BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Care Home Conversion - Renewables

As designed

Date: Tue Apr 29 11:18:42 2025

Administrative information

Building Details

Address: Care Home Conversion, 7 Belvedere Road, Redland, Bristol, BS6 7JG

Certifier details

Name: Benjamin Leech

Telephone number: 01242 506150

Address: Ground Floor Parker Court Knapp Lane, Cheltenham, GL50 3QJ

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

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

Foundation area [m^2]: 124.3

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

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	8.34	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	5.14	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	89.93	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	55.02	
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	0.22	0.23	1. Lower Ground Floor - Lounge_W_20
Floors	0.18	0.13	0.13	1. Lower Ground Floor - Lounge_S_3
Pitched roofs	0.16	0.13	0.13	4. Second Floor - Bedroom 12_R_19
Flat roofs	0.18	0.13	0.13	2. Ground Floor - Bedroom 1 En-Suite_R_13
Windows** and roof windows	1.6	1.2	1.2	1. Lower Ground Floor - Lounge_G_22
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.4	1.4	1. Lower Ground Floor - Dining Area_D_21
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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/m^2K

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	5

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- ASHP

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.84	-	-	-	-
Standard value	2.5*	N/A	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.					

1- From ASHP

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	0.001
Standard value	N/A	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	**SFP [W/(l/s)]**									**HR efficiency**	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
1. Lower Ground Floor - Lounge	-	-	-	-	0.9	-	-	-	-	0.9	N/A
1. Lower Ground Floor - Laundry	-	-	-	-	0.9	-	-	-	-	0.9	N/A
1. Lower Ground Floor - W.C.	-	-	-	-	0.9	-	-	-	-	0.9	N/A
1. Lower Ground Floor - Dining Area	-	-	-	-	0.9	-	-	-	-	0.9	N/A
1. Lower Ground Floor - Staff Area	-	-	-	-	0.9	-	-	-	-	0.9	N/A
1. Lower Ground Floor - Kitchenette	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 1 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 1	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 2	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 2 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 4	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 4 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Day Room	-	-	-	-	0.9	-	-	-	-	0.9	N/A
2. Ground Floor - Bedroom 3	-	-	-	-	0.9	-	-	-	-	0.9	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
2. Ground Floor - Bedroom 3 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 8	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 8 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 5	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 7	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Store	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 7 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Day Room	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 5 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 6 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
3. First Floor - Bedroom 6	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 9 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 9	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 10	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 10 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 12	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 12 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 11 En-Suite	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Day Room	-	-	-	-	0.9	-	-	-	-	0.9	N/A
4. Second Floor - Bedroom 11	-	-	-	-	0.9	-	-	-	-	0.9	N/A

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
1. Lower Ground Floor - Lounge	130	-	-
1. Lower Ground Floor - Lobby and Lift	130	-	-
1. Lower Ground Floor - Laundry	130	-	-
1. Lower Ground Floor - Hallway	130	-	-
1. Lower Ground Floor - W.C.	130	-	-
1. Lower Ground Floor - Dining Area	130	-	-
1. Lower Ground Floor - Staff Area	130	-	-
1. Lower Ground Floor - Kitchenette	130	-	-
2. Ground Floor - Store 1	130	-	-
2. Ground Floor - Bedroom 1 En-Suite	130	-	-
2. Ground Floor - Bedroom 1	130	-	-
2. Ground Floor - Bedroom 2	130	-	-
2. Ground Floor - Store 2	130	-	-
2. Ground Floor - Bedroom 2 En-Suite	130	-	-
2. Ground Floor - Store 4	130	-	-
2. Ground Floor - Lobby and Lift	130	-	-
2. Ground Floor - Bedroom 4	130	-	-
2. Ground Floor - Bedroom 4 En-Suite	130	-	-
2. Ground Floor - Day Room	130	-	-

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
2. Ground Floor - Central Corridor	130	-	-
2. Ground Floor - Store 3	130	-	-
2. Ground Floor - Bedroom 3	130	-	-
2. Ground Floor - Bedroom 3 En-Suite	130	-	-
3. First Floor - Lobby and Lift	130	-	-
3. First Floor - Bedroom 8	130	-	-
3. First Floor - Bedroom 8 En-Suite	130	-	-
3. First Floor - Central Corridor	130	-	-
3. First Floor - Bedroom 5	130	-	-
3. First Floor - Bedroom 7	130	-	-
3. First Floor - Store	130	-	-
3. First Floor - Bedroom 7 En-Suite	130	-	-
3. First Floor - Day Room	130	-	-
3. First Floor - Bedroom 5 En-Suite	130	-	-
3. First Floor - Bedroom 6 En-Suite	130	-	-
3. First Floor - Bedroom 6	130	-	-
4. Second Floor - Bedroom 9 En-Suite	130	-	-
4. Second Floor - Bedroom 9	130	-	-
4. Second Floor - Bedroom 10	130	-	-
4. Second Floor - Bedroom 10 En-Suite	130	-	-
4. Second Floor - Lobby and Lift	130	-	-
4. Second Floor - Bedroom 12	130	-	-
4. Second Floor - Bedroom 12 En-Suite	130	-	-
4. Second Floor - Bedroom 11 En-Suite	130	-	-
4. Second Floor - Day Room	130	-	-
4. Second Floor - Bedroom 11	130	-	-
4. Second Floor - Store	130	-	-
4. Second Floor - Central Corridor	130	-	-

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?
1. Lower Ground Floor - Lounge	NO (-12.9%)	NO
1. Lower Ground Floor - Laundry	NO (-65.9%)	NO
1. Lower Ground Floor - Dining Area	NO (-65.1%)	NO
1. Lower Ground Floor - Staff Area	NO (-93.1%)	NO
2. Ground Floor - Bedroom 1	NO (-59.2%)	NO
2. Ground Floor - Bedroom 2	NO (-13.3%)	NO
2. Ground Floor - Bedroom 4	NO (-18.6%)	NO
2. Ground Floor - Day Room	NO (-94.6%)	NO
2. Ground Floor - Bedroom 3	NO (-29.8%)	NO
3. First Floor - Bedroom 8	NO (-55.3%)	NO
3. First Floor - Bedroom 5	NO (-29%)	NO
3. First Floor - Bedroom 7	NO (-57.1%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3. First Floor - Day Room	NO (-45.7%)	NO
3. First Floor - Bedroom 6	NO (-23%)	NO
4. Second Floor - Bedroom 9	NO (-81.7%)	NO
4. Second Floor - Bedroom 10	NO (-87.2%)	NO
4. Second Floor - Bedroom 12	NO (-91%)	NO
4. Second Floor - Bedroom 11	NO (-92.4%)	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]	497.2	497.2
External area [m^2]	694.4	694.4
Weather	CAR	CAR
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	208.51	297.97
Average U-value [W/m^2K]	0.3	0.43
Alpha value* [%]	59.07	40.84

* 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
2	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
98	**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	3.52	8.61
Cooling	0	0
Auxiliary	14.9	11.92
Lighting	11.75	11.89
Hot water	15.74	28.18
Equipment*	53.5	53.5
TOTAL**	**45.91**	**60.6**

* 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	9.93	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*9.93*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	342.56	325.38
Primary energy [kWh_{PE}/m^2]	55.02	89.93
Total emissions [kg/m^2]	5.14	8.34

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] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	54.8	287.8	3.5	0	14.9	4.32	0	4.84	0
	Notional	81.9	243.5	8.6	0	9.9	2.64	0	----	----

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