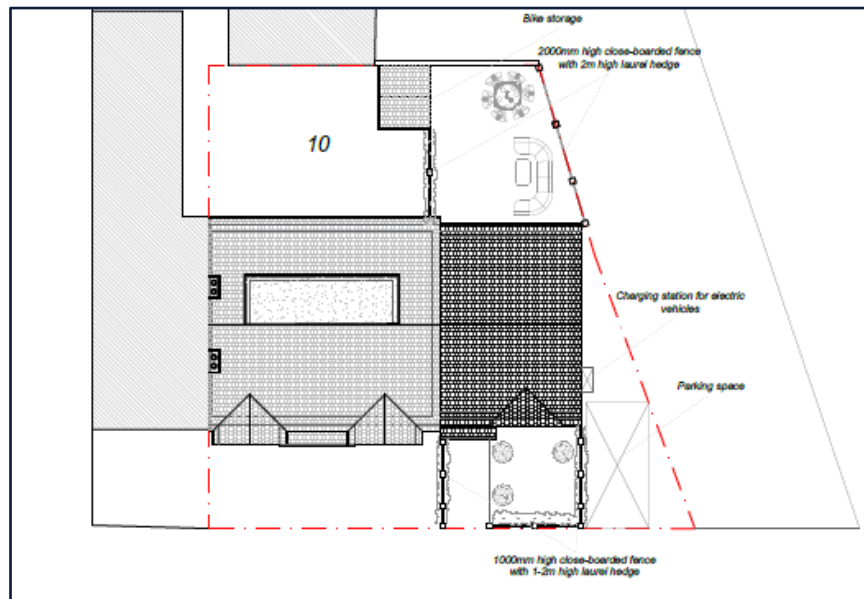




SAP Compliance Report

Proposed two storey side extension and creation of new end of terrace dwelling

At

10 Holmes Road

Reading

RG6 7BH

Detailed Design Stage

Consultant: Wires & Wireless Ltd
28 Wheatcroft way
Swindon
SN1 2RA

Revision	Designed	Date
A	ZA	02.11.2020

Contents

1	Executive Summary	3
2	Introduction.....	3
3	SAP Model	4
3.1	Related Documents	4
3.1.1	Drawings.....	4
3.2	Modeling Assumptions.....	4
3.2.1	Building Fabric	4
3.2.2	Services.....	5
4	Part L Compliance.....	6
4.1	Part L1A 2013 Criteria	6
4.2	Part L Compliance Results	6
4.3	Part L Compliance Conclusion	6
5	Appendix A: SAP Input	
6	Appendix B: Regulation Compliance Report	
7	Appendix C: Overheating Assessment	
8	Appendix D: Predicated Energy Assessment (PEA)	

1 Executive Summary

Proposed two storey side extension and creation of new end of terrace dwelling at 10 Holmes Road, Reading, RG6 7BH was investigated to test compliance with Part L1A (2013) of the Building Regulations. The thermal modeling has demonstrated the proposed construction is an efficient building that fully complies with the regulations and **planning target to achieve 19% Carbon reduction over Part L2013.**

The key results for carbon emissions are as follows:

- DER (Dwelling Emission Rate) = **15.61** kgCO₂/m².annum
- TER (Target Emission Rate) = **19.51** kgCO₂/m².annum

Hence this development achieves **20.0 %** reduction over the PartL1A target.

- DFEE (Dwelling Fabric Energy Efficiency) = **55.50** KWh/m²
- TFEE (Target Fabric Energy Efficiency) = **55.80** KWh/m²

Hence this development achieves **0.53%** Improvement of Target.

2 Introduction

This report outlines the calculations for **Proposed two storey side extension and creation of new end of terrace dwelling at 10 Holmes Road, Reading, RG6 7BH** with regards to the following:

- CO₂ emissions
- Building fabric performance
- Building services performance
- Summertime overheating

The purpose of the calculations is to demonstrate compliance with 'Part L1A 2013' of the building regulations which applies to new build dwellings.

The approved SAP 2012 calculation methodology was used to perform the analysis.

To establish the envelop areas, Architect's floor plans, elevations and section were used.

Detailed energy analysis could then be completed using FSAP 2012 (Version 1.0.5.9).

3 SAP Model

Architectural drawings were used to establish envelop areas of the dwelling:

A full list of all the documents used for creating the model can be found below:

3.1 Related Documents

3.1.1 Drawings

- 10 Holmes Rd_Reading – Location Plan
- 10 Holmes Rd_Reading – Proposed Floor Plans B
- 10 Holmes Rd_Reading – Proposed Elevations B

3.2 Modeling Assumptions

The following assumptions were made in creating the thermal model:

3.2.1 Building Fabric

Constructions

Details of the building fabric can be seen in the table below:

Element Type	U Value (W/m ² k)	G Value
Wall	0.24	-
Roof	0.11	
Ground Floor	0.12	
Window Frames	1.40	-
Window	1.40	0.63
Doors	1.40	0.63

Note: It is assumed that Building construction details will be in accordance with BRE accredited construction details.

Air Permeability

It is assumed the building is designed to **4.0m³/m².hr @50Pa**

3.2.2 Services

Space Heating

Conditions/Controls	
Boiler	Vaillant eco TEC Plus 825
Heating Type	Combi Boiler
Heating Controls	Programmer, room thermostat and TRVs
Fuel Type	Gas
Heating Efficiency (SEDBUK) (%)	89.5
Heating Emitter	Radiator

Domestic Hot Water

Conditions/Controls
Form Combi Boiler

Photovoltaic Panels

Panel Parameter	
Installed Peak Power (kW)	1.0 KWp
PV Generator Area (m ²)	6-8 m2
Tilt of Panel (°)	30
Panel Orientation (°)	South

4 Part L Compliance

4.1 Part L1A 2013 Criteria

As a new build dwelling, the project will need to comply with Part L1A (2013) of the building regulations. This document outlines 5 criteria for compliance:

Criterion 1: (Mandatory)

"The calculated rate of CO₂ emissions from the dwelling (DER) must not be greater than the Target Emission Rate (TER)"

Criterion 2: (Guidance)

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

Criterion 3: (Guidance)

"The dwelling should have appropriate passive control measures to limit the effect of solar gains on indoor temperatures in summer"

Criterion 4: (Guidance)

"The performance of the dwelling, as built, should be consistent with the DER"

Criterion 5: (Guidance)

"The necessary provisions for energy efficient operation of the dwelling should be put in place"

Criteria 4 and 5 relate to the building after construction, so this analysis purely focuses on the first 3.

4.2 Part L Compliance Results

The full results summary can be found as below:

- Appendix A: SAP Input
- Appendix B: Regulation Compliance Report
- Appendix C: Overheating Assessment
- Appendix D: Predicated Energy Assessment (PEA)

4.3 Part L Compliance Conclusion

The project achieved a DER of **15.61 kg/m²** which is **20.0 %** less than the TER and DFEE of **55.50 kWh/m²** which is **0.53%** less than the TFEE. Hence able to justify planning condition of minimum **carbon emission of 19% over Part L2013.**

5 Appendix A: SAP Input

SAP Input

Property Details: 10a Holmes Road

Address: 10a HOLMES ROAD, READING, READING, RG6 7BH
Located in: England
Region: Thames valley
UPRN: UPRN-000310042880
Date of assessment: 01 November 2020
Date of certificate: 02 November 2020
Assessment type: New dwelling design stage
Transaction type: New dwelling
Tenure type: Unknown
Related party disclosure: No related party
Thermal Mass Parameter: Indicative Value Medium
Water use <= 125 litres/person/day: True
PCDF Version: 467

Property description:

Dwelling type: House
Detachment: End-terrace
Year Completed: 2020
Floor Location: Floor area: Storey height:
 Floor 0 36.18 m² 2.4 m
 Floor 1 36.18 m² 2.65 m
Living area: 10.54 m² (fraction 0.146)
Front of dwelling faces: South

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
Front Door	Manufacturer	Half glazed	double-glazed	Yes	PVC-U
GF Rear Door	Manufacturer	Half glazed	double-glazed	Yes	PVC-U
GF S Window	Manufacturer	Windows	double-glazed	Yes	
GF N Window	Manufacturer	Windows	double-glazed	Yes	
FF S Window	Manufacturer	Windows	double-glazed	Yes	
FF N Window	Manufacturer	Windows	double-glazed	Yes	

Name:	Gap:	Frame Factor:	g-value:	U-value:	Area:	No. of Openings:
Front Door	16mm or more mm	0.7	0.63	1.4	3.5	1
GF Rear Door	16mm or more mm	0.7	0.63	1.4	2.294	1
GF S Window	16mm or more	0.71	0.63	1.4	2.632	1
GF N Window	16mm or more	0.71	0.63	1.4	2.074	1
FF S Window	16mm or more	0.71	0.63	1.4	3.875	1
FF N Window	16mm or more	0.71	0.63	1.4	2.831	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
Front Door		GF Wall	South	0	0
GF Rear Door		GF Wall	North	0	0
GF S Window		GF Wall	South	0	0
GF N Window		GF Wall	North	0	0
FF S Window		FF Wall	South	0	0
FF N Window		FF Wall	North	0	0

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
<u>External Elements</u>							
GF Wall	41.808	10.5	31.31	0.24	0	False	N/A
FF Wall	46.163	6.71	39.46	0.24	0	False	N/A

SAP Input

Roof - Joist	36.18	0	36.18	0.11	0	N/A
Ground Floor	36.18			0.12		N/A

Internal Elements

Party Elements

Thermal bridges:

Thermal bridges:	User-defined (individual PSI-values) Y-Value = 0.0992				
	Length	Psi-value			
[Approved]	9.705	0.3	E2	Other lintels (including other steel lintels)	
[Approved]	7.345	0.04	E3	Sill	
[Approved]	34.73	0.05	E4	Jamb	
[Approved]	17.42	0.16	E5	Ground floor (normal)	
[Approved]	17.42	0.07	E6	Intermediate floor within a dwelling	
[Approved]	8.18	0.06	E10	Eaves (insulation at ceiling level)	
[Approved]	9.24	0.24	E12	Gable (insulation at ceiling level)	
[Approved]	10.1	0.09	E16	Corner (normal)	
[Approved]	10.1	0.06	E18	Party wall between dwellings	
	6.84	0.16	P1	Ground floor	
	6.84	0	P2	Intermediate floor within a dwelling	
	6.84	0.24	P4	Roof (insulation at ceiling level)	

Ventilation:

Pressure test:	Yes (As designed)
Ventilation:	Natural ventilation (extract fans)
Number of chimneys:	0
Number of open flues:	0
Number of fans:	2
Number of passive stacks:	0
Number of sides sheltered:	1
Pressure test:	4

Main heating system:

Main heating system:	Boiler systems with radiators or underfloor heating
	Gas boilers and oil boilers
	Fuel: mains gas
	Info Source: Boiler Database
	Database: (rev 467, product index 018218) Efficiency: Winter 80.3 % Summer: 90.4
	Brand name: Vaillant
	Model: ecoTEC plus 825
	Model qualifier: VUW 196/5-5 (H-GB) R6
	(Combi boiler)
	Systems with radiators
	Central heating pump : 2013 or later
	Design flow temperature: Unknown
	Boiler interlock: Yes

Main heating Control:

Main heating Control:	Programmer, room thermostat and TRVs
	Control code: 2106

Secondary heating system:

Secondary heating system:	None
---------------------------	------

Water heating:

Water heating:	From main heating system
	Water code: 901
	Fuel :mains gas
	No hot water cylinder
	Solar panel: False

SAP Input

Others:

Electricity tariff:	Standard Tariff
In Smoke Control Area:	Unknown
Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Low rise urban / suburban
EPC language:	English
Wind turbine:	No
Photovoltaics:	<u>Photovoltaic 1</u> Installed Peak power: 1 Tilt of collector: 30° Overshading: None or very little Collector Orientation: South
Assess Zero Carbon Home:	No

6 Appendix B: Regulation Compliance Report

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.9
Printed on 02 November 2020 at 06:49:26

Project Information:

Assessed By: Zahid Ashraf (STRO023144) **Building Type:** End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 72.36m²

Site Reference : 10 Holmes Road

Plot Reference: 10a Holmes Road

Address : 10a HOLMES ROAD, READING, READING, RG6 7BH

Client Details:

Name:

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.51 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 15.61 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 55.8 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 55.5 kWh/m²

OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	OK
Floor	0.12 (max. 0.25)	0.12 (max. 0.70)	OK
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	OK
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 4.00 (design value)
Maximum 10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 467, product index 018218):
Boiler systems with radiators or underfloor heating - mains gas
Brand name: Vaillant
Model: ecoTEC plus 825
Model qualifier: VUW 196/5-5 (H-GB) R6
(Combi)
Efficiency 89.5 % SEDBUK2009
Minimum 88.0 %

OK

Secondary heating system: None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Programmer, room thermostat and TRVs **OK**
 Hot water controls: No cylinder thermostat

No cylinder
 Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%
 Minimum: 75.0% **OK**

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**

Based on:

Overshading: Average or unknown
 Windows facing: South 2.63m²
 Windows facing: North 2.07m²
 Windows facing: South 3.88m²
 Windows facing: North 2.83m²
 Ventilation rate: 4.00

10 Key features

Roofs U-value: 0.11 W/m²K
 Floors U-value: 0.12 W/m²K
 Photovoltaic array

7 Appendix C: Overheating Assessment

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 02 November 2020

Property Details: 10a Holmes Road

Dwelling type:	End-terrace House
Located in:	England
Region:	Thames valley
Cross ventilation possible:	Yes
Number of storeys:	2
Front of dwelling faces:	South
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Medium
Night ventilation:	False
Blinds, curtains, shutters:	
Ventilation rate during hot weather (ach):	4 (Windows open half the time)

Overheating Details:

Summer ventilation heat loss coefficient:	241.18	(P1)
Transmission heat loss coefficient:	64.5	
Summer heat loss coefficient:	305.63	(P2)

Overhangs:

Orientation:	Ratio:	Z_overhangs:
South (GF S Window)	0	1
North (GF N Window)	0	1
South (FF S Window)	0	1
North (FF N Window)	0	1

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
South (GF S Window)	1	0.9	1	0.9	(P8)
North (GF N Window)	1	0.9	1	0.9	(P8)
South (FF S Window)	1	0.9	1	0.9	(P8)
North (FF N Window)	1	0.9	1	0.9	(P8)

Solar gains:

Orientation		Area	Flux	g_	FF	Shading	Gains
South (GF S Window)	0.9 x	2.63	112.21	0.63	0.71	0.9	107
North (GF N Window)	0.9 x	2.07	81.19	0.63	0.71	0.9	61.01
South (FF S Window)	0.9 x	3.88	112.21	0.63	0.71	0.9	157.53
North (FF N Window)	0.9 x	2.83	81.19	0.63	0.71	0.9	83.27
Total							408.81 (P3/P4)

Internal gains:

	June	July	August
Internal gains	409.79	393.2	401.49
Total summer gains	840.1	802.01	779.79 (P5)
Summer gain/loss ratio	2.75	2.62	2.55 (P6)
Mean summer external temperature (Thames valley)	16	17.9	17.8
Thermal mass temperature increment	0.25	0.25	0.25
Threshold temperature	19	20.77	20.6 (P7)
Likelihood of high internal temperature	Not significant	Slight	Slight

SAP 2012 Overheating Assessment

Assessment of likelihood of high internal temperature: Slight

8 Appendix D: Predicated Energy Assessment (PEA)

Predicted Energy Assessment



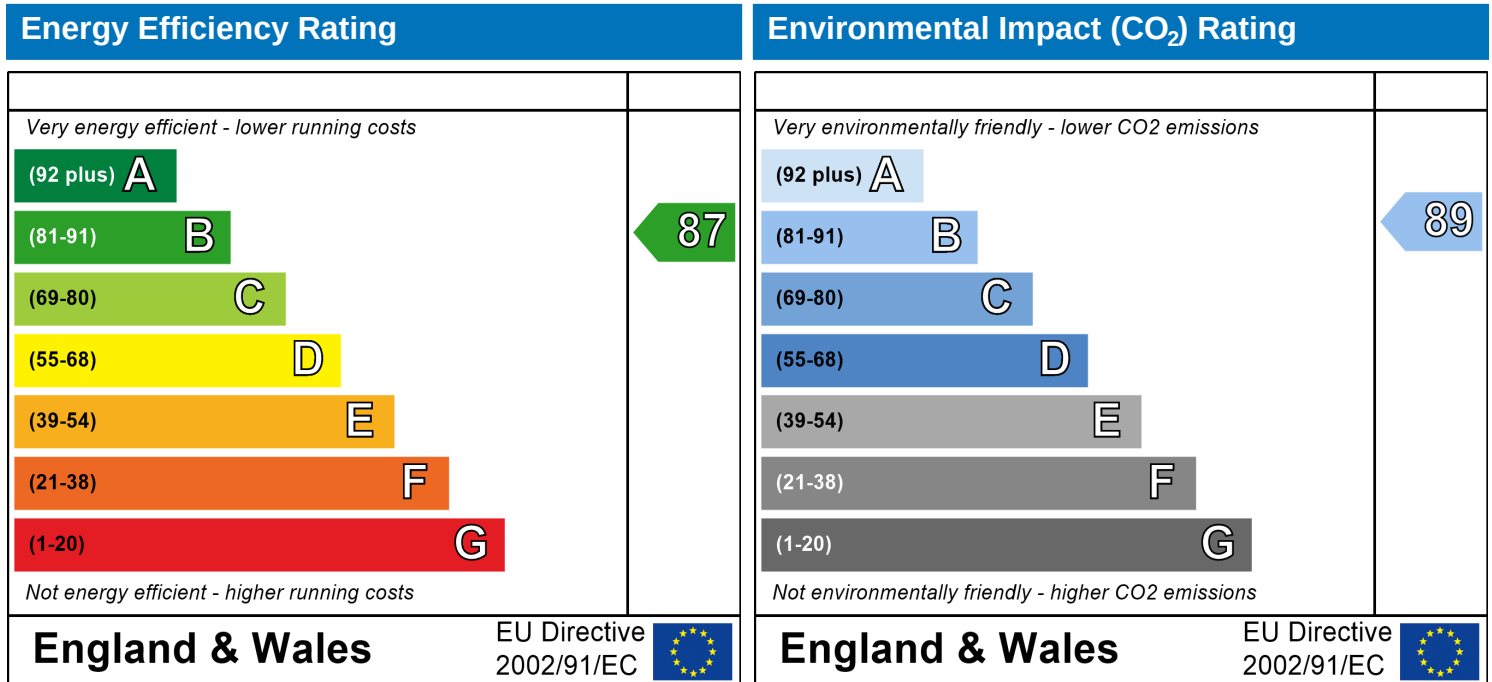
10a HOLMES ROAD
READING
READING
RG6 7BH

Dwelling type:
Date of assessment:
Produced by:
Total floor area:

End-terrace House
01 November 2020
Zahid Ashraf
72.36 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.