

Energy Statement

Client: Southway Housing Trust

Site: Minden Close, Burnage

Date: 23 February 2022

Ref: 11109 Minden Close

Contact: Adam Lindley

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1.0 Executive Summary

An energy statement has been carried out for the proposed development known as Minden Close, Burnage. The structure and philosophy of the report has been based upon utilising best practice methodology and adheres to the “Be Lean, Be Clean and Be Green” hierarchy as follows:

Energy Efficient Measures (Be Lean – Use Less Energy)

To maximise the energy efficiency of the development and reduce the energy demand, the development will benefit from the following:

- High specification building fabric with U values that will improve on Part L1 standard values
- Improved Psi values for limiting thermal bridging
- Hard coated glazing which will be BFRC certified
- Low air leakage rates

Energy Efficient Systems (Be Clean – Supply Energy Efficiently)

- The development will incorporate highly efficient mechanical ventilation units
- Electric panel heaters (or an ASHP)
- Dedicated LED low energy efficient light fittings within all areas

Renewable Technologies (Be Green – Use Renewable Energy)

The following renewable technologies have been evaluated as part of this report:

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

Due to the Manchester planning policy of 9% above building regulations – We have two options- Electric panel heaters with an ASHP cylinder and 1.5kWp of PV panels, or an ASHP unit for heating and hot water. Both options are well above the 9% required.

It can be concluded that CO₂ emissions of predicted energy use of the development will meet the targets in Part L of the Building Regulations and the Manchester’s Local Development Framework Core Strategy Development Plan 2012 – 2027.

Be Lean	Performance
Ground Floor	0.09 W/m ² k
External Wall	0.15 W/m ² k
Roof:	0.09 W/m ² k
Windows including roof lights	1.2 W/m ² k
External Doors	1.1 W/m ² k
Thermal Bridging	Individually calculated thermal bridging details
Air Permeability	4.00
Be Clean	
Electric Panel Heaters (or ASHP)	
Efficient heating controls – Programmable zone control	
100% LED lighting	
Low energy / carbon mechanical ventilation	

Be Green
We have reviewed the renewable options available to this site and have decided to assess two options- Electric panel heaters with an ASHP cylinder and 1.5kWp of PV panels, or an ASHP unit for heating and hot water. Both options are well above the Manchester planning policy of 9% above building regulations.

Table 1. Summary of all Be Lean, Be Clean and Be Green Measures.

2.0 Introduction

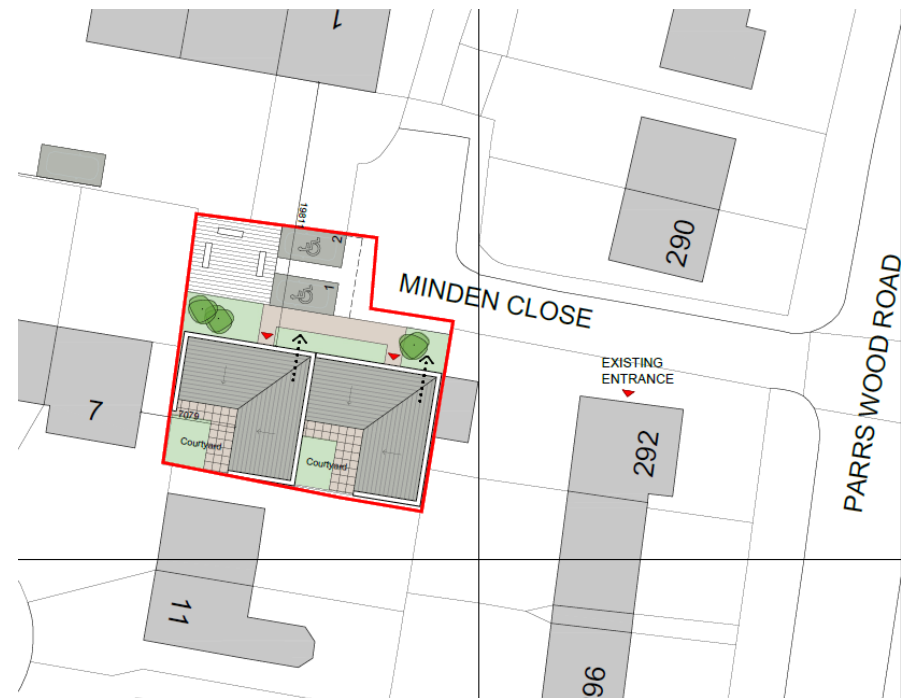
Complete Sustainability Solutions have been commissioned by Southway Housing Trust to carry out an Energy Statement to assist with their planning submission for the Minden Close development.

The purpose of this energy statement is to model the proposed development, utilising SAP software to identify the baseline carbon emissions; then utilise the energy hierarchy to minimise energy usage and carbon emissions, thus ensuring compliance with both national and local policy.

2.1 Development Description

The proposed development is located off Parrs wood Road, Manchester. The proposal is for two semi detached bungalows.

2.2 Site Plan



Picture 1 – Proposed site plan

3.0 Policy Context

Within this section of the report we will review both local and national policy, establishing key principles that can be taken forward and applied across the development.

3.1 Policy Context – National National Planning Policy Framework February 2019

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and

mitigating and adapting to climate change, including moving to a low carbon economy.

3.2 Policy Context – Local

**Manchester's Local Development Framework Core Strategy
Development Plan 2012 – 2027.**

3.2.1 Strategic Areas for low and zero carbon decentralised energy infrastructure

Within Manchester it is considered that the following strategic areas, indicated on the key diagram, will have a major role to play in achieving an increase in the level of decentralised, low and zero-carbon energy supplies available:

3.2.2 Manchester City Council's Policy EN 6 of Core Strategy.

Policy EN 6 requires applications for new development of 10 or more units and all other development over 1,000 sq. m to achieve a 15% reduction in CO2 emissions on Part L 2010, this equates to a 9% improvement upon Building Regulations Part L 2016.

After reviewing the Local Planning Policies, the development is required to achieve a 9% improvement above Building Regulations Part L 2016.

4.0 Carbon Reduction Strategy

Within this section of the report we will, utilising SAP software, carry out an assessment of the proposed development against current Building Regulations. We will establish CO₂ baseline, then following the energy hierarchy, establish a low-carbon specification to ensure CO₂ emissions meet the requirements of both national and local policy.

Full SAP calculations will be carried out at detailed design to ensure the specification meets the local policy. If any amendments are required these will be incorporated at this point.

4.1 – Review and implement the Energy Hierarchy: Be Lean – Be Clean – Be Green

The **Energy Hierarchy** is a classification of energy options, prioritised to assist progress towards a more sustainable energy system. The energy hierarchy uses a step by step process,

- Step 1 Be lean – use less energy.
- Step 2 Be Clean – use energy efficiently.
- Step 3 Be Green – utilise renewable technology.

4.2.1 Be Lean - Use Less Energy

The developer, in accordance with both national and local planning policy, has stated their wish towards ensuring the development follows a fabric first approach, therefore reducing demand on the national grid as reasonably possible. Below we have highlighted the proposed U values, going beyond the requirements of Building Regulations; thus improving upon the baseline CO₂ emissions.

Be Lean	Performance
Ground Floor	0.09 W/m ² k
External Wall	0.15 W/m ² k
Roof:	0.09 W/m ² k
Windows including roof lights	1.2 W/m ² k
External Doors	1.1 W/m ² k
Thermal Bridging	Individually calculated thermal bridging details
Air Permeability	4.00

Table 2. Summary of proposed Be Lean measures.

4.2.2 Be Clean – Supply Energy Efficiently

Within this section of the energy hierarchy, we see an emphasis being placed upon ensuring the regulated energy demands of the development are met as efficiently as possible.

Both district-wide and site-wide heat networks can be utilised to provide heating and hot water to a development in an efficient manner. In this instance there isn't a district wide network within the vicinity of the scheme.

Furthermore, in many cases we also see opportunities to include a combined heat and power system (CHP), which allows for the production of electricity. Due to the units being domestic use CHP should not be considered.

The next stage is to look at possible be clean measures that can be introduced to individual dwellings on site. Below we have identified the practical measures to be introduced:

Be Clean
Efficient heating controls – Programmable zone control
100% LED lighting
Low energy / carbon mechanical ventilation

Table 3. Summary of proposed Be Lean measures.

4.2.3 Be Green-Review of Renewable Technologies

The final phase of the report is to ascertain if the development will benefit from renewable/low carbon technologies and the following renewable/low carbon technologies will be analysed for this development;

- Solar Thermal
- Solar PV
- CHP
- Air Source Heat Pump
- Ground Source Heat Pump

Solar Thermal - Solar thermal hot water collectors are panels or evacuated tubes which are typically located on the roof of the buildings. The collectors harness the sun's energy to warm domestic hot water.

Pros	Cons
Reduced fuel bills and carbon footprint.	Only compatible with boilers that have hot water storage.
Low maintenance.	Need south facing roofs to optimise efficiency.
Proven technology.	Carbon saved is low comparative to the savings offered by PV.

Suitability – Solar Thermal HW is not considered appropriate for this development due to the relatively low carbon savings offered by this technology. Greater savings will be achieved using passive measures.

Solar PV - Solar Photovoltaic (PV) panels work by converting energy from the sun into electricity. This can then be used with the development to offset the electrical usage.	
Pros	Cons
Reduced bills and carbon footprint. Benefit from the feed in tariff. Proven technology. Relatively maintenance free.	PV panels lose efficiency over their lifetime.
Suitability - PV would be suited to this development as it is a simple bolt on technology that will assist with meeting the energy demand of the building and ensure compliance with the local planning policy. The PV will lower energy usage and in turn reduce energy bills whilst being relatively maintenance free for the client. We have decided to include PV panels as one of the options to this development to help meet the Manchester planning policy of 9% above building regulations.	

CHP - CHP is a technology which develops heat and power from the same energy source, typically mains gas. The CHP engine is fed by mains gas which then drives an alternator to provide electricity	
Pros	Cons
Reduced fuel bills and carbon footprints. Eligible for the feed in tariff. Proven technology which is in use in many schemes in the UK. Suited to large developments.	Not a true renewable technology. Heating and electricity demand must remain fairly stable to ensure CHP is running at optimum efficiency. Requires a centralised/district heating network scheme so is therefore more suited to apartment blocks. Noise. Capital intensive.
Suitability - The total size and nature of the development does not lend itself to CHP. It would add to the capital costs of the development making the development not financially viable. For these reasons, CHP has been discounted.	

Air Source Heat Pump - Air source heat pumps extract heat from the external air which can be used to heat radiators/underfloor heating and hot water within a dwelling. ASHP can still extract heat from air as cold as -15 degrees centigrade.

Pros	Cons
Can offer lower heating bills and reduce carbon footprints (when compared to electric systems). Relatively maintenance free. Offers high efficiencies. Can offer heating and cooling depending on system chosen (air to air).	Requires space to locate the external condenser unit. The unit requires lots of space around it to ensure adequate air flow. Requires the use of underfloor heating or large radiators due to low grade heat. Noise issues.
Suitability - Air source heat pumps have been included as one of the options available on this development.	

Ground Source Heat Pump - Ground source heat pumps (GSHP) work in a similar way to air source heat pumps, however they extract heat from the ground.

Pros	Cons
Can offer lower heating bills and reduce carbon footprints (when compared to electric systems). Relatively maintenance free. Offers high efficiencies.	High capital costs. Requires space for boreholes or trenches to locate ground loops. Requires the use of under floor heating or large radiators due to low grade heat.
Suitability - Ground source heat pumps have been discounted on this development predominantly due to the nature of the development and the lower emissions associated with using passive measures and PV.	

Table 4. Review of renewable technologies.

4.3 Review of Energy and Carbon Reduction

The table below details the CO₂ emissions for the development, incorporating the energy hierarchy, following a Be Lean, Be Clean, Be Green methodology:

Plot	DER KgCO ₂ /m ² . annum	TER KgCO ₂ /m ² . annum	Improvement upon Part L1A 2022
Elec panel heater, ASHP cylinder, 1.5kWp PV	5.41	11.43	52.67%
ASHP	5.95	11.72	49.23%

Table 5. Summary of proposed Be Lean measures.

It can be concluded that CO₂ emissions of predicted energy use of the development will meet the targets in Part L of the Building Regulations and the Manchester's Local Development Framework Core Strategy Development Plan 2012 – 2027.

Be Green

We have reviewed the renewable options available to this site and have decided to assess two options- Electric panel heaters with an ASHP cylinder and 1.5kWp of PV panels, or an ASHP unit for heating and hot water. Both options are well above the Manchester planning policy of 9% above building regulations.

5.0 Conclusion

This report is based upon a review of the proposals and a thorough analysis of relevant national and local planning policy requirements. Both the National Planning Policy Framework 2019 and Manchester's Local Development Framework Core Strategy Development Plan 2012 – 2027.

The development will follow the Be Lean, Be Clean, Be Green Energy Hierarchy as follows:

Energy Efficient Measures (Be Lean – Use Less Energy).

To maximise the energy efficiency of the development and reduce the energy demand, the development will benefit from a high specification of building fabric with U values that will improve on Part L1A standard values. Furthermore, improved Psi values will be implemented to aid further improvement over Building Regulations.

Energy Efficient Systems (Be Clean – Supply Energy Efficiently)

Energy efficient electric panel heaters (or ASHP)

Highly efficient Ventilation will be installed.

Highly efficient LED lighting will be installed.

Renewable Technologies (Be Green – Use Renewable Energy)

The following renewable technologies have been evaluated as part of this report;

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

We have reviewed the renewable options available to this site and have decided to assess two options- Electric panel heaters with an ASHP cylinder and 1.5kWp of PV panels, or an ASHP unit for heating and hot water. Both options are well above the Manchester planning policy of 9% above building regulations.

The steps listed above highlighted the development is on track to achieve compliance with building regulations Part L 2016 and Manchester's Local Development Framework Core Strategy Development Plan 2012 – 2027.

6.0 APPENDIX – SAP DOCUMENTS

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 23 Feb 2023 14:19:07

Project Information			
Assessed By	Adam Lindley	Building Type	Bungalow, Semi-detached
OCDEA Registration	EES/022683	Assessment Date	2023-02-23

Dwelling Details			
Assessment Type	As designed	Total Floor Area	63 m ²
Site Reference	Plot 1	Plot Reference	Plot 1
Address			

Client Details	
Name	Southway Housing Trust
Company	Southway Housing Trust
Address	Southern Gate, 729 Princess Road, Didsbury, Manchester , M20 2LT

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	11.43 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	5.41 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	61.1 kWh _{PE} /m ²		
Dwelling primary energy	60.19 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	50.6 kWh/m ²		
Dwelling fabric energy efficiency	47.8 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.09	Heatloss Floor 1 (0.09)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.19	Opening (1.2)	OK
Rooflights	2.2	1.2	Opening, South (1.2)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))			
Name	Net area [m ²]	U-Value [W/m ² K]	
Exposed wall: Walls (1)	58.7246	0.15	
Party wall: Party Wall (1)	14.59	0 (!)	
Ground floor: Heatloss Floor 1, Heatloss Floor 1	63.17	0.09 (!)	
Exposed roof: Roof (1)	56.372	0.09 (!)	

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Door	1.974	North	N/A	1.1 (!)
Opening, Windows	1.0117	North	0.7	1.2
Opening, Windows	1.05	North	0.7	1.2
Opening, Windows	1.431	North	0.7	1.2
Opening, Windows	3.7887	North	0.7	1.2
Opening, Windows	4.284	South	0.7	1.2
Opening, Windows	4.746	West	0.7	1.2
Opening, Rooflight	2.266	South	0.7	1.2
Opening, Rooflight	2.266	South	0.7	1.2
Opening, Rooflight	2.266	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	0.23	
External wall	E3: Sill	Calculated by person with suitable expertise	0.019 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.016 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.094	
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	
External wall	E14: Flat roof	SAP table default	0.16	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.051	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.07	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.04	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.068	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.091	

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 m ³ /hm ² , Design value		OK
Air permeability test certificate reference			

4 Space heating	
Main heating system 1: Room heaters - Electricity	
Efficiency	100.0%
Emitter type	
Flow temperature	
System type	Panel, convector or radiant heaters
Manufacturer	
Model	
Commissioning	
Main heating system 2: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	GDC Group Ltd
Model	EDL270UK-630
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 and appliance thermostats		
Function		
Ecodesign class		
Manufacturer		
Model		
Main heating 2 - type: Not applicable		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: N/A		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	450 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	0.09 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		
Technology type: Photovoltaic system (1)		
Peak power	1.5 kWp	
Orientation	South	
Pitch	30°	
Overshading	Modest	
Manufacturer		
MCS certificate		
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:	Assessor ID:	
Name:	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: Thu 23 Feb 2023 14:19:42

Project Information			
Assessed By	Adam Lindley	Building Type	Bungalow, Semi-detached
OCDEA Registration	EES/022683	Assessment Date	2023-02-23

Dwelling Details			
Assessment Type	As designed	Total Floor Area	63 m ²
Site Reference	Plot 1 ASHP	Plot Reference	Plot 1 ASHP
Address			

Client Details	
Name	Southway Housing Trust
Company	Southway Housing Trust
Address	Southern Gate, 729 Princess Road, Didsbury, Manchester , M20 2LT

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	11.72 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	5.95 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	62.67 kWh _{PE} /m ²		
Dwelling primary energy	62.23 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	50.6 kWh/m ²		
Dwelling fabric energy efficiency	47.8 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.09	Heatloss Floor 1 (0.09)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.19	Opening (1.2)	OK
Rooflights	2.2	1.2	Opening, South (1.2)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))			
Name	Net area [m ²]	U-Value [W/m ² K]	
Exposed wall: Walls (1)	58.7246	0.15	
Party wall: Party Wall (1)	14.59	0 (!)	
Ground floor: Heatloss Floor 1, Heatloss Floor 1	63.17	0.09 (!)	
Exposed roof: Roof (1)	56.372	0.09 (!)	

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Door	1.974	North	N/A	1.1 (!)
Opening, Windows	1.0117	North	0.7	1.2
Opening, Windows	1.05	North	0.7	1.2
Opening, Windows	1.431	North	0.7	1.2
Opening, Windows	3.7887	North	0.7	1.2
Opening, Windows	4.284	South	0.7	1.2
Opening, Windows	4.746	West	0.7	1.2
Opening, Rooflight	2.266	South	0.7	1.2
Opening, Rooflight	2.266	South	0.7	1.2
Opening, Rooflight	2.266	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	0.23	
External wall	E3: Sill	Calculated by person with suitable expertise	0.019 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.016 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.094	
Roof	R11: Upstands or kerbs of rooflights	SAP table default	0.24	
External wall	E14: Flat roof	SAP table default	0.16	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.051	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.07	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.04	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.068	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.091	

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 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	210.0%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 5.0 kW
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	250 litres
Declared heat loss	1.77 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: Time and temperature zone control by arrangement of plumbing and electrical services	
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	450 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	0.09 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:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		