise in the cost of electricity decreasing payback time, along with the withdrawal of the F.I.T and the fact that it would be a landlord connection because of the flats, does not justify the inclusion. The CO_2 offset in Part L 2021 has also decreased significantly.					No
Air Source Heat Pumps (ASHP/VRF)	ASHPs provide a heating system at high efficiency Due to the continued decarbonisation of the National Grid, the associated CO_2 offset will continually increase compared to gas					Yes
Ground Source Heat Pumps (GSHP)	GSHPs are like ASHPs but operate at slightly higher efficiencies due to drawing heat from the ground, a source that is warmer than the outside air, especially in Winter. However, the technology is more expensive than Air Source and requires either significant horizontal space for a *slinky* style system or deep boreholes as part of a vertical system. As this is not proposed here, ASHPs are more suited to the scheme.					No

Table: Renewable Energy Feasibility

5.5 Active Design (Residential)

The development will incorporate efficient building services to limit carbon emissions, including:

- A zero-NOx heating system
- LED Lighting

ELEMENT	PROPOSED DETAILS
Ventilation	System 1, Intermittent Extract Fans
Heating – Be Lean	*Mains gas 89.5% efficient*
Heating – Be Green	Individual Air Source Heat Pumps
Heating Controls	Programmer / Thermostat / Bypass
Heat Emitters	Radiators
Hot Water	Hot Water Cylinder
Lighting	LED (85 lm/W)

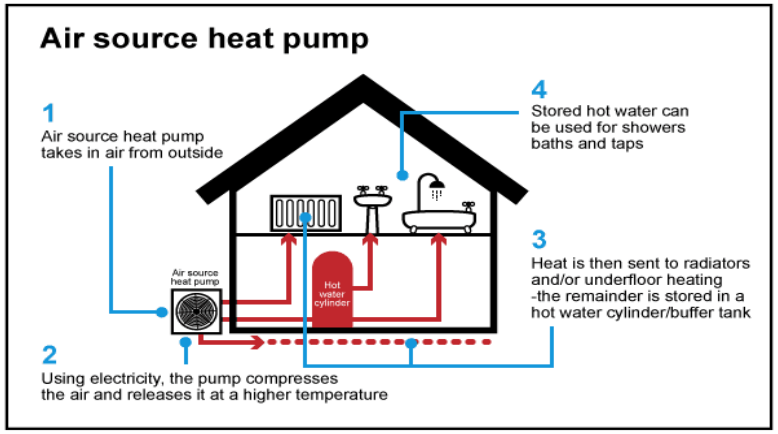
Table: Proposed Mechanical and Electrical Specification - Residential

5.6 An Air Source Heat Pump has been proposed to provide the heating and hot water for each dwelling within the scheme. The technology has been chosen because:

- It is a highly efficient system (300%+) and will provide both the space heating and hot water for each proposed dwelling.
- Requires less capital cost, space, and is simpler to install than Ground Source Heat Pumps
- It is simple to install when compared to other renewable technologies.

5.7 At this early stage, a specific Air Source Heat Pump make has not been modelled.

A final make & model will be supplied during M&E design at RIBA Stage 3 / 4.



5.8 Active Design (Commercial)

The development will incorporate efficient building services to limit carbon emissions, including:

- A zero-NOx heating system
- LED Lighting

ELEMENT	M&E SPECIFICATIONS AND DETAILS
Ventilation	Natural
Heating	VRF – COP 4.5
Cooling	VRF – SEER 5.5
Hot Water	Direct Hot Water – Electric Instantaneous
Heating Control	Central Timer, Local Thermostats (BMS)
Lighting (all areas)	105 lm/w (efficacy) 1.0 LOR
Lighting Controls	Auto on / off

Table: Proposed M&E Specification – (Non-Domestic)

5.9 VRF is considered a suitable technology for the following reasons:

- Quiet operation.
- Energy efficient
- Heat & cool simultaneously.
- Zoned heating & cooling.
- State-of-the-art controls.

5.10 At this early stage, a specific VRF make and model has not been specified and design parameters have been used based on similar projects and systems.

A final make & model will be supplied during M&E design at RIBA Stage 3 / 4.

6. CONCLUSION

6.1 A full energy strategy in-line with the energy hierarchy has been undertaken and this document illustrates a reduction in CO_2 emissions over the baseline of Part L 2021 via:

Energy Efficient Measures *(Be Lean)*

- High levels of thermal insulation to achieve U-Values lower than the Part L 2021 notional building specification.
- Air Permeability target of 3 m3/(hm2) @50Pa

Renewable and Low Carbon Technologies *(Be Green)*

Air Source Heat Pumps and VRF's will be provided for maximum efficiency and carbon savings.

When the above measures are combined, the scheme will achieve a total reduction of 66% at Be Green over that of the Part L 2021 CO2 baseline.

6.2 A final carbon emission reduction table is shown on the opposite side of the page illustrating the savings at each stage of the energy hierarchy.

	CO_2 Emissions (Tonnes per Annum)		
	Domestic	Non-Domestic	Site
Baseline: Part L 2021 of the Building Regulations (TER)	8.3	0.38	8.68
Be Lean: Energy Demand Reduction	10.9	0.35	11.25
Be Clean: Supply Energy Efficiently	10.9	0.35	11.25
Be Green: Renewable Energy (DER)	2.6	0.30	2.9
Regulated CO_2 Savings at 'Be Green' over Part L 2021	68.93 %	21 %	66.80 %

Table: Carbon Emissions Table

Appendix 1

High Street Hornsey

Residential Units - Part L 2021

All Plots	AREA	TER *Part L 2021 Baseline*	Total TER	DER 'Be Lean'	Total DER *'Be Lean'*	DER 'Be Green'	Total DER *'Be Green'*
	m^2	kg CO2/m^2/yr	kg CO2/yr	kg CO2/m^2/yr	kg CO2/yr	kg CO2/m^2/yr	kg CO2/yr
House 1 Block C	79	15.2	1,198	19.0	1,503	4.6	362
House 2 Block C	79	15.2	1,199	19.3	1,525	4.6	367
Flat 1 Block B	64	13.4	860	18.4	1,174	4.3	275
Flat 2 Block B	64	14.1	902	19.2	1,226	4.5	289
Flat 3 Block A	46	15.0	690	19.3	888	4.6	210
Flat 4 Block A	63	14.0	881	18.2	1,147	4.2	267
Flat 5 Block A	46	11.5	529	16.6	764	4.0	182
Flat 6 Block A	63	12.1	761	15.9	1,002	3.7	232
Flat 7 Block A	87	15.0	1,307	19.9	1,731	4.6	404
Total Site Area (m^2):	591	TOTAL TER CO2:	8,328	TOTAL DER CO2:	10,961	TOTAL DER CO2:	2,587

Total Site TER	8,328	kg CO2/yr
Total Site DER	2,587	kg CO2/yr

CO2 Savings at 'Be Green'	68.93%

CO2 Savings at 'Be Lean'	-31.62%

High Street Hornsey

Commercial Units - Part L 2021

All Plots	AREA	TER *Part L 2021 Baseline*	Total TER	BER 'Be Lean'	Total BER *'Be Lean'*	BER 'Be Green'	Total DER *'Be Green'*
	m^2	kg $CO2/m^2/yr$	kg CO2/yr	kg $CO2/m^2/yr$	kg CO2/yr	kg $CO2/m^2/yr$	kg CO2/yr
Units 1 and 2	101	3.9	388	3.6	358	3.0	306
Total Site Area (m^2):	101	TOTAL TER CO2:	388	TOTAL DER CO2:	358	TOTAL DER CO2:	306

Total Site TER	388	kg CO2/yr
Total Site DER	306	kg CO2/yr

Final CO2 Emissions at 'Be Lean'	358	kg CO2/yr
Final CO2 Emissions at 'Be Green'	306	kg CO2/yr

CO2 Savings at 'Be Green'	21.04%	

CO2 Savings at 'Be Lean'	7.79%	

Appendix 2

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:50:30

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	46 m^2
Site Reference	Flat 5 Block A	Plot Reference	Be Lean
Address	Flat 3 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*11.5 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	16.6 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*61.18 kWh_{PE}/m^2*	
Dwelling primary energy	93.82 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*14.6 kWh/m^2*	
Dwelling fabric energy efficiency	17.1 kWh/m^2	**FAIL**

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	**OK**
Windows, doors, and roof windows	*1.6*	1.29	d1 (1.4)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	9.158	0.17
Sheltered wall: Walls (2)	13.47	0.17
Party wall: Party Wall (1)	19	0 **(!)**
Party wall: Party Wall (2)	22.18	0 **(!)**
Exposed roof: Roof (1)	4.3	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	North	N/A	1.4
south windows, window	1.261	South	0.7	1.2
south windows, window	1.261	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	sheltered x0.72
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E11: Eaves (insulation at rafter level)	SAP table default	0.15	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	sheltered
External wall	E17: Corner (inverted - internal area greater than external area)	SAP table default	0 **(!)**	to sheltered
External wall	E16: Corner (normal)	SAP table default	0.18	to sheltered

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	84.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:51:33

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	87 m^2
Site Reference	Flat 7 Block A	Plot Reference	Be Lean
Address	Flat 7 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*15.02 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	19.9 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.43 kWh_{PE}/m^2*	
Dwelling primary energy	110.44 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*47.4 kWh/m^2*	
Dwelling fabric energy efficiency	47.2 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.16	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	**OK**
Windows, doors, and roof windows	*1.6*	1.24	d1 (1.4)	**OK**
Rooflights	*2.2*	1.3	RL, North (1.3)	**OK**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	36.119	0.17
Exposed wall: Walls (2)	18.17	0.16
Exposed wall: Walls (3)	14.54	0.15
Party wall: Party Wall (1)	20.83	0 **(!)**
Exposed roof: Roof (1)	54.855	0.11
Exposed roof: Roof (2)	45	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
d1, front door	1.89	North	N/A	1.4
north windows, window	1.32	North	0.7	1.2
north windows, window	1.32	North	0.7	1.2
north windows, window	1.911	North	0.7	1.2
dormer windows, window	1.215	South	0.7	1.2
dormer windows, window	1.215	South	0.7	1.2
RL, rooflight	0.7225	North	0.7	1.3
RL, rooflight	0.7225	North	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	df
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
Roof	R4: Ridge (vaulted ceiling)	SAP table default	0.12	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
External wall	E11: Eaves (insulation at rafter level)	SAP table default	0.15	df dormers
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df flat roof
Party wall	P5: Roof (insulation at rafter level)	SAP table default	0.48	df
Roof	R4: Ridge (vaulted ceiling)	SAP table default	0.12	dormers
Roof	R7: Flat ceiling (inverted)	SAP table default	0.12	dormers to main

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	84.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:52:01

Project Information			
Assessed By	Neil Rothon	Building Type	House, Semi-detached
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	79 m^2
Site Reference	House 1 Block C	Plot Reference	Be Lean
Address	House 1 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*15.17 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	19.02 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.75 kWh_{PE}/m^2*	
Dwelling primary energy	105.47 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*51.6 kWh/m^2*	
Dwelling fabric energy efficiency	45.4 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.11	exposed upper (0.13)	**OK**
Roofs	*0.16*	0.11	Roof (1) (0.11)	**OK**
Windows, doors, and roof windows	*1.6*	1.2	d1 (1.2)	**OK**
Rooflights	*2.2*	1.3	rl, South (1.3)	**OK**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	86.764	0.17
Party wall: Party Wall (1)	34.98	0 **(!)**
Ground floor: ground floor, ground floor	38.29	0.1 **(!)**
Upper floor: exposed upper, exposed upper	8	0.13
Exposed roof: Roof (1)	40.63	0.11
Exposed roof: Roof (2)	2.24	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
d1, front door	2.4	South	N/A	1.2
south windows, window	0.54	South	0.7	1.2
south windows, window	5.51	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
west windows, window	3.224	West	0.7	1.2
west windows, window	0.72	West	0.7	1.2
north windows, window	3.15	North	0.7	1.2
north windows, window	1.392	North	0.7	1.2
rl, rooflight	0.96	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.13	xt
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	default
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	df
External wall	E20: Exposed floor (normal)	SAP table default	0.32	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
Party wall	P1: Ground floor	SAP table default	0.32	df
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	89.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls		
Main heating 1 - type: Programmer, room thermostat, and TRVs		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:51:05

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	63 m^2
Site Reference	Flat 6 Block A	Plot Reference	Be Lean
Address	Flat 6 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*12.08 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	15.91 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*63.72 kWh_{PE}/m^2*	
Dwelling primary energy	89.26 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*26.2 kWh/m^2*	
Dwelling fabric energy efficiency	23.4 kWh/m^2	**OK**

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	**OK**
Windows, doors, and roof windows	*1.6*	1.25	d1 (1.4)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	43.855	0.17
Sheltered wall: Walls (2)	6.87	0.17
Party wall: Party Wall (1)	19.32	0 **(!)**
Exposed roof: Roof (1)	4.3	0.11
Exposed roof: Roof (2)	13.11	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	West	N/A	1.4
south windows, window	1.3	South	0.7	1.2
south windows, window	1.3	South	0.7	1.2
north windows, window	1.19	North	0.7	1.2
north windows, window	1.19	North	0.7	1.2
north windows, window	1.995	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	sheltered x 0.71
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E16: Corner (normal)	SAP table default	0.18	sheltered
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E11: Eaves (insulation at rafter level)	SAP table default	0.15	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	**OK**
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	84.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:52:31

Project Information			
Assessed By	Neil Rothon	Building Type	House, Semi-detached
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	79 m^2
Site Reference	House 2 Block C	Plot Reference	Be Lean
Address	House 2 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*15.18 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	19.31 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.79 kWh_{PE}/m^2*	
Dwelling primary energy	107.05 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*51.3 kWh/m^2*	
Dwelling fabric energy efficiency	46.2 kWh/m^2	**OK**

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.11	exposed upper (0.13)	**OK**
Roofs	*0.16*	0.11	Roof (1) (0.11)	**OK**
Windows, doors, and roof windows	*1.6*	1.2	d1 (1.2)	**OK**
Rooflights	*2.2*	1.3	rl, South (1.3)	**OK**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	89.244	0.17
Party wall: Party Wall (1)	34.98	0 **(!)**
Ground floor: ground floor, ground floor	38.29	0.1 **(!)**
Upper floor: exposed upper, exposed upper	8	0.13
Exposed roof: Roof (1)	40.63	0.11
Exposed roof: Roof (2)	2.24	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.4	South	N/A	1.2
south windows, window	0.54	South	0.7	1.2
south windows, window	5.51	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
east windows, window	0.744	East	0.7	1.2
east windows, window	0.72	East	0.7	1.2
north windows, window	3.15	North	0.7	1.2
north windows, window	1.392	North	0.7	1.2
rl, rooflight	0.96	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.13	xt
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	df
External wall	E20: Exposed floor (normal)	SAP table default	0.32	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
Party wall	P1: Ground floor	SAP table default	0.32	df
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	89.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls		
Main heating 1 - type: Programmer, room thermostat, and TRVs		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:48:58

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, End-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	64 m^2
Site Reference	Flat 2 Block B	Plot Reference	Be Lean
Address	Flat 7 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*14.1 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	19.16 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*73.99 kWh_{PE}/m^2*	
Dwelling primary energy	106.52 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*42.2 kWh/m^2*	
Dwelling fabric energy efficiency	41.2 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	**OK**
Windows, doors, and roof windows	*1.6*	1.23	d1 (1.4)	**OK**
Rooflights	*2.2*	1.3	rooflight, South (1.3)	**OK**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	29.4138	0.17
Sheltered wall: Walls (2)	12.06	0.17
Party wall: Party Wall (1)	25.77	0 **(!)**
Exposed roof: Roof (1)	62.48	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
d1, front door	2.1	South	N/A	1.4
east windows, window	1.62	East	0.7	1.2
east windows, window	1.62	East	0.7	1.2
east windows, window	2.1	East	0.7	1.2
east windows, window	0.972	East	0.7	1.2
north windows, window	1.4442	North	0.7	1.2
north windows, window	3.15	North	0.7	1.2
rooflight, rooflight	0.84	South	0.7	1.3
rooflight, rooflight	0.84	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	SAP table default	0.28	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	to sheltered
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	to sheltered
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	89.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:49:29

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	46 m^2
Site Reference	Flat 3 Block A	Plot Reference	Be Lean
Address	Flat 3 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*15.01 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	19.05 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.97 kWh_{PE}/m^2*	
Dwelling primary energy	106.93 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*31.1 kWh/m^2*	
Dwelling fabric energy efficiency	29.7 kWh/m^2	**OK**

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	exposed upper (0.13)	**OK**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.28	d1 (1.4)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	9.402	0.17
Sheltered wall: Walls (2)	14.83	0.17
Party wall: Party Wall (1)	20.66	0 **(!)**
Party wall: Party Wall (2)	24.15	0 **(!)**
Upper floor: exposed upper, exposed upper	2.56	0.13

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	North	N/A	1.4
south windows, window	1.649	South	0.7	1.2
south windows, window	1.649	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E20: Exposed floor (normal)	SAP table default	0.32	xt
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	df
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	sheltered x0.71
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E16: Corner (normal)	SAP table default	0.18	to sheltered
External wall	E17: Corner (inverted - internal area greater than external area)	SAP table default	0 **(!)**	to sheltered
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	89.5%
Emitter type	Radiators
Flow temperature	45°C
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:50:03

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	63 m^2
Site Reference	Flat 4 Block A	Plot Reference	Be Lean
Address	Flat 4 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*13.98 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	18.2 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*73.96 kWh_{PE}/m^2*	
Dwelling primary energy	101.53 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.1 kWh/m^2*	
Dwelling fabric energy efficiency	34.4 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	exposed bin store (0.13)	**OK**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.24	d1 (1.4)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	47.765	0.17
Sheltered wall: Walls (2)	7.65	0.17
Party wall: Party Wall (1)	21	0 **(!)**
Upper floor: exposed bin store, exposed bin store	12.6	0.13

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
d1, front door	2.1	West	N/A	1.4
south windows, window	1.3	South	0.7	1.2
south windows, window	1.3	South	0.7	1.2
north windows, window	1.445	North	0.7	1.2
north windows, window	1.445	North	0.7	1.2
north windows, window	1.995	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E20: Exposed floor (normal)	SAP table default	0.32	df
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	to sheltered x0.71
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E16: Corner (normal)	SAP table default	0.18	to sheltered
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	89.5%
Emitter type	Radiators
Flow temperature	
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:48:30

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, End-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	64 m^2
Site Reference	Flat 1 Block B	Plot Reference	Be Lean
Address	Flat 7 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	*13.43 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	18.35 $kgCO_2/m^2$	**FAIL**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*70.43 kWh_{PE}/m^2*	
Dwelling primary energy	102.25 kWh_{PE}/m^2	**FAIL**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*38.5 kWh/m^2*	
Dwelling fabric energy efficiency	37.5 kWh/m^2	**OK**

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	**OK**
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.11	Heatloss Floor 1 (0.11)	**OK**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.23	d1 (1.4)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	32.8608	0.17
Sheltered wall: Walls (2)	13.38	0.17
Party wall: Party Wall (1)	27.32	0 **(!)**
Ground floor: Heatloss Floor 1, Heatloss Floor 1	64.2	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	South	N/A	1.4
east windows, window	1.7	East	0.7	1.2
east windows, window	1.7	East	0.7	1.2
east windows, window	1.7	East	0.7	1.2
east windows, window	0.935	East	0.7	1.2
north windows, window	1.4442	North	0.7	1.2
north windows, window	3.15	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.13	xt
External wall	E5: Ground floor (normal)	SAP table default	0.32	sheltered
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	SAP table default	0.28	sheltered
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt
Party wall	P1: Ground floor	SAP table default	0.32	df
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	pw to sheltered
External wall	E18: Party wall between dwellings	SAP table default	0.24	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	**OK**
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating - Mains gas	
Efficiency	89.5%
Emitter type	Radiators
Flow temperature	45°C
System type	tbc
Manufacturer	tbc
Model	tbc
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: N/A	
Capacity	N/A
Declared heat loss	N/A
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, room thermostat, and TRVs	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Appendix 3

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 14:02:45

Project Information			
Assessed By	Neil Rothon	Building Type	House, Semi-detached
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	79 m^2
Site Reference	House 2 Block C	Plot Reference	Design stage for ES condition
Address	House 2 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*14.73 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.64 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.36 kWh_{PE}/m^2*	
Dwelling primary energy	48.51 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*51.3 kWh/m^2*	
Dwelling fabric energy efficiency	46.2 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.11	exposed upper (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	d1 (1.2)	OK
Rooflights	*2.2*	1.3	rl, South (1.3)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	89.244	0.17
Party wall: Party Wall (1)	34.98	0 **(!)**
Ground floor: ground floor, ground floor	38.29	0.1 **(!)**
Upper floor: exposed upper, exposed upper	8	0.13
Exposed roof: Roof (1)	40.63	0.11
Exposed roof: Roof (2)	2.24	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.4	South	N/A	1.2
south windows, window	0.54	South	0.7	1.2
south windows, window	5.51	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
east windows, window	0.744	East	0.7	1.2
east windows, window	0.72	East	0.7	1.2
north windows, window	3.15	North	0.7	1.2
north windows, window	1.392	North	0.7	1.2
rl, rooflight	0.96	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.13	xt
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	df
External wall	E20: Exposed floor (normal)	SAP table default	0.32	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
Party wall	P1: Ground floor	SAP table default	0.32	df
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	283.4%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls		
Main heating 1 - type: Programmer, TRVs, and bypass		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:58:19

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, End-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	64 m^2
Site Reference	Flat 1 Block B	Plot Reference	Design stage for ES condition
Address	Flat 7 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*12.82 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.3 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*67.16 kWh_{PE}/m^2*	
Dwelling primary energy	45.2 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*38.5 kWh/m^2*	
Dwelling fabric energy efficiency	37.5 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.11	Heatloss Floor 1 (0.11)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.23	d1 (1.4)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	32.8608	0.17
Sheltered wall: Walls (2)	13.38	0.17
Party wall: Party Wall (1)	27.32	0 **(!)**
Ground floor: Heatloss Floor 1, Heatloss Floor 1	64.2	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	South	N/A	1.4
east windows, window	1.7	East	0.7	1.2
east windows, window	1.7	East	0.7	1.2
east windows, window	1.7	East	0.7	1.2
east windows, window	0.935	East	0.7	1.2
north windows, window	1.4442	North	0.7	1.2
north windows, window	3.15	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.13	xt
External wall	E5: Ground floor (normal)	SAP table default	0.32	sheltered
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	SAP table default	0.28	sheltered
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt
Party wall	P1: Ground floor	SAP table default	0.32	df
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	pw to sheltered
External wall	E18: Party wall between dwellings	SAP table default	0.24	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	**OK**
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	284.4%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 14:00:31

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	63 m^2
Site Reference	Flat 6 Block A	Plot Reference	Design stage for ES condition
Address	Flat 6 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*11.55 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	3.69 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*60.89 kWh_{PE}/m^2*	
Dwelling primary energy	39.04 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*26.2 kWh/m^2*	
Dwelling fabric energy efficiency	23.4 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.25	d1 (1.4)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	43.855	0.17
Sheltered wall: Walls (2)	6.87	0.17
Party wall: Party Wall (1)	19.32	0 **(!)**
Exposed roof: Roof (1)	4.3	0.11
Exposed roof: Roof (2)	13.11	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	West	N/A	1.4
south windows, window	1.3	South	0.7	1.2
south windows, window	1.3	South	0.7	1.2
north windows, window	1.19	North	0.7	1.2
north windows, window	1.19	North	0.7	1.2
north windows, window	1.995	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	sheltered x 0.71
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E16: Corner (normal)	SAP table default	0.18	sheltered
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E11: Eaves (insulation at rafter level)	SAP table default	0.15	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	279.8%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 14:01:25

Project Information			
Assessed By	Neil Rothon	Building Type	House, Semi-detached
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	79 m^2
Site Reference	House 1 Block C	Plot Reference	Design stage for ES condition
Address	House 1 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*14.73 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.58 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.37 kWh_{PE}/m^2*	
Dwelling primary energy	47.82 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*51.6 kWh/m^2*	
Dwelling fabric energy efficiency	45.4 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.11	exposed upper (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	d1 (1.2)	OK
Rooflights	*2.2*	1.3	rl, South (1.3)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	86.764	0.17
Party wall: Party Wall (1)	34.98	0 **(!)**
Ground floor: ground floor, ground floor	38.29	0.1 **(!)**
Upper floor: exposed upper, exposed upper	8	0.13
Exposed roof: Roof (1)	40.63	0.11
Exposed roof: Roof (2)	2.24	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.4	South	N/A	1.2
south windows, window	0.54	South	0.7	1.2
south windows, window	5.51	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
south windows, window	1.15	South	0.7	1.2
west windows, window	3.224	West	0.7	1.2
west windows, window	0.72	West	0.7	1.2
north windows, window	3.15	North	0.7	1.2
north windows, window	1.392	North	0.7	1.2
rl, rooflight	0.96	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.13	xt
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	default
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	df
External wall	E20: Exposed floor (normal)	SAP table default	0.32	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
Party wall	P1: Ground floor	SAP table default	0.32	df
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	283.4%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls		
Main heating 1 - type: Programmer, TRVs, and bypass		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:59:16

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	46 m^2
Site Reference	Flat 3 Block A	Plot Reference	Design stage for ES condition
Address	Flat 3 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*14.37 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.56 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*76.51 kWh_{PE}/m^2*	
Dwelling primary energy	48.3 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*31.1 kWh/m^2*	
Dwelling fabric energy efficiency	29.7 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	exposed upper (0.13)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.28	d1 (1.4)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	9.402	0.17
Sheltered wall: Walls (2)	14.83	0.17
Party wall: Party Wall (1)	20.66	0 **(!)**
Party wall: Party Wall (2)	24.15	0 **(!)**
Upper floor: exposed upper, exposed upper	2.56	0.13

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	North	N/A	1.4
south windows, window	1.649	South	0.7	1.2
south windows, window	1.649	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E20: Exposed floor (normal)	SAP table default	0.32	xt
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	df
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	sheltered x0.71
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E16: Corner (normal)	SAP table default	0.18	to sheltered
External wall	E17: Corner (inverted - internal area greater than external area)	SAP table default	0 **(!)**	to sheltered
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	274.9%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 14:00:04

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	46 m^2
Site Reference	Flat 5 Block A	Plot Reference	Design stage for ES condition
Address	Flat 3 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*11.06 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	3.96 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*58.77 kWh_{PE}/m^2*	
Dwelling primary energy	42.18 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*14.6 kWh/m^2*	
Dwelling fabric energy efficiency	17.1 kWh/m^2	FAIL

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.29	d1 (1.4)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	9.158	0.17
Sheltered wall: Walls (2)	13.47	0.17
Party wall: Party Wall (1)	19	0 **(!)**
Party wall: Party Wall (2)	22.18	0 **(!)**
Exposed roof: Roof (1)	4.3	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	North	N/A	1.4
south windows, window	1.261	South	0.7	1.2
south windows, window	1.261	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	sheltered x0.72
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E11: Eaves (insulation at rafter level)	SAP table default	0.15	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	sheltered
External wall	E17: Corner (inverted - internal area greater than external area)	SAP table default	0 **(!)**	to sheltered
External wall	E16: Corner (normal)	SAP table default	0.18	to sheltered

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	263.8%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:58:45

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, End-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	64 m^2
Site Reference	Flat 2 Block B	Plot Reference	Design stage for ES condition
Address	Flat 7 Block C 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*13.58 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.51 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*71.21 kWh_{PE}/m^2*	
Dwelling primary energy	47.33 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*42.2 kWh/m^2*	
Dwelling fabric energy efficiency	41.2 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.23	d1 (1.4)	OK
Rooflights	*2.2*	1.3	rooflight, South (1.3)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	29.4138	0.17
Sheltered wall: Walls (2)	12.06	0.17
Party wall: Party Wall (1)	25.77	0 **(!)**
Exposed roof: Roof (1)	62.48	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	South	N/A	1.4
east windows, window	1.62	East	0.7	1.2
east windows, window	1.62	East	0.7	1.2
east windows, window	2.1	East	0.7	1.2
east windows, window	0.972	East	0.7	1.2
north windows, window	1.4442	North	0.7	1.2
north windows, window	3.15	North	0.7	1.2
rooflight, rooflight	0.84	South	0.7	1.3
rooflight, rooflight	0.84	South	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	SAP table default	0.28	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	to sheltered
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E18: Party wall between dwellings	SAP table default	0.24	to sheltered
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06	xt

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	285.0%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 13:59:36

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	63 m^2
Site Reference	Flat 4 Block A	Plot Reference	Design stage for ES condition
Address	Flat 4 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*13.42 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.24 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*70.94 kWh_{PE}/m^2*	
Dwelling primary energy	44.63 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.1 kWh/m^2*	
Dwelling fabric energy efficiency	34.4 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.17	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	exposed bin store (0.13)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.24	d1 (1.4)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	47.765	0.17
Sheltered wall: Walls (2)	7.65	0.17
Party wall: Party Wall (1)	21	0 **(!)**
Upper floor: exposed bin store, exposed bin store	12.6	0.13

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	2.1	West	N/A	1.4
south windows, window	1.3	South	0.7	1.2
south windows, window	1.3	South	0.7	1.2
north windows, window	1.445	North	0.7	1.2
north windows, window	1.445	North	0.7	1.2
north windows, window	1.995	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
External wall	E20: Exposed floor (normal)	SAP table default	0.32	df
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	xt
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.2	to sheltered x0.71
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
External wall	E18: Party wall between dwellings	SAP table default	0.24	df
External wall	E16: Corner (normal)	SAP table default	0.18	to sheltered
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	283.6%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Wed 17 May 2023 14:00:59

Project Information			
Assessed By	Neil Rothon	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022150	Assessment Date	2023-05-17

Dwelling Details			
Assessment Type	As designed	Total Floor Area	87 m^2
Site Reference	Flat 7 Block A	Plot Reference	Design stage for ES condition
Address	Flat 7 Block A 23 & 23A High Street, Hornsey, N8 7QB		

Client Details	
Name	Client
Company	Company
Address	Address, Town, AA11 1AA

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*14.59 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.64 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.15 kWh_{PE}/m^2*	
Dwelling primary energy	48.55 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*47.4 kWh/m^2*	
Dwelling fabric energy efficiency	47.2 kWh/m^2	OK

2a Fabric U-values

Element	*Maximum permitted average U-Value [W/m^2K]*	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	*0.26*	0.16	Walls (1) (0.17)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.24	d1 (1.4)	OK
Rooflights	*2.2*	1.3	RL, North (1.3)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: Walls (1)	36.119	0.17
Exposed wall: Walls (2)	18.17	0.16
Exposed wall: Walls (3)	14.54	0.15
Party wall: Party Wall (1)	20.83	0 **(!)**
Exposed roof: Roof (1)	54.855	0.11
Exposed roof: Roof (2)	45	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
d1, front door	1.89	North	N/A	1.4
north windows, window	1.32	North	0.7	1.2
north windows, window	1.32	North	0.7	1.2
north windows, window	1.911	North	0.7	1.2
dormer windows, window	1.215	South	0.7	1.2
dormer windows, window	1.215	South	0.7	1.2
RL, rooflight	0.7225	North	0.7	1.3
RL, rooflight	0.7225	North	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.06	xt
External wall	E3: Sill	Calculated by person with suitable expertise	0.04	xt
External wall	E4: Jamb	Calculated by person with suitable expertise	0.02 **(!)**	xt
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	df
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	df
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0 **(!)**	xt
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 **(!)**	df
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	xt
Roof	R4: Ridge (vaulted ceiling)	SAP table default	0.12	df
External wall	E15: Flat roof with parapet	SAP table default	0.3	df
External wall	E11: Eaves (insulation at rafter level)	SAP table default	0.15	df dormers
Party wall	P4: Roof (insulation at ceiling level)	SAP table default	0.48	df flat roof
Party wall	P5: Roof (insulation at rafter level)	SAP table default	0.48	df
Roof	R4: Ridge (vaulted ceiling)	SAP table default	0.12	dormers
Roof	R7: Flat ceiling (inverted)	SAP table default	0.12	dormers to main

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	283.4%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM 8kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Programmer, TRVs, and bypass	
Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	85 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Appendix 4

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name **Shell and Core**

High Street Hornsey - BE LEAN

As designed

Date: Mon Apr 24 11:51:41 2023

Administrative information

Building Details

Address: Commercial Areas, London, N8

Certifier details

Name: NRG Consulting Ltd

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.20

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.20

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 100.81

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.85	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.55	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	40.81	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	38.3	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.17	0.17	01000000:Surf[1]
Floors	0.18	0.1	0.1	01000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	-	-	No flat roofs in building
Windows** and roof windows	1.6	1.23	1.23	01000000:Surf[3]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)]

$U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- VRF Heating and Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	5.5	0	-	0.85
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

"No HWS in project, or hot water is provided by HVAC system"

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

Shell and core configuration

Zone	Assumed shell?
0/1 commercial unit 1	NO
0/2 commercial unit 2	NO

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
0/1 commercial unit 1	105	-	-
0/2 commercial unit 2	105	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0/1 commercial unit 1	NO (-19.6%)	NO
0/2 commercial unit 2	NO (-38.4%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	100.8	100.8
External area [m^2]	183.9	183.9
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	47.98	70.78
Average U-value [W/m^2K]	0.26	0.38
Alpha value* [%]	25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	7.79	12.13
Cooling	6.81	2.72
Auxiliary	0	0
Lighting	7.53	9.67
Hot water	3.04	2.74
Equipment*	42.19	42.19
TOTAL**	**25.17**	**27.26**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	164.77	166.7
Primary energy [kWh_{PE}/m^2]	38.3	40.81
Total emissions [kg/m^2]	3.55	3.85

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	69	95.8	7.8	6.8	0	2.46	3.91	2.64	5.5
	Notional	121.3	45.4	12.1	2.7	0	2.78	4.63	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name **Shell and Core**

High Street Hornsey - Be Green

As designed

Date: Mon Apr 24 12:03:47 2023

Administrative information

Building Details

Address: Commercial Areas, London, N8

Certifier details

Name: NRG Consulting Ltd

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.20

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.20

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 100.81

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.85	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.04	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	40.81	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	33.2	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.17	0.17	01000000:Surf[1]
Floors	0.18	0.1	0.1	01000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	-	-	No flat roofs in building
Windows** and roof windows	1.6	1.23	1.23	01000000:Surf[3]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)]

$U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- VRF Heating and Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	5.5	0	-	0.85
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

"No HWS in project, or hot water is provided by HVAC system"

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

Shell and core configuration

Zone	Assumed shell?
0/1 commercial unit 1	NO
0/2 commercial unit 2	NO

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
0/1 commercial unit 1	105	-	-
0/2 commercial unit 2	105	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0/1 commercial unit 1	NO (-19.6%)	NO
0/2 commercial unit 2	NO (-38.4%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	100.8	100.8
External area [m^2]	183.9	183.9
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	47.98	70.78
Average U-value [W/m^2K]	0.26	0.38
Alpha value* [%]	25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	4.57	12.13
Cooling	6.81	2.72
Auxiliary	0	0
Lighting	7.53	9.67
Hot water	3.04	2.74
Equipment*	42.19	42.19
TOTAL**	**21.95**	**27.26**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	164.77	166.7
Primary energy [kWh_{PE}/m^2]	33.2	40.81
Total emissions [kg/m^2]	3.04	3.85

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	69	95.8	4.6	6.8	0	4.19	3.91	4.5	5.5
	Notional	121.3	45.4	12.1	2.7	0	2.78	4.63	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type