



Energy & Sustainability Report

Finchampstead, Parcel 8

Client: Barratt Homes Southern Counties
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www.environmental-economics.co.uk

Revision History

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1	30/01/2024	<i>Ruth Ferguson BSc</i> <i>Rob Holbrook BSc MSc</i>	<i>Tim James C.Eng</i> <i>MCIBSE BSc MSc</i>

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:

- *Energy Reports*
- *Sustainability Statements*
- *Compliance assessments and advice covering*
 - *Part L (SAP)*
 - *Part F (ventilation)*
 - *Part G (water)*
- *Overheating assessments*
- *BREEAM*
- *SBEM (existing and new build)*
- *Minimum Energy Efficiency Standards (MEES)*
- *Thermal Bridging (Psi value calculations)*

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1. Executive Summary

- 1.1.1. Environmental Economics Ltd has been commissioned by Barratt Homes Southern Counties to prepare an energy and sustainability report for the residential site Finchampstead Parcel 8. This document sets out how the development proposal presents a positive sustainable development.
- 1.1.2. As part of the sustainable development strategy, the proposed development has been designed to consider sustainability in accordance with the National Planning Policy Framework (NPPF) and Part L 2021 Building Regulations.
- 1.1.3. The proposed development is designed to achieve carbon emissions in line with Part L 2021 through the adoption of good fabric performance and employment of low and zero carbon technologies.
- 1.1.4. All plots on site will be built to comply with Part L1A 2021, which represents a 31% uplift against Part L1A 2013.
- 1.1.5. Prior to commencement of development, the following shall be submitted to and agreed in writing by the Local Planning Authority:
 - a. Details to demonstrate how the development will achieve a 10% reduction in carbon emissions beyond the minimum requirements of Part L: Building Regulations; or
 - b. An alternative strategy which can demonstrate a greater carbon saving than would be achieved by a. (above).

The approved measures shall be installed and functional before first occupation of the buildings they are intended to serve.
- 1.1.6. An uplift of approximately 12.7% over Part L 2021 is achieved across the modelled house types, therefore meeting the 10% required by the policy.
- 1.1.7. The use of smart meters will provide occupiers with real time data which will allow occupiers to manage their energy consumption, save money and reduce Carbon. This is particularly important as the UK migrates towards half-hourly pricing levels and the proposed smart grid system.
- 1.1.8. Potential overheating risk will be assessed in accordance with Approved Document O.
- 1.1.9. Water efficiency has been reviewed as part of the design process and a Part G compliant specification will be adopted, resulting in the higher standard (lower water use) of 105 litres/person/day.
- 1.1.10. While the development is still at an early stage of the design process, it is considered that the proposal meets or exceeds the required level of sustainability across all given criteria.

2. Project Overview

2.1. Description of Site

- 2.1.1. The site proposal consists of the construction of 40 residential dwellings which include detached, semi-detached and terraced houses, along with apartments.
- 2.1.2. The proposed site plan is shown in Appendix A.

2.2. Brief

- 2.2.1. The planning authority for this site is Wokingham Borough Council.
- 2.2.2. Within the Local Plan there are several relevant policies which are addressed herein.
- 2.2.3. Outline Planning Permission Condition 49
*"49. The reserved matters for each phase of the development shall include either:
a. Details to demonstrate how the development will achieve a 10% reduction in carbon emissions beyond the minimum requirements of Part L: Building Regulations; or
b. An alternative strategy which can demonstrate a greater carbon saving than would be achieved by a. (above).
The approved measures will be installed and functional before the first occupation of the buildings they are intended to serve."*
- 2.2.4. Further conditions which this development must meet are condition 51 and 52 below:
*"51. The reserved matters for each phase of the development shall include provision for all dwellings within the phase with a garden with
a. A water butt of an appropriate size installed to maximise rainwater collection; and
b. Space for composting
Unless it can be demonstrated to the satisfaction of the Local Planning Authority that is not practicable to accommodate it within the curtilage of the building.
52. The reserved matters for each phase of the development shall include details of measures to reduce water consumption as far as possible. The measures shall be implemented in accordance with the approved details before first occupation of any building within the phase and shall be retained thereafter unless their replacement would result in improved water consumption."*
- 2.2.5. This report seeks to address the planning policies relevant for the proposed site and present a sustainable strategy.
- 2.2.6. This report should be read in conjunction with other reports prepared for this development.

2.3. Building Regulations

- 2.3.1. The 40 dwellings for this development now fall under Part L1A 2021 of the building regulations, and therefore will be required to follow SAP 10 methodology. Part L1A 2021 regulations have a higher standard in carbon requirements than Part L1A 2013. Specifically, any plots which are built to Part L 2021 (using SAP 10) will exceed current Part L1A 2013 regulations by 31%.
- 2.3.2. In addition to the higher standards, some of the carbon content for different types of fuel has changed, meaning that the resultant carbon emissions will be calculated differently.

3. Sustainability Appraisal

3.1. Green Guide Specification

- 3.1.1. The Green Guide is used to examine the environmental impact of the construction materials commonly used within dwellings.
- 3.1.2. The standard specification of materials used by Barratt Homes consists of predominantly 'A' and 'A+' Green Guide rated elements. 'A+' rated construction elements include: pitched roof construction, internal upper floors, internal timber partitions and external cavity walls.
- 3.1.3. Table 1 below shows a sample of materials used by Barratt Homes and their Green Guide rating.

Table 1

<i>Element</i>	<i>Green Guide Equivalent (online)</i>	<i>Code</i>	<i>Rating</i>
Ground Floor Option A (Beam and Aircrete Block)	Screed on insulation laid on grouted beam and Aircrete block flooring.	820140014	B
Ground Floor Option B (Beam and EPS Block)	Structural topping on beam and expanded polystyrene flooring	820140015	A+
Internal Upper Floors	Chipboard decking on timber I joists	807280024	A+
Wall – External Cavity (single & 2 storey) – Brick	Brickwork outer leaf, insulation, Aircrete blockwork inner leaf, cement mortar, plasterboard on battens, paint	806170615	A+
Wall – External Timber Frame (single and 2 storey)	UK produced natural slate on timber battens, breather membrane, OSB/3 sheathing, timber frame with insulation, vapour control layer, plasterboard on battens, paint	806210566	A+
Wall – Internal Partition (timber) non loadbearing	Timber stud, plasterboard, paint	809760003	A+
Wall – Internal Partitions (masonry) (Used in very small number of cases)	Medium dense solid blockwork, plasterboard, paint	809180008	B
Wall – Party (cavity)	Robust Detail E-WM-20: Twin leaf 100mm min. solid medium dense blocks (1350-1600kg/m ³), with 100mm min. cavity including proprietary glass wool acoustic roll, type A wall ties, with gypsum-based board (9.8kg/m ²) on dabs and paint to each side	1118190007	C
Windows	PVC-U window with steel reinforcement, double glazed	813100009	A
Insulation	Glass wool insulation - density 12 kg/m ³	815320001	A+
Pitched Roof	Timber trussed rafters and joists with insulation, roofing underlay, counterbattens, battens and concrete plain tiles	812410017	A+

3.2. Responsible Sourcing

- 3.2.1. BDW has an established network of responsible sourcing certified suppliers that have been carefully selected to align with sustainability and responsible sourcing policies.
- 3.2.2. Materials used within construction of the proposed development will be at a certified standard, proving the materials sourced have been done so with sustainability in mind.
- 3.2.3. Responsible sourcing of materials can come in a variety of certifications including: BES 6001, FSC, PEFC and EMS.
- 3.2.4. Appendix B shows a wide range of Barratt's suppliers with material responsible sourcing certification including:
- *Wallboard supplier British Gypsum;*
 - *Aggregate/cement product supplier Tarmac.*
 - *Aircrete block supplier H+H Celcon;*
 - *Brick supplier Ibstock Brick.*
- 3.2.5. Additionally, the site aims to utilise timber that is procured sustainably and independently accredited by either the FSC or PEFC schemes. The Barratt Homes Sustainable Procurement Policy can be seen in Appendix C. The policy sets a high standard of sustainability when sourcing materials.

3.3. Waste Management

- 3.3.1. Appendix D shows an extract of BDW's Sustainability Framework 2020+ that sets targets for waste management including at least 95% construction waste diverted from landfill as well as continued reductions in construction waste intensity.
- 3.3.2. The scheme aims to use waste reduction procedures to enable waste reduction and diversion of waste from landfill. The goal is to minimise waste and maximise re-use of resources in response to climate change. BDW achieved 97% of construction waste diverted from landfill in 2018 and BDW's Sustainability Framework 2020+ sets targets to continue diversion from landfill and reduce construction waste intensity.

3.4. Flood Risk

- 3.4.1. Appendix E shows the Environment Agency Flood Risk Map for the site location.
- 3.4.2. All residential development on site will be within Flood Zone 1, the lowest probability evaluated by the Environment Agency. Flood Zone 1 is defined as land with less than 1 in 1000 annual probability of river or sea flooding.
- 3.4.3. Zone 1 flood risk is considered best practice for a positive sustainable development and would be well located for a site that is resilient to climate change.

3.5. Electric Vehicle Charging

- 3.5.1. Providing EV charging points or the ability to retrofit EV charging points is an exemplary measure for sustainability and promotes sustainable lifestyles for residents.
- 3.5.2. With the provision of EV charging points, residents would have ready opportunity to purchase / lease EV's and have immediate secure charging infrastructure. This aligns with current government policy to stop the sale of new petrol and diesel cars by 2030 (GOV.UK, November 2020).
- 3.5.3. The BEAMA Guide to Electric Vehicle Infrastructure (BEAMA, 2015) illustrates the various "Modes" of electric car charging, with Mode 1 being the slowest, and Mode 4 the fastest. Mode 1 is not recommended and Mode 4 is only recommended for public and commercial use. Modes 2 to 3 are suitable for dedicated charging of EV's at domestic properties. Please refer to Figure 1 below which shows common infrastructure side connections for Mode 2 and 3.

CONNECTOR TYPE	BS 1363	BS EN 60309-2	BS EN 62196-2 TYPE 2	BS EN 62196-2 TYPE 3
				
MODE	2	2	3	3
MAX POWER (kW) (at mains voltage i.e. harmonised EU voltages)	Single phase - 3	Single phase - 28.8 Three phase - 86.6	Single phase - 16.1 Three phase - 43.7	Single phase - 7.4 Three phase - 43.7
NOTES	Standard UK household plug & socket-outlet system	Standard industrial plug & socket-outlet system	Specialist EV	Specialist EV

Figure 1 – Common infrastructure options for Mode 2 and 3 EV charging points (BEAMA, 2015)

- 3.5.4. It is currently proposed that there will be provision of one EV charging point for all plots in line with Part S of the Building Regulations.
- 3.5.5. The full specification of these charging points will be determined during detailed design stage.

3.6. Water Use

3.6.1. The design team will implement a specification which complies with the optional requirement of 110 litres/person/day as set out in Approved Document G 2015 with 2016 amendments (AD-G).

3.6.2. While the build specifications are not yet set, the table below provides an example of a compliant strategy, delivering reduced water consumption of 110litres/person/day.

		(1)	(2)	(3)	(4)
Installation type	Unit of measure	Capacity / flow rate	Use factor	Fixed use (litres/person/day)	Litres/person/day = [(1) × (2)] + (3)
WC (single flush)	Flush volume (litres)	-	4.42	0.00	0
WC (dual flush)	Full flush volume (litres)	4	1.46	0.00	5.84
	Part flush volume (litres)	2.6	2.96	0.00	7.696
WCs (multiple fittings)	Average effective flushing volume (litres)	-	4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/minute)	5	1.58	1.58	9.48
Bath (where shower also present)	Capacity to overflow (litres)	170	0.11	0.00	18.7
Shower (where bath also present)	Flow rate (litres/minute)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)	-	0.50	0.00	0
Shower only	Flow rate (litres/minute)	-	5.60	0.00	0
Kitchen/utility room sink taps	Flow rate (litres/minute)	5	0.44	10.36	12.56
Washing machine	Litres/kg dry load	8.17	2.1	0.00	17.157
Dishwasher	Litres/place setting	1.25	3.6	0.00	4.5
Waste disposal unit	Litres/use (If present = 1 If absent = 0)	0	3.08	0.00	0
Water softener	Litres/person/day	-	1.00	0.00	0
	(5)	Total calculated use = (Sum column 4)			115.3
	(6)	Contribution from greywater (litres/person/day) from Table 4.6			0
	(7)	Contribution from rainwater (litres/person/day) from Table 5.5			0
	(8)	Normalisation factor			0.91
	(9)	Total water consumption = [(5) – (6) – (7)] x (8)			104.9
	(10)	External water use			5.0
Approved Document G	(11)	Total water consumption = (9) + (10) (litres/person/day)			109.9

3.6.3. Alternative component consumption rates are available which can achieve the required water consumption. The rates provided are representative only.

3.6.4. Plots which have a rear garden will be provided with water butts to allow for further reductions of potable water use in compliance with Condition 51.

3.7. Composting

- 3.7.1. Plots which have a rear garden will have the provision for composting. Home composting facilities are to consist of an external composting container, specifically designed for composting, sited according to the manufacturer's instructions. These containers are to be housed sufficient distance from windows, doors and ventilation intakes of surrounding dwellings.
- 3.7.2. The development therefore complies with the composting requirements of Condition 51.

4. Design Response

4.1. Assessment Methodology

4.1.1. Environmental Economics have modelled a sample of the proposed dwellings using the software Design SAP 10 by Elmhurst and approved by BRE. 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)*

4.1.2. 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.*

4.1.3. SAP software is issued by independent software suppliers and checked and approved on behalf of government by the Building Research Establishment (BRE).

4.1.4. The draft SAP reports used in this energy report are shown in Appendix G.

4.2. Design Philosophy

4.2.1. 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 2 below.

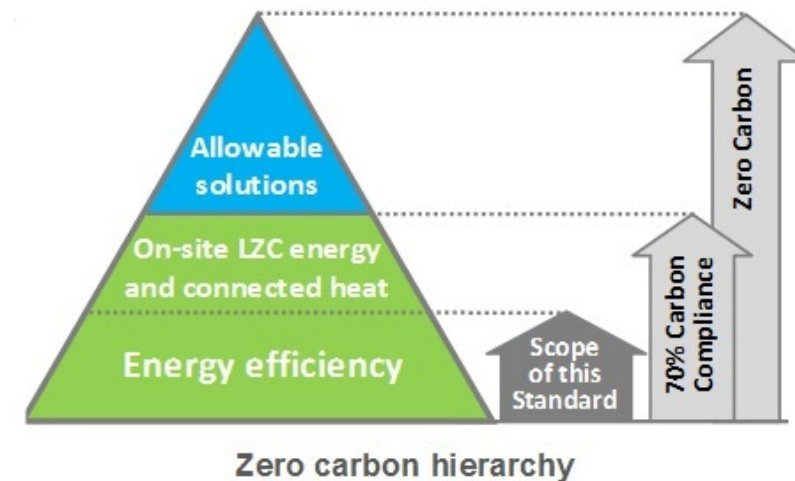


Figure 2

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

- *Improved insulation levels;*
- *Upgraded heating and hot water controls;*
- *Design air permeability of 4.00m³/hr/m²;*
- *Bespoke, low heat loss thermal bridging details.*

4.3. Fabric Improvements Part L1A 2021

- 4.3.1. The building fabric for all dwellings within the proposed development will be improved in comparison to ADL 2013 specifications, and in relation to the ADL 2021 backstop notional specification. These fabric improvements reduce the space heating requirement upon a property. The improvements will be 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.
- 4.3.2. Proposed fabric designs and U-Values can be found in Table 2 below.

Table 2 – 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 with full-fill blown bead insulation	0.24
Roof	0.16	Loft Space – 500mm Mineral Wool	0.09
		Sloping Ceiling to have 100mm PUR between joists, and 55mm PUR Board underlaid	0.16
Floors	0.18	Beam & Block flooring	0.11
Doors	1.60	Double glazed Low-E, u-PVC frame	1.30
Glazing	1.60	Double glazed Low-E, u-PVC frame	1.30

- 4.3.3. Please note that this specification is not finalised and is subject to change up until detailed design stage.
- 4.3.4. As improvements are made to the thermal conductivity of main elements, thermal bridging and air permeability becomes 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.
- 4.3.5. As a result of following these junction details and focusing on build quality air permeability will also decrease. A target air pressure rating of 4.00m³/hr.m² has been set for all houses on site which is an improvement on the maximum allowable rating in the 2021 Building Regulations.

4.4. Building Services & Renewable Energy (LZCT)

- 4.4.1. 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.
- 4.4.2. 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.
- 4.4.3. After due consideration of the potential LZCT available (shown in Appendix F) the design team propose to adopt the following technologies which provide benefits / compliance with national and local policies as listed:
- ***Photovoltaic (PV) panels***
 - Low noise and visual pollution;
 - Efficient low-carbon source of renewable energy.
 - ***Decentralised Mechanical Extract Ventilation (dMEV)***
 - Quieter than standard extractor fans;
 - Technology that manages humidity that is significantly more energy efficient in comparison to standard extractor fans.
 - ***Waste Water Heat Recovery (WWHR)***
 - Passive technology, no maintenance required;
 - Recovers waste heat from shower, pre-heats incoming cold. This reduces the amount of hot water required from the hot water cylinder;
 - Typical systems recover ~60% waste heat.
- 4.4.4. It is currently proposed that PV panels will be used to improve dwelling performance to the level required to achieve a 10% uplift over Part L 2021. The number of PV panels required for each plot will be decided at the detail design stage.
- 4.4.5. For Part L 2021 it is currently proposed to provide heating and hot water via mains gas boilers.
- 4.4.6. For a mains gas fired system, the minimum boiler efficiency required is 92%. Compliant Ideal Logic boilers have been adopted which exceed this requirement.
- 4.4.7. 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. Hot water distribution pipework will be fully insulated.
- 4.4.8. 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.

4.4.9. 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

5. Results (Energy and Carbon)

5.1. Energy from Renewables

- 5.1.1. Each house type employs the use of renewables, including Photovoltaic (PV) panels, Waste Water Heat Recovery Systems (WWHRS) and decentralised Mechanical Extract Ventilation (dMEV).
- 5.1.2. At time of writing PV panels typically provide 400W. Therefore, the SAP assessments are modified by changing PV in 400W intervals, effectively panel by panel uplift. To represent an average orientation across the site, the panels are assessed in South Easterly / South Westerly orientation.
- 5.1.3. The number of panels per plot will be determined at detailed design stage in order to achieve compliance with Part L 2021 and with the local policy. However, this will represent a minimum 10% uplift over Part L 2021. PV panels are currently proposed on all houses on site, but not on flats as they are not needed for compliance.
- 5.1.4. Condition 49 of the local plan require a 10% reduction in carbon emissions from Part L 2021. A reduction in carbon emissions of approx. 12.7% is achieved across the site according to the modelled house types (see Table 3).

5.2. Part L1A 2021 Performance

5.2.1. Detailed information of the SAP calculations from the SAP 10 Software can be found in Appendix G.

5.2.2. The calculation below shows the reduction in carbon emissions achieved from the SAP calculations:

$$\frac{(21 \text{ plots} \times 17.95\%) + (10 \text{ plots} \times 8.75\%) + (4 \text{ plots} \times 3.38\%) + (5 \text{ plots} \times 6.31\%)}{40 \text{ total plots}} \\ = 12.74\% \text{ over Part L1A 2021}$$

5.2.3. The modelled house types achieve on average an uplift of approx. 12.7% over Part L 2021 regulations. The 10% uplift required by the local policy is therefore achieved.

5.2.4. The SAP 10 results show that all the modelled house types pass all metrics required for Part L 2021 regulations, and represent an average 12.7% uplift over Part L 2021.

6. Conclusion

- 6.1.1. This sustainability statement has been produced to accompany the planning application for the proposed residential site of 40 dwellings at Finchampstead Parcel 8.
- 6.1.2. The development strategy sets a high standard of overall sustainability with measures that include:
- Building elements with highest standard 'A+' Green Guide ratings including upper floors, external cavity walls, internal partitions, insulation and pitched roof;
 - Material suppliers with responsible sourcing certification guided by a high-quality sustainable procurement policy;
 - Effective waste management procedures to minimise waste;
 - The provision of EV charging points to all plots;
 - Efficient internal and external water use in line with building regulations including the provision of water butts;
 - The provision of composting facilities to all plots with rear gardens;
 - Enhanced building fabric specification with a Fabric-First approach including high efficiency insulation and provision of efficient appliances;
 - Use of PV to achieve the efficiency levels required under Part L 2021 and the Wakefield Council Local Plan, as well as WWHR where necessary.
- 6.1.3. The proposed LZC Technologies are:
- Photovoltaic (PV) panels
 - Waste Water Heat Recovery Systems (WWHRS)
 - Decentralised Mechanical Extract Ventilation (dMEV)
- 6.1.4. All plots are being built to Part L 2021. The modelled house types achieve an average uplift of approximately 12.7% over Part L 2021 regulations, thereby meeting the 10% required by the policy.
- 6.1.5. The proposed development complies with Part L1A 2021, and therefore meets Condition 49 as required by the local policy.
- 6.1.6. It should be noted that future policies and building regulations may require an update to the sustainability measures within this report.
- 6.1.7. The proposed site is found to present a positive sustainable development based on the assessed sustainability criteria and exceeds current standards with an exemplary strategy.

Appendix A – Proposed Site Layout



Appendix B – Responsible Sourcing Certificates



Certificate of Registration

RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS

This is to certify that:

Saint-Gobain Construction Products
UK Limited
T/A British Gypsum
Head Office
East Leake
Loughborough
LE12 6HX
United Kingdom

Holds Certificate Number:

BES 613170

and complies with the requirements of BES 6001: Issue 3.1 - Framework Standard for the Responsible Sourcing of Construction Products for the following scope. This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology and underpinning processes.

Product Group: Gyproc plasterboard, Glasroc specialist board, Thistle Plaster, Cove products, Gyproc accessories. Overall Assessment Score: Excellent Amended scope should rea and replace above Gyproc plasterboard, Glasroc specialist board, Thistle Plaster, Gyproc Cove, Gyproc ready-mix joint cement. Overall Assessment Score: Excellent

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2014-10-13

Effective Date: 2020-09-01

Latest Revision Date: 2020-08-11

Expiry Date: 2023-08-31



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BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.



Certificate of Registration

RESPONSIBLE SOURCING OF PRODUCTS

This is to certify that:



Tarmac
part of Tarmac Holdings Limited
Portland House
Bickenhill Lane
Solihull
B37 7BQ
United Kingdom

Holds Certificate Number:

BES 567267

and complies with the requirements of BES 6001: Issue 3.1 - Framework Standard for the Responsible Sourcing of Products for the following scope. This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology and underpinning processes.

Product Group: Building Products

Overall Assessment Score - Excellent

For and on behalf of BSI:


Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2010-09-20

Effective Date: 2021-03-01

Latest Revision Date: 2020-12-14

Expiry Date: 2024-02-29



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A Member of the BSI Group of Companies.



Certificate of Registration

RESPONSIBLE SOURCING OF PRODUCTS

This is to certify that:

H+H UK Limited
Ightham Sandpits
Borough Green Road
Ightham
Sevenoaks
TN15 9JB
United Kingdom

Holds Certificate Number:

BES 636778

and complies with the requirements of BES 6001: Issue 3.1 - Framework Standard for the Responsible Sourcing of Products for the following scope. This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology and underpinning processes.

Product Group: Solar Aircrete Blocks, Standard Aircrete Blocks, High Strength Aircrete Blocks, Super Strength Aircrete Blocks, Coursing Units.

Overall Assessment Score: Very Good.

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2015-07-23

Effective Date: 2021-07-23

Latest Revision Date: 2021-07-07

Expiry Date: 2024-07-22



Page: 1 of 3

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Printed copies can be validated at www.bsigroup.com/ClientDirectory

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP, Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.



Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Ibstock Brick Ltd
Leicester Road
Ibstock
LE67 6HS
United Kingdom

Holds Certificate Number:

FS 738379

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

**The design, development and manufacture of clay bricks, special shapes.
The supply of architectural and design consultancy for brick, brickwork, terracotta
and cast stone.**

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2018-10-23

Latest Revision Date: 2021-09-20

Effective Date: 2021-10-23

Expiry Date: 2024-10-22

Page: 1 of 5



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Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP, Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

Appendix C – Sustainable Procurement Policy

Sustainable Procurement Policy

Introduction

By its very nature our business has environmental and social impacts. Accordingly, we are committed to continuously safeguarding the environment and maintaining good labour relations by:

- Working with suppliers, contractors and supply chains to minimise the environmental and social impact of the materials, services and labour within our operations and supply chain that are integral to our business; and
- Developing commercial relationships with partners that embrace sustainable practices and spread best practice through the supply chain.

This Policy sets out a framework that we expect our supply chain partners to apply and relates to both the products/services they provide to us and the operating activities that they and their respective supply chains are engaged in.

The Policy

The key elements of our Policy relating to suppliers and subcontractors are:

- Suppliers must ensure compliance to all mandatory legislation that affects their activities and those of their own supply chain.

- Suppliers must conform to the specific requirements of our health, safety, environmental, quality and responsible sourcing requirements.
- Suppliers must maintain a Health and Safety Management System that is of a suitable standard for the operations they are engaged in. As a preference, organisations should gain certification to OHSAS:18001.

Suppliers and subcontractors must commit to follow our supplier code of conduct.
[www.barrattcommercialsupport.co.uk]

Suppliers must maintain an ethical sourcing policy that aims to ensure as a minimum that:

- All statutory legislation (in their country of operation) is adhered to;
- Working conditions are safe and healthy;
- No child, forced or slave labour takes place and the requirements of the International Labour Organisation's conventions are complied with;



Sustainable Procurement Policy

- All employees are paid a real Living Wage which is the hourly rate set by the Living Wage Foundation, is based on cost of living and is higher than the legal minimum (see <https://www.livingwage.org.uk/>);
 - No individual is expected to work excessive hours; and
 - There is no discrimination on the grounds of ethnicity, skin colour, gender, sexual orientation, age or other criteria.
- c) Have low embodied carbon (against BRE Green Guide);
 - d) Utilise less material by design;
 - e) Can be recycled;
 - f) Minimise packaging waste;
 - g) Minimise use of water;
 - h) Use local resources; and
 - i) Conform to Responsible Sourcing Standard: BES6001.

Our suppliers and subcontractors must be prepared to demonstrate how they monitor compliance with these requirements on request.

We will use sustainability criteria including environmental & social impact, quality and price in the assessment and selection of future supply sources.

We will include appropriate sustainability criteria in our tender and contract documentation. Where materials can be ethically sourced (and are economically viable and have equivalent quality and technical performance to alternative offerings), a preference will be given to materials that:

- a) Have a recycled content (with reference to WRAP – Recycled Content Product Guide);
- b) Minimise ecological damage;

This policy underpins our Group Sustainability, Climate Change and Environment Policies, and is supported by our Timber Sourcing Policy.

This policy is reviewed annually and is approved by the Group Board. It is communicated to key stakeholders and is available on our website.

David Thomas, Chief Executive
13th October 2020



Appendix D – Waste Management Targets

Barratt Developments, October 2019

barrattddevelopments.co.uk/sustainability

5

INNOVATIVE EFFICIENT CONSTRUCTION

Our ambition is to minimise our use of materials and energy, reduce waste generation and maximise low carbon opportunities in all aspects of our business through innovation and development.



MODERN METHODS OF CONSTRUCTION (MMC)

OUR TARGET

To apply MMC based products and systems in 20% of our homes by 2020 and 25% by 2025.

ACTIONS

- Increase roll out of low embodied carbon timber frame, offsite ground floor systems and large format blocks.
- Investigate a viable MMC system for apartments.

CONSTRUCTION WASTE

OUR TARGET

To reduce construction waste intensity by 20% from 2015 levels by 2025 (to 5.67t per 100m² legally completed build area).

To maintain diversion from landfill rate at 95% for construction waste.

ACTIONS

- Use the findings from our traditional/timber frame build comparison study to inform our waste reduction plans.
- Increase uptake of suitably sized plasterboards across divisions to avoid off-cuts.
- Work with suppliers and sub-contractors to find ways to reduce waste from chipboard packs and single-use plastics across our supply chain.
- Return 300,000 pallets for repairing, re-use and recycling.



Appendix E – Flood Risk Map (Zone



Flood map for planning

Your reference
Finchampstead

Location (easting/northing)
477519/164469

Created
25 Jan 2024 10:53

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

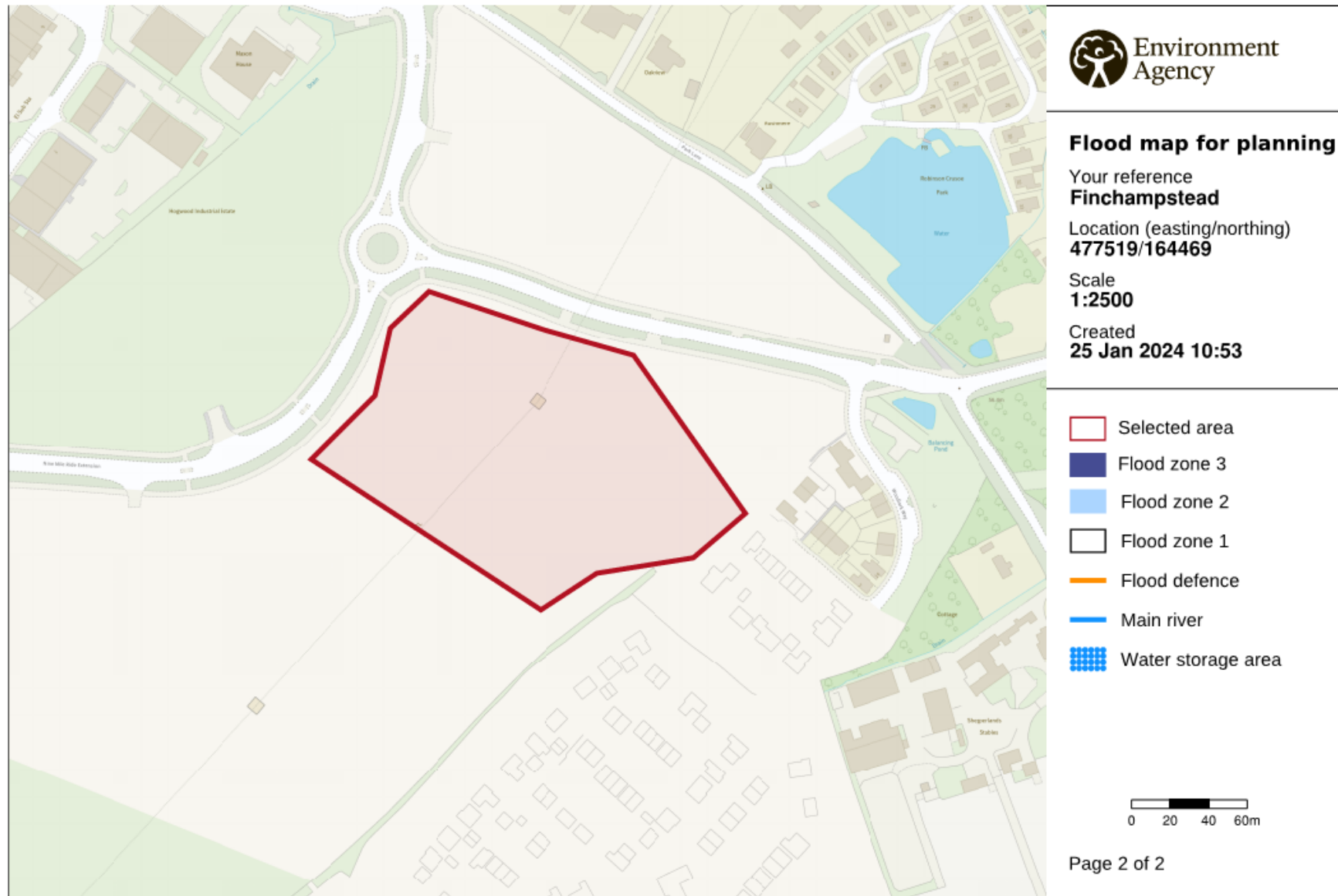
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



© Environment Agency copyright and / or database rights 2022. All rights reserved. © Crown Copyright and database right 2022. Ordnance Survey licence number 100024198.

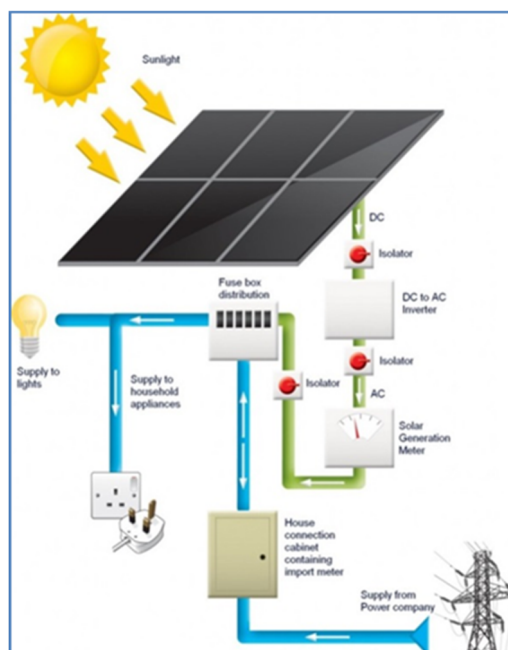
Appendix F – Low and Zero Carbon Technologies

Photovoltaic (PV) Cells

The efficiency of PV cells has improved rapidly over the last 15 years. This has made a previously uneconomical technology an increasingly viable solution to rising energy costs and demand. The cells can be produced in a variety of formats but are typically manufactured as a panel or a roof tile for domestic housing applications.

The PV system typically produces direct current (DC) which is then sent through an inverter to supply the house with electricity. If a greater amount of electricity is produced than used by the household, this extra can be exported to the national grid.

A PV cell is assessed on its peak power rating. This is tested by exposing the cell to the equivalent of full solar radiation and measuring the power output. The peak power is input into the Design SAP software as well as the physical attributes of the installation such as pitch, orientation and over-shading. A total energy saving per year can then be calculated through SAP for the PV installation. This is then offset against the electricity energy demand for the house.



Solar Hot Water (SHW)

SHW systems generate energy which is used to heat stored water (in a special solar hot water cylinder) which offsets the energy required for the boiler, thereby reducing fuel use and reducing carbon emissions. Therefore, SHW systems are ideally utilised when the design of a dwelling already calls for a hot water cylinder, and not when a combination boiler is specified.

There are two main SHW systems: evacuated tubes and flat plate collectors. Evacuated tubes are more efficient at transferring solar irradiation to the fluid although flat plate collectors are considered to be better aesthetically and to install.



The final energy contribution to the household, calculated through SAP, is based on several factors:

- *Pitch, orientation, and over-shading*
- *Heat absorption efficiency for the collector*
- *Average hot water usage of the dwelling*

Most of the energy savings will be made in the hot water demand for the dwelling however, adding a SHW system will impact upon other energy demands.

Air Source Heat Pumps (ASHP)

ASHP provide heating and hot water to a home through thermal energy gathered from air outside the dwelling. Systems can be designed to work in conjunction with a boiler system but in the case of energy efficient new builds it is possible for an ASHP unit to provide 100% of the heating and hot water demand.

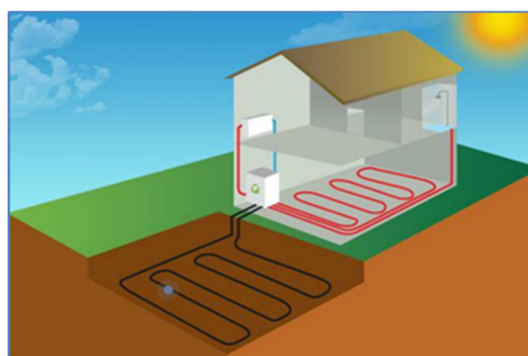
The thermal performance of the unit depends on the outside temperature as well as the unit's Coefficient of Performance. This is the ratio of thermal energy produced to energy used. A typical value for this would be around 3.5, meaning that for every 1kW of electricity consumed the unit would provide 3.5kW of thermal energy to the household. This efficiency leads to large carbon and energy savings for both space and water heating.



Ground Source Heat Pumps (GSHP)

GSHP provide heating and hot water to a dwelling through geothermal effects. A GSHP system would offset the energy demand from the main space heating. There is, however, an additional electricity demand for the pump and control system. This would reduce energy savings from the installation.

GSHP are expensive to install and rely on having appropriate ground conditions and suitable space around the dwelling for the pipe looping. Energy savings are dependent upon the type of system being replaced and the way the system is operated by the homeowner.



Biomass Heating Systems

Biomass heating systems burn fuels, considered carbon neutral, to heat the water required for a dwelling. There are a large variety of systems available, and choice depends on the type of fuel to be burned and the level of automation.

The system would offset the energy demand from the hot water and main space heating. However, biomass systems typically require a large amount of maintenance and monitoring.

The savings from such a system, in terms of CO₂ and money, depends upon what it is replacing. The savings are greatest when replacing an electrical hot water system but are considerably less for replacing mains gas.



Wind Turbines

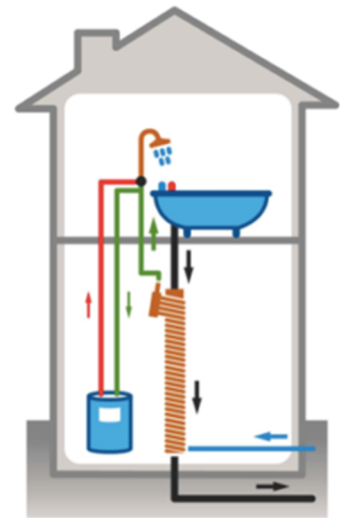
Wind turbines provide electricity directly to a dwelling. They can be added to a property in two ways: pole mounted or building mounted. The pole mounted systems are free standing and therefore require enough space around them to allow for the construction and maintenance of the structure, as well as to allow for efficient operation. The building mounted systems have a lower power output but do not require additional structures, as can be seen in figure

The energy produced from a wind turbine is heavily dependent upon the surrounding landscape. The energy saved will be offset against the electricity usage of the dwelling.



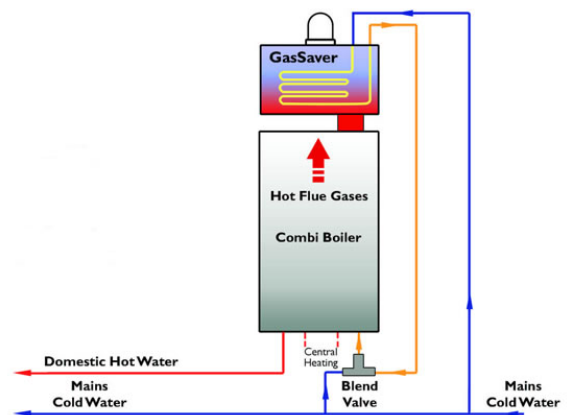
WWHRS

Waste water heat recovery system (WWHRS) recovers the energy that is lost from the waste water that is generated from showers. It uses a heat exchange system which recovers a portion of the energy that would normally be wasted. The waste heat is partially transferred to the incoming mains water inlet, which reduces the change in temperature required for the boiler to make. It therefore has the ability to reduce the amount energy required for the boiler to operate at specific points in the day.



FGHRS

Flue gas heat recovery system (FGHRS) works by recovering waste heat from the flue of a boiler. This waste heat is partially transferred to the main water inlet which raises the temperature of the water which is fed into the boiler. This reduces the amount of energy required to heat the boiler, as it reduces the temperature increase required for the boiler to operate, and therefore reduces the energy demand to heat the dwelling.



Appendix G – SAP Calculations

SAP Calculations can be found on the following pages.

Building Regulations England Part L (BREL) Compliance Report

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

Date: Tue 30 Jan 2024 16:18:08

Project Information			
Assessed By	Ruth Ferguson	Building Type	House, Detached
OCDEA Registration	EES/027190	Assessment Date	2024-01-30

Dwelling Details			
Assessment Type	As designed	Total Floor Area	137 m ²
Site Reference	3B4/5P Detached	Plot Reference	Issue A
Address	Finchampstead 9, Wokingham		

Client Details	
Name	Technical Department
Company	Barratt Southern Counties
Address	Barratt Southern Counties, Barratt Southern Counties, LU1 1PP

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	9.75 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	9.42 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	50.94 kWh _{PE} /m ²		
Dwelling primary energy	46.5 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	40.7 kWh/m ²		
Dwelling fabric energy efficiency	39.6 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	0.23	Walls (1) (0.23)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.11	NuSpan NU375 (0.11)	OK
Roofs	0.16	0.09	Roof (2) (0.17)	OK
Windows, doors, and roof windows	1.6	1.29	D2 (1.3)	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)	157.419818	0.23	
Ground floor: NuSpan NU375, NuSpan NU375	69.03	0.11	
Exposed roof: Roof (1)	68.08	0.09 (!)	
Exposed roof: Roof (2)	0.95	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, Entrance Door	1.839882	North East	N/A	1.1 (!)
D2, Window	3.15	North West	0.7	1.3
D21, Window	5.04	South West	0.7	1.3
W1, Window	1.5345	North East	0.7	1.3
W1a, Window	0.732	North	0.7	1.3
W1b, Window	0.732	East	0.7	1.3
W2, Window	1.5345	North East	0.7	1.3
W3, Window	0.6615	South East	0.7	1.3
W4, Window	1.5345	South East	0.7	1.3
W5, Window	1.5345	South West	0.7	1.3
W6, Window	0.6615	South West	0.7	1.3
W7, Window	1.38105	North East	0.7	1.3
W8, Window	1.38105	North East	0.7	1.3

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
W9, Window	1.38105	North East	0.7	1.3
W10, Window	0.6615	South East	0.7	1.3
W11, Window	0.366	South East	0.7	1.3
W12, Window	1.38105	South East	0.7	1.3
W13, Window	1.38105	North West	0.7	1.3
W14, Window	0.6615	South West	0.7	1.3
W15, Window	1.38105	South West	0.7	1.3

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	0.032 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.031 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.036 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.083	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.045	
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	0.078	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.057	
External wall	E14: Flat roof	SAP table default	0.16	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.052	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.094	

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: Boiler with radiators or underfloor heating - Mains gas

Efficiency	88.9%
Emitter type	Radiators
Flow temperature	
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	210 litres
Declared heat loss	1.42 kWh/day
Primary pipework insulated	Yes
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: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	82 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	0.14 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	2.8 kWp	
Orientation	South West	
Pitch	45°	
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 Array SAP 10 program, Array

Date: Tue 30 Jan 2024 16:18:09

Project Information			
Assessed By	Ruth Ferguson	Building Type	House, Detached
OCDEA Registration	EES/027190	Assessment Date	2024-01-30

Dwelling Details			
Assessment Type	As designed	Total Floor Area	127 m ²
Site Reference	4B6/7P Detached	Plot Reference	Issue A
Address			

Client Details	
Name	Technical Department
Company	Barratt Southern Counties
Address	Barratt Southern Counties, Barratt Southern Counties, LU1 1PP

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	11.41 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	10.69 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	59.82 kWh _{PE} /m ²		
Dwelling primary energy	57.24 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	41.5 kWh/m ²		
Dwelling fabric energy efficiency	41.2 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	0.22	Walls (2) (0.26)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.11	225mm TE Platinum Ground Floor (0.11)	OK
Roofs	0.16	0.12	Roof (3) (0.19)	OK
Windows, doors, and roof windows	1.6	1.33	W11 (1.7)	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)	131.605875	0.23
Exposed wall: Walls (2)	4.742	0.26
Exposed wall: Walls (3)	27.6165	0.23
Exposed wall: Walls (4)	22.36	0.11 (!)
Ground floor: 225mm TE Platinum Ground Floor, 225mm TE Platinum Ground Floor	47.44	0.11
Exposed roof: Roof (1)	16.49	0.09 (!)
Exposed roof: Roof (2)	14.66	0.11
Exposed roof: Roof (3)	1.79	0.19
Exposed roof: Roof (4)	16.429	0.15
Exposed roof: Roof (5)	0.56	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 Type 3	2.490075	North East	N/A	1.3
W1, BDW Std Window	1.5885	North East	0.7	1.3
W1a, BDW Std Window	0.714	North	0.7	1.3
W1b, BDW Std Window	0.714	East	0.7	1.3
W2, BDW Std Window	0.7035	North West	0.7	1.3

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
D2, BDW Std Window	3.234	South West	0.7	1.3
W3, BDW Std Window	1.146	South West	0.7	1.3
W4, BDW Std Window	1.43505	North East	0.7	1.3
W5, BDW Std Window	0.7035	North East	0.7	1.3
W6, BDW Std Window	0.7035	North West	0.7	1.3
W7, BDW Std Window	1.146	South West	0.7	1.3
W8, BDW Std Window	1.146	South West	0.7	1.3
W9, BDW Std Window	1.098	North East	0.7	1.3
W10, BDW Std Window	0.7035	North West	0.7	1.3
W11, Rooflight 40 Deg	0.539	North West	0.7	1.7
W12, Rooflight 40 Deg	1.092	North West	0.7	1.7

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	0.032 (!)	EW21/LN03 W1,9,10 R
External wall	E3: Sill	Calculated by person with suitable expertise	0.031 (!)	EW21/SL01 W9,10 D2 R
External wall	E4: Jamb	Calculated by person with suitable expertise	0.036 (!)	EW21/RV01 W1,9,10 D1,2
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.059	EW21/GF22
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.005 (!)	TE311-E6-02 300mm FJ
External wall	E24: Eaves (insulation at ceiling level - inverted)	Calculated by person with suitable expertise	0.054	TE311-E24-02 300mm FJ, W1
External wall	E11: Eaves (insulation at rafter level)	Calculated by person with suitable expertise	0.0113 (!)	FC 30.03.23 Rev B Summary
External wall	E13: Gable (insulation at rafter level)	Calculated by person with suitable expertise	0.08	E13.4
External wall	E14: Flat roof	Calculated by person with suitable expertise	0.039 (!)	TE311-E14-01 GF Hex Bay W1
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.052	EW21/CN01 Ext x4
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.094	EW21/CI01 GF Bay x2
Roof	R1: Head of roof window	Calculated by person with suitable expertise	0.11	R1/2-240mm W11,12
Roof	R2: Sill of roof window	Calculated by person with suitable expertise	0.11	R1/2-240mm W11,12
Roof	R3: Jamb of roof window	Calculated by person with suitable expertise	0.06	R3.2-240mm W11,12
Roof	R7: Flat ceiling (inverted)	Calculated by person with suitable expertise	-0.029 (!)	STG_R7a
Roof	R9: Roof to wall (flat ceiling)	Calculated by person with suitable expertise	0.054	TE315-R9-01 Dormer
Roof	R1: Head of roof window	Calculated by person with suitable expertise	0.074	TE315-R1-01 W9
Roof	R2: Sill of roof window	SAP table default	0.24	(D) W9
Roof	R3: Jamb of roof window	Calculated by person with suitable expertise	0.06	TE315-R3-01 W9
External wall	E4: Jamb	Calculated by person with suitable expertise	0.083	EW21/RV04 W1
External wall	E4: Jamb	Calculated by person with suitable expertise	0.047	EW21/RV02 D1, D2
Roof	R7: Flat ceiling (inverted)	Calculated by person with suitable expertise	-0.014 (!)	STG_R7b
Roof	R7: Flat ceiling (inverted)	Calculated by person with suitable expertise	0.048	STG_R7c

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
Roof	R6: Flat ceiling	Calculated by person with suitable expertise	0.0153 (!)	FC 30.03.23 Rev B Sum, 400mm
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.0679	FC 30.03.23 Rev B Sum, 400mm
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.052	EW21/CN01 Bay Corners
External wall	E2: Other lintels (including other steel lintels)	SAP table default	1	(D) W10, I-Roof Spandrel
External wall	E3: Sill	SAP table default	0.1	(D) W10 I-Roof Spandrel
External wall	E4: Jamb	SAP table default	0.1	(D) W10 I-Roof Spandrel
Roof	R10: All other roof or room-in-roof junctions	Calculated by person with suitable expertise	0.0264 (!)	FC 30.03.23 Rev B Summary

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: Boiler with radiators or underfloor heating - Mains gas

Efficiency	89.0%
Emitter type	Radiators
Flow temperature	
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: Cylinder thermostat and HW separately timed

Manufacturer	
Model	

7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	101.25 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		
Technology type: Photovoltaic system (1)		
Peak power	1.2 kWp	
Orientation	South West	
Pitch	45°	
Overshading	None or very little	
Manufacturer	3 x 0.40kWp	
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: Tue 30 Jan 2024 16:18:08

Project Information			
Assessed By	Ruth Ferguson	Building Type	Flat, Semi-detached
OCDEA Registration	EES/027190	Assessment Date	2024-01-30

Dwelling Details			
Assessment Type	As designed	Total Floor Area	50 m ²
Site Reference	Apartment GF	Plot Reference	Issue A
Address	Finchampstead 9, Wokingham		

Client Details	
Name	Technical Department
Company	Barratt Southern Counties
Address	Barratt Southern Counties, Barratt Southern Counties, LU1 1PP

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	15.1 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	12.39 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	80.16 kWh _{PE} /m ²		
Dwelling primary energy	70.42 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	34.7 kWh/m ²		
Dwelling fabric energy efficiency	30.2 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	0.24	Walls (1) (0.25)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.11	NuSpan NG375 (0.11)	OK
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.2	W1 (1.3)	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)	28.56825	0.25	
Exposed wall: Walls (2)	12.229366	0.22	
Party wall: Party Wall (1)	17.95	0 (!)	
Ground floor: NuSpan NG375, NuSpan NG375	50.1	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, Entrance Door	1.810634	North West	N/A	0.89 (!)
W1, Window	1.098	North East	0.7	1.3
W2, Window	1.098	South East	0.7	1.3
W3, Window	0.96075	South East	0.7	1.3
D6, Window	2.835	North East	0.7	1.3

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	0.029 (!)	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E3: Sill	Calculated by person with suitable expertise	0.032 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.037 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.045	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.035 (!)	
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.034 (!)	
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.027 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.058	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.045	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.099	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.04	
External wall	E25: Staggered party wall between dwellings	Calculated by person with suitable expertise	0.041	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.041	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	

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: 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	51.8%
Manufacturer	Dutch Solar Systems BV
Model	Easyfit+

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	101.25 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	0.19 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		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Tue 30 Jan 2024 16:18:08

Project Information			
Assessed By	Ruth Ferguson	Building Type	House, End-terrace
OCDEA Registration	EES/027190	Assessment Date	2024-01-30

Dwelling Details			
Assessment Type	As designed	Total Floor Area	85 m ²
Site Reference	Semi detached	Plot Reference	Issue A
Address	SH52 XEH7		

Client Details	
Name	Technical Department
Company	Barratt Southern Counties
Address	Barratt Southern Counties, Barratt Southern Counties, LU1 1PP

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	11.31 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	10.32 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	59.11 kWh _{PE} /m ²		
Dwelling primary energy	55.55 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	35.3 kWh/m ²		
Dwelling fabric energy efficiency	34.4 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	0.23	Walls (1) (0.23)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.1	225mm TE Platinum B&B (0.1)	OK
Roofs	0.16	0.09	Roof (1) (0.09)	OK
Windows, doors, and roof windows	1.6	1.29	D2 (1.4)	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)	74.4516	0.23
Party wall: Party Wall (1)	44.95	0 (!)
Ground floor: 225mm TE Platinum B&B, 225mm TE Platinum B&B	42.43	0.1 (!)
Exposed roof: Roof (1)	42.43	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]
W1, Opening Type 1	2.745	North East	0.7	1.3
D1, Opening Type 2	2.142	North East	N/A	1.1 (!)
W2 Optional, Opening Type 1	0.6615	South East	0.7	1.3
W3, Opening Type 1	2.196	South West	0.7	1.3
D2, Opening Type 5	2.142	South West	N/A	1.4
W4, Opening Type 1	1.1776	North East	0.7	1.3
W5, Opening Type 1	1.1776	North East	0.7	1.3
W6, Opening Type 1	1.1776	South West	0.7	1.3
W7, Opening Type 1	1.1776	South West	0.7	1.3
W8 Optional, Opening Type 1	0.6615	South East	0.7	1.3

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	0.026 (!)	Catnic value
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.04	Lintels at eaves. Catnic value
External wall	E3: Sill	Calculated by person with suitable expertise	0.031 (!)	H+H - EW21 / SL01
External wall	E4: Jamb	Calculated by person with suitable expertise	0.036 (!)	H+H - EW21 / RV01
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.059	H+H - EW21 / GF22
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.006 (!)	H+H - EW21 / IF01
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.124	30° H+H - EW21 / RE21
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.078	45° H+H - EW21 / RE24
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.052	H+H - EW21 / CN01
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.053	H+H - EW21 / PW01
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.089	H+H - PW01 / GF22 rev A
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 (!)	Default value
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.077	H+H - PW01 / RG22
External wall	E4: Jamb	Calculated by person with suitable expertise	0.047	H+H - EW21 / RV01
3 Air permeability (better than typically expected values are flagged with a subsequent (!))				
Maximum permitted air permeability at 50Pa		8 m³/hm²		
Dwelling air permeability at 50Pa		4 m³/hm², 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	101 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	0.11 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	0.8 kWp	
Orientation	South West	
Pitch	45°	
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		