SEPTEMBER 19, 2025

LAND SOUTH OF SMUGGLERS LANE, BARNS GREEN, HORSHAM, WEST SUSSEX

Energy Statement

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ON BEHALF OF MILLER HOMES

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Energy & Design

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1.0 INTRODUCTION

1.1. CONTEXT

This Statement has been prepared by Energy & Design Ltd. on behalf of Miller Homes to support a planning application for the proposed development of 68 dwellings with vehicular and pedestrian accesses, public open space, hard and soft landscaping and associated works, including supporting foul and surface water drainage works, and works to the existing culverted watercourse on site.

Land south of Smugglers Lane, Barns Green, Horsham, West Sussex

1.2. DESCRIPTION OF DEVELOPMENT

Land south of Smugglers Lane, Barns Green, Horsham, West Sussex, includes 68 plots. These plots feature various types of housing: detached houses, semi-detached houses, terraced houses, and apartments.

The current site is shown below.

1.3. PROJECT BRIEF

The development is designed to achieve a reduction from the Target Emission Rate (TER) set out in Part L of the Building Regulations (2021) and to comply with the following Policies.

Policy 36 - Strategic Policy: Appropriate Energy Use

Energy hierarchy

All development will be required to contribute to clean, efficient energy in Horsham based on the following hierarchy:

1. Lean – use less energy – e.g. through demand reduction
2. Clean – supply energy efficiently – e.g. through heat networks
3. Green – use renewable energy sources

District Heating and Cooling

Commercial and residential developments in Heat Priority Areas or the strategic development locations will be expected to connect to district heating networks where they exist using the following hierarchy, or incorporate the necessary infrastructure for connection to future network.

Development should demonstrate that the heating and cooling systems have been selected in accordance with the following heating and cooling hierarchy;

1. Connection to existing (C)CHP distribution networks
2. Site wide renewable (C)CHP
3. Site wide gas-fired (C)CHP
4. Site wide renewable community heating/cooling
5. Site wide gas-fired community heating/cooling
6. Individual building renewable heating
7. Individual building heating, with the exception of electric heating

All (C)CHP must be of a scale and operated to maximise the potential for carbon reduction. Where site-wide (C)CHP is proposed, consideration must be given to extending the network to adjacent sites.

Energy Statements

All applications for residential or commercial development must include an Energy Statement demonstrating and quantifying how the development will comply with the Energy Hierarchy.

Developments in Heat Priority Areas and strategic developments should demonstrate and quantify how the development will comply with the heating and cooling hierarchy. Horsham District Council will work proactively with applicants on major developments to ensure these requirements are met.

Renewable energy schemes

The Council will permit schemes for renewable energy (e.g. solar) where they do not have a significant adverse effect on landscape and townscape character, biodiversity, heritage or cultural assets or amenity value. Community initiatives which seek to deliver renewable and low carbon energy will be encouraged.

2.0 METHODOLOGY

2.1 ASSESSMENT METHODOLOGY

Energy & Design Ltd. has modelled sample types using L12021 (SAP 10) methodology to calculate the dwellings' emissions.

This will allow us to show compliance in following steps.

1) Baseline carbon emissions – this will be calculated and given in Total CO_2 emissions ($kgCO_2$/year). SAP uses the Target Emission Rate (TER = CO_2 kilograms per M2 of total useful floor area per year) to create the baseline for compliance with the approved document Part L12021. This is then multiplied by the total useful floor area for the overall target CO_2 emissions.
2) Improved Fabric with Low and Zero Carbon (LZC) technologies – various fabrics & technologies will be looked at to get the reduction of CO_2 emissions (kgCO2/year) and the results will be taken from the DER of the L12021 calculation and then multiplied by the total useful floor area for the overall site CO2 emissions.
3) A percentage reduction will be calculated for the design vs target.

3.0 BASELINE CARBON EMISSIONS

3.1 THE DEVELOPMENT BASELINE

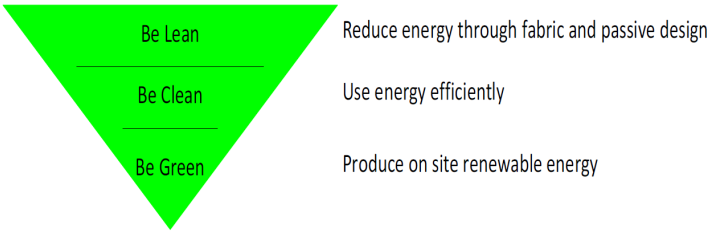
To evaluate the proposed energy strategy, it is essential to determine the baseline first. In this case, it is the Target Emission Rate for CO_2 emissions per year.

The proposed dwellings have been modelled in SAP L12021; the maximum CO_2 emissions permitted and Baseline emissions to comply with L12021 are shown below.

Target Emission Rate: Compliant with AD L 2021	
Total CO_2 emissions – $kgCO_2$/year	70,902

4.0 CO_2 REDUCTION STRATEGY - FABRIC APPROACH

4.1 ENERGY HIERARCHY



The 'energy hierarchy' aims to reduce energy demand through passive design measures and a fabric-first approach before utilising low-carbon energy and the production of on-site renewable energy.

The developer has followed the above energy hierarchy approach for this site by improving the fabric.

4.2 DEVELOPMENT DESIGN AND EFFICIENCY MEASURES

The proposed design will reduce thermal energy demand by targeting improved insulation levels, air leakage, and fabric u-values, in accordance with current Building Regulations requirements.

The following measures to reduce energy use and carbon emissions have been included in the design of the new dwellings:

- Design new homes to optimise natural daylight in all the habitable spaces with suitable window sizes relative to living rooms and bedrooms.
- Design and layout to promote passive solar gains and maximise natural daylight, sunlight, and ventilation.
- Development which balances minimising the direct adverse impact of shading from other buildings and landscape features and improving access to passive solar gains.
- High-performance glazing with appropriate window u-values and g-values to reduce heat loss and optimise positive solar gain while reducing the potential for overheating.
- 100% low energy lighting.
- Smart meters
- Bespoke individual PSI values - these have been calculated and used; this assists in Fabric Energy Efficiency by designing out the cold bridges, which may occur if using the Approved details.
- TMP—The TMP (Thermal Mass Perimeter) has been calculated rather than using default figures as required by L12021; this now gives a more accurate reflection of the actual as-built dwelling, closing the gap between design and as-built performance.

4.3 PROPOSED FABRIC FIRST SPECIFICATION

The following are the U-values of the proposed fabric.

Element	Limiting Average Values - Part L12021	Proposed Average Values
Ground Floor U-Value (W/m^2K)	0.18	0.14
External Wall U-Value (W/m^2K)	0.26	0.21
Party Wall U-Value (W/m^2K)	0.20	0.00 (fully filled & sealed)
Roof - Insulated at ceiling U-Value (W/m^2K)	0.16	0.07
Window U-Value (W/m^2K)	1.60	1.30
Door U-Value (W/m^2K)	1.60	1.50
Design Air Permeability $m^3/h.m^2$ at 50 Pa	8.00	4.5

5.0 LOW AND ZERO CARBON (LZC) TECHNOLOGIES

5.1 TECHNOLOGIES

The following technologies will be assessed for appropriateness in the development.

- District Heating
- Air Source Heat Pumps (ASHP)
- Ground Source Heat Pumps (GSHP)
- Wind Power
- Biomass Technology
- Solar Hot Water (SHW) Technology
- Photovoltaic (PV) Technology

5.2 DISTRICT HEATING

Based on the government's heat network map, which can be found at https://data.barbour-abi.com/smart-map/repd/desnz/?type=heat_network

This indicates that there are no Heat networks in the local area; the nearest is a planning application, approximately 5.5 miles away, on Parsonage Road, Horsham.

Conclusion

Due to the absence of heat networks in the local area, they have been deemed **unsuitable for this development.**

5.3 AIR SOURCE HEAT PUMP (ASHP)

ASHP technology extracts heat from the external air and condenses this energy to heat a smaller space within a dwelling or non-domestic building. A pump circulates a refrigerant through a coil to absorb energy from the air. This refrigerant is then compressed to raise its temperature, which can be used for space heating and domestic hot water.

Advantages

- Mature technology
- Can assist in cooling.
- Approx. 250% efficient using electricity.

Disadvantages

- Hot water cylinder required.
- Either oversized radiators or underfloor heating is required
- Currently, the running costs are high compared to a gas system.
- Can be noisy.

Conclusion

ASHP has been deemed **suitable for this development.**

5.4 GROUND SOURCE HEAT PUMP (GSHP)

GSHP technology exploits seasonal temperature differences between the ground and air. Fluid is pumped through pipes laid in the ground, taking up heat extracted by the heat pump and released at a higher temperature to drive a space heating system. The pipework is placed either horizontally or vertically in the ground.

Advantages

- More efficient than ASHP
- Mature technology
- Can assist in cooling.
- Approx. 320% efficient using electricity.

Disadvantages

- Costly to install.
- Hot water cylinder required.
- Either oversized radiators or underfloor heating is required
- Currently, the running costs are high compared to a gas system.
- Can be noisy.

Conclusion

Due to the cost, GSHP has been deemed **unsuitable for this development.**

5.5 WIND POWER

Wind turbines are available in various sizes, from large rotors able to supply whole communities, small roof or wall-mounted units for individual dwellings.

Advantages

- Generation of clean energy

Disadvantages

- Costly to install.
- Maintenance costs
- Can be noisy (hum of the generator)

Conclusion

The http://www.solarinsiders.co.uk/cWindspeed/lookup predictor suggests the wind speed is 4.9m/s at 10 meters above the ground. This is below the minimum of 5.0m/s for technical viability.

Results for postcode "GU9":

Windspeeds at your chosen location

10m Elevation: 4.9 mph

30m Elevation: 5.7 mph

45m Elevation: 6.2 mph

Due to the windspeed being below 5.0, Wind power has been deemed **unsuitable for this development.**

5.6 BIOMASS TECHNOLOGY

Biomass boilers work on the principle that the combustion of wood chips or pellets can create heat for space heating and hot water.

Advantages

- Considerable reduction in CO_2 emissions

Disadvantages

- Can be costly to run compared to a gas boiler.
- Space for a plant room to store fuel and plant.
- Regular maintenance may be required.
- A local source of fuel (reduce transport emissions)

Conclusion

Due to the cost and the requirement of space for plant and fuel storage, Biomass has been deemed **unsuitable for this development.**

5.7 SOLAR HOT WATER (SHW) TECHNOLOGY

Solar thermal technology harnesses solar energy to generate heated water.

Advantages

- Mature Technology
- Approx. 50% of hot water demand can be met.
- Low maintenance

Disadvantages

- Not always aesthetically pleasing.
- The benefit of installation is limited to the water heating demand.
- A Large hot water cylinder is required.
- If the system is oversized, it can contribute to overheating
- Access for maintenance
- Not as many installers as previously
- Benefits not as good as similar technologies.

Conclusion

Due to the number of disadvantages, SHW has been deemed **unsuitable for this development.**

5.8 PHOTOVOLTAIC (PV) TECHNOLOGY

Photovoltaic (PV) technology involves converting the sun's energy into electricity.

Advantages

- Mature Technology
- Low maintenance
- Easily integrated.

Disadvantages

- Not always aesthetically pleasing.
- Poor design can lead to lower-than-expected yields.
- Access for maintenance

Conclusion

Due to the benefits of this technology, PV has been deemed **suitable for this development.**

5.9 CONCLUSION

The following technologies have been deemed suitable for this development.

- Air Source Heat Pump (ASHP)
- Photovoltaic (PV) Technology

5.10 PROPOSED FABRIC & LZC RESULTS

ASHP and PV have been chosen as the preferred technology for this development to reduce emissions over L12021 regulations.

- Houses = ASHP for heating and hot water
- Apartments = Electric panel heaters for heating and ASHP cylinders for hot water + PV or WWHRS if required.

The reason PV is not installed on the houses is that modern ASHP (water and heating) models have running costs that achieve a B EPC rating, similar to gas boilers. We have, however, due to the slightly higher running costs of the ASHP Cylinder (water) and panel heaters in the apartments, included PV or WWHRS to achieve lower running costs and ensure a B EPC rating.

After incorporating the above technologies, the total site demand is expected to be as follows.

Target & Design Emission Rate: Compliant with AD L 2021		
Target Total CO_2 emissions – $kgCO_2$/year	70,902	
Design Total CO_2 emissions – $kgCO_2$/year	23,649	
Total achieved reduction - $kgCO_2$/year	**47,253**	**66.65%**

6.0 WATER CONSERVATION

6.1 WATER NEUTRALITY

All new developments must be designed to reduce, reuse, and then offset water consumption in line with the Horsham District Council Water Neutrality and Planning Policy.

Using low-water-use fixtures and water restrictors, internal water consumption will be 85 Litres per Person per Day or less. Additionally, rainwater harvesting will be utilised, further reducing this figure.

For further details, please refer to the external document, 'Water Neutrality Statement'.

7.0 EV CHARGING

7.1 PART S ELECTRIC VEHICLE CHARGING

Electric Vehicle Chargers will be installed as required in the approved document S2021.

The requirement is shown below.

Requirement

The erection of new residential buildings

S1. (1) A new residential building with associated parking must have access to electric vehicle charge points as provided for in paragraph (2).

(2) The number of associated parking spaces which have access to electric vehicle charge points must be—

(a) the total number of associated parking spaces, where there are fewer associated parking spaces than there are dwellings contained in the residential building; or

(b) the number of associated parking spaces that is equal to the total number of dwellings contained in the residential building, where there are the same number of associated parking spaces as, or more associated parking spaces than, there are dwellings.

(3) Cable routes for electric vehicle charge points must be installed in any associated parking spaces which do not, in accordance with paragraph (2), have an electric vehicle charge point where—

(a) a new residential building has more than 10 associated parking spaces; and

(b) there are more associated parking spaces than there are dwellings contained in the residential building.

The Technical requirements are.

Technical requirements for electric vehicle charge points

6.2 Each electric vehicle charge point should meet all the following.

a. Be designed and installed as described in **BS EN 61851**.

b. Have a minimum nominal rated output of 7kW.

c. Be fitted with a universal socket (also known as an untethered electric vehicle charge point). Alternatively, in exceptional circumstances, such as for a self-build property, if the vehicle requirements are already known, a tethered electric vehicle charge point may be acceptable.

d. Be fitted with an indicator to show the equipment's charging status that uses lights, or a visual display.

e. Be a minimum of a Mode 3 specialised system for electric vehicle charging running from a dedicated circuit, or equivalent, as defined in **BS EN IEC 61851-1**.

f. The requirements of **BS 7671**.

g. The requirements in the IET's *Code of Practice: Electric Vehicle Charging Equipment Installation*.

NOTE: Other legislation may also apply to the installation of electric vehicle charge points. For example, the Alternative Fuels Infrastructure Regulations 2017.

8.0 OVERHEATING

8.1 PART O OVERHEATING ASSESSMENTS

In line with the policies, all dwellings will be assessed for overheating via the following methods.

- Simplified method as per guidance O1 section 1; if the simplified method fails, then.
- The Dynamic thermal modelling methodology will be used, which is based on the CIBSE's TM59 as per O1 Section 2

9.0 RESOURCE EFFICIENCY

This has been designed in accordance with policies that encourage all new developments to be resource-efficient both during construction and operation.

9.1 HOUSEHOLD WASTE

Horsham District Council currently operates a household collection service that includes general waste, garden waste, and recyclable materials, including metal foils, tins, paper, plastic bottles, glass, and cardboard. Residents will receive an information pack detailing the Council's current waste and recycling collection arrangements, as well as the location of the nearest recycling centre.

9.2 CONSTRUCTION WASTE

Site Waste will have best practice target benchmarks for resource efficiency. Where possible, materials will be diverted from landfills using various methods.

9.3 MATERIALS

Material choices will be made to mitigate impacts on the environment, including but not limited to the following:

- Have a Global Warming Potential (GWP) of < 5 in manufacture and installation.
- Obtain certification where possible to confirm it is responsibly sourced.
- Materials will be preferred with a low environmental impact as per the BRE Green Guide
- Design Buildings where possible to use less energy and reduce resources.
- Materials with low embodied carbon will be sought in line with building regulations.
- Use of local sustainable materials

10.0 SUMMARY

10.1 RENEWABLES

ASHP will be used in all plots. PV or WWHRS will be fitted to the plots with ASHP Cylinders, if required to achieve compliance with L12021.

10.2 WATER CONSUMPTION

The internal water consumption, facilitated by the installation of low-water-use fixtures and water restrictors, will be 85 Litres per Person per Day or less.

Additionally, the implementation of rainwater harvesting systems will further decrease overall consumption.

For further details, please refer to the external document, 'Water Neutrality Statement'.

10.3 ELECTRIC VEHICLE CHARGING

Electric Vehicle Chargers will be installed in compliance with the approved document S 2021.

10.4 OVERHEATING

All dwellings will be assessed for overheating via the Part O 2021 simplified method or the TM59 dynamic modelling approach.

10.5 CARBON REDUCTION

Using fabric, ASHP, and PV, an average reduction of 66.65% in carbon emissions (kg CO2/year) is expected against L12021 targets across the site.

10.6 PART L COMPLIANCE

The development will use a mixture of the above measures to meet the current Part L / ‘future homes’ requirements, which a plot-type SAP assessment will define.

If there are any Future Homes plots, we believe ASHP technology will be utilised for compliance purposes. However, a specific specification cannot be provided at this time, as we are awaiting the government’s response to the consultation.

APPENDIX A – SITE LAYOUT

REV.	DATE	REVISIONS:	BY
A	05.03.25	Revised incorporating changes to plots 6-8.	A.Gh.
B	05.03.25	Revised incorporating tree survey.	A.Gh.
C	04.07.25	Revised layout to SK22.	AM
D	07.07.25	Revisions to plots 2-18, 28, 22, 45, 49-52, 56-65. Tenure distribution adjusted.	AL
E	09.07.25	Minor amendments, plots 18-20, 24-25 adjusted. Access road aligned to engineers access drawing	AL
F	15.07.25	Revisions to site layout.	AM
G	17.07.25	Road tracking revisions.	AM
H	30.07.25	Minor layout revisions.	AM
J	08.08.25	Apartment revisions.	AM
K	14.08.25	Client comment revisions.	AM

REV.	DATE	REVISIONS:	BY
L	27.08.25	Minor layout revisions.	AM
M	03.09.25	Revisions to access road.	AM
N	04.09.25	Minor layout revisions.	AM
P	08.09.25	Minor boundary revisions.	AM
Q	12.09.25	Revisions to plot 55 location.	AM

REV.	DATE	REVISIONS:	BY

STATUS:

Planning

CLIENT:	Miller Homes	PROJECT:	Barns Green, Horsham
SCALE:	1:500 (A1 ORIGINAL)	DRAWING:	Proposed Site Layout
DRAWN:	A.Gh.	24088	P101 Q
DATE:	Feb '25		

architecture planning masterplanning
Broadmede House, Farnham Business Park,
Weydon Lane, Farnham, Surrey GU9 8QT.
info@osparchitecture.com www.osparchitecture.com
Tel: 01252 267878

APPENDIX B – RESULTS

Land south of Smugglers Lane, Barns Green, Horsham **Total Carbon Savings from L12021 Target Calculation** **18/09/2025**

Dwelling Type	L12021		kg CO_2/year per Type	number of Plots	kg CO_2/year whole site		Assumed Technology	L12021		kg CO_2/year per plot	Number of Plots	kg CO_2/year whole site	kg CO_2/year
	TER	Total floor area	L12021 Target #	Per Type	L12021 Target #			DER	Total Floor Area	L12021 Design ##	Per Type	L12021 Design ##	% Reduction
AL24 Baymont - Semi	11.41	79.00	901	10	9014		**ASHP**	3.76	79	297	10	2970	-67.05%
AL32 Lockton - Semi	10.42	92.98	969	6	5813		**ASHP**	3.35	92.98	311	6	1869	-67.85%
AL41 Torwood - Semi	9.68	106.14	1027	2	2055		**ASHP**	3.17	106.14	336	2	673	-67.25%
L250 Richmont - Semi	13.27	58.06	770	3	2311		**ASHP**	4.13	58.06	240	3	719	-68.88%
L356 Denton - Semi	10.96	84.24	923	9	8309		**ASHP**	3.63	84.24	306	9	2752	-66.88%
L358 Whitton - Semi	10.65	87.94	937	6	5619		**ASHP**	3.55	87.94	312	6	1873	-66.67%
L360 Chilton - Semi	11.03	90.92	1003	2	2006		**ASHP**	3.68	90.92	335	2	669	-66.64%
L361 Braxton - Det	11.99	92.54	1110	5	5548		**ASHP**	3.85	92.54	356	5	1781	-67.89%
L454 Haywood - Det	11.00	104.98	1155	6	6929		**ASHP**	3.55	104.98	373	6	2236	-67.73%
L467 Beauwood - Det	10.00	126.84	1268	2	2537		**ASHP**	3.39	126.84	430	2	860	-66.10%
L470 Briarwood - Det	9.91	133.14	1319	5	6597		**ASHP**	3.37	133.14	449	5	2243	-65.99%
L474 Faverwood - Det	9.05	158.30	1433	3	4298		**ASHP**	3.10	158.3	491	3	1472	-65.75%
L552 Homesford - Det	9.78	145.77	1426	2	2851		**ASHP**	3.25	145.77	474	2	948	-66.77%
L554 Grayford - Det	9.21	165.36	1523	1	1523		**ASHP**	3.03	165.36	501	1	501	-67.10%
Apartment - GF *	13.15	70.57	928	3	2784		**ASHP Cylinder & PV**	4.97	70.57	351	3	1052	-62.21%
Apartment - FF *	12.79	70.57	903	3	2708		**ASHP Cylinder & PV**	4.86	70.57	343	3	1029	-62.00%
Total				**68**	**70902**						**68**	**23649**	**-66.65%**

based on L12021 TER
based on L12021 DER
* Data Assumed

Energy & Design

APPENDIX C – DRAFT BREL REPORT

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 18 Sep 2025 13:20:12

Project Information			
Assessed By	Matthew Hurd	Building Type	House, Detached
OCDEA Registration	EES/014743	Assessment Date	2025-09-18

Dwelling Details			
Assessment Type	As designed	Total Floor Area	93 m^2
Site Reference	L361 Braxton - Det	Plot Reference	ASHP
Address	L361 Braxton - Det, Barns Green, RH13		

Client Details	
Name	Miller Homes Limited
Company	Miller Homes Limited
Address	First Floor, Miller House, 2 Lochside View, Edinburgh Park, Edinburgh, EH12 9DH

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	*11.99 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	3.85 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*62.65 kWh_{PE}/m^2*	
Dwelling primary energy	40.2 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*42.7 kWh/m^2*	
Dwelling fabric energy efficiency	42.6 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*	0.21	Walls (1) (0.21)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.14	Heat Loss Floor (0.14)	OK
Roofs	*0.16*	0.08	Roof (2) (0.37)	OK
Windows, doors, and roof windows	*1.6*	1.34	D1 (1.5)	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)	112.99815	0.21
Ground floor: Heat Loss Floor, Heat Loss Floor	46.27	0.14
Exposed roof: Roof (1)	45.27	0.07 **(!)**
Exposed roof: Roof (2)	1	0.37

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, (D1) Half Glazed Door	2.121	North East	N/A	1.5
W1, Window	1.6875	North East	1.0	1.3
W2, Window	1.6875	North East	1.0	1.3
W3, Window	1.19175	South East	1.0	1.3
W4, Window	1.6848	North West	1.0	1.3
W5, Window	1.6848	North West	1.0	1.3
W7, Window	1.40625	North East	1.0	1.3
D2 W14, Window	3.339	South East	1.0	1.3
W8, Window	0.7245	North East	1.0	1.3
W9, Window	1.40625	North East	1.0	1.3
W10, Window	1.197	South East	1.0	1.3
W11, Window	0.828	South West	1.0	1.3
W12, Window	1.40625	North West	1.0	1.3

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
W13, Window	1.40625	North West	1.0	1.3
D3, (D1) Half Glazed Door	2.121	South West	N/A	1.5

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1**: 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	0.065	HI-Therm+
External wall	E3: Sill	Calculated by person with suitable expertise	0.004 **(!)**	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.005 **(!)**	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.061	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	-0.006 **(!)**	
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.087	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.037 **(!)**	

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	4.5 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	274.8%
Emitter type	Radiators
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM plus 5kW & AI VIH RW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	193.9 litres
Declared heat loss	1.45 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, 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	89.55555555555556 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	*0.7 W/(l/s)*	
Specific fan power	0.15 W/(l/s)	**OK**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model	Lo-Carbon NBR dMEV C 100, 498095	
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	