



Energy Statement

Cowm Top Lane, Castleton

Clients: GLP Ltd and Barratt Homes

Author: Ruth Ferguson



www.environmental-economics.co.uk

Revision History

<i>Version</i>	<i>Date Issued</i>	<i>Issued by</i>	<i>QA Check</i>
1	18/12/2019	Michael Woodbridge	Tim James
2	16/03/2020	Michael Woodbridge	Tim James
3	16/03/2020	Michael Woodbridge	Tim James
4	08/01/2021	Michael Woodbridge	Tim James
5	19/08/2022	 Ruth Ferguson	 Tim James

About Environmental Economics

Our team of experienced consultants specialise in construction and building energy. We have qualifications in sustainability, energy, engineering, building physics and construction as well as environmental, quality management and auditing.

Over the last decade, we have provided assessments and consultancy for some of the largest UK house builders, including Barratt Developments, David Wilson Homes, Bellway Homes, Abbey New Homes and Davidsons. We develop flexible, practical, cost-effective specifications for our clients through identifying solutions and delivering design advice. This includes the following disciplines:

- *Overheating Analysis (dynamic thermal modelling)*
- *Daylighting / Sunlight Simulations*
- *Energy Reports*
- *Compliance assessments and advice covering*
 - *Part L (SAP)*
 - *Part F (ventilation)*
 - *Part G (water)*
- *BREEAM*
- *SBEM (existing and new build)*
- *Minimum Energy Efficiency Standards (MEES)*
- *Thermal Bridging (Psi value calculations)*

Contents

1. Project Overview	1
1.1. Introduction	1
1.2. Description of Site	1
1.3. Client Brief	1
2. Design Response	2
2.1. Assessment Methodology	2
2.2. Design Philosophy	3
2.3. Fabric Improvements Part L1A 2021	4
2.4. Building Services & Renewable Energy (LZCT).....	5
3. Conclusion.....	6
Appendix A – Site Plan	7
Appendix B – Sample SAP Calculations.....	8

1. Project Overview

1.1. Introduction

- 1.1.1. This energy study was prepared by Environmental Economics Ltd. The report assesses measures to reduce the carbon emissions of the domestic housing on site.

1.2. Description of Site

- 1.2.1. The site consists of 495 plots. These include detached, semi-detached and terraced housing.
- 1.2.2. The site plan for the whole site is shown in Appendix A.
- 1.2.3. This report addresses a domestic development being undertaken by GLP Ltd and Barratt Homes, and does not include any further proposals for subsequent developments or non-residential parcels.

1.3. Client Brief

- 1.3.1. All newbuild development must comply with Building Regulations. The newly implemented Approved Document L 2021 (AD-L 2021) provides for a 31% reduction in Carbon emissions over the previous 2013 edition.
- 1.3.2. AD-L 2021 came into effect 15th June 2022, with a 12-month transitional arrangement. Sites which have been notified to local authorities prior to this date have 12 months transitional allowance on a plot-by-plot basis. That is to say, if a plot has commenced construction prior to 15th June 2023, it will be built under AD-L 2013. It is understood that Trows Farm, Castleton will be developed in accordance with AD-L 2021.

2. Design Response

2.1. Assessment Methodology

2.1.1. Environmental Economics have modelled some typical housing designs in order to validate the proposed specifications for this site. The Design SAP 10 software by Elmhurst has been used for this. The software provides a number of outputs, and based on the provided specification for this proposed development, we are able to assess the following areas for our calculations:

- *Building regulations compliance, including:*
 - *Carbon emissions (kg CO₂/m²/year)*
 - *Primary Energy Demand (kWh/m²/annum)*
 - *Fabric Energy Efficiency (kWh/m²/annum)*
- *Energy usage per year (kWh/annum)*
- *Energy costs per year (£/annum)*
- *More detailed breakdowns by end use (space heating, water heating, cooking, lighting, appliances)*

2.1.2. Each of these outputs can be used in different ways to analyse the performance of the dwelling. The total regulated carbon emissions for each property is based upon:

- *Space heating*
- *Water heating*
- *Electricity for pumps and fans*
- *Electricity for lighting*

2.1.3. SAP software is issued by independent software suppliers, and checked and approved on behalf of government by the Building Research Establishment (BRE). At time of writing, SAP 10 software is only approved for specific technologies and the software available to assessors is still going through revisions due to known bugs which create uncertainty in the results. However, it is still possible to obtain a very good indication of compliance based on the modelled typical housing designs.

2.1.4. The dwellings on this proposed development will be assessed using this methodology during the detailed design stage.

2.2. Design Philosophy

2.2.1. Upgrades have been made to a number of elements from a standard build specification in order to improve energy efficiency across the development. The site adopts the good design principles endorsed and promoted by The Zero Carbon Hub, the construction industries' key advisors and partners with the Governments Communities and Local Government Department. This guidance follows the general good principles of energy efficiency as the industry moves towards zero carbon. The principles are illustrated in figure 1 below.

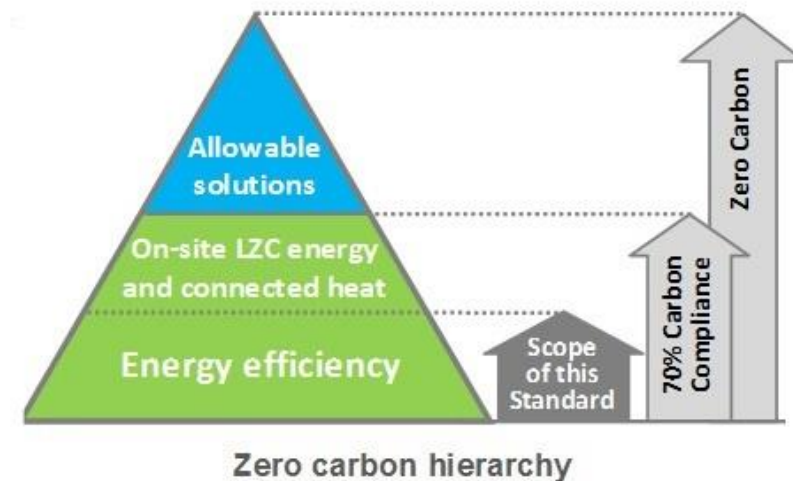


Figure 1

2.2.2. In order to reduce the residual carbon emissions a number of improvements were made to the standard material and product specification. These improvements include:

- *Upgraded heating and hot water controls*
- *Delayed start thermostat*
- *Design air permeability of 5.01m³/hr/m²*
- *Bespoke thermal bridging details*

2.3. Fabric Improvements Part L1A 2021

2.3.1. The building fabric for all dwellings was improved from the minimum standards required to an enhanced specification. These fabric improvements reduce the space heating requirement upon a property. The improvements have been made through a combination of upgraded materials and increased insulation thicknesses. Enhanced glazing with a larger transmittance factor allowing for increased solar gains will also be used. Changes to the U-Value of external elements for dwellings built to Part L 2021 are shown in table 1 below.

Table 1 – Part L 2021 Build Specification

<i>Element</i>	<i>Minimum Standard</i>	<i>Improved Specification</i>	
-	<i>W/m²k</i>	<i>Description</i>	<i>W/m²k</i>
Walls	0.26	Masonry 100mm Alreflex Platinum in 150mm cavity	0.19
Roof	0.16	400mm Mineral Wool Horizontal Ceiling, Loft Space	0.11
		Sloping Ceiling to have 100mm PUR between joists, and 55mm PUR Board underlaid	0.15
Floors	0.18	150mm TE Platinum Insulation	0.13 - 0.16
Doors	1.60	Double glazed Low-E, u-PVC frame	0.60 - 1.00
Glazing	1.60	Double glazed Low-E, u-PVC frame	1.20

2.3.2. As improvements are made to the thermal conductivity of main elements, thermal bridging and air permeability become increasingly significant in the overall fabric performance. Bespoke thermal bridging designs have been utilised, which achieve much lower heat loss levels in comparison with standard practice.

2.3.3. As a result of following these junction details and focusing on build quality, air permeability will also decrease. A target air pressure rating of 5.01m³/hr.m² has been set for all houses on site which is an improvement on the maximum allowable rating in the 2021 Building Regulations.

2.4. Building Services & Renewable Energy (LZCT)

- 2.4.1. The systems used in a property to supply hot water and heating, as well as control it, are important to the overall energy demand of a property. AD-L 2021 includes requirements for efficiency and controls of such equipment, including space heating, water heating, ventilation and lighting.
- 2.4.2. The design of building services which provide space heating and domestic hot water, ventilation, and lighting, must be considered in a holistic way in order to avoid unintended consequences and to maximise the benefits from such systems.
- 2.4.3. For Part L 2021 it is currently proposed to provide heating and hot water via mains gas boilers.
- 2.4.4. For a mains gas fired system, the minimum boiler efficiency required is 92%. Compliant Ideal Logic boilers have been adopted which exceed this requirement.
- 2.4.5. Where installed, hot water cylinders can lose a significant amount of energy. To minimise this energy loss and corresponding carbon emissions, cylinders which have higher levels of insulation in comparison to typical hot water cylinders will be used.
- 2.4.6. Hot water distribution pipework will be fully insulated.
- 2.4.7. All plots will include Solar Photovoltaic (PV) Panels as per the sample SAP reports at the bottom of this report.
- 2.4.8. Lighting provision will be from LED low energy fittings achieving a minimum efficacy of 100 lamp lumens per circuit watt, an improvement of over 50% from AD-L 2013 performance levels.
- 2.4.9. Smart meters will be installed on all properties, providing:
- Real time information on energy use both in terms of consumption and cost
 - Occupier can manage their energy, save money and reduce carbon emissions
 - Smart meters will also allow for easier switching between suppliers
 - Facilitate a more reactive, price driven, demand-response
 - End estimated billing and eliminate the need for meter readers to visit premises

3. Conclusion

- 3.1.1. The sample SAP calculations presented in Appendix B show the total carbon emissions from typical dwellings, including emissions from fabric and energy use, based on the modelling of representative housing designs using SAP 10 software. The enhanced fabric specifications including better insulation and improved thermal bridging details result in lower carbon emissions from the dwelling.
- 3.1.2. It is anticipated that all the plots of this development will be, at the very least, constructed to comply with the higher standards set out by Part L1A 2021, which is a 31% reduction in carbon emissions in relation to Part L1A 2013 regulations. Therefore, as long as the proposed specification guidance is followed, this development will comply with the new Part L1A 2021 legislation.
- 3.1.3. All plots will include Solar Photovoltaic (PV) Panels as per the sample SAP reports at the bottom of this report.

Appendix A – Site Plan



Appendix B – Sample SAP Calculations

Sample SAP reports can be found on the following pages

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Elmhurst Sap 10 SAP 10 program, 1.0

Date: Fri 19 Aug 2022 09:08:43

Project Information			
Assessed By	James Lane	Building Type	House, Detached
OCDEA Registration	EES/022679	Assessment Date	2022-08-19

Dwelling Details			
Assessment Type	As designed	Total Floor Area	143 m ²
Site Reference	H469-LG7 (97AP InSitu EW)	Plot Reference	H469-LG7 DS00
Address	Holden		

Client Details	
Name	GLP Ltd and Barratt Homes
Company	GLP Ltd and Barratt Homes
Address	Cowm Top Lane, Castleton, OL11

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	9.12 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	9.09 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	47.67 kWh _{PE} /m ²		
Dwelling primary energy	47.41 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	39.2 kWh/m ²		
Dwelling fabric energy efficiency	38.2 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	0.19	Walls (1) (0.19)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.15	150 TE PGF (0.15)	OK
Roofs	0.16	0.11	Roof (2) (0.17)	OK
Windows, doors, and roof windows	1.6	1.2	D1 (1.2)	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 ² K]	
Exposed wall: Walls (1)	142.054575	0.19	
Ground floor: 150 TE PGF, 150 TE PGF	74.02	0.15	
Exposed roof: Roof (1)	69.16	0.11	
Exposed roof: Roof (2)	4.32	0.17	
Exposed roof: Roof (3)	0.53	0.17	

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]
D1, Front door	2.373825	East	N/A	1.2
D2, Rear Door	1.9992	West	N/A	1.2
D3, French door	7.0665	West	0.7	1.2
D3(a), French door	1.9572	South	0.7	1.2
D3(b), French door	1.9572	North	0.7	1.2
W1, Window	1.419	East	0.7	1.2
W1(a), Window	0.8415	South East	0.7	1.2
W1(b), Window	0.8415	North East	0.7	1.2
W2, Window	1.5345	East	0.7	1.2
W3, Window	0.6615	North	0.7	1.2
W4, Window	1.098	West	0.7	1.2
W5, Window	1.5345	East	0.7	1.2

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
W6, Window	1.098	East	0.7	1.2
W7, Window	1.098	East	0.7	1.2
W8, Window	0.6615	North	0.7	1.2
W9, Window	1.098	West	0.7	1.2
W10, Window	1.098	West	0.7	1.2
W11, Window	1.098	West	0.7	1.2
W12, Window	1.098	West	0.7	1.2
W13, Window	0.6615	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	0.068	Keystone - KP00266
External wall	E3: Sill	Calculated by person with suitable expertise	0.028 (!)	BDW21 E3 (01a)
External wall	E4: Jamb	Calculated by person with suitable expertise	0.024 (!)	BDW21 E4 (01a)
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.089	BDW21 E5 (01a)
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.003 (!)	BDW21 E6 (01)
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.046	BDW21 E16 (01)
External wall	E4: Jamb	SAP table default	0.1	Lightpod / Hex Bay & 100 AP
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	Lightpod / Hex Bays & 100 AP
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.058	BDW21 E10 (01)
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	BDW21 E12 (01)
External wall	E14: Flat roof	SAP table default	0.16	Lightpod / Hexagonal Bay
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.086	BDW21 E17 (01)

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	5.01 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	88.9%
Emitter type	Radiators
Flow temperature	45°C
System type	Regular boiler
Manufacturer	Ideal Boilers
Model	LOGIC HEAT
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	180 litres
Declared heat loss	1.27 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: Instantaneous		
Efficiency	68.8%	
Manufacturer	Recoup Energy Solutions Ltd	
Model	Pipe+ HE	
Waste water heat recovery system 2 - type: Instantaneous		
Efficiency	51.0%	
Manufacturer	Recoup Energy Solutions Ltd	
Model	Pipe+ HE	
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	105.5 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		
Technology type: Photovoltaic system (1)		
Peak power	3.68 kWp	
Orientation	East	
Pitch	30°	
Overshading	None or very little	
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 Elmhurst Sap 10 SAP 10 program, 1.0

Date: Fri 19 Aug 2022 11:08:50

Project Information			
Assessed By	James Lane	Building Type	House, Mid-terrace
OCDEA Registration	EES/022679	Assessment Date	2022-08-19

Dwelling Details			
Assessment Type	As designed	Total Floor Area	76 m ²
Site Reference	Ellerton Mid Terrace	Plot Reference	Ellerton
Address	Holden		

Client Details	
Name	GLP Ltd and Barratt Homes
Company	GLP Ltd and Barratt Homes
Address	Cowm Top Lane, Castleton, OL11

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	10.97 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	10.39 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	57.23 kWh _{PE} /m ²		
Dwelling primary energy	55.89 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	31.7 kWh/m ²		
Dwelling fabric energy efficiency	30.3 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	0.19	Walls (1) (0.19)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	150 TE PGF (0.12)	OK
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	1.6	1.17	D2 (1.2)	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 ² K]	
Exposed wall: Walls (1)	27.23	0.19	
Exposed wall: Walls (2)	4.24	0.19	
Party wall: Party Wall (1)	80.31	0 (!)	
Ground floor: 150 TE PGF, 150 TE PGF	37.9	0.12	
Exposed roof: Roof (1)	37.9	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 ² K]
D1, BDW Std Front Door	1.98	East	N/A	1 (!)
D2, BDW Std Window	3.15	West	0.7	1.2
D2, BDW Std Window	3.15	West	0.7	1.2
W2, BDW Std Window	1.09	West	0.7	1.2
W3, BDW Std Window	0.66	East	0.7	1.2
W4, BDW Std Window	1.09	East	0.7	1.2
W6, BDW Std Window	1.09	West	0.7	1.2
W7, BDW Std Window	1.09	West	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	0.204	BDW21 E2 (01)
External wall	E3: Sill	Calculated by person with suitable expertise	0.028 (!)	BDW21 E3 (01a)
External wall	E4: Jamb	Calculated by person with suitable expertise	0.024 (!)	BDW21 E4 (01a)
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.089	BDW21 E5 (01a)
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.003 (!)	BDW21 E6 (01)
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.041	BDW21 E16 (01)
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.061	BDW21 E10 (01)
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.085	H+H 11/102/PW 01-GF01
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.076	H+H 11/102/PW 01-GF01
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	(d)

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	5.01 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	89.0%
Emitter type	Radiators
Flow temperature	45°C
System type	Combi boiler
Manufacturer	Ideal Boilers
Model	LOGIC CODE COMBI ESP1
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	1.27 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: Instantaneous	
Efficiency	51.0%
Manufacturer	Recoup Energy Solutions Ltd
Model	Pipe+ HE

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	105.5 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		
Technology type: Photovoltaic system (1)		
Peak power	0.68 kWp	
Orientation	East	
Pitch	30°	
Overshading	None or very little	
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 Elmhurst Sap 10 SAP 10 program, 1.0

Date: Fri 19 Aug 2022 11:10:49

Project Information			
Assessed By	James Lane	Building Type	House, Detached
OCDEA Registration	EES/022679	Assessment Date	2022-08-19

Dwelling Details			
Assessment Type	As designed	Total Floor Area	92 m ²
Site Reference	P341L-WG7 (97AP InSitu NS)	Plot Reference	P341L-WG7 DS00 (Hadley)
Address	Front Door North Hadley SAP Conventions 8.2		

Client Details	
Name	GLP Ltd and Barratt Homes
Company	GLP Ltd and Barratt Homes
Address	Cowm Top Lane, Castleton, OL11

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	12.12 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	11.7 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	63.42 kWh _{PE} /m ²		
Dwelling primary energy	61.57 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	41.4 kWh/m ²		
Dwelling fabric energy efficiency	40.7 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	0.19	Walls (1) (0.19)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.15	150mm Thermal Economics PGF (0.15)	OK
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	1.6	1.18	W1 (1.2)	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 ² K]
Exposed wall: Walls (1)	114.746875	0.19
Ground floor: 150mm Thermal Economics PGF, 150mm Thermal Economics PGF	45.83	0.15
Exposed roof: Roof (1)	45.83	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 ² K]
D1, BDW Std FD with Fanlight	2.373825	South	N/A	1 (!)
W1, BDW Std Window	1.5345	South	0.7	1.2
W2, BDW Std Window	1.5345	South	0.7	1.2
W3, BDW Std Window	1.098	North	0.7	1.2
D3, BDW Std Side Door	1.9992	North	N/A	1.2
D2, BDW Std Window	5.04	North	0.7	1.2
W4, BDW Std Window	1.38105	South	0.7	1.2
W5, BDW Std Window	0.567	South	0.7	1.2
W6, BDW Std Window	1.38105	South	0.7	1.2
W7, BDW Std Window	1.098	North	0.7	1.2
W8, BDW Std Window	1.098	North	0.7	1.2
W9, BDW Std Window	1.098	North	0.7	1.2

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
------	------------------------	-------------	--------------	------------------------------

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	0.204	BDW21 E2 (01a)
External wall	E3: Sill	Calculated by person with suitable expertise	0.028 (!)	BDW21 E3 (01a)
External wall	E4: Jamb	Calculated by person with suitable expertise	0.024 (!)	BDW21 E4 (01a)
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.089	BDW21 E5 (01a)
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.003 (!)	BDW21 E6 (01)
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.061	BDW21 E10 (09)
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	BDW21 E12 (01)
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.046	BDW21 E16 (01)

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		5.01 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	89.0%
Emitter type	Radiators
Flow temperature	45°C
System type	Combi boiler
Manufacturer	Ideal Boilers
Model	LOGIC CODE COMBI ESP1
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: Instantaneous	
Efficiency	70.7%
Manufacturer	Recoup Energy Solutions Ltd
Model	Pipe HEX

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: N/A	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	105.5 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		
Technology type: Photovoltaic system (1)		
Peak power	1.36 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
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		